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Teachers' Perceptions of the Use of AI Tools in the Teaching of Yoruba Grammar in Sagamu Local Government Area of Ogun State

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Abstract

This study investigated teachers' perceptions of integrating artificial intelligence (AI) tools in teaching Yoruba grammar within secondary schools in Sagamu Local Government Area of Ogun State, Nigeria. As digital technologies increasingly permeate educational settings, understanding educators' attitudes toward AI-assisted language instruction becomes crucial, particularly for indigenous African languages like Yoruba that face challenges in digital representation and pedagogical innovation. The research employed a descriptive survey design, sampling 120 Yoruba language teachers across public and private secondary schools in Sagamu LGA. Data were collected through structured questionnaires and semi-structured interviews exploring teachers' awareness of AI tools, their perceived benefits and challenges, attitudes toward technology integration, and willingness to adopt AI-enhanced instructional methods for grammar teaching. Findings revealed that while teachers acknowledged potential benefits of AI tools—including personalized learning experiences, immediate feedback mechanisms, and enhanced student engagement—significant barriers existed, including limited access to technology infrastructure, inadequate training in digital pedagogical approaches, and concerns about cultural appropriateness of AI systems for Yoruba language instruction. The study concludes that successful integration of AI tools in Yoruba grammar teaching requires comprehensive professional development programs, improved technological infrastructure, and development of culturally responsive AI applications that preserve the linguistic and cultural integrity of Yoruba language education. Recommendations are provided for educational policymakers, school administrators, and technology developers to support effective AI adoption in indigenous language pedagogy.

Keywords

Artificial Intelligence, Yoruba grammar, teacher perception, technology integration, indigenous language education, Sagamu, Ogun State

INTRODUCTION

The 21st century has witnessed unprecedented technological advancement that has fundamentally transformed educational landscapes across the globe (Holmes et al., 2019). Among these innovations, artificial intelligence has emerged as a potentially transformative force in language education, offering possibilities for personalized learning, adaptive assessment, and enhanced pedagogical practices (Luckin et al., 2016). However, while AI applications in teaching widely spoken languages such as English, Mandarin, and Spanish have received considerable attention, indigenous African languages remain largely underrepresented in this technological revolution (Adegbija, 2004). Yoruba, one of Nigeria's three major languages with over 40 million speakers, faces particular challenges in contemporary educational contexts (Bamgbose, 2011). Despite its official status and constitutional provisions for its use in education, Yoruba language instruction confronts numerous obstacles, including diminishing student interest, inadequate instructional materials, and limited integration of modern pedagogical technologies (Adedimeji, 2020). The teaching of Yoruba grammar, in particular, presents specific difficulties as students struggle with tonal marks, orthographic conventions, and complex grammatical structures that differ significantly from English, the dominant language of instruction in Nigerian schools (Oyetade, 2003).

Sagamu Local Government Area in Ogun State represents a microcosm of these broader challenges. As a semi-urban area experiencing rapid modernization and increasing English language dominance, Yoruba language education in Sagamu schools faces threats to its vitality and relevance (Salawu, 2004). Teachers in this context must navigate between traditional pedagogical approaches and the emerging demands of digital-native students who expect technology-enhanced learning experiences. The integration of AI tools in Yoruba grammar instruction could potentially address several persistent challenges, including the provision of immediate feedback on tonal pronunciation, automated grammar checking for written assignments, personalized learning pathways that accommodate different proficiency levels, and engaging interactive exercises that increase student motivation (Roll & Wylie, 2016). However, the successful implementation of such technologies depends critically on teachers' perceptions, attitudes, and willingness to adopt these innovations (Teo, 2011).

Despite growing global interest in AI-enhanced language education, there exists a significant knowledge gap regarding how teachers of indigenous African languages perceive and might utilize these technologies. Yoruba language teachers in Sagamu LGA face the dual challenge of maintaining cultural and linguistic heritage while meeting the expectations of digitally literate students (Afolayan, 2018). Without understanding teachers' perspectives on AI integration, including their perceived benefits, concerns, and readiness for adoption, educational planners and policymakers cannot effectively support technology-enhanced Yoruba instruction. Current literature on AI in language education focuses predominantly on European and Asian languages, creating a significant void in understanding how these technologies might be adapted for tonal African languages with unique grammatical structures (Zawacki-Richter et al., 2019). Furthermore, teachers' perceptions remain understudied despite their critical role as gatekeepers of educational innovation (Ertmer et al., 2012). This study addresses these gaps by examining how Yoruba grammar teachers in Sagamu LGA perceive AI tools and what factors influence their attitudes toward technology adoption.

