

HARNESSING ARTIFICIAL INTELLIGENCE FOR LANGUAGE EDUCATION: A KEY TO NATIONAL DEVELOPMENT.

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Abstract

The integration of Artificial Intelligence (AI) in language has transformed the way we learn and teach language offering unprecedented opportunities for national development. The paper explores the impact of AI in language education and national development, highlighting the potential benefits and challenges of AI powered Language learning tools. AI driven language learning platforms, virtual assistants and chatbots have made language education more accessible, prominence, personalized and engaging. These tools can help address the shortage of language teachers, resources and infrastructure particularly in developing countries like Nigeria. Moreover, AI-powered language education can enhance language proficiency, cultural comprehension and communication skills, essentially for global competitiveness and national development. However, the adoption of AI in language education also raises concerns about job displacements, bias and data privacy. This papers argues that policy makers, educators and stakeholders must collaborate to harness the potentials of AI in language while addressing these challenges. While language is seen as the tool with which human beings express their feelings and communicate effectively with one another, AI still played a vital role for language education and national development. This paper concludes that AI – powered language education can drive national development by improving language proficiency, promoting cultural exchange and promoting economic opportunities. To achieve this, Nigeria must invest in AI infrastructure, develop AI literacy among educators and create policies that support the integration of AI in language education.

Keywords: Artificial Intelligence, Language Education, National Development, Language Learning, AI Literacy.

INTRODUCTION

The rapid advancement of digital technologies has significantly transformed many sectors including education. Among these technologies, Artificial intelligence (AI) has emerged as a powerful tool capable of improving teaching and learning processes. AI refers to computer system that can perform tasks that normally require human intelligence such as learning, reasoning and decision making.

Language education which involves the teaching and learning of languages plays a crucial role in communication, cultural exchange and national development. In an increasing globalised world, proficiency in language – especially international languages such as English, French and Chinese – has become essential for participation in global markets diplomacy and knowledge exchange.

According to (Udeze, 2024), Artificial intelligence is wildly being integrated into language education through applications such as automated language translation speech recognition, chatbots and intelligent tutoring systems. These tools/mechanisms support personalized learning and provide learners with real time feedback and adaptive learning experiences. Studies show that AI-based language learning system can significantly improve vocabulary as well as the four language acquisition skills: listening, speaking, reading and writing when used alongside traditional teaching methods.

This paper explores the relationship between artificial intelligence language education and national development. It aims at highlighting how AI can facilitate language learning and adds to building a knowledgeable workforce capable of driving national growth.

CONCEPT OF ARTIFICIAL INTELLIGENCE

Artificial intelligence refers to the stimulation of human intelligence in machines that are programmed to think and learn (Bambose 2011). AI systems use technologies such as machine learning, natural language processing, and data analytics to analyze information and carryout decisions.

Mohammed and Watson (2019) cited in AIED work: “The basic definition of artificial intelligence can be expressed as the skillful imitation of human behavior or mind by tools or programmes.”

UNESCO (2023) defines AI as tools that can produce automated texts, images, videos, music and software codes” and frame AI in education through a human centred lens.

“UNESCO's Mandate calls inherently for a human-centred approach to AI. It aims to shift the conversation to include AI's role in addressing current inequalities regarding access to knowledge, research and the diversion of cultural expressions and to ensure AI does not widen the technological dividends within and between countries.”

OECD, (2024) recommended definition of Artificial Intelligence: “an AI system is a machine-based system that for explicit or implicit objectives, how to generate outputs such as predictions, contents, recommendations or decisions that can influence physical or virtual environment”. This implies that AI is treated as machine-based system that infer and generate outputs to achieve objectives. In education, they emphasis what AI does Mastery learning, tutoring, adaptation, content generation and how those capabilities compare to human skills.

In the educational context AI can perform several function including;;

- **Automated assessment and grading:**

What it does; all grades multiple choice, short answers, essays and even code sub missions automatically.

Pros: saves teachers tons of time, gives students instant feedback, removes human grading bias for objective questions.

Cons: struggles with nuance, creativity and context in essays, can be gamed if students figures out the rubric pattern.

Verdict: excellent for quizzes, math and first-draft feedback. Still needs human oversight for high-stakes or subjective work.

- **Intelligence Tutoring Systems(ITS):**

What it does: acts like a 1-on-1 tutor that adapts to students mistakes in real time. Think Carnegie learning's Mathia or Duolingo's explanation..

Pro: available 24/7, patient, explains concepts multiple ways, targets specific misconceptions.

Cons: can't replace human empathy or motivation. Weak on open-ended discussion and social learning.

Verdict: strong for skill-building subjects like Maths, coding, language drills. Best for replacement.

- **Personalized learning pathways:**

What it does: AI analyses performance and build a custom sequence of lessons, pace and difficulty for each student.

Pros: lets fast learners move ahead and struggling students get more practice. Increases engagement because content feels relevant.

Verdict: one of AI's biggest promises in education. Works best when combined with teacher input to keep the pathway broad.

- **Learning analytics and performance tracking:**

What it does: collect data on time-on-task, error patterns, engagement and predicts who might fall behind.

