Castledown

OPEN ACCESS

Technology in Language Teaching & Learning
ISSN 2652-1687
https://www.castledown.com/journals/tltl/

Technology in Language Teaching & Learning, 6(3), 1–11 (2024)
https://doi.org/10.29140/tltl.v6n3.1813

Exploring Ethical Dimensions of AI-enhanced Language Education: A Literature Perspective

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Abstract

Advances in artificial intelligence (AI), particularly in generative AI, continue to affect language education paradigms. The integration of AI in language education raises deep-seated ethical concerns such as privacy and data security, potential biases and hidden ideologies in the output, transparency and accountability, dependency and autonomy, digital divide, and job displacement and professional development. The article analyzes these ethical concerns and introduces the multifaceted dimensions of ethics associated with AI in language education. This article comprehensively examines the potential biases of AI in language education. These biases can be algorithmic, demographic, cultural, linguistic, temporal, confirmation, ideological and political. The analysis includes factors contributing to biases, such as training data , labelling and annotation, product design decisions, policy decisions, and algorithms. This paper analyzes algorithmic transparency and advocates for more transparent AI systems to address bias in algorithms. Violations of student privacy emerge as one of the profound ethical issues in the discourse on AI-enhanced language education. The article also examines the challenges and risks associated with the protection of student data privacy, emphasizing the need for robust privacy frameworks to alleviate concerns regarding privacy, human agency and the lack of transparency in the collection of an excessive amount of personal information. By synthesizing the key findings, the paper will conclude with a potential framework of ethical guidelines for the responsible and ethical integration of AI in language education.

Keywords: AI ethics, language learning, language education, AI-enhanced language education, language teaching, generative AI

Introduction

The field of artificial intelligence (AI) is gaining momentum in various societal domains, including education (Remian, 2019; Rusmiyanto et al., 2023). As technology advances in the field of education, AI-driven technologies have emerged as innovative approaches to support and enhance language acquisition (Rusmiyanto et al., 2023). In recent years, AI has revolutionized the way language teaching and learning, empowering students to personalize their learning experiences based on their needs and preferences (Awad & Oueida, 2024; Pratama et al., 2023). This personalization increases engagement, fosters more independence and enhances overall learning outcomes (Pratama et al., 2023). It also highlight the benefits of integrating AI to enhance the quality of language education through personalized feedback, recognition of data patterns, and facilitation of collaborative learning. The debate over ethical implications and potential risks surrounding the integration of AI in language education is an ongoing topic of contention. A growing body of literature, including studies by Liang et al. (2023), focuses on the role and research foci of AI in language learning and teaching. While AI-powered platforms and tools have been a breakthrough in the teaching and learning process, it is crucial to address the ethical concerns associated with their integration (Ortega & Orozco, 2024). Attention must be paid to ensuring the responsible and equitable use of AI-based technologies in language educational settings.

Most of the existing studies generally focus on addressing the ethical challenges of AI in educational contexts (Akgun & Greenhow, 2021; Nguyen et al., 2023). However, the ethical risks and concerns of AI systems are rarely fully considered in language educational settings, which might be insufficient for relevant educational stakeholders, including educational institutions, students, parents, government and regulatory bodies, AI developers, ethics and compliance professionals, and research communities, to have a full understanding of key principles underpinning ethical implications of integrating AI into language education. Therefore, the present study aims to analyze the ethical implications surrounding the integration of AI and provide a comprehensive framework of ethical guidelines for the responsible integration of AI in language education settings.

Ethical Dimensions in AI-enhanced Language Education

Generative AI (GenAI) is an emerging computational technique that is capable of generating meaningful new content such as text, images, audio or video (Feuerriegel et al., 2024). GenAI applications such as ChatGPT, also known as Large Language Models (LLMs), have spawned much debate regarding the ethical implications of GenAI applications, and continue to prompt considerations about responsible GenAI use in education (Ara & Ara, 2024; Williams, 2024). The integration of AI in language education offers not only an array of benefits, but also expands learning opportunities beyond the classroom; however, it also introduces a complex array of ethical concerns.

As shown in Figure 1, considering the different forms of ethical implications in AI-integrated language education settings, the study focuses on concerns of privacy and data security, potential biases and hidden ideologies, transparency and accountability, over-dependency and autonomy, digital divide, and job displacement and professional development.

