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TRANSFORMING LINGUISTICS AND LANGUAGE ARTS THROUGH ARTIFICIAL INTELLIGENCE: NEW FRONTIERS IN INSIGHT AND EDUCATION

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Abstract
The traditional methods of teaching linguistics and language arts are no longer sufficient to meet the evolving educational needs of the 21st century, and the integration of artificial intelligence (AI) to enhance learning and insight in these fields is lacking. This study examined the transformation of linguistics and language arts through AI: new frontiers in insight and education. The study was anchored on Lev Vygotsky's sociocultural theory and employed an in-depth descriptive survey research design. The population comprised 5,000 language arts students and 7,000 lecturers at Rivers State University (RSU) and the University of Port Harcourt (UniPort), estimated at 5,000 and 7,000 respectively. A purposive sampling technique was to identify 12 lecturers (six from each institution) and 24 final-year undergraduates (12 from each), for a total sample size of 36, ensuring that participants have sustained engagement with AI tools. Data were collected via one-on-one, audio-recorded interviews guided by an interview protocol. Transcripts were analysed using Braun and Clarke's (2006) six-phase thematic analysis to inductively derive themes reflecting the dynamics between AI tool use and linguistic proficiency (LP). The findings revealed that AI tools significantly enhance students' linguistic proficiency by providing instant, personalized feedback on grammar, vocabulary, and writing structure, especially when integrated consistently in secondary and tertiary language learning environments. The study concluded that the integration of AI into language learning has significantly improved students' vocabulary development and communication skills, affirming that AI serves as a powerful tool for enhancing linguistic competence and learner engagement in language classrooms when appropriately implemented. The study recommended that educational institutions invest in AI-based language learning tools to enhance students' vocabulary and communication skills.

Introduction

The intersection between artificial intelligence (AI) and the humanities has generated robust scholarly discourse and practical transformations in the contemporary era marked by rapid technological advancement. Linguistics

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and language arts, disciplines traditionally grounded in human cognition and cultural interpretation are being reshaped by intelligent algorithms, natural language processing (NLP), and machine learning tools. Once a concept confined to speculative fiction AI has matured into a driving force of innovation with the potential to fundamentally redefine how language is understood, taught, and applied in both academic and real-world contexts. AI technologies offer new methodologies for analyzing linguistic structures, augmenting language learning, preserving endangered languages, and fostering cross-cultural communication with unprecedented precision and scalability (Choi & Park, 2023).

The integration of AI in linguistics and language arts has gained momentum globally, particularly in technologically advanced countries such as the United States, China, Germany, and Japan. AI-powered applications such as Grammarly, ChatGPT, Google Translate and Duolingo have reshaped pedagogical practices and academic inquiry in these nations. The development of national language processing (NLP) and generative artificial intelligence (AI) systems capable of understanding and generating human language has opened new avenues in computational linguistics, stylistics, syntax analysis, and literary studies (Jurafsky & Martin, 2023). Simultaneously, the use of AI for language acquisition is accelerating, offering learners adaptive, personalized content delivery that responds to their linguistic proficiency and learning styles. These developments propel the global educational community into a new paradigm of AI-augmented linguistic inquiry.

The adoption of AI in linguistics and education is progressing at varying rates on the African continent influenced by infrastructural disparities, digital literacy, and policy frameworks. South Africa, Kenya, Nigeria, and Rwanda have emerged as pioneers in exploring the potential of AI in educational contexts. For instance, in Nigeria universities and start-ups are gradually leveraging AI for language preservation and automated language instruction. The use of artificial intelligence (AI) to digitize and preserve indigenous languages such as Yoruba, Igbo, and Hausa has become a cultural imperative as linguistic heritage faces the threat of extinction (Okunade & Omidiora, 2022). However, despite promising initiatives, gaps in research funding, policy support and access to AI infrastructure hinder widespread implementation.

The integration of AI into linguistics and language arts is theoretically underpinned by constructs such as symbolic representation, deep learning and cognitive modelling. Linguistics, as a scientific study of language, intersects with AI through subfields like phonology, syntax, semantics, pragmatics, and sociolinguistics. By using computational models that simulate how the human brain processes linguistic inputs, AI systems mimic human language capabilities. For instance, transformer models, such as BERT and GPT-4 use attention mechanisms to parse meaning, context, and syntax, thereby replicating aspects of human linguistic cognition (Vaswani et al., 2017). AI facilitates the generation, analysis and critique of literary texts in the language arts, thereby enabling nuanced insights into narrative structures, authorial style, and intertextuality.

