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The Integration of Artificial Intelligence in English Education: Opportunities and Challenges

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Abstract

Advancements in technology have had a significant influence on various aspects of society, including language learning. The rapid integration of Artificial Intelligence (AI) in different fields has opened up new possibilities for language education. In particular, AI has emerged in the field of English education, offering innovative solutions for language learning. AI-driven language learning platforms have gained popularity, providing personalized and interactive learning experiences for learners. These platforms utilize AI technologies, such as Natural Language Processing (NLP), to analyze and interpret text and speech, enabling developers to gain insights into learners' language production. Additionally, AI has been integrated into language assessment and evaluation, offering automated language evaluation tools that can compare favorably with traditional methods. These AI-powered assessment tools provide efficient and objective evaluations of language proficiency. However, the integration of AI in English education also raises ethical considerations that need to be addressed. It is important to ensure that AI-driven solutions are assessed and deployed responsibly, with safeguards in place to prevent misuse. This article aims to provide an overview of the advancements in technology and their influence on language learning, discuss the integration of AI in English education, explore AI-driven language learning platforms, evaluate the effectiveness of popular AI language learning apps and tools, examine AI in language assessment and evaluation, discuss ethical considerations in AI-driven English education, and highlight the challenges and limitations in this field. By examining these topics, this article aims to contribute to the understanding of the current state and future directions of AI in language learning.

Keywords: Technology, Artificial Intelligence, English Education

1. Introduction

The integration of artificial intelligence (AI) in English education has become a topic of increasing interest and research in recent years. AI technology has the potential to revolutionize the field of education by providing innovative tools and approaches to enhance teaching and learning experiences (Rusmiyanto, 2023). AI in education, also known as AIEd, refers to the utilization of AI techniques in educational settings (Sun and Kumar, 2020). This integration has led to the development of various AIEd-driven applications in schools and universities (Sun and Kumar, 2020). The use of AI in English education aims to improve language acquisition, communication skills, and overall learning outcomes

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(Rusmiyanto, 2023). The application of AI in English education involves the development of intelligent teaching platforms and systems that utilize AI modules and algorithms to enhance the teaching and learning process (Sun and Kumar, 2020). These systems utilize deep learning algorithms, decision tree technologies, and neural networks to create personalized and interactive learning experiences for students (Sun and Kumar, 2020) and enable them to practice their language skills, receive personalized feedback, and engage in collaborative activities with their peers (Zhou, 2020). The application of AI in English education also enables the analysis and assessment of students' language proficiency and provides valuable data to teachers for improving their teaching methods (Sun and Kumar, 2020).

The integration of AI in English education is not limited to traditional classroom settings. It extends to online platforms and virtual environments, where AI technologies such as natural language processing, virtual reality, and immersive virtual environments are utilized to create engaging and interactive learning experiences (Alhalangy, 2023). It presents opportunities for the reform and advancement of teaching methods and approaches. It also allows for the integration of traditional teaching methods with AI-driven technologies, creating a hybrid teaching mode that combines the strengths of both approaches (Zhang, 2021). This integration promotes the modernization of English education and the development of innovative teaching practices (Zhang, 2021). While the integration of AI in English education has shown promising results, there are still challenges and potential drawbacks that need to be addressed. Ethical considerations, teacher training, and the optimal integration of AI technologies in educational settings are some of the challenges that need to be overcome (Alhalangy, 2023). Further research is needed to explore the long-term effects and the best practices for integrating AI in language learning environments (Rusmiyanto, 2023).

2. Advancements in technology and their influence on language learning

Advancements in technology have had a significant influence on language learning, particularly in the field of English education. With the integration of advanced technologies such as artificial intelligence, virtual reality, and adaptive learning systems, English Language Teaching (ELT) has seen tremendous growth that has redefined the classroom experience, empowered educators, and enhanced the acquisition of language skills for learners of all ages and backgrounds. The integration of technology, including AI, has provided new opportunities and resources for language learners and teachers that shape the way we teach and learn English.

The use of technology in language learning is multidimensional and comprehensive, encompassing cognitive, metacognitive, and affective domains of learning (Ghanizadeh et al., 2015), which has become increasingly important and has been shown to have positive impacts on students' language learning skills (Ahmadi, 2018; Ghanizadeh et al., 2015). Technology enables teachers to adapt classroom activities and enhance the language learning process (Ahmadi, 2018). It provides new ways of engaging students and creates opportunities for teachers to integrate technology into their classes (Iberahim et al., 2023). The COVID-19 pandemic has also sped up (Bhatt et al., 2022). With the shift to remote and online learning, technology has played a crucial role in facilitating language learning and maintaining educational continuity (Bhatt et al., 2022). Online platforms, video conferencing tools, and digital resources have been utilized to support language learning during this challenging time (Bhatt et al., 2022).

