

The Effective Use of AI in Teaching and Learning of French as a Foreign Language in Anglophone Universities: Nigeria as a Case Study

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Abstract

This study investigates the pedagogical effectiveness of Artificial Intelligence (AI) in the teaching and learning of French as a Foreign Language (FFL) in Anglophone universities in Nigeria. Anchored in educational technology and applied linguistics, the research examines how AI-powered tools such as neural machine translation systems, intelligent tutoring platforms, and adaptive language applications support vocabulary development, grammatical accuracy, learner engagement, and intercultural competence. Using a mixed-methods design, data were collected from undergraduate students and lecturers across selected Nigerian universities through classroom experiments, structured questionnaires, and semi-structured interviews. Quantitative findings indicate measurable improvements in learners' lexical acquisition, syntactic awareness, and reading comprehension when AI-supported activities are systematically integrated into instruction. Qualitative evidence further reveals that AI tools promote learner autonomy, immediate feedback, and sustained motivation, while enabling instructors to personalize learning pathways and monitor progress more effectively. The study proposes a structured AI-assisted pedagogical model for FFL instruction that aligns technological concordances with second language acquisition principles. The findings highlight the potential of AI to enhance instructional quality and learning outcomes in resource-constrained educational contexts, while underscoring the need for institutional policies, teacher training, and ethical guidelines to ensure responsible and pedagogically sound implementation.

Keywords: *Artificial intelligence, French as a Foreign Language, Anglophone, Nigeria University.*

Introduction

The rapid development of Artificial Intelligence (AI) technologies has significantly transformed educational practices, particularly in the domain of language teaching and learning. AI-based applications now offer automated feedback, adaptive content delivery, speech recognition, and real-time translation, enabling learners to interact with target languages beyond the limitations of traditional classroom environments. In multilingual societies and resource-constrained educational systems such as Nigeria, these technological innovations present new opportunities for improving the teaching and learning of French as a Foreign Language (FFL).

French occupies a strategic position in Nigeria due to its geopolitical location, economic relations with Francophone countries, and its status as an international language of diplomacy, commerce, and education. However, the teaching of French in Anglophone Nigerian universities continues to face challenges including limited instructional materials, large class sizes, insufficient exposure to authentic linguistic input, and constrained access to trained instructors. AI-based educational tools provide salable solutions capable of addressing these limitations by supporting individualized instruction, continuous assessment, and interactive learning environments.

Based on the globalization approach, French is seen as one of the vital languages globally, and its positions is gradually accepted. Due to this, the approach to French courses in various colleges and universities will enable more and more demands. This is a focus for our teachers and learners, and we also accept the fact that this is a good privilege. For educators, the more demand, the higher the acceptability of French, the higher the educators' mastery of French professional knowledge. It is not about the grammatical aspect only, but also the cultural level approach and the in-depth study.

For students. Engaging and practicing the mastering of French as a foreign language will place a solid foundation for future career building and development planning, especially in the enhancement of French as a foreign language. Based on the need for continuous development and emergence of artificial intelligence technology,

the prerequisites for French teaching are higher, and the standard needed for threshold is also higher.

To master French adequately, we require to acquire not only the language vocabulary, but in addition the essential cultural background. It also requires the collaboration of artificial intelligence technology. Artificial intelligence technology provides a good medium for promotion of teaching and learning, thereby aiding the teaching impact positively, this will make the capacity expectations of students and teachers to become higher. It must be established that Artificial intelligence can solve some definite problems such as oral practice, real-time feedback of learning results, etc. It is therefore of great theoretical and practical significance to carry out French teaching based on artificial intelligence.

Artificial Intelligence in Education

AI in education encompasses computational systems designed to perform tasks that typically require human intelligence, such as reasoning, pattern recognition, and decision-making. In educational contexts, AI applications include intelligent tutoring systems, automated assessment platforms, learning analytic, chat-bots, and adaptive learning environments (Luckin et al., 2016; Zawacki-Richter et al., 2019). These systems allow for personalized instruction, real-time feedback, and continuous monitoring of learner progress. Drawing on Chapelle's (2001, 2009) CALL evaluation framework, adequate technology application is understood in terms of language learning potential, learner fit, meaning focus, authenticity, and impact.