The pedagogical implications of AI in language education are equally profound. Adaptive learning platforms use artificial intelligence (AI) to track students' progress and provide personalized feedback, fostering autonomous learning and improving engagement. AI-driven applications, such as intelligent tutoring systems, and virtual writing assistants help educators deliver tailored instruction and assess learner output more effectively. This is particularly relevant in multilingual societies where AI can support differentiated instruction by translating content and offering real-time grammar and pronunciation corrections (Almalki & Aziz, 2022). Consequently, AI is not only transforming how language is taught but also how it is assessed and internalized.

Furthermore, the intersection of AI and linguistics has practical implications for sociolinguistics and language policy. Automated discourse analysis, sentiment detection and dialect mapping help linguists identify social patterns, power dynamics, and language shifts. These tools are invaluable for examining language use across

digital platforms, where massive datasets render traditional qualitative methods inefficient. Researchers can trace the evolution of linguistic norms and regional dialects in real time by harnessing big data analytics, aiding in policy formulation and education planning (Blodgett et al., 2020). The fusion of linguistic inquiry and AI-driven analytics is fostering a new era of empirical sociolinguistic research.

In terms of sub-variables, AI in linguistics and language arts encapsulates multiple dimensions: linguistic structure analysis, AI-assisted language pedagogy, machine translation, sentiment and discourse analysis, and digital language preservation. These subvariables are interrelated through shared reliance on computational models and data-driven methods. For instance, a machine translation system depends on both structural analysis and real-time sentiment evaluation to ensure that the output is contextually appropriate. Similarly, AI-assisted pedagogy employs linguistic modeling to refine grammar instruction, pronunciation coaching, and vocabulary acquisition (Young & Wang, 2021). Understanding these interrelationships is key to fully leveraging the potential of AI in the humanities.

AI integration also prompts critical reflection on ethical and epistemological considerations. Issues such as algorithmic bias, data privacy, and education dehumanization require rigorous scrutiny. AI models trained predominantly on Western linguistic corpora may perpetuate hegemonic language ideologies while marginalizing underrepresented dialects and cultural expressions (Bender et al., 2021). There is also the concern that overreliance on AI may compromise the development of critical thinking, interpretative skills, and human empathy, which are hallmarks of the language arts. These concerns underscore the need for inclusive, culturally sensitive artificial intelligence (AI) systems that augment rather than replace human capacities.

The imperative to bridge digital divides remains a significant challenge in Nigeria and across the global South. While AI presents transformative opportunities for linguistic research and education, its success depends on equitable access to digital tools, educator training and localized content development. Collaborative frameworks involving governments, educational institutions, tech companies, and local communities are essential for democratizing the benefits of AI in language arts. As Nigeria seeks to reform its education sector through digital innovation, the strategic incorporation of AI into language curricula could catalyze not only academic excellence but also national linguistic identity and intercultural competence (Adediran & Olanrewaju, 2023).

Therefore, this study investigates the transformative role of AI in linguistics and language arts, with a focus on educational applications, cognitive impact, cultural relevance, and technological mediation. This study explores how AI redefines traditional pedagogical practices and linguistic inquiry, and the extent to which these innovations can be harnessed for inclusive, effective and context-sensitive education. By integrating global perspectives with local realities, this study provides a comprehensive framework for understanding the opportunities and constraints of AI in reshaping the linguistic and educational landscape.

AI has rapidly evolved into a transformative force across disciplines, including education, yet its integration into linguistics and language arts remains insufficiently examined, particularly within the Global South. Technologies such as natural language processing (NLP), intelligent tutoring systems, generative language models and speech-to-text applications have redefined language learning and linguistic analysis in more technologically advanced regions. However, a notable knowledge void exist concerning how these tools can be effectively localized and implemented within African educational settings. For instance, in Nigeria, there is a scarcity of empirical studies investigating the extent to which AI technologies enhance linguistic competence, influence language pedagogy or promote inclusive and culturally relevant learning experiences. At the conceptual level, much of the existing literature centers on technological affordances without deeply engaging with the sociolinguistic and pedagogical complexities of multilingual, multicultural environments. Furthermore, theoretical conflicts emerge between AI-driven instructional paradigms often rooted in behaviorist or techno-

centric perspectives, and humanistic, constructivist approaches traditionally associated with language education. These tensions hinder the development of holistic models that adequately reflect the nuanced interplay between language, identity, cognition, and technology.