Privacy and Data Security

The violation of data privacy is considered one of the most significant legal concerns (Ortega & Orozco, 2024). In the context of AI-integrated language education, where AI systems inevitably rely on collecting massive amounts of student data (Huang, 2023), diverse forms of data collection may occur within classrooms. This can encompass the gathering of students' data such as name and contact

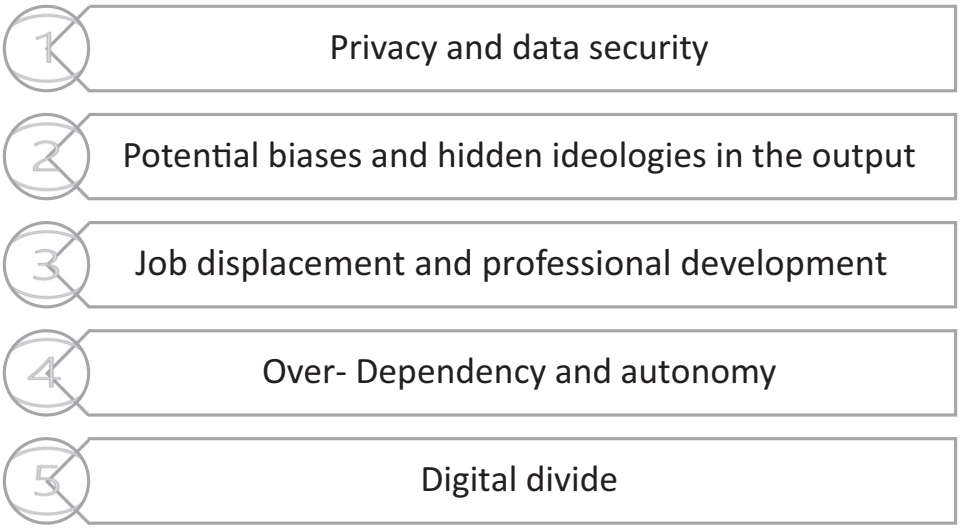

Figure 1 *Potential Ethical Implications in AI-Integrated Language Education.*

information (Huang, 2023), tracking of students' behavioral progress (Williamson, 2017), monitoring of attendance, tracking and analyzing students' learning status, motivation and well-being through various AI-driven platforms and tools (Sperling et al., 2024). Moreover, AI systems can even gather sensitive information about students, such as academic accomplishments, personal traits and learning habits (Ortega & Orozco, 2024). Akgun and Greenhow (2021) argue that privacy violations primarily take place through the exploitation of personal and sensitive information on online platforms. This definition goes hand in hand with the utilization of AI technology in language classrooms. Specifically, AI's capacity to collect and analyze a wide range of data raises concerns regarding the potential misuse or compromise of students' personal information through various means such as unauthorized access, data leakage/breaches and exploitation of their private data (Huang, 2023), posing a grave threat to the student's "right to privacy" (Ortega & Orozco, 2024, p. 1569). These studies raise serious ethical and legal dilemmas about the protection of student data privacy and underscore the importance of comprehensive privacy regulations.

Potential Biases and Hidden Ideologies in the Output

One of the primary ethical concerns associated with AI in language education is the potential for biases and hidden ideologies in the generated output (Choi, 2022). These biases can manifest in various forms, including algorithmic and demographic biases and can arise from various sources such as initial training data, the design of the algorithm, labelling and annotation, product design and policy decisions (Ferrara, 2023) or the context in which the AI system is employed.

Algorithmic Bias

Algorithms are the backbone of AI systems (Akgun & Greenhow, 2021). Despite the looming applications of machine learning algorithms in educational settings, concerns about their inherent bias and discrimination towards certain demographic groups (Rzepka et al., 2023). It can prove challenging to maintain the fairness of these algorithms, however, preventing further discrimination is paramount as algorithms are increasingly developed to make recommendations and decision-making in educational contexts (Rzepka et al., 2023). Sam and Olbrich (2023) criticize a mere 'techno-optimistic narrative' on AI, instead of a more nuanced and critical approach to AI systems. This sentiment echoes that AI remains largely an abstract, harmless, technical, powerful, and beneficial tool, without considering

