LANGUAGE TEACHING AND LEARNING: EXPLORING AI-RELATED BENEFITS AND CHALLENGES IN THE EDUCATION FIELD

[1]Ife AJEPE and [2]Afeez Bolanle YUSUFF
[1]Department of Languages and Literary Studies,
Afe Babalola University, Ado-Ekiti, Ekiti State
[2]Centre for General Studies (CGS), University of Ibadan, Nigeria

Abstract
Digital technologies have become practical focal points in the language teaching but there are huge gaps in the acceptance of artificial intelligence (AI) in higher institutions of learning. Therefore, this paper discusses AI-related benefits and challenges in language teaching and learning in the education field. The AI machines are: Natural Language Processing (NLP), Machine Learning (ML), Deep Learning (DL), AI Writing Assistants, and Chatting Robots, used for language teaching and learning. AI applications introduce practical training in language skills and educational games based on language. Communication tools based on AI help design situations for practising the accurate pronunciation of letters and words through sound drills and visual media. The AI-related challenges are limited language options, academic dishonesty, lack of accountability and laziness among students and lecturers. The paper concludes that the use of AI-based language education tools could promote the development of digital literacy skills among educators and learners in higher institutions of learning.

Keywords: Artificial intelligence, Language teaching, Learning skills, Educational games

Introduction

Digital technologies have become scientific and practical focal points in the language teaching world. Whether digital media is a friend or a foe, technology-enhanced language learning has been part of an international discourse, varying between euphoric proposals, pessimistic stances and opinions which stress that the risks of digital media need to be addressed. Regardless of general technology-enhanced language learning, research studies have shown that technology can influence the processes and outcomes of education and many countries are investing in technological support for teaching and learning (Paiva & Bittencourt, 2020). The dynamic development of new technologies and the concomitant digital transformations result in significant challenges both for society as a whole and at all levels of the education system. One of the latest technological developments, which raises more interest is artificial intelligence (AI).

The development of AI explicitly shows that data-driven, multi-layered technologies based on algorithms have transformed from a niche discipline into a highly relevant technology for educational purposes which include language learning. The potential of these programmes to analyze unprecedented amounts of data, collected in real time, combined with novel methods from the field of AI, are bringing the optimisation of language teaching and learning processes into particular focus. AI reshapes key aspects of education and it influences humans' contribution to life basically. Some could argue that AI's functions are hyperbolic not futuristic but it is a fact that language teachers and teacher educators have experienced firsthand knowledge and basic notions of

their profession have been challenged by technologies. Thus, Big Data, combined with sophisticated analytical processes (learning analytics) give hope for a new era of personalised language learning, formative assessment, and activating, student-centered, and collaborative forms of language learning (Cope & Kalantzis 2016).

New technologies affect the educational system much more substantially than merely on the level of didactic surface structures. This is because they blur the boundaries between formally organised learning environments in schools and informal learning opportunities in leisure time and at home. They challenge learners and teachers to adopt an entirely new approach to these new digitally enhanced educational spaces. The development of AI-based language learning environments that adapt to learner heterogeneity enables the high-level language learning and practice. English language learning programmes are among the most widely used applications on the Internet and Computer-Assisted Language Learning (CALL) software of various kinds has widely been used for several decades (Blume, Schmidt & Schmidt, 2017). A great desideratum is to intensify interdisciplinary cooperation between computer-linguists, experts in teaching language, educational scientists, psychologists, computer scientists and interface designers in order to develop smarter language learning systems (Schmidt & Strasser, 2022). This paper attempts to discuss AI-related benefits and challenges in language teaching/ learning, education and literacies.

Artificial Intelligence

There are many different definitions of what exactly Artificial Intelligence (AI) is. However, Healey's (2020) definition seems to be a certain semantic lowest common denominator: Artificial intelligence (AI) is a broad term used to describe a collection of technologies that can solve problems and perform tasks to achieve defined objectives without explicit human guidance. AI is what sets certain software apart from computer programmes in general and it can offer personalised learning experiences. It can enhance language assessment with automated grading and feedback and facilitate immersive language practice through chatbots and language processing tools.