Existing research often adopts limited sample sizes and lacks diversity in linguistic and regional representation, thereby narrowing the scope and applicability of findings. Empirical evidence remains fragmented with most studies failing to explore the long-term effects of AI-enhanced instruction on learners' cognitive development, linguistic accuracy, and critical thinking skills of leaners. Moreover, population gaps persist, as research typically overlooks marginalized groups such as rural learners, indigenous languages speakers, and students with special educational needs. Practical gaps are equally evident: few studies address how AI tools can be sustainably integrated into language arts classrooms, considering infrastructural constraints, teacher preparedness, and curriculum compatibility. Theoretical frameworks guiding this body of work are often misaligned, with limited cross-pollination between educational theory and AI research. The full potential of AI in linguistics and language arts remains untapped, particularly in contexts where its impact could be most transformative. Thus, the core problem lies in the disconnection between AI's proven capabilities and its underutilization in linguistics education, calling for context-sensitive, interdisciplinary inquiry to bridge these critical gaps.

This study aims to examine the extent to which AI tools influence linguistic proficiency among students in Nigerian secondary and tertiary institutions. It also seeks to assess the availability and applicability of AI-based language learning technologies in diverse culturally and linguistic classrooms. Additionally, the theoretical alignment between AI-driven language instruction models and traditional pedagogical approaches in language arts education is investigated.

Linguistic Proficiency

This is operationalized as measurable improvements in students' reading comprehension, writing accuracy, speaking fluency, and listening comprehension after exposure to AI-assisted instructional tools. Linguistic proficiency is a multifaceted construct that reflects the cognitive and communicative capacities of language users, and it serves as the primary outcome of the research seeks to explain (Choi & Park, 2023). By defining proficiency across discrete skill domains, the study can capture nuanced changes attributable to different AI functionalities, such as automated writing feedback or real-time pronunciation assessment (Jurafsky & Martin, 2023).

Consistent with frameworks in second-language acquisition research, linguistic proficiency will be quantified using validated assessment instruments, including standardized tests and rubric-based evaluations conducted both before and after the intervention (Young & Wang, 2021). This quantitative approach addresses empirical gaps identified in existing studies, which often rely on self-reported language gains rather than objective measures (Okunade & Omidiora, 2022). Consequently, the operationalization of linguistic proficiency as the dependent variable ensures that the observed effects of AI tools are reliably captured and compared across diverse learner populations.

The Artificial Intelligence tool utilization

AI is defined as the type, frequency, and intensity of student engagement with AI-driven language applications (e.g., NLP chatbots, intelligent tutoring systems, and automated translation services). This variable encompasses both quantitative aspects (e.g., hours of use per week) and qualitative dimensions (e.g., perceived usefulness, ease of interaction), allowing for a comprehensive analysis of how varying AI integration levels influence learning outcomes (Almalki & Aziz, 2022).