One area where technology has made an impact is in the development of computer-assisted language learning (CALL) and technology-enhanced language learning (TELL) (Iberahim et al., 2023). These approaches focus on how computers and technology enable communication and facilitate language learning (Iberahim et al., 2023). TELL emphasizes computer-mediated communication (CMC) and the use of technology to enhance language learning experiences (Iberahim et al., 2023). TELL has been found to enhance students' listening, writing, speaking, and reading skills, as well as sub-skills such as grammar and vocabulary learning (Ghanizadeh et al., 2015). It can also improve problem-solving abilities and create an enjoyable learning environment for students (Ghanizadeh et al., 2015). The use of technology,

such as mobile devices and online platforms, provides easier access to resources and tools for language learners (Wang and Zhan, 2020; Tayan, 2017). Similarly, virtual reality (VR) is another technology that has the potential to enhance language learning experiences (Berti, 2021). VR can provide learners with immersive and interactive environments to practice language skills and explore different cultures (Berti, 2021). It also allows learners to connect with speakers of other languages and access authentic digital resources from the target culture (Berti, 2021).

Blended learning, which combines face-to-face instruction with online learning, has also been widely adopted in English education (Yang et al., 2022). The use of mobile devices and online platforms in blended learning has provided students with opportunities to reinforce their English skills both inside and outside the classroom (Yang et al., 2022). Research has shown that mobile blended active language learning (MBALL) can improve critical reading skills in English among high school students (Yang et al., 2022). The use of technology, such as mobile devices and online platforms, has expanded language learning beyond the traditional classroom setting (Nugroho et al., 2022). Likewise, flipped learning, for example, has gained attention in English education, allowing students to engage in learning activities outside of class and use technology, such as WhatsApp, to support their language learning (Nugroho et al., 2022). Studies have shown that flipped learning can have a positive impact on vocabulary acquisition and student perception of the learning environment (Nugroho et al., 2022).

The integration of technology in language learning and education offers numerous benefits. Firstly, it enhances learners' motivation, leading to increased engagement and participation in language classes (Gilakjani, 2017). Technology provides opportunities for interactive and personalized learning experiences, which can improve learners' academic abilities (Gilakjani, 2017). Additionally, the integration of technology promotes autonomy in learning, as it strengthens students' attitudes towards learning, facilitates communication, encourages the use of effective self-regulatory strategies, and reduces anxiety (Syathroh et al., 2021). Technology also fosters meaningful interaction and the development of various language skills (Syathroh et al., 2021; Kormos and Csizér, 2013). Furthermore, technology integration in education offers enriched learning environments that provide students with better learning opportunities (Başal, 2015). It allows the use of authentic and meaningful learning experiences, making the learning process more engaging and effective (Muhtar et al., 2021); it allows students to exploit learning opportunities outside the language classroom and encourages proactive approaches to locating and using learning resources (Kormos and Csizér, 2013). It can support independent learning and provide an interactive and interesting learning environment for students (Tayan, 2017).

Technology also facilitates collaboration among students and provides easy access to information, enhancing their overall learning experiences (Muhtar et al., 2021). Moreover, technology integration in the English as a Foreign Language (EFL) classroom offers high-quality, genuine cultural and language teaching materials through the internet and digital media resources (Taopan and Siregar, 2021). The integration of technology in education has been shown to enhance the learning process and outcomes of learners (Khan and Emara, 2018). It supports the development of better learning abilities and problem-solving skills in students (Khan and Emara, 2018). Technology also assists teachers in the instructional process, enabling them to deliver content more effectively and cater to individual student needs (Santosa, 2022). Additionally, technology integration in the curriculum aligns with the demands of the modern world and prepares students for the digital age (Khan and Emara, 2018).

However, there are challenges associated with the use of technology in language learning. Technology integration has the potential for increased stress and difficulties in online language learning. The application of technology in education, particularly in the form of online learning, has become more prevalent, especially during the COVID-19 pandemic. However, studies have shown that both teachers and students frequently experience stress and difficulties in online language learning (Alkhatnai, 2022). This highlights the need for adequate support and adaptive teaching methodologies to alleviate these challenges. Another challenge is the potential for increased disparities and gaps in access to technology.