LITERATURE REVIEW

Artificial Intelligence in Education

Artificial intelligence in education refers to the application of machine learning algorithms, natural language processing, and adaptive

systems to enhance teaching and learning processes (Luckin et al., 2016). AI educational applications range from intelligent tutoring systems that provide personalized instruction to automated assessment tools that offer immediate feedback on student performance (Roll & Wylie, 2016). In language education specifically, AI technologies enable speech recognition for pronunciation practice, natural language processing for grammar checking, and adaptive algorithms that adjust content difficulty based on learner performance (Chiu et al., 2023). Recent developments in AI language learning tools include chatbots for conversational practice, automated essay scoring systems, vocabulary learning applications with spaced repetition algorithms, and pronunciation training software with phonetic analysis capabilities (Godwin-Jones, 2018). However, these technologies have been developed primarily for widely spoken international languages, raising questions about their applicability to indigenous languages with smaller speaker populations and different linguistic structures (Adegbija, 2004).

Yoruba Language and Grammar Instruction

Yoruba belongs to the Niger-Congo language family and functions as a lingua franca across southwestern Nigeria (Bamgbose, 2011). Its grammar presents several features that distinguish it from English and pose particular teaching challenges. Yoruba is a tonal language with three distinctive tones—high, mid, and low—that change word meanings, making tone marking essential for accurate written communication (Akinlabi & Urua, 2003). The language employs serial verb constructions where multiple verbs appear in sequence without conjunctions, noun classification through prefixes, and aspectual rather than tense-based temporal systems (Oyetade, 2003). Traditional Yoruba grammar instruction in Nigerian schools has relied heavily on rote memorization, decontextualized exercises, and teacher-centered methodologies that often fail to engage contemporary students (Adedimeji, 2020). Students frequently struggle with proper tone marking, distinguishing between homophonous words with different tones, applying complex verb serialization patterns, and mastering orthographic conventions that differ from English spelling rules (Salawu, 2004). These challenges suggest potential benefits from technology-enhanced instruction that could provide individualized practice, immediate corrective feedback, and engaging interactive exercises.

Technology Acceptance and Teacher Perceptions

The Technology Acceptance Model developed by Davis (1989) posits that perceived usefulness and perceived ease of use are primary determinants of technology adoption. This model has been widely applied to educational contexts, where teacher attitudes emerge as critical factors influencing successful technology integration (Teo, 2011). Teachers' perceptions are shaped by multiple factors including prior technology experience, institutional support, availability of training, perceived relevance to instructional goals, and concerns about workload implications (Ertmer et al., 2012). Research on teacher adoption of educational technologies reveals that positive attitudes correlate strongly with actual implementation, while negative perceptions create significant barriers regardless of technology quality or availability (Sang et al., 2010). For indigenous language teachers specifically, additional factors include concerns about cultural appropriateness of technologies designed for dominant languages, adequacy of linguistic representation in digital tools, and potential threats to traditional pedagogical knowledge (Warschauer & Donaghy, 1997).

THEORETICAL FRAMEWORK

This study was grounded in the Unified Theory of Acceptance and Use of Technology developed by Venkatesh et al. (2003), which integrates multiple technology acceptance models to explain user intentions and behavior. The UTAUT framework identifies four key

constructs: performance expectancy (the degree to which technology is believed to enhance job performance), effort expectancy (the ease of technology use), social influence (the perception that important others believe one should use the technology), and facilitating conditions (the belief that organizational and technical infrastructure exists to support use). Applied to Yoruba grammar teachers in Sagamu LGA, this framework suggests that adoption of AI tools depends on teachers believing these technologies will improve their instructional effectiveness (performance expectancy), perceiving them as relatively easy to learn and use (effort expectancy), experiencing support from colleagues and administrators (social influence), and having access to necessary training and resources (facilitating conditions). The UTAUT framework also recognizes that these relationships are moderated by individual factors such as age, gender, experience, and voluntariness of use (Venkatesh et al., 2003).

METHODOLOGY

This study employed a descriptive survey research design, which is appropriate for investigating attitudes, perceptions, and opinions of a population (Creswell & Creswell, 2018). This design was selected because the study aimed to describe the current state of teachers' awareness, attitudes, and concerns regarding AI integration rather than to test specific interventions. The target population comprised all Yoruba language teachers in secondary schools within Sagamu Local Government Area of Ogun State. According to data from the Ogun State Ministry of Education (2024), there were 156 qualified Yoruba language teachers working in 42 secondary schools across Sagamu LGA, distributed among 28 public schools and 14 private schools. A sample of 120 Yoruba language teachers was selected for this study, representing approximately 77% of the total population. The researchers increased the sample to 120 to account for potential non-responses. Two instruments were used for data collection: a structured questionnaire and a semi-structured interview protocol.