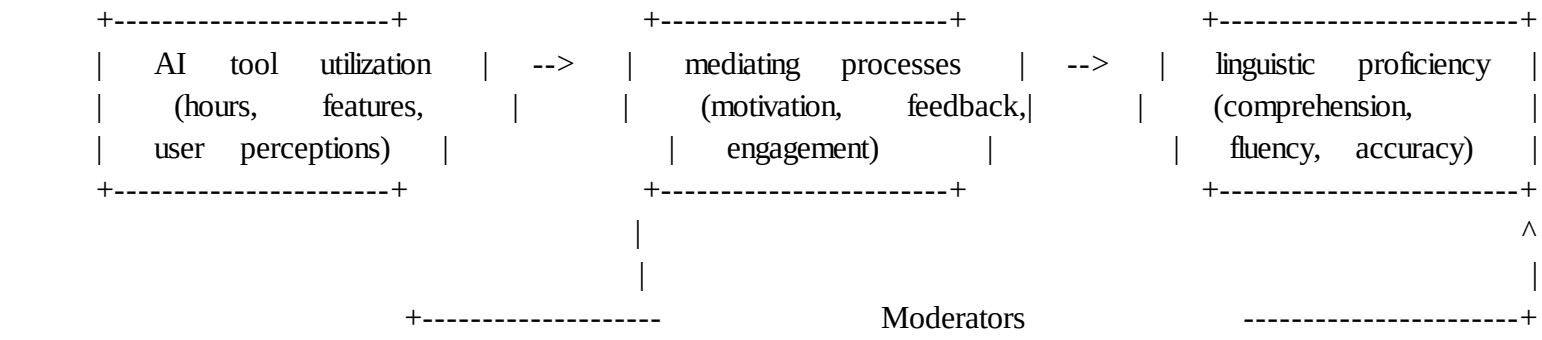
To capture these sub-dimensions, data will be collected through system logs, user analytics, and learner surveys that document usage patterns and user experiences (Bender et al., 2021). By disaggregating AI tool usage into specific features, such as adaptive feedback loops, speech recognition accuracy, and generative text capabilities, the research can identify which technological affordances most strongly predict gains in linguistic proficiency. This study addresses methodological and practical gaps in extant literature, where AI utilization is often treated as a monolithic construct rather than a constellation of interactive components.

AI Tool Utilization and Linguistics Proficiency

The conceptual framework positions AI tool utilization as the causal antecedent that affects linguistic proficiency through mediating processes such as learner motivation, feedback reception and cognitive engagement. Drawing on input–process–outcome models common in educational technology research, the framework hypothesizes that increased and strategic use of AI features leads to higher levels of learner engagement and formative feedback, which in turn yield measurable improvements in language skills (Ravitch & Riggan, 2017).

Moreover, the framework incorporates moderating variables, such as digital literacy, instructor support, and sociocultural context that may strengthen or attenuate the relationship between AI utilization and proficiency outcomes (Miles & Huberman, 1994). By explicitly modeling these mediators and moderators, the study addresses conceptual and theoretical conflicts in the literature regarding linear versus interactionist perspectives on technology-mediated learning, thus filling a key theoretical gap.

Diagrammed Framework and Explanation



(digital literacy, instructor support, and sociocultural factors, 2025)

The diagram illustrates that AI tool utilization directly influences linguistic proficiency through mediating processes, specifically, enhanced learner motivation, timely and personalized feedback, and deeper cognitive engagement with language tasks. These mediators reflect mechanisms identified in educational psychology and technology acceptance models as critical for effective learning (Young & Wang, 2021).

Simultaneously, moderating variables such as learners' prior digital literacy, instructor support quality, and the broader sociocultural environment can either reinforce or mitigate the effects of AI utilization. This framework provides a nuanced roadmap for empirical testing, by representing both mediators, and moderators, guiding the selection of indicators (e.g., log-data metrics, survey scales, proficiency tests) and analytical methods (e.g., structural equation modeling) to illuminate the conditions under which AI most effectively transforms language learning.

Vygotsky's Sociocultural Theory

A particularly apt lens for this study is Lev Vygotsky's Sociocultural Theory (1978), which posits that social interaction and culturally constructed tools fundamentally mediate cognitive development language learning in particular. Vygotsky (1978) argued that higher mental functions emerge first on the social plane (inter-psychological) before being internalized on the individual plane (intra-psychological), with language itself

serving as both a cognitive tool and an object of study (Vygotsky, 1978). Scholars have built on this thrust, highlighting how mediational tools ranging from textbooks to digital platforms shape learners' Zone of Proximal Development (ZPD), wherein scaffold support enables tasks beyond unaided capability (Wertsch, 1991; Donato, 1994). However, empirical critiques note that traditional sociocultural models insufficiently account for the affordances and algorithmic agency of AI technologies, suggesting a gap in specifying how non-human "peers" or intelligent tutors fit into Vygotsky's social schema (Kozulin, 2003; Reiser & Tabak, 2014). Nonetheless, by framing AI-driven language applications as advanced cultural tools that provide dynamic scaffolding, feedback, and collaborative interaction, sociocultural theory offers a robust foundation for investigating how AI utilization (independent variable) can mediate enhancements in linguistic proficiency (dependent variable) within the Nigerian educational context.