Pros: gives teachers early warning signs, helps school allocate supports, shows students their own progress.

Cons: privacy concerns with students data risk of reducing learning to dashboards and metrics. Correlation – causation.

Verdict: powerful for intervention and decision making, but needs clear ethics policies and human interpretation.

- **Natural language processing for language learning (NLP)**

What it does: uses natural language processing for speech recognition, grammar correction, conversation practice and translation. Think Duolingo max, ELSA speak.

Pros: instant pronunciation feedback, endless conversation practice without embarrassment, personalized vocab.

Cons: still worse than humans at pragmatics, humor and cultural nuance. Can reinforce unnatural phrasing.

Verdict: game-changer for getting input and low-stake practice. Fluency still needs real human interaction.

AI system can analyze students learning patterns and provide customized learning experience based on individual needs and abilities. These technologies assist educators monitor students progress and improve teaching strategies. AI also promotes Educational assessment by providing automated scoring, rapid analysis of learning data and timely feedback to students, thereby improving learning situation.

In language education, AI integrates technologies such as;

Natural language processing (NLP) enables computers to understand and generate human language.

Machine learning - allows systems to learn from data and improve over time.

Speech recognition – helps learners practice pronunciation and speaking skills

Intelligent tutoring systems (ITS) – provide personalized learning guidance.

AI-powered educational platforms can analyse learners strength and weakness adapt lessons accordingly and offer real time feedback. These technologies create a learner centred environment that enhances language acquisition and improves learning outcomes.

AI- assisted language education has become an inter disciplinary field combining linguistics, computer science, and pedagogy to create more effective language learning systems.

ROLE OF ARTIFICIAL INTELLIGENCE IN LANGUAGE EDUCATION

Akinsemolu and Onyeaku (2025) stated five roles of AI in language education.

Personalized learning:

One of the most significant contributions of AI to language education is personalized learning. AI

systems can analyse learners performance and tailor learning materials to meet individual needs. Students who struggle with grammar, vocabulary or pronunciation can receive customized exercises designed to improve their speech weaknesses. Adaptive learning platforms adjust the difficulty level of lessons based on learners' progress. The approach ensures that students learn at their own pace and receive targeted support when necessary.

Automated feedback and assessment:

AI technology can automatically evaluate students' writing, grammar and pronunciation. Automated writing evaluation systems assess essays and provide suggestions for improvement. Similarly, speech recognition tools evaluation pronunciation and provide feedback to learners. These systems help teachers save time on grading and allow students to receive instant feedback which improves the learning process.

Interactive learning through chatbots:

AI chatbots stimulate human conversation and provide opportunities for learners to practice language skills in a realistic environment. Learners can interact with AI chatbots to improve their speaking and learning skills without fear of making mistakes. The interactive approach increases students' confidence, enthusiasm and encourages continuous practice.

Language translation and accessibility:

AI-powered translation tools help learners understand unfamiliar words and sentences. These tools also facilitate communication between speakers of different languages. Machine translation technologies have expand access to educational materials by translating content into multiple languages, making learning more inclusive.

Intelligent content creation:

AI can generate learning materials such as quizzes, exercises and reading passages. Teachers can use AI tools to design customized teaching materials that match the needs of their students. Their capabilities enhance teaching efficiency and enable educators to focus more on monitoring and guiding learners.

BENEFITS OF AI IN LANGUAGE EDUCATION

Improved learning outcomes:

Research shows that AI has a significant positive impact on language learning performance, particularly in vocabulary, reading, writing, listening and speaking skills. AI technologies support active learning by providing interactive activities and real time feedback, which improves comprehension and retention.

Increased access to education:

AI based language learning platforms allow students to access learning resources anytime and anywhere. This flexibility is particularly beneficial for learners in remote or deserved areas where qualified language teachers may be limited.

Enhanced student engagement:

Gamified learning platforms and AI powered applications make language learning and engaging and pleasurable. Interactive activities encourages students to participate actively in the learning process.

Support for teachers:

AI assists teachers by automating administrative task such as grading and data analysis. This allows educators to focus more on instructional activities and students' support.

Personalization & adaptive learning:

This create an avenue where AI tutors can diagnose gaps and adjust pace/content for each learner.

Learning support & feedback

Gen AI acts as a thinking partner available anytime. Students can use Gen AI to ask clarifying questions, summarize a reading or to help find resources as a thinking partner.

Teacher workload reduction

Automates routine tasks so teachers focus on high value work. UNESCO's Framework list "AI for professional development" and AI pedagogy to help teachers leverage AI for innovative teaching methods and driving their own lifelong professional development.

Enhance accessibility & inclusion

Develops AI literacy & 21st century skills

CHALLENGES OF AI IN LANGUAGE EDUCATION

Despite its benefits, the integration AI in language education also presents several challenges.

Digital divide: Not all students have access to the technology required to use AI tools. Limited access to computers, smart phones and internet connectivity can widen educational inequalities.

Ethical and privacy concerns: AI systems collect and analyse large amounts of students' data. This raises concern about data privacy, security and the ethical use of information.