According to Wang (2018), AI refers to devices' or systems' ability to think as human beings, having the power and skills to learn, perceive, and decide rationally and intelligently. AI includes a collection of technologies that enable machines to act with a very high level of intelligence similar to humans. It is a cluster of technologies and various computing science approaches to make flexible rational decisions that align with unpredictable environmental conditions. (Tredinnick, 2017). AI is like machines, computers or computer systems that imitate cognitive functions or tasks that are normally associated with the human mind, such as learning and problem solving. It is a science and a set of computational technologies that are inspired but they typically operate quite differently from the ways people use their nervous systems and bodies to sense, learn, reason, and take action (Russell & Norvig, 2010; Baker & Smith, 2019). Therefore, AI is the imitation of human intelligence processes such as speech and visual recognition, translation of the languages and virtual decision making by machines and robots. The ability of machine to think and behave like human beings, has given AI a special place in all

fields. AI is present everywhere in various aspects of our lives starting from intelligent sensors to personal assistants.

AI Applications in the Education Field

There are various applications of AI in the education field including content design, delivery, assessment, feedback and support. In terms of content design, AI can enable the designing of content which is friendly and flexible. According to Culican (2024), Al algorithms can scan large data to tap into the gaps, thus creating content that is interesting and trendy. AI can also be used for making content including textbooks, personalised learning materials and interactive courses according to the target audience. AI tools enable the development of educational material that is based on natural language processing capabilities, thus ensuring material that is consistent, concise and grammatically correct (Dawes, 2023). In terms of delivery of contents, AI enables delivery of contents more efficiently and flexibly by substituting classroom instruction and providing support for students to learn from anywhere in the world at any time. In the future, AI systems might replace lecturers in some subjects. Currently, some educational programmes are equipped with AI and scaffolding to learn basic skills.

AI is a computer science field that focuses on the development of non-human technologies that can perform tasks that have been traditionally known to require human intelligence such as decision-making, perception, and problem-solving (Mintz & Brodie, 2019; Zhang & Lu, 2021). AI application in language education offers numerous benefits that outweigh any potential or perceived costs. This is because AI-powered language education tools can provide personalized learning paths, real-time feedback, gamification, and increased accessibility. Since these tools can be used anywhere and anytime, they make language learning more accessible to learners who may not have access to traditional language classes (Guilherme, 2019). AI-powered language education tools can be less expensive than traditional language classes, saving students and educators lots of money. AI has also been praised for saving time for educators by automating grading and assessment it optimises the learning process for both teachers and learners (Fitria, 2021).

Baker and Smith (2019) divide AI tools used in education into three groups: Learner-facing, Teacher-facing and System-facing Tools. Learner-facing AI tools are software that students use to learn a subject matter. Teacher-facing systems are used by teachers with the purpose to reduce their workload and make their output more effective in specific automating tasks, such as administration, assessment, feedback and plagiarism detection. System-facing AI tools provide information for administrators and managers on the institutional level, for example, they help monitor attrition patterns across faculties or colleges.

AI applications are widely used in education specifically, including personalisation of learning, accommodating special needs learners and supporting system and school management. With AI in terms of instruction, AI's biggest promise lies in the personalisation of learning and learning materials. Personalised learning is an educational approach aimed at customising learning based on students' individual needs and strengths. AI applications can identify pedagogical

materials and approaches adapted to the level of individual students, and make predictions, recommendations and decisions about the next steps of the learning process based on data from individual students. AI provides adaptive educational systems shape students' learning path through appointed learning materials. Some AI powered tools can customise learning materials for a specific learner, course or school and create, for example, personalised textbooks. Personalised learning materials are an alternative to traditional textbooks and materials which represent the so-called one-size-fits-all‖ approach to schooling in which teachers provide all students in each class or course with only one type of learning materials. Supporting students with special needs: AI systems have already shown their effectiveness to help students with disabilities, e.g. visual or hearing impairments or impairments in social skills (language and communication), to benefit from education. For example, wearables using AI can help visually impaired students to read books and recognise faces, and thus to learn and socialise within their communities (Sharma, 2021; Schmid, Blanc & Toepel, 2021).