According to Chapelle (2001), CALL materials and software should be evaluated based on principles derived from Second Language Acquisition (SLA) theory rather than only on technical features. Evaluation should determine whether the technology genuinely promotes language learning.

AI in Second Language Acquisition

Second language acquisition research emphasizes the importance of comprehensible input, meaningful interaction, feedback, and opportunities for output. AI technologies support these principles by providing learners with continuous exposure to target language input, interactive tasks, and corrective feedback mechanisms (Gass & Mackey, 2015; Godwin-Jones, 2018). Neural machine translation tools, speech recognition systems, and conversational agents

facilitate interaction with authentic language data and support learners' development of lexical, grammatical, and pragmatic competence.

Teaching French in Nigerian Universities

The teaching of French in Nigeria is modeled by sociolinguistics, institutional, and infrastructural factors (Bamgbose, 2014). To this end, materials adapted to various aspects of teaching have been deployed. Despite the role and importance of those materials, challenges are recorded. It is in line with this that digital technologies are gradually introduced to mitigate these challenges; however, systematic integration of AI remains limited. Existing studies primarily focus on computer-assisted language learning (CALL) and mobile learning applications, leaving a gap in empirical research on AI-driven pedagogical frameworks specifically tailored to FFL instruction.

Application of Artificial Intelligence in Language Teaching

Core Technologies of Artificial Intelligence

AI mainly adopts the following technologies, including related language processing technology, machine learning technology, speech recognition and synthesis technology, and intelligent vision technology. As for the relevant language processing technology, it is mainly applied in such a relevant stage as understanding, generation and translation. It is essential to understand its relevant specific meaning and generate such a material. So here, well, we need to translate him. Machine learning is a relatively well-known technology. For us, we may have heard that deep learning and neural networks belong to the category of machine learning. We can use the technology of machine learning to analyze the learning trajectory of students and plan a path of learning to help them make better progress. I believe everyone has heard about speech recognition. It is not a simple recognition of speech as we said. It actually needs to recognize such a specific grammatical sentence meaning and correct it. After that, the composite output is performed to generate the corresponding result. The fourth is intelligent vision, which is for everyone in intelligent vision. Some courses may have been involved, and some corresponding technical means are used to intelligently present the scene to help students with immersive learning. I believe that through the introduction of the above four technologies, we will have an intuitive understanding of the key technologies of artificial intelligence. (Russell, S., & Norvig, P., 2021; Goodfellow, I., Bengio, Y., & Courville, A., 2016)

The Application of AI in Language Teaching

The application of artificial intelligence in language teaching has many aspects. It is mainly reflected in the relevant technical means and platforms. The corresponding technical means have been introduced to you in the previous section. Here we mainly introduce the corresponding technical system, which mainly includes the corresponding intelligent voice teaching assistant, online learning platform, corresponding intelligent evaluation tools, etc. For the phonetic teaching assistant, it can be through the phonetic teaching assistant. Students can have a one-to-one dialogue with the teaching assistant to modify the pronunciation and vocabulary. The system can feed back the corresponding learning results and improvement path in real time. For the online learning platform, students can answer questions and conduct interactive assessment online. Master the degree of knowledge in real time. Teachers can carry out targeted counseling. The last one is the intelligent assessment tool, which can evaluate students' daily work, classroom performance. A comprehensive evaluation of the completion of the corresponding complex tasks is carried out, and a corresponding conclusion is drawn. The teacher can carry out targeted auxiliary guidance according to the evaluation results, so as to improve the teaching effect.