its potential drawbacks and ethical implications. Algorithmic bias can occur when an AI application is developed, as it is deeply influenced by the norms, values, and perspectives of its developers (Sam & Olbrich, 2023). In other words, an AI algorithm reflects the values of its developers (Akgun & Greenhow, 2021). When an algorithm is designed, the developers essentially depend upon sets of data to train that algorithm (Sah et al., 2024). The training datasets generally reflect social (Kordzadeh & Ghasemaghaei, 2022), historical, and systemic biases which may result in biased algorithm outputs (Akgun & Greenhow, 2021). On the other hand, Favaretto et al. (2019) and Silva and Kenney (2019) argue that algorithm design may also lead to undesirable consequences in the output of the algorithm. In the context of language teaching and learning, this raises serious concerns when AI is used for developing content and curriculum, personalized learning recommendations, offering feedback and corrections, or even in decision-making based on biased data about learners' first language, gender, cultural and linguistic background, ethnicity, and certain accents. For example, research by Rzepka et al. (2023) assesses the algorithmic fairness of three AI-driven dropout prediction models for different demographic groups including gender, learners' first language, parents' educational background and home literacy environment. The findings suggest that all three models make unfair recommendations towards all the demographic groups concerned. There is also a challenge associated with the use of AI in language education, 'Algorithmic oppression', the term coined by Safiya Noble, how the lack of representation, and unequal access to skills in the tech industry shaping the digital landscape, including language learning technologies, emphasizing the significance of addressing 'racialized digital divide' to ensure equitable access and opportunities for all learners (Bulut, 2018; Jakacki & Croxall, 2023; Noble's, 2019).

Demographic Bias

Demographic bias in AI-integrated language education refers to the phenomenon where AI systems display unequal opportunities based on demographic factors such as age, gender, and ethnicity. By employing a template-based data collection pipeline, empirical research by Kirk et al. (2021) highlights potential demographic biases present in widely used large language models through the lens of occupational associations. Their study reveals how these language models exhibit preferences in recommending intersectional occupations across various demographic identities such as gender, ethnicity, sexuality, political affiliation, and religion. Also, they noted skewed representations of gender and ethnicity data output in societal distributions of occupational segregation. Similarly, Salinas et al. (2023) claim that LLMs, such as ChatGPT and LLaMA exhibit demographic bias, particularly gender and nationality biases towards historically disadvantaged groups through job recommendations. In the context of language teaching and learning, the above studies point out that when teachers incorporate AI systems into classroom pedagogy, it is crucial for them to critically examine the demographic biases embedded within AI platforms and ensure equal learning opportunities for all students regardless of their different demographic backgrounds. Moreover, demographic bias in LLMs such as GPT or LLaMA, and their applications like ChatGPT, could result in skewed representation in AI-integrated language learning materials. This may lead to the overrepresentation or underrepresentation of particular demographic groups, potentially influencing students' perspectives, characteristics, and understanding of various linguistic and cultural norms (Vaccino-Salvadore, 2023).

Job Displacement and Professional Development

One major concern is primarily focused on the potential impact on teachers, as the increasing use of AI technologies such as ChatGPT to displace the future role of teachers in the classroom (Mhlanga, 2023; Rudolph et al., 2023). The strength of ChatGPT lies in its capacity to understand and process human language and engage in conversational interactions as well as generate human-like responses making it an extremely useful tool for teachers and students. The utilization of chatbots, particularly

ChatGPT, is becoming a subject of interest in educational settings, however, Mhlanga (2023) argues that the integration of ChatGPT should be recognized as a supplement rather than a replacement for classroom instruction and student learning. Further, he critically explores the potential opportunities for the responsible and ethical usage of ChatGPT in education and claims that the application of ChatGPT is not intended to take the place of qualified teachers. Recent empirical research into the implications of ChatGPT in English language teaching through the perspectives of teachers reveals the potential displacement of traditional English teachers by AI technologies, emphasizing the evolving role of language teachers to reassess and adapt to the changing educational landscape (Saud, 2023). The research also highlights some irreplaceable roles of human teachers against AI-powered technologies in accommodating the ever-evolving requirements of language learning. These roles may involve aspects such as fostering creativity, emotional understanding and support, empathy, physical presence, adapting teaching methods to student needs, fostering interpersonal skills, and providing personalized feedback. To keep pace with the widespread use and advancement of AI systems, teachers should incorporate the application of AI, such as ChatGPT in a way that enhances their teaching methods and encourages learners to develop creative, critical and analytical skills (Mhlanga, 2023).