The primary instrument was a researchers-designed questionnaire titled "Teachers' Perception of AI Tools in Yoruba Grammar Instruction Questionnaire" (TPAITYGIQ). The questionnaire comprised two sections. Section A collected demographic information including gender, age, educational qualification, years of teaching experience, school type, and prior technology training. Section B contained 40 items organized into five subscales corresponding to the research questions: awareness of AI tools (8 items), attitudes toward AI integration (8 items), perceived benefits (8 items), anticipated challenges (8 items), and factors influencing adoption willingness (8 items). Items were presented as statements with responses on a 5-point Likert scale: Strongly Agree (5), Agree (4), Undecided (3), Disagree (2), and Strongly Disagree (1). For negatively worded items, scoring was reversed to ensure consistency in interpretation. To complement quantitative data and provide deeper insights into teachers' perceptions, a semi-structured interview protocol was developed containing 12 open-ended questions. These questions explored teachers' understanding of AI concepts, specific experiences with educational technology, detailed views on potential applications for Yoruba grammar instruction, concerns about cultural appropriateness, and suggestions for successful implementation. The semi-structured format allowed flexibility to probe interesting responses while maintaining consistency across interviews.

Following approval from the Ogun State Ministry of Education and ethical clearance from the institutional review board, the researcher obtained permission from principals of selected schools. Data collection occurred over six weeks from September to November 2024. The researcher personally visited each school to administer questionnaires, providing brief explanations of the study's purpose and ensuring

voluntary participation with assurances of confidentiality. Teachers were given adequate time to complete questionnaires, typically 25 to 35 minutes, and the researcher remained available to clarify questions without influencing responses. Completed questionnaires were collected immediately or within 48 hours to minimize loss and maximize response rate. For the qualitative component, 15 teachers representing diverse demographic characteristics were purposively selected for semi-structured interviews. These 30 to 45-minute interviews were conducted in settings convenient to participants, audio-recorded with consent, and subsequently transcribed verbatim for analysis. Of the 120 distributed questionnaires, 114 were properly completed and returned, representing a 95% response rate. All 15 selected teachers participated in interviews, providing robust qualitative data.

Quantitative data from questionnaires were analyzed using descriptive and inferential statistics with SPSS version 26. Descriptive statistics including frequencies, percentages, means, and standard deviations summarized demographic characteristics and responses to questionnaire items. Mean scores were interpreted using the following scale: 1.00–1.80 (Strongly Disagree), 1.81–2.60 (Disagree), 2.61–3.40 (Undecided), 3.41–4.20 (Agree), and 4.21–5.00 (Strongly Agree). Inferential statistics included independent samples t-tests to examine differences in perceptions based on school type (public versus private) and gender, one-way ANOVA to assess differences across teaching experience levels and age groups, and Pearson correlation analysis to explore relationships between variables such as technology training and attitudes toward AI adoption. Statistical significance was set at $p < 0.05$.

Qualitative data from interviews were analyzed using thematic analysis following Braun and Clarke's (2006) six-phase approach: familiarization with data through repeated reading of transcripts, generating initial codes by identifying meaningful segments, searching for themes by grouping codes into patterns, reviewing themes for coherence and distinction, defining and naming themes with clear descriptions, and producing the report by selecting illustrative quotes. This systematic process ensured rigorous qualitative analysis that complemented quantitative findings. Data triangulation, combining quantitative and qualitative findings, provided comprehensive understanding of teachers' perceptions and enhanced the validity of conclusions.

RESULTS AND DISCUSSION

Demographic Characteristics of Respondents

The demographic analysis of the 114 respondents revealed the following distribution. Regarding gender, 68 respondents (59.6%) were female while 46 (40.4%) were male, reflecting the general gender distribution among language teachers in Nigerian secondary schools. Age distribution showed that 23 respondents (20.2%) were between 25-35 years, 45 (39.5%) were between 36-45 years, 32 (28.1%) were between 46-55 years, and 14 (12.3%) were 56 years and above, indicating a predominantly middle-aged teaching workforce. Educational qualifications varied, with 51 respondents (44.7%) holding Bachelor's degrees (B.A./B.Ed.), 56 (49.1%) possessing Master's degrees (M.A./M.Ed.), and 7 (6.1%) having doctoral degrees (Ph.D.). This distribution suggests a relatively well-qualified teaching population. Teaching experience ranged from 27 respondents (23.7%) with 1-5 years of experience, 38 (33.3%) with 6-10 years, 31 (27.2%) with 11-15 years, and 18 (15.8%) with over 15 years of experience. School type distribution reflected the sampling strategy, with 81 respondents (71.1%) teaching in public schools and 33 (28.9%) in private schools. Importantly, regarding prior technology training, only 34 respondents (29.8%) reported having received formal training in using educational technology, while 80 (70.2%) had not received

such training, highlighting a significant professional development gap.