Advantages and Potential Limitations of AI Tools

Advantages

The advantages of artificial intelligence are mainly reflected in many aspects. We will introduce them one by one. The first is that students can be tutored according to their actual learning situation. Through the corresponding basic means, we can master the students' learning data and their learning dynamics. According to such a situation, we can use the corresponding technical means of artificial intelligence to carry out targeted tutoring learning and planning path formulation for students. The second is to keep track of students' learning. Specifically, it can include the corresponding vocabulary practice, grammar practice, pronunciation practice, listening practice, writing practice and scene comprehensive design practice, etc. Through such a technical means, students' all skills can be comprehensively evaluated and improved, and the learning efficiency and teaching effect can be greatly improved. The third is that relevant technical means can be used to generate some intelligent learning resources to help students better learn French. It includes such a learning resource that can generate different difficulties and then be suitable for different students. For students with good grades, the difficulty of their

homework will be improved to a certain extent, while for students with poor foundation, the difficulty of their homework will be the basic part.

Methodology

Research Questions

The study is guided by the following research questions:

RQ1: What types of AI-supported instructional tools are used in the teaching and learning of French as a Foreign Language in Nigerian universities?

RQ2: How do AI-supported instructional tools relate to learner engagement and French language learning outcomes?

RQ3: To what extent does learner autonomy mediate the relationship between AI-supported instruction and learning outcomes?

RQ4: How do instructor mediation, institutional support, and ethical awareness moderate the effectiveness of AI-supported learning environments?

Research Design

A mixed-methods approach was adopted, combining quantitative experimental measures with qualitative insights to capture both learning outcomes and participant perceptions.

Participants

Participants consisted of 72 undergraduate students enrolled in French language programs and 18 French language lecturers from four universities in Nigeria as an Anglophone country. The participants were randomly selected without following specific criteria.

Instruments

AI-assisted instructional modules (vocabulary, grammar, and reading comprehension)

Standardized language proficiency tests

Structured questionnaires.

Semi-structured interview protocols

Procedure

Over a 5-week term, AI-based tools including adaptive learning platforms, NMT-based reading assistants, and intelligent grammar feedback systems were

incorporated into instruction. Learners completed weekly tasks using the platforms, while instructors monitored progress via built-in analytic dashboards.

The below table and graph show 4 key metrics for AI assisted and human mediated activities across the 5 weeks.

Week	Vocabulary scores AI	Vocabulary scores Human	Grammar scores AI	Grammar scores Human
1	55	60	50	58
2	60	62	55	61
3	65	66	60	64
4	70	69	65	68
5	75	72	70	71

Graph

The line chart shows a progress scores over 5 weeks, comparing AI-assisted and Human-mediated activities.

Vocabulary: Circle (AI versus Human)

Grammar: Square (AI versus Human)

Trend: Both AI and Human scores improves over time, with human slightly ahead initially, but AI shows faster gains by week 5. The Percentage Improvement in Vocabulary and Grammar Learning Outcomes under AI-Assisted and Human-Mediated Instruction (Weeks 1–5).

Percentage increase was calculated relative to week 1 baseline scores using the formula:

Percentage increase = $\frac{\text{week n score} - \text{week 1 score}}{\text{week 1 score}} \times 100$

Week	Vocabulary (AI) % Improvement	Vocabulary (Human) % Improvement	Grammar (AI) % Improvement	Grammar (Human) % Improvement
1	0.0%	0.0%	0.0%	0.0%
2	9.1%	3.3%	10.0%	5.2%
3	18.2%	10.0%	20.0%	10.3%
4	27.3%	15.0%	30.0%	17.2%
5	36.4%	20.0%	40.0%	22.4%

The percentage improvement in students' vocabulary and grammar performance over five instructional weeks. AI-assisted learning demonstrates accelerated gains in both linguistic domains, with convergence observed in Week 5, where AI-supported outcomes approach or exceed those of human-mediated instruction.

Description and Interpretation

Figure 1 presents the longitudinal percentage improvement in vocabulary and grammar scores among students exposed to AI-assisted learning and human-mediated instructional support. Both instructional modes show progressive improvement across the five-week period; however, the growth trajectory differs notably in magnitude and rate.

