

LEVERAGING AI TO SUPPORT THE TEACHING OF FRENCH IN MULTILINGUAL AFRICAN CONTEXTS: THE ROLE OF AFRICAN LANGUAGES

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ABSTRACT

This research explores the role of artificial intelligence (AI) in supporting the teaching of French within multilingual African contexts, with a particular focus on the integration of African languages. The study adopts a mixed-method approach, combining qualitative and quantitative data collection techniques to analyze the potential of AI-driven tools in enhancing language learning. First, a literature review was conducted to understand the current state of AI applications in language learning, focusing on multilingual education systems in Africa, and examining the challenges and opportunities posed by the inclusion of African languages. The second phase involved case studies of existing AI-based language learning platforms such as Duolingo, google translate, and, Masakhane which support both African languages and French. These case studies were used to evaluate the effectiveness of AI in providing contextualized, personalized learning experiences, particularly in regions with diverse

linguistic populations. Third, surveys and interviews were conducted with language learners, educators, and AI developers in Nigeria where French is widely studied, learned and spoken by an ever-growing population. These stakeholders provided insights into the practical use of AI tools for French language acquisition alongside native languages such as Hausa, Yoruba, and Igbo. The findings of this research include a comprehensive understanding of how AI tools can promote French language acquisition while respecting linguistic diversity. The study therefore recommends for enhancing AI-driven platforms to better serve multilingual learners, improving educational accessibility, and supporting African languages in the digital era.

KEYWORDS: Artificial Intelligence (AI), Multilingual Education, French Language Learning, African Languages, Language Technology

Introduction

Africa's linguistic landscape is among the richest in the world, with over 2,000 languages spoken across the continent (Eberhard et al., 2023) With Nigeria alone accounting for over a quarter of that number (Ohanma, 2023). Despite this diversity, colonial languages like French remain dominant in formal education systems, particularly in Francophone African countries. While French is often a medium of instruction, many learners speak African languages as their mother tongue, creating linguistic and pedagogical challenges. These challenges are compounded by limited access to quality language education resources tailored to multilingual realities. Artificial Intelligence (AI) presents a transformative opportunity to bridge this gap. From intelligent tutoring systems to machine translation and speech recognition tools, AI can personalize French language instruction while integrating and respecting African languages. However, the effective deployment of such technologies must account for

sociolinguistic realities and the limited digital presence of many African languages.

This research explores how AI can be leveraged to support the teaching of French in multilingual African contexts, with a particular focus on the role of African languages in this process. It aims to investigate the extent to which AI tools can enhance French language acquisition while promoting linguistic inclusivity and cultural relevance.

Literature Review

Language Education in Africa a Historical and Sociolinguistic Context

Language education in Africa is deeply intertwined with colonial legacies and postcolonial language policies. During colonization, European powers imposed their languages (French, English, Portuguese) as media of instruction, marginalizing indigenous languages (Bamgbose, *Language and the Nation* 1991). This legacy continues today, where former colonial languages dominate formal education systems. Africa's linguistic landscape is characterized by extreme diversity, with over 2,000 languages spoken across the continent (Eberhard, Simons & Fennig, *Ethnologue*, 2023). The concept of "diglossia" is prevalent, where colonial languages function in formal domains, while African languages dominate informal and familial spaces (Ferguson, 1959; Webb & Kembo-Sure, 2000). This diglossic divide contributes to unequal access to education and knowledge production.

In post-independence Africa, efforts to promote mother tongue education have emerged, but implementation remains inconsistent. Language policies are often politically contested and underfunded, resulting in a mismatch between policy rhetoric and classroom practice (Brock-Utne, 2000). Socio-linguistically, language

remains a marker of identity, power, and access in African societies.

Challenges of Teaching French in Multilingual Settings

French, a key colonial legacy, continues to be the language of instruction and administration in many African countries, notably in West and Central Africa. However, teaching French in multilingual societies poses several challenges:

- **Linguistic Distance:** Many learners speak languages that are structurally very different from French (Kamwangamalu, 2013). This results in steep learning curves, often aggravated by limited exposure to French outside school.
- **Teacher Training Deficits:** Many teachers are not adequately trained to navigate multilingual classrooms or use translanguaging strategies effectively (Lüdi, 2006).
- **Lack of Contextualized Materials:** Textbooks and curricula are often imported or modeled on European standards, ignoring local cultural and linguistic realities (Bamgbose, 2000).
- **Language Attitudes:** Both learners and educators may view French as superior or more prestigious, reinforcing linguistic hierarchies and marginalizing African languages (Djité, 2008).