AI-Powered Tools Used for Language Teaching and Literacies

Lecturers could use the software facility of artificial intelligence application to carry out the language learning process. This application helps students improve on language skills and English language (Vasiljeva, Kreituss & Lulle, 2021). Students learn grammar, spelling, word matching, and sentences construction by artificial intelligence application. It can detect students' mistakes in writing and give them feedback. Mozgovoy (2011) states that grammar examination is important in text writing and language learning. Artificial intelligence provides feedback on students' assignments so that they can make improvements. This can affect student learning activities. With this assistance, students will be motivated to learn if the mistakes they made in grammar, diction, or sentence construction are corrected and the corrections are returned to students. Mistakes in writing can also be traced by the application of artificial intelligence. Cotos (2011) says that students get feedback from artificial intelligence, then reread and improve their writing and practice to become independent learners It seems to be of relevance to specify the following general AI key concepts in terms of AI-powered language learning (Miller, 2019; Schmidt & Strasser, 2022).

According to Woo and Choi (2021), AI tools developed for learning and natural language processing were used to identify errors, provide feedback, and assess language abilities. The main aim of any language teacher is to develop communicative competence in students, which is achieved through knowing how to use language elements and vocabulary to develop the skills of listening, speaking, reading, and writing. It also includes how to use language to produce texts, and how to use it to understand reading passages. Some of the AI tools or machines used for language teaching or learning and literacies are discussed as follows:

A. *Natural Language Processing (NLP):* Natural Language Processing (NLP) is an area that combines AI and linguistics in general and is concerned with the automated processing of human language. It addresses the generation and analysis of written and spoken language, though

speech processing is often regarded as a separate subfield. NLP can be seen as the applied side of computational linguistics, the interdisciplinary field of research concerned with formal analysis and modeling of language and its applications at the intersection of linguistics, computer science, and psychology (Meurers, 2012).

B. *Machine Learning (ML):* Machine Learning (ML) is a type of AI that allows software applications to become more accurate at predicting outcomes without being explicitly programmed to do so. Machine learning helps us find solutions to many problems in vision, speech, recognition, and robotics (Alpaydin 2014). Furthermore, it can be claimed that ML refers to programming computers and their corresponding applications software to optimize a performance criterion using example data or past experience. Most of the data used in education is generally personal data that requires particularly high levels of data privacy and data security. Hence, example data must be categorized in order to use it for NLP purposes.

C. *Deep Learning (DL):* Deep Learning (DL) is a subfield of AI that uses Artificial Neural Networks (computing systems resembling specific neural networks of a human's brain) to learn from extensive data sets (Schmidhuber, 2015). Deep Learning mainly focuses on vision-based categories such as distinction of images, but can also be used for NLP purposes. AI based systems provide language learners with the environment where they can choose their own path and pace of learning, and where learners can take more control over their own learning. AI powered systems facilitate development of learner's decision-making skills and lead to their learning autonomy. Students can digitally connect with native speakers around the world or to use AI-powered conversational tools such as chatbots to intensify their learning without a teacher's personal involvement. Language learners have more opportunities to be more active participants in the learning process rather than passive recipients of knowledge. Teaching becomes more learner-centered, since learners are expected to be able to make their own decisions and become responsible for their work more independently. The teacher, on the other hand, abandons his/her previous position of the only authority and decision-maker, to become rather a facilitator and supporter of learners (Bancheri, 2006; Pokrivcakova, 2019).