Research Question 1: Level of Awareness of AI Tools Among Teachers

Table 1 presents the mean scores and standard deviations for items assessing teachers' awareness of AI tools for language instruction.

Table 1: Teachers' Awareness of AI Tools (N = 114)

Item	Mean	SD	Interpretation
I am familiar with the term "artificial intelligence"	3.65	1.12	Agree
I am aware of AI applications used in education	2.98	1.24	Undecided
I know specific AI tools for language teaching	2.34	1.18	Disagree
I understand how AI tools can assess grammar	2.41	1.15	Disagree
I have seen demonstrations of AI language tools	2.67	1.29	Undecided
I am aware of AI tools specifically for African languages	1.89	0.98	Disagree
I can name at least three AI-powered language apps	2.12	1.06	Disagree
I follow developments in AI for education	2.45	1.21	Disagree
Overall Mean	**2.56**	**0.87**	**Disagree**

The overall mean score of 2.56 (SD = 0.87) indicates that Yoruba grammar teachers in Sagamu LGA generally have low awareness of AI tools for language instruction. While teachers showed familiarity with the general term "artificial intelligence" (M = 3.65, SD = 1.12), their awareness of specific educational applications, particularly for African languages, was limited. The item "I am aware of AI tools specifically for African languages" received the lowest mean score (M = 1.89, SD = 0.98), suggesting a significant knowledge gap regarding available technologies for indigenous language instruction.

Interview data corroborated these findings. One teacher stated, "I have heard about artificial intelligence in the news and social media, but I don't really know how it works or how it could be used for teaching Yoruba" (Teacher 7, female, 8 years' experience). Another explained, "We mostly use basic tools like Microsoft Word and PowerPoint. I'm not aware of any special AI programs for teaching African languages" (Teacher 12, male, 15 years' experience).

Research Question 2: Teachers' Attitudes Toward AI Integration

Table 2 summarizes teachers' attitudes toward integrating AI tools in Yoruba grammar instruction.

Table 2: Teachers' Attitudes Toward AI Integration (N = 114)

Item	Mean	SD	Interpretation
AI tools could make Yoruba grammar more interesting	3.78	1.08	Agree
I would be willing to learn how to use AI tools	3.92	0.95	Agree

Item	Mean	SD	Interpretation
AI integration would improve my teaching effectiveness	3.45	1.14	Agree
I am concerned AI might replace human teachers	3.21	1.32	Undecided
Technology can help preserve Yoruba language	4.03	0.89	Agree
AI tools might not respect Yoruba cultural values	3.34	1.18	Undecided
Students would respond positively to AI-enhanced lessons	3.67	1.02	Agree
Using AI aligns with modern teaching approaches	3.81	0.98	Agree
Overall Mean	**3.65**	**0.82**	**Agree**

The overall mean score of 3.65 (SD = 0.82) reveals that teachers hold generally positive attitudes toward AI integration in Yoruba grammar instruction. Teachers particularly agreed that technology could help preserve Yoruba language (M = 4.03, SD = 0.89) and expressed willingness to learn about AI tools (M = 3.92, SD = 0.95). However, some ambivalence existed regarding concerns about job replacement (M = 3.21, SD = 1.32) and cultural appropriateness (M = 3.34, SD = 1.18).

Qualitative data revealed nuanced perspectives. One teacher expressed optimism: "If these AI tools can help our students learn Yoruba grammar better and make the language more attractive to young people, I am definitely interested in trying them" (Teacher 3, female, 6 years' experience). Another voiced caution: "Technology is good, but we must make sure it doesn't change the essence of Yoruba language and culture. The language has deep cultural meanings that a computer might not understand" (Teacher 9, male, 18 years' experience).

Research Question 3: Perceived Benefits of AI Tools

Table 3 presents teachers' perceptions of potential benefits from using AI tools in Yoruba grammar instruction.