Over-Dependency and Autonomy

'Personalized curriculum' is one of the core abilities claimed by AI-based educational systems (Maksimova, 2022). By employing predictive algorithms, AI-driven systems can create interactive 'personalized learning spaces', offer student-centered learning solutions, recommend personalized 'learning paths', augment 'intelligent examination systems' and learning materials, provide individualized feedback to optimize learning as well as adapt teaching methods based on the individual needs, preferences, and characteristics of each learner (Bhutoria, 2022). However, Qin et al. (2020) argue that individualized learning of AI-powered education systems may lead learners to excessively depend on technology and lack developing their critical thinking abilities. In other words, the more learners rely on AI systems for language learning, the less they tend to develop the skills necessary to think critically, solve problems creatively, or engage in meaningful discussions, which may negatively affect classroom collaborative learning experience (Marzuki et al., 2023). In addition, Iskender (2023) also argues that students' over-reliance on AI writing tools like ChatGPT leads to diminishing their critical thinking skills as well as creating educational inequalities. Johinke et al. (2023) point out that this excessive reliance on digital writing technologies can moderate students' creativity and originality.

AI-aided technologies have the potential to play a crucial role in fostering greater learner autonomy among students (Javaid, 2024), but it will require careful consideration of the challenges and ethical considerations. While AI has the potential to enhance learner autonomy, there are multiple ways in which it has negatively impacted the classroom environment. Regan and Jesse (2019) argued that student independence can be significantly influenced by AI surveillance or tracking systems as these platforms not only monitor students' behavior and performances but also predict their future preferences and actions as well as lead them in certain directions, compromising or posing a greater threat to individual autonomy or agency. The fact that these predictive or decision-making systems may be prone to trigger issues related to learners' and teachers' autonomy, jeopardizing their ability to act in their own best interests and values (Akgun & Greenhow, 2021; Lo Piano, 2020; Regan & Jesse, 2019). For students, such systems which are powered by algorithms may limit their autonomy by shaping their learning paths and policing their thoughts and actions rather than allowing them to make their own choices and decisions. Similarly, for teachers, relying on applications of algorithm-driven decision-making may challenge their autonomy by dictating how they should teach or interact with learners, potentially raising concerns about fairness and self-freedom (Citron & Pasquale, 2014).

Digital Divide

The digital divide is a global challenge characterized by disparities in physical and digital infrastructure between countries, regions, and people (Bon et al., 2024). Although AI in education claims to have the potential to offer more access to a wider audience, Bulathwela et al. (2024) argue that not all students are benefiting equally due to the digital divide and existing social and educational inequalities. Further, they claimed that the digital divide could worsen educational inequalities with the widespread adoption of AI in education. Equitable access to AI-driven language learning technologies is significant to all learners regardless of their background. Ensuring equal chance to benefit from AI-technologies can help bridge the digital divide. As technology plays a significant role in modern education, the digital divide can manifest in various ways in the context of AI-integrated language education. In a classroom environment, some students or even teachers may have limited access to the necessary tools and resources due to their demographic, literacy level, and socio-economic background (Corrigan et al., 2023; Shah, 2023). There is also a challenge associated with the use of AI in language education known as 'algorithmic oppression,' a term coined by Safiya Noble. This concept highlights unequal access to skills in the tech industry shapes the digital landscape, including language learning technologies, underscoring the importance of addressing the 'racialized digital divide' to ensure equitable access and opportunities for all learners. Addressing the ethical challenges posed by the digital divide, social and educational inequalities, and global misallocation of resources in education, Bulathwela et al. (2024) suggested combining efforts from multiple stakeholders, including teachers, policymakers, and technology developers. The combined effort, including advocating for open educational resources, developing human-centered algorithms, and supporting emerging pedagogies, should be directed toward building "a sustainable, large-scale, and inclusive AI-driven education ecosystem that facilitates equitable, high-quality lifelong learning opportunities for all" (Bulathwela et al., 2024, p. 1).