D. *AI Writing Assistants:* AI Writing Assistants help users through various steps of the writing process (augmented writing). Using AI systems, they correct grammatical errors within a written text (via conducting a continual error analysis), provide recommendations for later improvements and provide additional resources for further study. In foreign language classrooms, these systems help learners to go through the writing process individually, correct themselves, and think about the

process itself. Using AI in this way facilitates learner's self-regulation and autonomy. The examples of AI writing assistants are Grammarly, ProWriting Aid, Textio, AI Writer, Textly AI and Essaybot (Pokrivcakova, 2019).

E. *Chatting Robots (Chatbots):* Chatting Robots (Chatbots) are communication tools that represent one example of human-machine interaction. A human user and a computer (robot) are engaged in informal chat (in a written or spoken form) using a natural language. Chatbots are most frequently utilised in marketing communication. However, they may be used effectively in language classrooms as well (Kerly, Hall, and Bull, 2007). Learners can learn through the process of direct communication with a robot. In addition, chatbots can provide customised answers in response to learners' messages, grade their performance, and provide tips on what learners need to improve. Most students enjoy using the chatbots and they generally fill more comfortable conversing with the bots than a student partner or teacher. A chatbot could be used to motivate learners to practise English (Fryer & Carpenter, 2006).

F. *AI-powered Language Learning Software:* When it comes to language learning, online platforms are increasingly becoming the norm. Cloud-based online platforms incorporating NLP, crowdsourcing, gamification elements, automatic speech recognition, automatic speech generation and AI writing assistant applications belong to the most popular learning aids used by young users. In addition, AI provides with several resources to people who speak different languages or have hearing or visual difficulties. Presentation Translator provides subtitles in real-time mode, which is an AI-based system application. For example, with the help of google translator, students can read and hear in their national language (Qoura & Emansi, 2023).

G. *Speaking and Listening:* Speaking and Listening are made better by the help of Al tools that include a. Intelligent personal assistants by examining comprehensibility, usability, and improvements in listening comprehension, speaking proficiency, and willingness b. Programmable robots were used in group conversations c. Neural-Network-based dialogue system was used for free conversation practice and d. An NN-based multimodal dialogue system was also developed to holistically assess spoken language in terms of delivery, content, vocabulary and grammar. With these tools, the learners became more confident, willing and less anxious about speaking in English (Qoura & Emansi, 2023).

AI-Related Challenges in the Language Education and Literacies

Some of the identified AI-related challenges in the language education and literacies include: the limited language options, academic dishonesty, biases and lack of accountability, and issues of laziness (Makelenia, Mutongoza & Linakea, 2023). These are discussed as follows:

A. *Limited Language Options:* Despite the positive advancements that were brought by the introduction of AI, many AI systems are developed primarily in English or other widely spoken languages to the detriment of the AI systems based other languages (Mackenzie, 2022). The lingua franca of business, academia, and technology are English, Chinese, Spanish, and French, and have a large user base and thus a larger market potential for AI developers. The cumulative effect of this is that prioritisation of the most-spoken languages makes it difficult for speakers of Nigerian local languages to access digital tools and services in their own language, which in turn impacts language education. Language education in Nigeria has been reported to face multiple challenges related to resources, infrastructure, and funding, thus AI systems with limited language options can further exacerbate these challenges, making it difficult for educators and students to access high-quality language learning materials. However, much more work needs to be done to ensure that AI systems are accessible and effective for speakers of all languages.