Table 3: Perceived Benefits of AI Tools (N = 114)

Item	Mean	SD	Interpretation
AI could provide immediate feedback on student work	4.12	0.86	Agree
AI tools could personalize learning for each student	3.87	0.94	Agree
AI could help with tone mark accuracy checking	4.23	0.79	Strongly Agree
Students could practice grammar at their own pace	4.01	0.88	Agree
AI could generate varied practice exercises automatically	3.76	1.01	Agree
AI tools could increase student engagement	3.69	1.05	Agree
AI could help identify specific student weaknesses	3.94	0.91	Agree
AI could reduce teachers' workload in marking	3.58	1.12	Agree

Item	Mean	SD	Interpretation
Overall Mean	**3.90**	**0.74**	**Agree**

Teachers perceived multiple benefits from AI integration, with an overall mean score of 3.90 (SD = 0.74). The highest-rated benefit was AI's potential for checking tone mark accuracy (M = 4.23, SD = 0.79), addressing one of the most challenging aspects of Yoruba grammar instruction. Teachers also highly valued immediate feedback capabilities (M = 4.12, SD = 0.86) and self-paced learning opportunities (M = 4.01, SD = 0.88).

Interview participants elaborated on these benefits. One teacher explained, "Tone marks are the biggest problem for my students. If a computer program could immediately show them when they get the tone wrong and explain the correct one, that would be incredibly helpful" (Teacher 5, female, 11 years' experience). Another noted, "With large class sizes, I cannot give individual attention to every student. AI tools that adapt to each student's level could really help address this problem" (Teacher 14, male, 7 years' experience).

Research Question 4: Anticipated Challenges in Implementing AI Tools

Table 4 shows teachers' perceptions of potential challenges in implementing AI tools for Yoruba grammar instruction.

Table 4: Anticipated Challenges in AI Implementation (N = 114)

Item	Mean	SD	Interpretation
Lack of computers and devices in schools	4.45	0.72	Strongly Agree
Unreliable electricity supply	4.38	0.81	Strongly Agree
Insufficient internet connectivity	4.29	0.85	Strongly Agree
Limited AI tools available for Yoruba language	4.11	0.88	Agree
Inadequate training for teachers	4.33	0.76	Strongly Agree
Cost of acquiring AI software and tools	4.21	0.83	Strongly Agree
Resistance from colleagues who prefer traditional methods	3.47	1.15	Agree
Concern about accuracy of AI for Yoruba language	3.68	1.07	Agree
Overall Mean	**4.12**	**0.67**	**Agree**

The overall mean score of 4.12 (SD = 0.67) indicates that teachers anticipate significant challenges in implementing AI tools. Infrastructural barriers were rated most severely, with lack of devices (M = 4.45, SD = 0.72), unreliable electricity (M = 4.38, SD = 0.81), and insufficient internet (M = 4.29, SD = 0.85) all receiving very high scores. Inadequate training (M = 4.33, SD = 0.76) and cost concerns (M = 4.21, SD = 0.83) also emerged as major obstacles. Qualitative data emphasized these challenges. One teacher stated, "In my school, we have only one small computer lab with about 15 working computers for over 800 students. How can we realistically use AI tools when we don't even have basic equipment?" (Teacher 2, female, 4 years' experience). Another noted, "The electricity goes off almost every day, sometimes for many hours. Even if we had the tools, we couldn't depend on them" (Teacher 11, male, 12 years' experience). Teachers also expressed concerns about linguistic appropriateness. As one participant explained, "Yoruba has many dialects and variations. I worry that an AI tool might teach the wrong pronunciation or grammar for our local variety" (Teacher 6, female, 16 years' experience).

Research Question 5: Factors Influencing Adoption Willingness

Table 5 presents factors that teachers indicated would influence their willingness to adopt AI tools.

Table 5: Factors Influencing AI Adoption Willingness (N = 114)

Item	Mean	SD	Interpretation
Availability of comprehensive training programs	4.31	0.78	Strongly Agree
Provision of necessary technological infrastructure	4.42	0.71	Strongly Agree
Evidence of effectiveness from other schools	3.89	0.96	Agree
Support from school administration	4.18	0.84	Agree
Financial assistance for technology acquisition	4.27	0.80	Strongly Agree
Availability of AI tools designed for Yoruba language	4.35	0.75	Strongly Agree
Ongoing technical support and maintenance	4.14	0.87	Agree
Collaboration with colleagues using AI tools	3.76	1.02	Agree
Overall Mean	**4.17**	**0.71**	**Agree**

The overall mean score of 4.17 (SD = 0.71) demonstrates that teachers identified multiple factors as important for their adoption willingness. The most critical factors were provision of necessary infrastructure (M = 4.42, SD = 0.71), availability of Yoruba-specific AI tools (M = 4.35, SD = 0.75), comprehensive training programs (M = 4.31, SD = 0.78), and financial assistance (M = 4.27, SD = 0.80).

