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The Role of Artificial Intelligence in Transforming Language Learning: Opportunities and Ethical Considerations

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ABSTRACT

Artificial Intelligence (AI) has transformed teaching and learning across various disciplines, among them languages. AI has numerous applications in language teaching and learning, including algorithms that personalize learning for individual learners, identify and structure lessons and learning activities based on a learner's strengths, evaluate and provide constant feedback on a learner's progress, and simulate interactive learning environments. Such innovative tools and applications enhance both language comprehension and production skills among learners, optimizing the outcomes of language teaching and learning. However, the adaptation of AI for language learning presents some ethical challenges related to data privacy, bias in the development and training of algorithms, and the lack of universality in access and usage of AI, which threatens to widen the already extensive inequalities in education. This article explores these dimensions of the application of AI in language learning and teaching with the overarching goal of fostering a more informed and ethical approach to the integration of AI and related technologies in language education.

KEYWORDS

Artificial Intelligence, language, algorithms, education, integration

INTRODUCTION

Since its development in the 1950s, the concept of intelligent computers and computer systems that can simulate human activities such as learning, decision-making, and problem solving has advanced through innovations that have enabled its integration in different fields. One of the fields in which AI has and continues to be applied is learning. The integration of AI in learning takes various forms from both learning and teaching perspectives. From a learning perspective, AI offers unlimited learning materials that learners can use, ranging from personalized lessons to chatbots that answer questions when prompted (Seo et al., 2021). From a teaching perspective, AI offers opportunities for the automation of learning, student assessment to determine their level of knowledge in a course, and the provision of automated feedback to learners (Seo et al., 2021; Zhang and Aslan, 2021; González-Calatayud, Prendes-Espinosa and Roig-Vila, 2021). These applications of AI in education are universal across all disciplines but have been adapted differently to suit individual disciplines.

In language learning, technological innovations such as mobile applications, interactive chatbots, and speech recognition programs are revolutionizing learning and teaching (Kushmar et al. 2022 and Ali, 2020). These innovations are favored for benefits such as self-regulation in learning, improved vocabulary among learners who use AI to learn or improve their skills in new languages, and increased motivation to learn new languages quickly compared to learners who use conventional approaches to language learning (Wei-Xun and Jia-Ying, 2024; Song and Xiong, 2023; Wei, 2023). However, the use of Ai in language learning and teaching presents a few challenges as well. Notably, while AI provides a wide pool of information and

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lessons through which learners can acquire language skills, no program can fully replace human instructors. Further, AI-led language learning programs are only as accurate as the data used in their formulation and the programs used in their development, which are yet to be refined to account for limitations such as heavy accents, inaccurate translations, and the role of non-verbal communication cues such as gestures in language expression and learning (Liu, 2023; Sharadgah and Sa'di, 2022).

As further advancements in AI continue to drive its applications in language learning and teaching, we explore how AI is reshaping language learning and teaching to develop a more ethical and informed approach to its further integration with how language skills are taught and learned. To achieve this objective, this article explores some of the innovations in AI that have been adapted for language education to enhance fundamental language skills such as reading, comprehension, sentence construction, and speaking. We discuss existing ethical issues and challenges observed in these applications, identify gaps in research and literature on these challenges, and propose solutions to promote a more informed and ethical approach to integrating AI in language education.

Artificial Intelligence in Language Learning and Education

The integration of AI in education has attracted extensive research, which is well documented in literature over the past decade as shown in Table 1 below. A common consensus in the literature on AI in education is the supplementary role of innovations in AI in advancing education, alluding to their role as supporting methods of instruction and learning and not the primary means of instruction and learning (Chichekian and Benteux, 2022; Karan and Angadi, 2024). While it is a universally held notion that is widely accepted in academia and research and is reflected in the types of AI tools developed for learning, the recognition of AI as a supplementary method of learning and teaching has not stopped a group of researchers, instructors, and other education stakeholders from calling attention to its nature as a disruptive innovation in education. Schiff (2021) identified various ways in which AI disrupts the status quo in education, including threatening the role of the teacher as held in conventional learning, upsetting or invalidating important concepts in education such as classroom size, and potential negative impacts on learner motivation. Despite the widespread recognition of its disruptive nature, a second universal notion in the integration of AI in learning is its inevitability, which has sparked interest and research in its application in specific fields of education. One of these fields is language learning.