Over-relevance of technology: Excessive reliance on AI tools may reduce students' independent thinking and problem-solving skills. AI should complement traditional teaching methods rather than replace teachers.

Algorithms Bias: AI systems may reflect present in their training data. This can lead to unfair or inaccurate results in language evaluation and content generation.

Pedagogical quality: review prioritise empirical evidence of learning gains and retention rates, not just user experience. Long term transfer remains understudied. AI used as a short cut instead of improving learning.

Cultural and linguistic bias: AI responses may simplify complex concepts and most tools are optimized for high resource languages.

Context and generalisation: research notes limits of single cultural contexts and calls for cross cultural comparative work.

Infrastructure: electricity, internet and device access mediate impact, yet few studies model cost-effective, scaling in low resource settings inadequate computers etc.

Measurement: self report measurement introduce bias objective indicators like eye-tracking and learning analytics are recommended

Artificial Intelligence and national development: Language education supported by AI contributes significantly to national development in several ways.

Human capital development: A well-educated population with strong language skills is essential for economic growth. AI-enhanced language education improves communication skills and prepares individuals for global employment opportunities.

Economic growth and innovation: Countries that adopt advanced technologies in education develop a workforce capable of driving innovation and technological progress. A literacy and language proficiency enable citizens to participate in the global digital economy.

Global communication and diplomacy: Language skills are essential for international trade, diplomacy and cultural exchange. AI tools help individuals learn global languages more efficiently, improving international communication.

Knowledge economy: In the knowledge based economy, access to information is critical. AI-powered language tools enable people to access and understand global knowledge resources, promoting research, innovation and development

SOLUTIONS

Pedagogy-first design: starts with learning outcomes, then choose AI tools that support them, OECD calls this "ensuring digital technologies are used to enhance teaching and learning, not as an end in themselves."

AI-combination assessments: blend AI-integrated tasks with AI-resistant activities. Example students are Gen AI to draft an argument, then students are Gen AI to critique flaws in class, keep focus on critical thinking and foundational skills.

Teacher training on AI Pedagogy: UNESCO's AI competency framework for teachers' list "AI pedagogy as a core domain – supporting teacher to leverage AI for innovative methods while ensuring AI complements, not replacing teachers.

Cultural and linguistic bias: The solution to this challenge is that cross cultural system design should be practiced whereby it could recognize diverse educational traditions from the start, not as superficial add-ons. "incorporating local knowledge system in AI, development is essential for achieving ethical implementation". In the process it should incorporate the following indices: audit and mitigate bias, policy on EAL/disability use and diverse governance.

Context and generability: discipline + local co-design approach should be put in place where AI literacy is built into subject-specific courses using local case studies, not generic prompts. The framework encourages integrating AI-related topics into core subjects across the curriculum emphasizing inter disciplinary learning in both STEM and social studies. In doing this, you take into cognizance; teacher led adaptation where you give teachers tool kits to modify AI task for their context, also context-sensitive evaluation. This is where socio-emotional impact of AI necessitates implementing context-sensitive emotional support systems tailored to local cultural understanding rather than relying on imported models.

Infrastructure: these are the following ways to solve this challenge.

Low-resource AI design: prioritize tools that work offline, on mobile or with low bandwidth. UNESCO Beijing consensus urges member states to harness AI "while ensuring that its application... is inclusive and equity.". also that, they should be a Bring-your-device institutional licenses where enterprises versions are like Gemini app with privacy protections provided so that all students/faculty have equal access to secure tools, not just those who can pay.

Measurement: The solution is that some approaches such as:

Authentic assessment redesign, define allowable AI use per task and this approach takes four categories

- Assist learning
- Improve students' work
- Generate new content
- Not allow clarity let you measure student's skill not AI skill (Amali, 2025)

RECOMMENDATIONS FOR EFFECTIVE INTEGRATION OF AI IN LANGUAGE EDUCATION

To maximize the benefits of AI in language education, the following strategies should be implemented

Teacher's training: educators should receive training on how to effectively use AI tools in language teaching.

Infrastructural development: government should invest in digital infrastructure to ensure equal

access o AI technologies.

Ethical guidance: policies should be established to ensure responsible use of AI and protect student data.

Blended learning approach: AI should complement traditional teaching methods rather than replace teachers.

Curriculum integration: educational curricular should incorporate AI-based learning tools and digital literacy skills.

CONCLUSION

Artificial intelligence is transforming language education by introduction innovative tools that education by introducing innovative tools that enhances AI technologies provide personalized teaching experiences, environments that improve language acquisition. These advancements increase access education, support teachers and enhance student engagement.

Beyond the classroom, AI driven language education contributes significantly to national development by improving human capital, fostering global communication and supporting economic growth. However, challenges such as digital inequality, ethical concerns and over-reliance on technology must be addressed to ensure responsibility and effective implementation. Ultimately, AI should be viewed as a supportive tool that enhances the role of teachers and expands educational opportunities. With proper policies, infrastructure and training, Artificial Intelligence can play a vital role in Strengthening language education and promoting sustainable national development.

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