Interview data highlighted the interconnected nature of these factors. One teacher stated, "We need a complete package—the equipment, the internet, the training, and the right software. Just giving us one without the others won't work" (Teacher 1, female, 9 years' experience). Another emphasized cultural specificity: "The AI tools must be designed by people who understand Yoruba language and culture, not just translated from English programs. Otherwise, they won't be accurate or appropriate" (Teacher 8, male, 14 years' experience). Several teachers mentioned the importance of administrative support. As one explained, "If the principal and the ministry don't support this initiative with resources and encouragement, teachers cannot do it alone. We need institutional commitment" (Teacher 13, female, 10 years' experience).

Differences Based on School Type

An independent samples t-test was conducted to examine differences in perceptions between public and private school teachers. Results showed no significant difference in overall awareness ($t = 1.42$, $p = 0.158$), but significant differences emerged in attitudes toward AI integration ($t = 2.34$, $p = 0.021$), with private school teachers (M = 3.89, SD = 0.78) showing more positive attitudes than public school teachers (M = 3.56, SD = 0.83). This difference may reflect greater technology exposure in private schools or different institutional cultures regarding innovation.

Differences Based on Prior Technology Training

Teachers with prior technology training demonstrated significantly higher awareness of AI tools (M = 3.21, SD = 0.82) compared to those without training (M = 2.28, SD = 0.79), $t = 5.67$,

$p < 0.001$. They also expressed more positive attitudes toward AI integration ($M = 3.98$, $SD = 0.71$ versus $M = 3.51$, $SD = 0.85$), $t = 3.12$, $p = 0.002$. These findings underscore the importance of professional development in shaping teacher perceptions and readiness for technology adoption.

Correlation Analysis

Pearson correlation analysis revealed several significant relationships. Awareness of AI tools correlated positively with attitudes toward integration ($r = 0.56$, $p < 0.001$), suggesting that increased knowledge promotes more favorable views. Perceived benefits correlated negatively with anticipated challenges ($r = -0.38$, $p < 0.001$), indicating that teachers who see greater potential benefits are less deterred by obstacles. Years of teaching experience showed no significant correlation with attitudes ($r = 0.12$, $p = 0.213$), suggesting that openness to AI integration is not age or experience-dependent.

DISCUSSION OF FINDINGS

The finding that teachers possess limited awareness of AI tools for language instruction, with an overall mean score of 2.56, aligns with Olaofe's (2019) observation that Nigerian teachers generally lack exposure to advanced educational technologies despite positive attitudes toward innovation. The particularly low awareness of AI tools for African languages ($M = 1.89$) confirms Adegbija's (2004) assertion that indigenous languages remain marginalized in technological development, creating a knowledge gap among educators who might otherwise benefit from such tools. This limited awareness likely stems from multiple factors. First, professional development programs for Nigerian teachers rarely include training on emerging technologies like AI, focusing instead on traditional pedagogical methods (Afolayan, 2018). Second, the scarcity of AI applications specifically designed for Yoruba language means teachers have few concrete examples to observe or evaluate. Third, the general digital divide affecting African education limits teachers' exposure to global conversations about AI in education (Ngcobo, 2014).

The contradiction between general familiarity with AI terminology ($M = 3.65$) and lack of knowledge about specific applications suggests that teachers encounter AI concepts through popular media but lack professional contexts that translate general awareness into pedagogical understanding. This pattern indicates a need for targeted professional development that bridges conceptual knowledge and practical application.

The overall positive attitudes toward AI integration ($M = 3.65$), despite limited awareness, reflect an openness to innovation among Yoruba language teachers that contradicts stereotypes about resistance to change in traditional education systems. This finding supports Ertmer et al.'s (2012) observation that teacher attitudes toward technology are often more positive than implementation rates suggest, with barriers existing primarily at institutional rather than individual levels. The particularly strong agreement that technology could help preserve Yoruba language ($M = 4.03$) reveals teachers' recognition of challenges facing indigenous language education and willingness to explore technological solutions. This pragmatic orientation aligns with broader concerns about declining student interest in Yoruba and the language's marginalization in digital contexts (Bamgbose, 2011). Teachers appear to view AI not as a threat to traditional language instruction but as a potential ally in making Yoruba relevant to digital-native students.

However, the ambivalence regarding job replacement concerns ($M = 3.21$) and cultural appropriateness ($M = 3.34$) highlights important nuances in teacher attitudes. These concerns resonate with Warschauer and Donaghy's (1997) findings that indigenous language educators worry about technologies designed for dominant languages potentially distorting cultural and linguistic authenticity. This suggests that

successful AI integration requires culturally responsive design that respects Yoruba language's unique characteristics and cultural embeddedness. The finding that private school teachers showed significantly more positive attitudes than public school teachers likely reflect different institutional contexts. Private schools in Nigeria often have better technology infrastructure and more flexibility in adopting innovations, creating environments where teachers can more readily envision technology integration (Adedimeji, 2020). This difference underscores the importance of institutional factors in shaping teacher perceptions.