In vocabulary acquisition, AI-assisted learning exhibits a steeper improvement curve, rising from 0% in Week 1 to 36.4% by Week 5, compared to 20.0% under human-mediated instruction. This accelerated growth suggests that AI tools through repeated exposure, adaptive feedback, and autonomous practice substantially enhance lexical development in foreign language learning contexts. Similarly, grammar learning under AI-assisted instruction improves markedly from 0% to 40.0%, while human-mediated learning reaches 22.4% over the same period. Although human instruction maintains an early advantage, the gap narrows steadily, indicating convergence in instructional effectiveness as learners become more familiar with AI-driven scaffolding.

The convergence points observed in Week 5 highlight the pedagogical potential of AI technologies to complement formal instruction. Rather than replacing instructors, AI-assisted learning supports sustained engagement, individualized practice, and performance consistency critical factors in large Anglophone university classrooms where instructional resources may be limited.

Technical AI Methodology

AI tools utilized include the following: Google Translate API (Transformer-based NMT, 2024), DeepL Pro v2 (NMT, transformer architecture), GPT-4-Turbo (LLM, OpenAI). The Domain adaptation is Academic linguistics texts while evaluation metrics included lexical coverage, grammatical accuracy, semantic fidelity, and cultural sensitivity.

Data Analysis

Quantitative: descriptive statistics, paired-sample t-tests, ANOVA was deployed. It was also qualitative. thematic coding using NVivo, triangulation for validity.

Results

Quantitative analysis revealed significant improvements in: Vocabulary acquisition ($p < 0.01$). Grammatical accuracy ($p < 0.01$), Reading comprehension ($p < 0.05$), Survey responses indicated high teaching improvement with immediate feedback, personalized pacing, and interactive tasks. Interviews highlighted increased learner confidence, improved instructor monitoring, and enhanced engagement.

Model Variables

Conceptual Variables

Based on the AI-enhanced pedagogical model, the study identifies the following key variables:

Independent Variables

- i. AI-Supported Instructional Tools (speech recognition systems, automated writing feedback, conversational agents, adaptive vocabulary platforms)
- ii. Pedagogical Alignment (degree of integration of AI tools with curriculum objectives and assessment)

Mediating Variables

- iii. Learner Autonomy (self-regulated learning, frequency of independent practice, perceived control over learning)
- iv. Instructor Mediation (guided use of AI tools, feedback interpretation, task design)

Moderating Variables

- vi. Institutional Support (digital infrastructure, access to platforms, institutional policy)
6. Ethical Awareness (data privacy, transparency, responsible AI use)

Dependent Variables

- vii. French Language Learning Outcomes (pronunciation accuracy, lexical development, written accuracy, communicative confidence).
- viii. Learner Engagement and Motivation

Model Implications

The inclusion of mediating and moderating variables responds directly to Language Learning & Technology's emphasis on explanatory models rather than purely

descriptive accounts of technology use. By articulating hypothesized relationships among technological, pedagogical, and learner-related variables, the model enables future empirical validation using structural equation modeling, multilevel analysis, or longitudinal designs. The framework also extends technology-mediated SLA research by incorporating ethical governance and institutional support as integral components of learning effectiveness—dimensions that remain under-explored in AI-focused language education research, particularly in Global South contexts.

Proposed AI-Supported Pedagogical Model for FFL

The study proposes a nine-component model:

- i. Instructional Integration – embedding AI tools into lesson planning and assessment cycles.
- ii. Learner Autonomy Support – promoting self-regulated learning through adaptive platforms.
- iii. Instructor Digital Capacity Building – continuous professional development in AI literacy.
- iv. Institutional Infrastructure – reliable connectivity, technical support, and policy frameworks.
- v. Diagnostic Profiling (AI assesses learner proficiency)
- vi. Adaptive Content Delivery
- vii. Interactive Practice (chatbots, translation tasks)
- viii. Automated Feedback
- ix. Instructor Mediation

The proposed model conceptualizes AI integration across five interdependent dimensions: pedagogical alignment, learner-centred personalization, instructor mediation, institutional infrastructure, and ethical governance. In Nigerian Anglophone universities, where instructional time and exposure to French are limited, AI tools extend learning beyond classroom boundaries and promote sustained engagement. Importantly, instructor mediation remains central, as instructors curate AI activities, interpret automated feedback, and align digital tasks with learning objectives.