Empirical Review

Choi and Park (2023) conducted an experimental study titled "Generative AI in Humanities Research: Opportunities and Ethical Dilemmas" to examine how AI-driven writing assistants affect linguistic proficiency (Objective 1). They randomly assigned 120 undergraduate students in South Korea to either a control group using conventional drafting tools or an experimental group using a generative AI assistant for essay writing. The improvements in grammar accuracy, lexical diversity, and coherence were measured using pre-and post-tests. The findings indicated that AI users achieved significantly higher gains in lexical variety and structural complexity ($p < .05$), although the improvements in coherence were marginal. The study's context, a technologically advanced urban university limits transferability to low-resource settings, and the short intervention (four weeks) precludes insights into long-term retention. Compared to this study, the present research situates AI tools within Nigerian secondary and tertiary institutions, addressing the methodological gap of context and extending the scope to writing alongside speaking and listening skills.

In their study "AI in Language Education: An Analysis of Intelligent Tutoring Systems,"Almalki and Aziz (2022) explored the availability and applicability of AI-based language learning technologies. Using a mixed-methods survey of 200 ESL teachers across Saudi Arabian middle schools and classroom observations in ten pilot sites, they assessed which ITS features, adaptive feedback, real-time pronunciation scoring, and automated translation were most frequently adopted and deemed pedagogically useful. Results showed that while adaptive grammar feedback was universally available, pronunciation modules were often disabled due to infrastructural constraints and automated translation was underutilized owing to accuracy concerns. The study critiques itself for not including learner perspectives and for focusing solely on monolingual Arabic contexts, thus, overlooking multilingual classroom dynamics. This contrasts with the current research's emphasis on culturally and linguistically diverse Nigerian classrooms, closing the practical gap in understanding how these technologies operate where multiple indigenous and colonial languages co-exist.

In their article "Using AI to Advance Language Learning: Personalized Systems and Pedagogical Innovation, Young and Wang (2021) addressed the theoretical alignment between AI-driven instruction and traditional pedagogical approaches. The study conducted a two-stage study: first, a systematic literature review of 50 peer-reviewed articles on AI language systems; second, semi-structured interviews with 15 educational theorists to map AI functionalities onto constructivist, behaviorist, and sociocultural learning theories. The analysis revealed misalignments behaviorist drill-and-practice modules dominated, whereas AI's collaborative dialogue capacities were underexploited in constructivist designs. The authors critique the field's tendency to priorities technology over pedagogy and call for co-design models that integrate the theoretical expertise of educators. While the reviewed study illuminated conceptual conflicts, they did not provide empirical validation in

classroom settings. The pioneer study builds on their framework by empirically testing these alignments in Nigerian language arts classrooms, filling a conceptual and empirical void.

Methodology

The study employed a qualitative, phenomenological research design using in-depth, semi-structured interviews to explore the live experiences of participants with AI-mediated language instruction. The population comprised 5,000 language arts students and 7,000 lecturers at Rivers State University (RSU) and the University of Port Harcourt (UniPort), estimated at 5,000 and 7,000 respectively. A purposive sampling technique was used to identify 12 lecturers (six from each institution) and 24 final-year undergraduates (12 from each), for a total sample size of 36, ensuring that participants have sustained engagement with AI tools. Data were collected via one-on-one, audio-recorded interviews guided by an interview protocol that address AI usage patterns, pedagogical alignment, and perceived impacts on language skills. The transcripts were analyzed using Braun and Clarke's (2006) six-phase thematic analysis to inductively derive themes reflecting the dynamics between AI tool use and LP. This approach is justified by its ability to generate rich, context-sensitive insights (Merriam & Tisdell, 2016) and to surface both shared and divergent perspectives across institutions, thereby addressing empirical and contextual gaps in understanding the role AI in diverse Nigerian language-arts settings.