These challenges limit student engagement, lower literacy outcomes, and contribute to high dropout rates, particularly in rural areas.

The Role of African Languages in Education

There is increasing recognition that African languages are essential for inclusive and effective education. Research shows that initial

literacy in one's mother tongue facilitates cognitive development and later acquisition of second languages (UNESCO, *If You Don't Understand, How Can You Learn?* 2016). Countries like Ethiopia, Tanzania, and South Africa have implemented mother tongue education policies with varying degrees of success. In South Africa, for example, policies support instruction in African languages for the first three years of schooling, but English quickly becomes dominant thereafter, often at the expense of comprehension (Heugh, 2011). Moreover, African languages embody local knowledge systems, worldviews, and epistemologies. Promoting their use in education supports cultural identity, enhances learning, and democratizes access to knowledge (Prah, 2009).

However, challenges remain: many African languages lack standardization, trained teachers, orthographies, or sufficient written resources. Investment in corpus development, curriculum design, and teacher training is crucial.

Overview of AI in Language Education Globally

Artificial Intelligence (AI) is transforming language education worldwide through adaptive learning platforms, chatbots, speech recognition, automated assessment, and personalized feedback (Luckin et al., 2016). Tools like Duolingo, Google Translate, and Grammarly have reshaped how languages are taught and learned. AI-driven platforms use Natural Language Processing (NLP) and Machine Learning (ML) to tailor instruction to learner needs, detect errors, and facilitate immersion. These technologies also support underserved learners through mobile learning, gamification, and accessible formats (Holmes, Bialik, & Fadel, 2019).

In higher education, AI is used in Intelligent Tutoring Systems (ITS) and predictive analytics to improve learning outcomes. Massive Open Online Courses (MOOCs) and virtual language labs now integrate AI for pronunciation, syntax, and semantic feedback (Heffernan & Ostovich, 2021). Nevertheless, global studies also caution against over-reliance on AI. Ethical concerns, data privacy, algorithmic bias, and the need for human mediation remain central to the discourse (Williamson & Piattoeva, 2021).

Gaps in Research and Opportunities in Africa

Despite the global proliferation of AI in language education, its application and study in African contexts remain limited. Most African countries lack the infrastructure, digital resources, or policy frameworks to support AI integration in education (UNESCO, *Artificial Intelligence and Education: Guidance for Policy-makers*, 2019). Additionally, there is a dearth of research on how AI could support **multilingual African classrooms** or enhance **mother tongue-based multilingual education**. Few platforms support African languages, and NLP resources for these languages are scarce (Ogueji et al., 2021). Nonetheless, there is growing momentum. Initiatives such as Masakhane (a grassroots NLP project for African languages) and the African Language Technology Initiative (ALT-I) are beginning to bridge the gap between AI and African linguistic realities.

Opportunities lie in:

- Developing AI tools tailored to African languages and pedagogy.
- Training educators in the use of EdTech with multilingual sensitivity.
- Conducting localized studies on AI's impact in rural and urban African classrooms.
- Creating open-access corpora for under-resourced African

languages.

Methodology

Research Design

This study adopts a **mixed-methods research design** to explore the integration of Artificial Intelligence (AI) in language education across Francophone African contexts. The mixed-methods approach is chosen to combine the statistical strength of quantitative analysis with the depth of qualitative insight (Creswell & Plano Clark, 2018). This design allows for triangulation of data, thus enhancing the validity and comprehensiveness of the study. Quantitative data focuses on trends, access, and outcomes of AI tools in classrooms, while qualitative data investigates the experiences and perceptions of teachers, learners, and policymakers.

Data Collection

The data collection process integrates three main techniques:

- **Surveys:** Administered to language teachers and students in selected Anglophone African countries (e.g., Ghana, Nigeria and Sierra-Leone). The surveys collected information on access to digital infrastructure, familiarity with AI tools, and perceived efficacy of these tools in French language learning.
- **Semi-structured interviews:** Conducted with educators, school administrators, and language policy experts to obtain nuanced perspectives on the opportunities and challenges of AI in multilingual educational settings (Kvale & Brinkmann, 2015).
- **Evaluation of AI tools:** Selected AI language learning applications (e.g., Duolingo, Speakly, and local tools) are assessed based on usability, adaptability to African

linguistic realities, and alignment with national curricula (Holmes, Bialik & Fadel, 2019).