By foregrounding learner autonomy, adaptive feedback, and contextual responsiveness, the model resonates with contemporary perspectives in technology-mediated SLA that emphasize interaction, noticing, and self-regulation.

The model therefore offers a theoretically grounded and context-sensitive framework for AI-assisted French language instruction in higher education.

Implications

Pedagogical Implications

Universities should incorporate AI-based activities into FFL curricula and encourage blended learning environments.

Policy Implications

Educational authorities should invest in digital infrastructure and establish ethical guidelines for AI use in higher education.

Research Implications

Future studies should examine longitudinal learning outcomes and cross-institutional comparisons across West Africa.

Model Recommendations:

AI-Enhanced Framework for FFL Instruction in Anglophone Universities

Based on the empirical findings of this study, a context-sensitive model is recommended for the effective integration of Artificial Intelligence in the teaching and learning of French as a Foreign Language (FFL) in Anglophone universities in Nigeria. The model is structured around five interrelated pillars:

i. Pedagogical Alignment and Curriculum Integration

AI tools should be systematically embedded within FFL curricula rather than treated as supplementary or optional resources. Learning objectives, assessment tasks, and classroom activities must be explicitly aligned with AI-supported practices such as automated feedback, speech recognition, and adaptive vocabulary systems. This ensures pedagogical coherence and measurable learning outcomes.

ii. Learner-Centred Personalization

AI platforms should be leveraged to support individualized learning trajectories. Adaptive systems that respond to learners' proficiency levels, learning pace, and error patterns are recommended to enhance autonomy, sustained engagement, and self-regulated learning—particularly in large and heterogeneous classes.

iii. Instructor Digital and Pedagogical Capacity Building

Continuous professional development is essential for effective AI integration. Universities should implement structured training programs focusing on AI literacy, pedagogical use of intelligent systems, data interpretation, and ethical awareness. Instructors function as pedagogical designers and facilitators, guiding meaningful AI-mediated learning experiences.

iv. Institutional Infrastructure and Policy Support

Reliable internet connectivity, access to digital devices, and institutional subscriptions to AI-based educational platforms are critical. Universities should also establish clear policies on data privacy, academic integrity, and responsible AI use to foster trust and sustainability.

v. Ethical and Contextual Responsiveness

AI implementation must be guided by ethical considerations, including transparency, exclusivity, and respect for learner data. Tools should be selected and adapted to local sociolinguistic realities, ensuring relevance to Nigerian learners' academic and professional needs.

Conclusion

This study advances a technology-mediated, learner-centred model that situates AI as an integral component of digitally mediated second language acquisition. The findings demonstrate that AI-supported environments function as sociolect-cognitive tools that scaffold language development through interaction, feedback, and personalization rather than as autonomous instructional agents. Consistent with technology-enhanced language learning research, the effectiveness of AI integration emerges from the dynamic interaction between technological concordances, pedagogical design, and learner agency. Small sample size and short-term study. Future research should include longitudinal studies, diverse regions, and low-resource languages. AI enhances FFL teaching in Nigerian universities by improving linguistic competence, engagement, and instructional efficiency. Structured implementation, institutional support, and ethical guidelines are critical for sustainable adoption. Artificial intelligence plays a very powerful role. It can analyze the students' learning situation, master the students' learning situation, the completion of homework and a situation of answering questions in class in real time before, during and after class, so it provides a good judgment basis for teachers. With the further development of artificial intelligence technology and

higher and higher requirements for teaching, artificial intelligence will be deeply coupled with courses in the next step.

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