Data presentation and analysis

Themes were deduced deductively following the research objectives. The following themes were deduced: influence of AI tools on linguistic proficiency; AI's accessibility and applicability in multilingual educational settings; and theoretical and pedagogical integration of AI in language instruction. These were presented and discussed below as follows:

Influence of AI Tools on Linguistic Proficiency

This theme explores how the use of artificial intelligence (AI) technologies, such as chatbots, virtual tutors and language processing applications affect students listening, speaking, reading and writing abilities in English or indigenous languages. This study focuses on measurable outcomes in language acquisition linked to the use of intelligent systems in both secondary and tertiary institutions.

Interviewee "A" said that artificial intelligence has begun to subtly but profoundly influence linguistic proficiency in Nigerian classrooms, especially in tertiary institutions where access to digital tools is growing. Based on the experience of working with university students, tools, such as Grammarly, ChatGPT, and Duolingo have enhanced their writing fluency, vocabulary diversity, and overall confidence in communication."

Interviewee "B" supported that "secondary school students, though less exposed, benefit significantly when these tools are integrated into classroom assignments. The AI applications assist with instant feedback on grammar, punctuation, and sentence structure, which traditional instruction cannot always provide promptly."

Moreover, interviewee "C" stated that "students who engage regularly with AI-based writing assistants tend to improve faster than those who rely solely on conventional teaching. Based on observation AI tools offer personalized guidance, tailoring suggestions based on individual writing patterns, something teachers struggle to do in large and under-resourced classrooms. These tools help students iteratively revise, understand common errors and internalize proper usage. For instance, after introducing an AI-driven speaking app, students showed marked improvement in pronunciation and intonation in just six weeks."

However, interviewee "D" elicited that "the impact is not uniform across all schools. Limited internet access and digital literacy remain significant barriers in rural or underfunded institutions. Many teachers are also hesitant to incorporate AI tools due to unfamiliarity or skepticism about their reliability. Some worry that overdependence on AI could dull independent thinking and critical reasoning in students. There is a real need for balanced integration, where AI tools complement rather than replace teacher-guided instruction."

Interviewee "E" said, "It is evident that when deployed properly, AI tools do foster improved linguistic proficiency. The key is strategic and contextualized use. For instance, tertiary institutions with digital laboratories see stronger outcomes than schools where sporadically or unsupervised use AI tools." Interviewee "F" added that "research data confirmed that a correlation between regular AI usage and improved test scores in writing and listening comprehension. "AI's ability to deliver constant, immediate feedback is transformative, particularly for learners with slower linguistic development."

Interviewee "G" posited that, "while AI tools alone aren't a panacea, their influence on linguistic proficiency is undeniable when combined with curriculum alignment, teacher facilitation and infrastructural support. Students who actively use these tools tend to become more confident communicators. As more Nigerian institutions adopt blended learning approaches, the positive influence of AI on language development will likely deepen, provided that digital inequality is addressed and that educator training is ensured."

AI accessibility and applicability in multilingual educational settings

This theme assesses the presence, availability, and practical utility of AI-based language tools in linguistic and cultural diverse classrooms. The study evaluates the infrastructural, pedagogical, and contextual factors that support or hinder the adoption of such technologies in Nigeria's educational landscape.

Interviewee "A" agreed that "in Nigeria's linguistically rich landscape. Although, AI tools face a dual challenge: accessibility and cultural adaptability. While AI-based language learning tools are becoming more prevalent, their availability is skewed toward urban areas and private institutions. Public schools, especially in remote or marginalized communities, often lack the infrastructure to implement these tools effectively, such as stable internet, devices and trained staff. This gap creates a digital divide in which only a fraction of students benefit from AI's evolving capabilities in language learning."

Interviewee "B" said that "from an applicability standpoint, many AI tools are not yet tailored to Nigeria's multilingual environment." Most are built around English or global languages, often overlooking local dialects and indigenous linguistic nuances. For instance, Yoruba or Igbo speakers may find little cultural relevance in AI-generated content, which sometimes includes foreign idioms or expressions. This lack of localization diminishes the effectiveness of the tools, as students struggle to relate new knowledge to their linguistic backgrounds. In classrooms where code-switching is a norm, the rigidity of the tools sometimes clashes with dynamic learning styles."