B. *Academic Dishonesty on Steroids:* AI has led to the proliferation of automated cheating. With the rise of online learning and remote assessment practices, students have been known to use AI-powered tools to cheat in assignments and examinations (Mutongoza, 2021). Students use AI-powered essay-writing tools that can generate essays that are indistinguishable from those written by humans, and some of these AI-powered tools have been known to fool plagiarism detectors by text-spinning tools that reword sentences to avoid detection. Students complete high-quality assessments without putting any significant effort. In this regard, language lecturers sometimes witness work submissions that contain errors from AI-software-generated tools (Mutongoza & Olawale, 2022). Language students in developing countries sometimes use AI to cheat by using machine translation tools to translate their assignments from their native language to the target language. Unlike their counterparts in the developed countries, who can access AI-detection software (Straume & Anson, 2022). Many universities and research institutions in Nigeria have limited funding and resources to invest in expensive AI-detection technologies. It is essential to emphasise that many African languages are not well-represented in AI datasets, and this has the potential to limit the accuracy and effectiveness of AI-detection software for African academics teaching indigenous languages (Mutongoza & Olawale, 2022).

C. *Biases and lack of accountability:* AI biases significantly impact language education in different ways. These biases can occur through the training data used to develop AI-powered systems. Although there are biases in language educators, human biases are localised to limited geographical locations. The impact of AI biases spread more easily because of globalisation (Tehzeeb & Raza, 2022). According to Currie and

Rohen (2022), this bias manifests as a result of a lack of diversity in teams that design and develop AI tools. The result is usually that there is increased difficulty in recognising or generating language patterns that are associated with non-standard varieties of a language or with non-native speakers. This has grave repercussions when it comes to the use of AI systems for language proficiency assessments as this can lead to biases in evaluation, as certain systems may unfairly penalise students who use non-standard language varieties (Lawrence, 2023). Furthermore, a lack of transparency and limited oversight can lead to unethical or inappropriate use of these technologies in language learning, which can negatively impact students' learning outcomes (Winke & Isbell, 2017). Therefore, there may be no remedy for educators or students if something goes wrong with these technologies, which can lead to dissatisfaction and frustration.

D. *Issues of Laziness:* While AI-powered technologies have many benefits, they have been blamed for leading to laziness among students and lecturers. It is argued that AI-powered technologies make tasks easier and eliminate the need for students and lecturers to put in the same level of effort they would have had to previously (Tehzeeb & Raza, 2022). Through their ability to do things such as automatically grading exams, there is a general sentiment that AI tools leave lecturers with less work to do in comparison to other traditional tools. On the other hand, students also generate essays, making it easier for them to produce work without putting in much effort. Similarly, students and lecturers who rely heavily on AI tools sometimes become too dependent on AI-powered technologies and may find it challenging to do things manually. Over-reliance can lead to a lack of critical thinking and problem-solving skills, which are essential for academic success, and restricts students' and lecturers' development of important skills that are critical for educational development (Wiratman & Rahmadani, 2022). One must also note that while AI-powered technologies are designed to make tasks more efficient, they are not designed to be creative. Students and lecturers who rely solely on these tools may fail to develop their creativity, which is an essential aspect of learning. Because AI technologies can only perform specific tasks that they are programmed to do, their scope is sometimes limited, and this can lead to a lack of diversity in the types of assignments and projects that students and lecturers undertake (Aziz & Silfiani, 2020). Thus, those who overly rely on AI-powered tools may not explore different approaches to problem-solving or develop innovative ideas.

Conclusion

The paper has explored AI-related benefits and challenges in the education field. It discussed different AI machines that are available and could be used for language teaching and learning in higher institutions of learning. AI applications introduce practical training in language

skills and educational games based on language. Communication tools based on AI help design situations for practising the accurate pronunciation of letters and words through sound drills and visual media. AI tools provide exercises for describing and interpreting images and everyday situations, for listening, and for practicing guided pronunciation. They also allow learners to practise language skills and provide feedback for guidance. Some programmes have language drills that give training in communication through using language skills to guarantee that learners reach proficiency levels. AI tools have been developed for each of the skill areas such as speaking, listening, writing, pronunciation, grammar, vocabulary and reading. Despite the AI-related challenges: limited language options, academic dishonesty, lack of accountability and laziness among students and lecturers, the paper concludes that the use of AI-based language education tools could promote the development of digital literacy skills among educators and learners in higher institutions of learning.

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