Research and literature on the applications of AI in language teaching and learning are extensive. One of the areas of the integration of AI in language learning that has been studied widely is the revolutionary role of language learning applications and its impact on the acquisition of language skills both as a replacement for conventional language learning and as the sole method of learning (Wei-Xun and Jia-Ying, 2024; Song and Xiong, 2023). Notably, most research studies recognize that the language learning applications have innumerable benefits, including establishing autonomy in the acquisition of language skills, enabling learners to pick up new vocabulary and learn the correct pronunciations at their convenience, and increased motivation to learn new languages (Karasimos, 2022; Yuen and Schlote, 2024). However, the challenges that are associated with the innovation are also discussed in depth. Studies highlight drawbacks such as the need for large datasets to train the applications, the lack of human interaction, the applications' failure to account for the relationship between language and context, limitations on creativity since output and lessons are based solely on the provided data, and unexplained language rules (de la Vall and Araya, 2022; Ali et al., 2024; Yuen and Schlote, 2024). Another AI tool whose integration in education is revolutionizing language learning is adaptive learning platforms, which has attracted the attention of stakeholders in academia as reflected in research on its adaptation for learning benefits, and challenges. Notable out-

Table 1

Studies on the Applications of Artificial Intelligence in Language Education

Study Focus	Reference
The potential for the integration of AI in education	Chichekian and Benteux, 2022
The risks of the integration of AI into school education	Karan and Angadi, 2024
The future of AI in education	Schiff, 2021
The impact of the integration of AI in language education on learning outcomes	Wei-Xun and Jia-Ying, 2024
The impact of language learning applications on learners' vocabulary	Song and Xiong, 2023
The experiences of learners who use AI to supplement conventional language learning	Yuen and Schlote, 2024
The benefits of AI language learning tools	de la Vall and Araya, 2023

comes of these efforts include breakthroughs in the design of adaptive e-learning environments that optimize learner engagement, the recognition of the positive impact of the innovation on learner engagement and motivation, and a negative implication on data privacy (El-Sabagh, 2021; Kaur, Kumar and Kaushar, 2023; Gligorea et al., 2023). While the bulk of this research and literature on the innovative ways in which AI has been integrated specifically in education focuses on general aspects such as overall learning outcomes, there is a pool of studies focusing on language education, with emphasis on innovations such as language learning applications, adaptive learning systems, interactive e-learning tutoring systems, and chatbot technology (Liu, 2023; Kaur, Kumar and Kaushar, 2023; Gligorea et al., 2023; Contrino et al., 2024).

One of the primary challenges that researchers and other stakeholders with an interest in research on the adaptation of AI for language teaching and learning identify in their research lies in ethics. A review of the available literature on the topic identifies three main ethical considerations namely data privacy, bias, and the implications of most AI innovations on teacher-learner interactions (Gligorea et al., 2023; Kaur, Kumar and Kaushar, 2023; Akgun and Greenhow, 2022; Idowu, 2024). While the ethical challenges are not discussed exclusively based on their relevance to language learning, their implication on learning outcomes, access to language education, and the safety of learners' data is clear without the direct link to the field of study. In addition to the three biases, there is a common concern over the implication of the integration of AI with language learning and teaching on inequalities in access to education. Existing inequalities, particularly in access to technology due to the digital divide, are linked to equally pervasive inequalities in the adoption of AI in teaching and learning, with researchers concerned that the integration will exacerbate socio-economic differences in access to education (Bentley et al., 2024; Veras, Dyer and Kairy, 2024). However, the ethical consideration is only discussed in the context of the general integration of AI in education.

DISCUSSION

The integration of AI with language education has the potential to drive a transformation of how languages are taught and learned. This transformation is already underway, a transition that has been captured extensively in literature and continues to attract further research. While the role of innovation has received appropriate recognition for its contribution to the ongoing integration of AI with language education, some factors that have made equally significant contributions to the transformation have received less attention. For instance, some studies report a positive reception to innovations such as language learning applications (Victorivna et al., 2022). While the link is not established by the studies, the positive attitude with which AI-based learning models are perceived and have been received is responsible for the fast and positive uptake of AI-based language learning. This could justify the rapid growth of the language learning applications market as well as the rising adoption and acceptance of other applications such as adaptive learning systems.