Teachers' strong recognition of AI benefits (M = 3.90), particularly for tone mark accuracy checking (M = 4.23) and immediate feedback (M = 4.12), demonstrates sophisticated understanding of Yoruba grammar instruction challenges and how technology might address them. The emphasis on tone marks is particularly significant given that tonal accuracy represents one of the most persistent difficulties in Yoruba language learning (Akinlabi & Urua, 2003). Teachers' identification of this specific application suggests they are not merely expressing generic enthusiasm for technology but are thinking critically about pedagogical needs.

The high value placed on personalized learning (M = 3.87) and self-paced practice (M = 4.01) reflects teachers' awareness of large class sizes and limited opportunities for individualized instruction in Nigerian secondary schools. This finding aligns with Roll and Wylie's (2016) research showing that adaptive learning systems can address educational contexts where teacher-student ratios prevent individualized attention. Teachers appear to view AI as a complement to rather than replacement for their instruction, helping them manage diverse student needs more effectively. The relatively lower rating for workload reduction (M = 3.58) compared to student-focused benefits is noteworthy. This suggests that teachers' primary motivation for considering AI adoption centers on improving student learning rather than easing their own responsibilities, reflecting professional commitment to educational quality. This student-centered orientation increases the likelihood that AI implementation, if properly supported, would focus on pedagogical improvement rather than mere efficiency.

The very high scores for infrastructural challenges—lack of devices (M = 4.45), electricity problems (M = 4.38), and internet limitations (M = 4.29)—underscore the material constraints facing Nigerian education. These findings strongly corroborate research by Olaofe (2019) and Adedimeji (2020) documenting how infrastructural deficits undermine technology integration regardless of teacher willingness or pedagogical benefits. The consistency of these high ratings across respondents suggests these are not isolated school-level problems but systemic issues requiring policy-level interventions. The emphasis on inadequate training (M = 4.33) highlights a critical gap in professional development systems. The finding that only 29.8% of respondents had received any technology training, combined with the significant differences in attitudes and awareness between trained and untrained teachers, demonstrates that effective AI integration requires substantial investment in human capacity development. This aligns with Teo's (2011) observation that perceived usefulness depends partly on confidence in one's ability to use technology effectively—without training, teachers cannot develop this confidence.

The concern about limited Yoruba-specific AI tools (M = 4.11) points to a fundamental challenge in indigenous language technology development. Unlike major international languages with extensive computational linguistic resources, Yoruba lacks large digital corpora, standardized natural language processing tools, and sufficient commercial incentive for private sector investment (Adegbija, 2004). This creates a vicious cycle where lack of tools limits adoption, which in turn reduces

demand that might drive development. Teachers' concerns about AI accuracy for Yoruba (M = 3.68) reflect legitimate worries about linguistic appropriateness. Yoruba's dialectal variation, complex tonal system, and cultural embeddedness mean that AI tools trained primarily on written standard Yoruba might not accommodate regional variations or cultural contexts that teachers recognize as important (Oyetade, 2003). This suggests that AI development for Yoruba must involve language educators and cultural experts, not just computational linguists.

The identification of infrastructure provision (M = 4.42) and Yoruba-specific tools (M = 4.35) as the most critical adoption factors reinforces that technical prerequisites must precede pedagogical implementation. This finding supports Venkatesh et al.'s (2003) UTAUT framework, particularly the facilitating conditions construct, which posits that technology adoption requires perceived organizational and technical support infrastructure. The strong emphasis on comprehensive training (M = 4.31) validates research by Ertmer et al. (2012) showing that professional development is essential for translating positive attitudes into effective practice. However, qualitative data suggesting teachers want "complete packages" rather than isolated interventions indicates that training alone is insufficient—it must be accompanied by ongoing technical support, collaborative learning opportunities, and time for experimentation.

The importance of evidence from other schools (M = 3.89) reflects a pragmatic desire to see proof of concept before committing to new approaches. This aligns with Rogers' (2003) diffusion of innovations theory, which identifies observability and trialability as key factors in technology adoption. Establishing demonstration sites where teachers can observe AI integration in similar contexts could accelerate adoption by reducing perceived risk. The value placed on administrative support (M = 4.18) and financial assistance (M = 4.27) underscores that individual teacher enthusiasm cannot overcome institutional barriers. This finding resonates with research on educational change showing that sustainable innovation requires system-level commitment rather than depending on individual teacher initiative (Fullan, 2007). For AI integration in Yoruba instruction to succeed, support must extend from ministry policy through school administration to classroom practice.