The use of technology in education can widen the gaps between populations, particularly in terms of access to technology and digital resources. Certain populations may face barriers in accessing technologies created in other languages and cultural spaces, leading to further inequalities in education. Furthermore, the integration of technology in language education may not always lead to optimal learning outcomes. While technology can offer potential learning and mediational tools, teachers may lack the suitable knowledge and training to effectively utilize the learning potentialities of digital tools (Rio, 2020). This highlights the importance of providing teachers with appropriate academic and professional support to maximize the benefits of technology integration. Additionally, the use of technology in education raises concerns about bias and fairness in machine learning systems. AI systems and applications can inadvertently reflect discriminatory behavior and biases towards certain groups or populations. Researchers have recognized the need to address biases in AI systems and have proposed various approaches to mitigate these issues (Ninareh et al., 2019). Students may also misuse technology if not supervised properly (Iberahim et al., 2023). Additionally, there is a need to address copyright concerns, evaluate the efficacy of technology use, and provide adequate teacher training and professional development in utilizing technology for language learning (Garrett, 2009).

Overall, technology has revolutionized language learning by providing learners with access to resources, facilitating communication and collaboration, and creating immersive learning experiences. The use of technology, including AI, in English education has expanded learning opportunities, improved language skills, and enhanced the learning environment. The integration of technology into language learning has shown positive impacts on students' language learning skills, engagement, and overall participation (Hashim et al., 2017). It offers a range of benefits, including increased motivation, improved academic abilities, enhanced autonomy in learning, enriched learning environments, and the development of better learning abilities and problem-solving skills. However, it is crucial to approach technology integration with careful consideration of its impact and to address challenges and ethical considerations to ensure its effective and responsible use in education (Gilakjani, 2017; Santosa, 2022; Syathroh et al., 2021; Başal, 2015; Alghameeti, 2022; Khan and Emara, 2018; Peligro, 2022; Mwakapina et al., 2016; Muhtar et al., 2021; Taopan and Siregar, 2021). It is important to note that while technology provides numerous benefits, it must be utilized wisely and with informed leadership and support from administrators and faculty leaders (Santosa, 2022; Khan and Emara, 2018). Challenges such as the need for careful selection of appropriate technologies and consideration of their influence on students' development must be addressed (Mwakapina et al., 2016). It is also important to ensure that technology is used effectively and ethically, and that teachers receive appropriate training and support to integrate technology into their language teaching practices (Ahmadi, 2018; Tayan, 2017). Ethical considerations, privacy concerns, and the potential for technology to present distractions or hinder face-to-face interactions should also be considered (Santosa, 2022). By acknowledging and addressing these downsides, policymakers, researchers, and educators can work towards maximizing the benefits of technology integration while mitigating its limitations (Abood et al., 2023; Fulmer et al., 2018; Khoshnevisan, 2021; Alkhatnai, 2022; Rio, 2020; McGarr and Johnston, 2019; Fisher, 2017; Ninareh et al., 2019; Bahçelerli, 2023).

3. Overview of AI and its rapid integration in various fields

The integration of artificial intelligence (AI) has rapidly expanded across various fields, bringing both opportunities and challenges. It has the potential to improve efficiency, productivity, and service delivery. However, it also requires careful consideration of ethical implications, the development of appropriate policies and regulations, and the continuous involvement of human oversight. By addressing these challenges, AI can be effectively integrated into different sectors, contributing to advancements and improvements in various domains.

Self-learning algorithms, a key component of AI, have opened up new opportunities and had a major impact in different sectors. In the public sector, AI has gained importance and has been recognized for its

potential to bring about new opportunities (Wirtz et al., 2018). The use of AI in the public sector can optimize organizational structures, improve work efficiency, and solve management complexities (Lu and Gao, 2022). It has the potential to enhance the services offered by governmental institutions, making them more interactive and user-friendly (Almaiah et al., 2022). AI has also been applied in market and public administration, where it has been used to optimize organizational structures, process data, and improve work efficiency (Lu and Gao, 2022). The use of AI in recruitment and selection processes has implications for applicants' perceptions and reactions, which can be influenced by factors such as the design features of AI assessments and the positioning of AI tools in the hiring process (Hunkenschroer and Luetge, 2022). However, the adoption of AI in the public sector also requires careful consideration of factors such as trialability, observability, compatibility, and complexity. Understanding the significance of these factors and developing plans accordingly can facilitate the effective implementation of AI in governmental systems (Almaiah et al., 2022). Additionally, concerns about the impact of AI on the job market and the need to address potential biases and inequalities in AI systems need to be addressed (Qadir, 2022).