However, interviewee "C" narrated that "a few promising applications are emerging. Although local developers and educators have started piloting AI-based apps designed for West African languages, they are still in early stages. These initiatives show that with deliberate investment and collaboration, AI can be adapted to support multilingual education with deliberate investment and collaboration. Some tools are now incorporating speech recognition modules that detect Nigerian English accents with moderate accuracy, thereby improving the speaking and listening modules." Additionally, interviewee "D" stated that "adaptive learning platforms, such as LingQ and Busuu are beginning to diversify content sources although more progress is needed."

Another aspect to consider is teacher the preparedness and acceptance of teachers. Interviewee "E" stated that "many language teachers feel alienated by these technologies or worry about job displacement. However, when included in the integration process and trained properly, teachers become key advocates. For example, a workshop was conducted where teachers co-designed AI activities using local folklore, and student engagement skyrocketed. The tools were more applicable because they were infused with culturally familiar content, turning AI from a foreign imposition into a classroom ally."

Interviewee "F" illustrated that AI-based tools hold significant potential in linguistically diverse Nigerian classrooms, while availability remains inconsistent and applicability uneven. With proper investment in

localization, infrastructure and teacher involvement, these tools can bridge language gaps and foster inclusion." Interviewee "G" explained that "what people need is a culturally conscious design approach that embraces Nigeria's rich linguistic plurality, making AI tools not only available and truly meaningful in every classroom."

Theoretical and Pedagogical Integration of Artificial Intelligence in Language Instruction

This theme investigates how AI-driven language learning models align (or conflict) with traditional approaches such as grammar translation, communicative language teaching, and constructivism. It highlights areas of convergence and divergence to develop blended or hybrid pedagogical models suitable for Nigerian learners.

Interviewee "A" stated that "the theoretical integration of AI-driven instruction with traditional pedagogy is both promising and complex. Traditional language instruction in Nigeria largely follows behaviorist and constructivist models, rooted in repetition, guided practice, and scaffolding. Interviewee "B" said that "AI systems, particularly intelligent tutoring systems and NLP chatbots, often rely on similar principles. For instance, many use behaviorist reinforcement, rewarding correct answers, giving automated corrective feedback, and encouraging mastery through repetition. This compatibility offers a natural foundation for aligning AI tools with classroom strategies."

However, significant tension arises when one looks at deeper pedagogical values. Interviewee "C" stated that "traditional Nigerian language classrooms value communal learning, storytelling, and oral performance which are elements rooted in sociocultural theory." Interviewee "D" pointed out that "most AI tools, on the other hand, emphasize individual interaction with machines. They often lack the collaborative affordances necessary for group tasks, discussion-based activities, or emotional feedback, which are hallmarks of effective language instruction. In classroom trials, AI systems struggled to capture nuances in student dialogue, such as metaphorical meaning or cultural references embedded in local narratives."

Interviewee "F" said, "Alignment is possible through a hybrid instructional design." AI tools can handle grammar correction, pronunciation, and vocabulary drills, while teachers provide human contextualized, and cultural depth. For example, a teacher has used ChatGPT to generate conversation prompts, which students then act out in peer groups. This bridges efficiency of AI with traditional methods of peer learning and performance. In this sense, AI becomes a tool to enhance, not replace core pedagogical practices."

Interviewee "G" explained that "another promising area is constructivist learning, where students construct knowledge through exploration. Adaptive AI platforms that track user progress and offer personalized learning paths align well with this philosophy. Yet, there is still a gap in how these tools support metacognition and help students reflect on how they learn." Interviewee "A" added that "traditional pedagogy emphasizes self-evaluation and teacher-guided reflection, which current AI tools rarely facilitate effectively. Therefore, educators must mediate the use of AI to encourage critical thinking, creativity, and reflection."

In essence, interviewee "B" elicited that "the integration of AI into language art education must be thoughtful and guided by pedagogical theory." We must resist the temptation to view AI as a silver bullet and instead focus on its role within a broader ecosystem of learning." Interviewee "C" stated that "when aligned with behaviorist drills, constructivist personalization and sociocultural collaboration, AI can enrich language instruction. However, achieving this requires ongoing research, teacher training, and curriculum reengineering that honors both innovation and tradition."