Currently, the two innovations, and other AI tools that have been integrated with language learning, have been applied to several elements of language learning, including the development of individualized learning paths for students to learn at their pace and assessment features that offer tests to learners. While there are no standardized guidelines for their integration with formal and informal language learning, their adoption, progress, benefits, and drawbacks as captured in recent research and literature provides a roadmap for the development of a standardized, more ethical, and informed approach to the further integration of AI in language learning. For instance, some inherent biases in machine learning algorithms are transferred to the algorithms used to train the models on which language learning applications are based. One such bias is the data bias, which stems from the social, cultural, and economic status, racial identity, and geographical location of the sources of data used to train AI language learning models on content and assessment (Idowu, 2024). The bias could limit the educational content to the nuances of the language usage of the individuals or resources used to develop it resulting in unfair assessment standards and limitations in the learning resources. An improved and ethical approach to integrating AI in language education could address the problem by training the algorithms on which innovations such as adaptive learning systems are based on comprehensive and standardized data drawn from approved curricula. Further, the detrimental implications of algorithmic bias leads back to the conversation on the role of AI as supplementary or complementary as opposed to the primary method of instruction in language learning.

Second, as discussed in literature and captured in research, the digital divide carries over gaps in access to education to AI-based language learning models and platforms (Bentley et al., 2024; Veras, Dyer and Kairy, 2024). As a result, access to language education is not universal despite the adoption of innovations such as apps that allow learners to access courses, assessments, and virtual tutors using widely used gadgets such as smartphones. Another perspective on the digital divide, which is missing in studies and literature on the topic, is its implication on less-spoken languages, designation of some languages as the primary languages of instruction, and implication on different variants of popular languages. For instance, there are several variants of spoken English with speakers strewn all over the world. However, only a few are reflected in AI-driven learning and tutoring systems. Similarly, the current language learning applications, AI tutoring systems, and other AI tools are only available for some languages, leaving out many languages

spoken in different parts of the world, particularly the parts of the world that are on the adverse side of the digital divide. Unfortunately, not much can be done to address these concerns and establish universality in the integration of AI with language learning without addressing the overarching problem of the digital divide.

A final element of AI integration in language education that is not adequately discussed in literature is the lack of standardization in language content, lesson structure, methods of teaching and learning, nature of assessments, and other standards of language education that are adhered to in conventional language education. Granted, the lack of a universal consensus on standard guidelines for AI in education is acknowledged (Nguyen et al., 2022). However, specific links to language education are missing, leading to gaps such as the structure of lessons in AI language tutoring systems, the order of introducing vocabulary and concepts on language structure in language learning applications, and the methods of instruction to be adapted for AI-driven integrated learning systems. To foster a more informed and ethical approach to integrating AI in language education, universal standard language pedagogy should be developed and used to develop learning paths, course content, and assessments for AI applications for language learning. This should be done through the involvement of all stakeholders, who include all stakeholders who are present in traditional or conventional learning settings, including teachers, learners, and academic researchers and stakeholders whose involvement is warranted by the integration of AI, particularly software developers (Arajlani, Crabb and Murray, 2023).

Ultimately, if the above challenges facing the applications of AI for language education are addressed as proposed, the future of AI within the field will be more inclusive. The content, lessons, and assessments will be standardized, more languages, including indigenous languages, will be available on AI-driven learning platforms, and algorithms will be unbiased, enhancing the quality of language content and accuracy of assessments. However, reshaping language learning and teaching using AI will require collaboration between learners, stakeholders in academia, the technology experts who develop the AI systems, curriculum developers, and the people in charge of policy formulation in education and developing technologies.

CONCLUSION

The adaptation of AI for applications in education has influenced various fields of education positively. One of these fields is language education, which has benefited from innovations such as learning applications, tutoring systems, interactive learning platforms that allow learners to receive feedback on their progress, meet and interact with other learners, and experience learning that simulates the traditional physical learning. While transformative and effective in the acquisition of new language skills, the integration of AI in language education raises some ethical challenges, including bias in the algorithms on which the platforms are based, inequalities in access to the platforms, and lack of standardization. With the proposed solutions, these drawbacks can be addressed to optimize learning outcomes, broaden the pool of the number of languages available for learning, and establish pedagogical standards to maintain quality language education.

DECLARATION OF COMPETITING INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Adenike A. Akinsemolu: conceptualization, writing (original draft), writing (reviewing and editing), validation

Helen N. Onyeaka: conceptualization, writing (original draft), writing (reviewing and editing), validation

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