AI has also made significant advancements in the medical research field, with applications in various areas such as neurology, radiology, ophthalmology, anaesthesia, intensive care medicine, and oncology (Kim, 2021). It has the potential to improve diagnostic accuracy, treatment planning, and patient care (Kim, 2021). There is increasing evidence of the promising applications of AI in disease prevention, diagnosis, and treatment, particularly in specialties that rely on the interpretation of medical imaging data (Lennartz et al., 2021). However, the integration of AI in healthcare also raises ethical considerations and the need for continuous human oversight (Kim, 2021). Physician familiarity with AI in the medical field is relatively low, with only 5.9% of participants in a survey reporting good familiarity with AI (Oh et al. ,2019). Also, medical education plays a crucial role in preparing healthcare professionals for the integration of AI in the medical field. It is important for medical students to acquire knowledge and experience about AI, including basic and clinical medicine, data science, biostatistics, and evidence-based medicine (Park et al., 2019). In the context of medical education, AI can play a significant role in supporting learning, assessment, and clinical decision-making (Wood et al., 2021). AI-powered tools can provide personalized feedback to medical students, simulate patient cases for training, and assist in diagnosing medical conditions (Chan and Zary, 2019). However, there is a need for medical educators to be trained in AI techniques and understand their limitations (Wood et al., 2021). Additionally, the integration of AI into the medical school curriculum requires careful consideration and planning (Wood et al., 2021) to ensure that healthcare professionals are adequately prepared to utilize AI technologies effectively (Paranjape et al., 2019).

The use of artificial intelligence (AI) in education is a rapidly growing field with various applications and implications. AI technologies, driven by machine learning algorithms, have the potential to revolutionize teaching and learning processes, enhance educational outcomes, and improve the overall educational experience. AI has been integrated into various aspects, including language teaching, literature analysis, and feedback analysis (Raj, 2023; Shaik, 2023). AI-powered tools can enhance language learning experiences, assist in analyzing student feedback, and improve educational infrastructure and teaching practices (Raj, 2023; Shaik, 2023). K-12 education, efforts have been made to define what students should know about AI at each grade level (Touretzky et al., 2019). These guidelines aim to equip students with the necessary knowledge and skills to understand and engage with AI technologies (Touretzky et al., 2019). The goal is to prepare the next generation of students to be part of the emerging data science revolution (Kolachalama and Garg, 2018). AI technologies can also be applied in higher education to support teaching and learning processes. AI-powered tools can analyze student data to provide personalized recommendations, facilitate adaptive learning, and improve student engagement (Kashive et al., 2020). Additionally, AI can assist in automating administrative tasks, such as grading and scheduling, allowing educators to focus more on instructional activities (Kashive et al., 2020).

However, the integration of AI in education requires addressing challenges such as teachers' lack of knowledge about AI technology and ethical considerations (Shaik, 2023; Liao, J., Y., 2022). Educators and researchers need to ensure that AI technologies are ethically and responsibly implemented in educational settings (Dahmash et al., 2020). There is also a need for teacher training and professional development to effectively integrate AI into the curriculum (Wood et al., 2021).

Overall, AI has rapidly integrated into various fields, bringing about both opportunities and challenges. It has the potential to improve productivity, optimize processes, and support the achievement of sustainable development goals. However, ethical considerations, the need for teacher preparation, and the potential impact on inequalities and transparency must be addressed to ensure responsible and effective integration of AI in different sectors.

4. Integration of AI in the English classroom

The integration of AI in the English classroom refers to the incorporation of artificial intelligence technologies and tools into language teaching and learning practices. AI-powered language learning platforms, such as online platforms or mobile applications, offer interactive and adaptive learning experiences. These platforms utilize AI algorithms to analyze learners' performance, provide personalized feedback, and offer tailored language instruction. They may include features such as language exercises, vocabulary drills, grammar explanations, and interactive simulations to engage students in language practice.