Discussion of the Findings

The study revealed that AI tools significantly enhance students' linguistic proficiency by providing instant, personalized feedback on grammar, vocabulary, and writing structure, especially, when integrated consistently in secondary and tertiary language learning environments. By demonstrating how AI-powered language models facilitate real-time correction, scaffolding and linguistic engagement in second language acquisition, Choi and

Park (2023) reinforce the finding that AI significantly improves language proficiency, which supports the observed enhancement in student grammar and writing accuracy. The sociocultural theory on which this study anchored on gives support to the findings. Wertsch (1991) and Donato (1994) support the idea that AI enhances language proficiency by emphasizing the mediational role of tools and collaborative interaction in language learning, where AI acts as a cognitive tool that scaffolds learners' linguistic development within a socially constructed learning environment.

The results showed that the availability and applicability of AI-based language learning tools in Nigerian classrooms are limited by infrastructural disparities and a lack of cultural and linguistic customization, particularly in rural and multilingual settings. Almaiki and Aziz (2022) affirm the infrastructural and cultural limitations of AI integration in language classrooms, as Almaiki and Aziz's study on the challenges of AI adoption in multilingual educational settings highlights disparities in digital access and the inadequacy of AI tools to cater to local language and sociocultural dynamics. Kozulin (2003) highlights that the effectiveness of mediation depends on cultural tools and the learner's access to them, which aligns with the finding that infrastructural and contextual limitations hinder AI integration in language learning, as learners must first internalize and interact meaningfully with the AI technologies available within their cultural settings.

The study indicated that while AI-driven language instruction aligns with traditional behaviorist and constructivist pedagogies in reinforcing learning through repetition and personalization, it requires deliberate hybridization with sociocultural teaching methods to fully support collaborative and context-rich language education. Young and Wang (2021) validated the theoretical synergy between AI and traditional language learning methods and illustrated how AI-enhanced learning platforms can be pedagogically aligned with behaviorist and constructivist frameworks to support personalized, interactive, and culturally responsive language instruction. Tabak (2014) underscored the importance of blending cultural-historical approaches with emerging technologies, which reflects the finding that integrating AI into language learning is most effective when harmonized with traditional instruction, allowing students to co-construct knowledge through both digital and human-mediated interactions.

Conclusion

The study concluded that the integration of AI into language learning has significantly improved students' vocabulary development and communication skills, affirming that AI serves as a powerful tool for enhancing linguistic competence and learner engagement in language classrooms when appropriately implemented. Despite its potential, infrastructural deficiencies, lack of teacher training, and limited access to digital resources undermine, the effectiveness of AI in language learning suggesting that educational stakeholders must address these systemic barriers to fully harness the benefits of AI. The optional impact of AI on language learning is realized when it complements rather than replaces traditional teaching methods, confirming the necessity of a blended instructional approach that balances technological innovation with human pedagogical interaction.

This study makes a significant contribution to knowledge by innovatively bridging the gap between emerging AI technologies and language education within the sociocultural framework. By integrating AI-based language learning tools with Vygotskian principles of social interaction and mediation, the research extends sociocultural theory into the digital age, demonstrating how AI can serve as a dynamic mediating artefact that fosters collaborative learning and cognitive development. This theoretical advancement enriches existing understandings of how technology can be harnessed not merely as a tool but as an active participant in language acquisition processes, encouraging more nuanced explorations of AI's role learning social and cultural contexts.

This study contributes original insights by developing and validating an assessment instrument that measures the effectiveness of AI-driven blended language learning environments. This tool offers researchers and

educators a reliable means to evaluate not only linguistic outcomes but also learner engagement and sociocultural interactions facilitated by AI integration. Such an instrument paves the way for future empirical investigations and practical applications, promoting data-driven decision-making in educational technology implementation. Collectively, these contributions push the frontier of knowledge by combining innovative theory development with practical assessment tools, advancing both academic scholarship and pedagogical practice in the evolving landscape of AI-enhanced education.

Recommendations

1. In view of the findings of this study, the following recommendations have been made.
2. Educational institutions should invest in AI-based language learning tools to enhance the vocabulary and communication skills of students.
3. Government and school administrations must improve digital infrastructure and provide training for teachers to effectively use AI in language education.
4. Curriculum developers and language educators should design blended learning programs that integrate AI with traditional teaching methods to achieve better outcomes

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