A Potential Framework for the Responsible and Ethical Use of AI in Language Education

This paper proposes a potential framework for the responsible and ethical use of AI in language education, considering three key perspectives: privacy and data protection, bias mitigation, and human-AI collaboration, as presented in Figure 2.

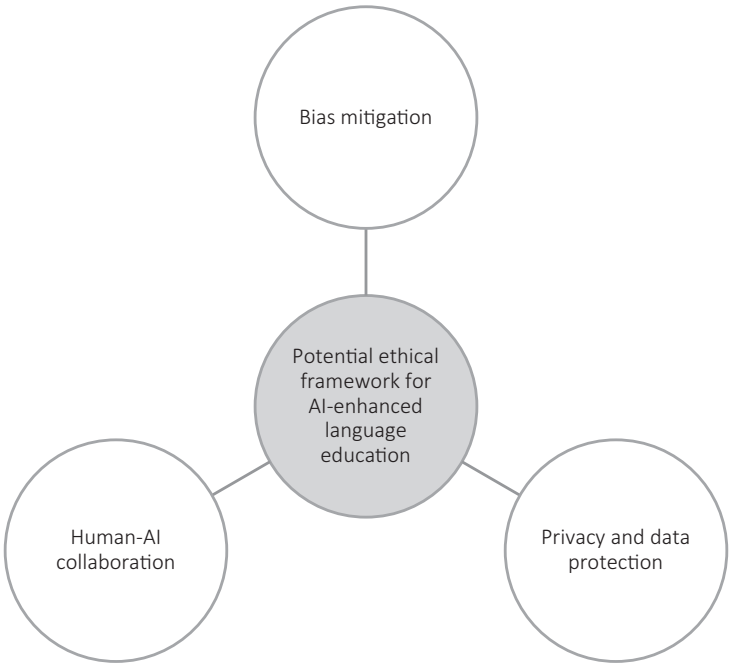

Figure 2 *Responsible and Ethical Use of AI in Language Education.*

Privacy and Data Protection

Leveraging AI-integrated technologies in language education can be seen as positive and can create enormous benefits for learners and teachers in the short term; however, compromising learners' as well as teachers' personal and sensitive data and their privacy rights by exploitation of data undermines the ethical principles and potential benefits of such technological integration. It is recommended that several measures be adopted to address privacy concerns and data protection issues in envisioning AI-enriched classrooms, ensuring the ethical, legal, and secure integration of AI systems for optimal learning outcomes.

Fostering a culture of privacy awareness among students would be an effective and preventive measure to educate and empower them about data privacy and security (Huang, 2023). Huang (2023) suggested that students' self-protection awareness can be promoted through classroom curriculum, real-world examples and case studies, emphasizing the importance of personal and sensitive information protection and data management. In addition, teachers can incorporate well-developed open-access instructional materials and workshop resources on data and privacy topics offered by academic scholars, technocrats, and legal professionals (Akgun & Greenhow, 2021). For example, the Massachusetts Institute of Technology (MIT) Media Lab offers "AI and Data Ethics" workshop resources for young students, aimed at increasing their awareness of privacy issues and best practices for protecting personal data (Nguyen & DiPaola, 2020). These resources also aim to empower students to become ethical users and designers of AI solutions, fostering their ability to navigate future AI-enabled technologies responsibly.

Ulgen (2022) suggested that AI systems should follow a notion of "Respecting human agent rights" with autonomy, adopting a 'human-centric approach' and prioritizing the values of 'rights to privacy', data protection and fundamental rights. The notion requires careful consideration of AI systems' designers and developers to place human-centric ethics up front and enhance learners' agency and autonomy over their learning experiences when designing AI-integrated language learning platforms. For an AI system to uphold the values of privacy and data protection, the developers must prioritize rigorous data processing, and personal data rights measures, ensuring compliance and principles with regulations like the EU General Data Protection Regulation (GDPR) (The European Parliament and Council of the European Union, 2016), the Council of Europe's Modernized Convention for the Protection of Individuals concerning Automatic Processing of Personal Data (Convention 108+) (De Terwangne, 2021), the Family Educational Rights and Privacy Act (FERPA) (Parks, 2017). Kantian human dignity (Kant, 1785/1969, p. 91), Kant's notion of autonomy (Kant, 1785/1969, pp. 94,101), and EU AI Guidelines on "meaningful opportunity for human choice" (European Commission, 2019) are an obvious starting point for AI designers and developers who would need to consider regulating the use of AI and maintaining fundamental rights and autonomy throughout the development process (Ulgen, 2022).