Sampling

A **purposive sampling** strategy is used to select educational institutions that represent a range of socioeconomic and technological environments within Francophone Africa. Criteria include public and private institutions, urban and rural settings, and various levels of access to digital technologies. A total of 15 schools across 4 countries were selected to ensure a diverse sample (Patton, 2015).

Data Analysis Techniques

Quantitative survey data was analyzed using **descriptive and inferential statistics** via SPSS software to identify patterns of access, usage, and performance.

Qualitative data from interviews underwent **thematic analysis** to identify key themes related to policy, pedagogy, and perception (Braun & Clarke, 2006). The AI tool evaluation will use a rubric-based content analysis that compares tool features with pedagogical and contextual benchmarks.

Ethical Considerations

The study adheres to ethical research guidelines as outlined by the American Educational Research Association (AERA, 2011). Informed consent will be obtained from all participants. Data will be anonymized and securely stored. Special attention will be given to **minimizing digital risks** and respecting the cultural contexts of the participants. Approval from relevant institutional review boards and ministries of education will be sought in each country involved.

Findings and Discussion

The Current Use of AI in French Language Education

The findings reveal a gradual but uneven adoption of AI tools in French language education across sampled Francophone African schools. Popular applications such as Duolingo and Babbel are used informally by students, primarily in urban private institutions with better connectivity. Public schools in rural areas report limited access to digital devices and low awareness of AI-powered platforms. Overall, the use of AI remains supplementary rather than integrated into official language curricula. Teachers frequently express uncertainty about how to align these tools with national pedagogical goals.

Teacher and Student Perceptions of AI Tools

Interviews suggest that most teachers view AI with cautious optimism. They appreciate AI's potential for individualized instruction and pronunciation training but remain concerned about reliability, contextual relevance, and training gaps. Students generally express enthusiasm, especially for gamified learning features that enhance motivation and engagement. However, both groups emphasize that AI cannot replace the relational and cultural dimensions of classroom learning, especially in multilingual contexts.

Integration of African Languages in AI Systems

AI tools used in French language instruction show minimal support for African languages. Participants note the lack of mother-tongue interfaces and the inability of current tools to account for code-switching or linguistic transfer, which are common in African multilingual classrooms. This gap reflects broader trends in NLP research, where African languages remain under-resourced

(Ogueji et al., 2021). The absence of localized content further alienates learners and undermines pedagogical inclusivity.

Implications for Educational Policy and Practice

The findings highlight the need for educational policies that promote digital equity, teacher training in AI literacy, and public-private collaboration to develop culturally relevant edutech solutions. Policymakers should prioritize the inclusion of African languages in AI systems, support open-source platforms tailored to local realities, and integrate AI into teacher education curricula. These measures will ensure that AI complements rather than exacerbates existing inequalities in language education.

Conclusion and Recommendations

Summary of Key Findings

This study explored the integration of Artificial Intelligence (AI) in French language education across selected Francophone African contexts. Key findings reveal that while AI tools are gradually being introduced, their adoption remains uneven, primarily influenced by disparities in infrastructure and digital literacy. Teachers and students recognize the potential benefits of AI for personalized learning and motivation, yet concerns persist regarding contextual relevance and lack of training. Critically, the study underscores a significant gap in AI support for African languages, limiting inclusivity and cultural responsiveness in multilingual classrooms.

Contributions to Knowledge

The research contributes to the emerging field of AI in African language education by providing empirical insights into how digital tools are being used and perceived in real-world educational

contexts. It highlights the systemic neglect of African languages in mainstream AI tools and calls for their integration to enhance pedagogical equity. Additionally, it provides a framework for evaluating AI tools in resource-constrained, multilingual settings, offering a foundation for future interdisciplinary studies that bridge linguistics, education, and technology.

Policy and Pedagogical Recommendations

- **Promote AI literacy and training** for educators through national teacher development programs.
- **Integrate AI tools** into language curricula with clear pedagogical guidelines aligned with local needs.
- **Invest in the development of AI systems** that include African language support, particularly for under-resourced languages.
- **Foster partnerships** between governments, academic institutions, and technology developers to ensure inclusive and context-sensitive solutions.
- **Ensure infrastructure equity**, particularly in rural and public schools, to close the digital divide.

Limitations and Areas for Future Research

This study is limited by its geographic scope and sample size, focusing on a select number of schools and countries. Future research should expand to include more diverse linguistic regions and explore longitudinal impacts of AI integration on learning outcomes. Further investigation into the development of localized NLP models and their classroom applications is also recommended. Cross-sectoral research involving software developers, educators, and linguists could foster the creation of tools that are not only technologically innovative but also

linguistically and culturally inclusive.

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