Conclusion

This study investigated teachers' perceptions of using AI tools in Yoruba grammar instruction in Sagamu Local Government Area of Ogun State, revealing a complex landscape of limited awareness, cautious optimism, recognized potential, and significant barriers. While teachers possess minimal knowledge of specific AI applications for language instruction, particularly for African languages, they demonstrate positive attitudes toward technology integration and sophisticated understanding of how AI might address persistent pedagogical challenges in Yoruba grammar teaching. Teachers clearly identify potential benefits, especially AI's capacity to provide immediate feedback on tone mark accuracy, personalize learning experiences, and enable self-paced practice—features that directly address recognized weaknesses in current instructional approaches. However, these potential benefits confront formidable obstacles rooted in inadequate technological infrastructure, unreliable electricity supply, insufficient internet connectivity, limited availability of Yoruba-specific AI tools, and pervasive lack of teacher training in educational technology.

The study demonstrates that successful AI integration in Yoruba grammar instruction requires comprehensive systemic support rather than isolated interventions. Teachers need not only devices and internet access but also culturally appropriate software, extensive professional development, ongoing technical support, and institutional encouragement. The significance of these interconnected factors

suggests that piecemeal approaches will likely fail, while coordinated efforts addressing multiple barriers simultaneously might unlock the considerable potential that both teachers and researchers recognize.

Furthermore, the research highlights the particular challenges facing indigenous language education in the digital age. The marginalization of Yoruba in technological development creates a disadvantage compared to widely spoken international languages, yet this gap also presents an opportunity. Developing AI tools specifically for Yoruba, designed in collaboration with language educators and cultural experts, could simultaneously advance both technology integration and language preservation efforts. The generally positive attitudes among teachers, despite limited awareness and significant anticipated challenges, suggest that the primary obstacles to AI integration are structural rather than attitudinal. This finding is encouraging because structural barriers, while substantial, are potentially addressable through policy interventions, resource allocation, and strategic planning in ways that changing deeply held beliefs would not be.

RECOMMENDATIONS

Based on the study findings, the following recommendations are offered:

1. The Ogun State Ministry of Education should develop a comprehensive Indigenous Language Technology Initiative that allocates dedicated funding for AI tool development and implementation specifically for Yoruba and other Nigerian languages, recognizing that market forces alone will not address the needs of indigenous language education.

2. State and federal governments should prioritize infrastructural development in schools, including reliable electricity supply through solar alternatives where grid power is unstable, adequate computing devices with student-to-device ratios enabling meaningful technology use, and robust internet connectivity through partnerships with telecommunications providers.

3. Educational authorities should establish mandatory technology integration components in teacher professional development programs, requiring all language teachers to receive training in educational technology including AI applications, with regular updates as technologies evolve.

4. Government should create demonstration schools equipped with AI tools for Yoruba instruction where teachers from other schools can observe implementation, participate in workshops, and develop confidence in technology-enhanced pedagogy before attempting implementation in their own contexts.

5. Principals should advocate for technology resources in school budgets, prioritizing sustainable infrastructure over one-time purchases of devices that cannot be maintained, and seeking partnerships with private sector organizations for technology donations and support.

6. School leaders should establish collaborative learning communities where teachers can share technology experiences, troubleshoot challenges, and develop collective expertise, reducing the isolation individual teachers might feel when attempting innovation.

7. Administrators should provide institutional support that explicitly encourages experimentation with technology-enhanced pedagogy, including flexibility in curriculum pacing to accommodate learning curves and recognition systems that reward innovative teaching approaches.

8. Software developers and computational linguists should collaborate with Yoruba language experts, educators, and cultural specialists to create AI tools specifically designed for Yoruba grammar instruction that accommodate dialectal variation, handle tonal complexity accurately, and respect cultural contexts embedded in language use.

9. Developers should prioritize tools that function effectively in low-bandwidth environments and have offline capabilities, recognizing that connectivity constraints in Nigerian schools require technologies adapted to local conditions rather than assuming high-speed internet access.

10. Technology companies should adopt pricing models accessible to Nigerian schools, including freemium versions for public schools, open-source alternatives, and partnerships with educational authorities that subsidize costs in exchange for broad implementation.

11. Colleges of education and university education faculties should integrate technology pedagogy throughout pre-service teacher programs rather than treating it as a separate course, ensuring that new teachers enter the profession with fundamental technology competencies.

12. Teacher training institutions should establish partnerships with schools for technology integration practicum experiences where student teachers observe and practice using AI tools in authentic classroom contexts under mentorship from experienced technology-using teachers.

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