Bias Mitigation

Despite the promise and hope of AI-driven applications to enhance language teaching and learning, there are students as well as teachers who have and continue to experience systematic and persistent bias and discrimination to accessing equal opportunities due to various factors, including age, gender, ethnicity, and language barriers. Numerous instances of AI biases and discriminations have been documented in the literature and real-world case studies, highlighting the ongoing challenges of ensuring fairness and ethical practices in AI development and application (Akgun & Greenhow, 2021; Choi, 2022; IBM Data and AI Team, 2023; Rzepka et al., 2023; Salinas et al., 2023).

Singha et al. (2024) argue that teachers need to be aware of and address the ethical implications and understand the ethical ramifications that warrant a responsible and ethical implementation of AI in

language teaching and learning. In mitigating potential AI biases, it is crucial for learners and teachers to identify, understand and address potential biases surrounding AI applications used in language education (Akgun & Greenhow, 2021). In the integration of AI into language education, bias mitigation is significant to prevent discrimination or unfair treatment of learners based on factors such as gender, ethnicity, sexuality, political affiliation, socioeconomic status, and religion. Meng et al. (2022) argue that ethical considerations and teacher preparedness are very important facilitating factors in promoting responsible and successful integration.

Many researchers have attempted to explain and address potential biases and hidden ideologies embedded in the application of AI in educational settings. For example, Choi (2022) it focused on the case of voice chatbots, such as "AI Peng Talk" and "AI Tutor", and pointed out the reinforcement of inequality, promoting and reproducing the discourse of native speakerism while potentially marginalizing other varieties. He suggested that voice chatbots are ingrained with structural bias, emphasizing the predominance of the native speaker fallacy.

Human-AI Collaboration

Teachers' trust and willingness play a significant role in using and adopting AI-powered educational applications in classrooms (Nazaretsky et al., 2022). These factors, especially trust, can be promoted by providing access to a professional development program and enhancing teachers' knowledge in both the theoretical concepts and practical applications of AI technologies. In the context of AI-enhanced language learning and teaching, to mitigate risk of displacement or potential obsolescence, it is important for language teachers to develop a comprehensive understanding of how AI functions, its positive and negative implications in language education, how AI can be utilized to maximize its capacity to enhance the learning experience as AI becomes increasingly integrated into language education and it potentially revolutionizes pedagogical practices in the field of language teaching and learning. As language teachers, it is also important to note AI technologies, such as ChatGPT, are not created to substitute for qualified language teachers but to complement and enhance teachers' and learners' capabilities and improve efficiency as well as augment human cognitive performance (McGee, 2023). Similarly, Mhlanga (2023, pp. 400–401) echoes this optimistic perspective and states, "Even though ChatGPT presents several opportunities for improvement in educational settings, it is not intended to take the place of actual instructors" reassuring teachers that their role remains significant in the learning process. Overall, language teachers can stay relevant and effective in their profession by embracing AI technologies (Swargiary, 2024) and implementing 'new emerging pedagogies' (Bulathwela et al., 2024, p. 1).

Conclusion

The integration of AI technologies in language education holds great potential for enhancing learning experiences and outcomes. AI-driven technologies have emerged as innovative approaches to support and enhance language acquisition, revolutionized the way language teaching and learning, empowered students to personalize their learning experiences based on their needs and preferences, as well as enhanced the quality of language education through personalized feedback, recognition of data patterns, and facilitation of collaborative learning.

However, this potential must be balanced with careful consideration of ethical implications. Addressing data privacy and security concerns, ensuring fairness and reducing bias, and preserving the essential human elements of language education are critical to the responsible use of AI in language learning. By proactively addressing these ethical issues, teachers and researchers can harness the benefits of AI while fostering an equitable and effective language educational settings. This approach will ensure that

AI serves as a tool to support and enhance the language educational experience, rather than as a source of new challenges and inequalities.

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