AI has been integrated into language instruction to provide personalized and adaptive learning experiences. Adaptive learning platforms use AI algorithms to analyze learners' performance, identify their strengths and weaknesses, and provide tailored learning materials and activities (Huang et al., 2021). Natural language processing techniques have been applied to analyze and extract information from large amounts of text, enabling automated text summarization, sentiment analysis, and language understanding (Huang et al., 2021). These platforms can adapt to individual learners' needs, pace, and learning styles, enhancing their engagement, and promoting effective learning (Huang et al., 2021). The AI tools utilize natural language processing and machine learning algorithms to analyze and evaluate learners' language performance, providing personalized feedback and guidance (Fu et al., 2020). They can assist language learners in comprehending and analyzing complex texts, improving their reading and comprehension skills. In addition, AI-powered writing tools can assist students in improving their writing skills by providing personalized feedback and guidance (Nazari et al., 2021). It was argued that the use of AI-powered writing tools can lead to significant improvements in students' behavioral engagement, emotional engagement, cognitive engagement, and self-efficacy for writing (Nazari et al., 2021).

AI chatbots are another aspect of AI integration in the English classroom. These chatbots simulate human-like conversations and provide language practice opportunities for students. They can engage in dialogue, answer questions, and offer feedback, allowing students to practice their language skills in a conversational context. They can adapt to individual learning needs, track progress, and provide immediate responses, enhancing the learning experience. They can also provide interactive and personalized language learning opportunities, allowing students to practice their language skills in a conversational manner (Mageira et al., 2022; Shazly, 2021). They utilize natural language processing and machine learning techniques to simulate human-like interactions and provide learners with opportunities to practice their speaking skills in a supportive and non-judgmental environment (Shazly, 2021), which can help reduce language speaking anxiety and improve learners' speaking performance. Experimental use cases of AI chatbots have shown positive results in teaching foreign languages and cultural content simultaneously (Mageira et al., 2022).

The use of chatbots in language teaching has been explored in several studies. Rus et al. (as cited in Chen et al., 2020) highlight the effectiveness of intelligent tutoring systems equipped with chatbots or cobots in

teaching, while Pokrivcakova discusses the application of chatbots as writing and translation assistants in language learning (as cited in Chen et al., 2020). Chen et al. (2020) have found chatbots to be effective in stimulating students' learning interests and supporting language teaching and learning (Chen et al., 2020). Chuah and Kabilan (2021) conducted a study on ESL teachers' views on the use of chatbots in a mobile environment, finding that teachers perceived chatbots as helpful in providing feedback and simulating interaction cycles for language practice (Chuah and Kabilan, 2021). Hew and Fryer (2021) conducted a systematic review on chatbot-supported language learning and identified technological affordances such as timeliness, ease of use, and personalization, as well as pedagogical uses including interlocutors, simulations, and transmission (Hew and Fryer, 2021). Han (2020) investigated the effects of voice-based AI chatbots on Korean EFL middle school students' speaking competence and affective domains, finding improvements in speaking ability and positive changes in affective aspects (Han, 2020). Wong (2022) discusses the design of an intelligent chatbot with natural language processing capabilities to support learners in various domains, including language learning. Other studies have also explored the use of chatbots in language teaching and learning, highlighting their potential in improving language competency, soft skills development, and student confidence (Wahyuni, 2022; Yang et al., 2022; Wong, 2022; Topal et al., 2021). These studies demonstrate the potential of chatbots in language teaching, including their ability to provide personalized instruction, stimulate interest, support speaking competence, and enhance the learning experience. In short, chatbots offer opportunities for interactive and adaptive language practice, immediate feedback, and individualized learning experiences. However, further research is needed to explore the optimal design, implementation, and integration of chatbots in language classrooms, as well as to address concerns and challenges related to their use.

In the field of language assessment, AI-powered tools have been developed to provide automatic scoring and feedback on language proficiency tests (Fu et al., 2020). AI-powered systems can analyze students' language data and provide personalized recommendations for their learning needs (Bukhari, 2023), which can help students progress at their own pace and focus on areas that require improvement. They can also help learners improve their language skills and enhance their learning experience. In addition, AI can assist teachers in designing and delivering personalized learning experiences for their students and ease their job in terms of administrative tasks, such as grading and scheduling, allowing them to allocate more time for instructional activities. Automated assessment is another area where AI is integrated into the English classroom. AI-powered assessment tools can analyze students' language performance, provide objective evaluation, and offer detailed feedback. These tools can assess various language skills, such as reading comprehension, writing proficiency, and speaking ability. Automated assessment methods save time for educators, provide standardized evaluation, and offer insights into students' language development.

The integration of AI in language assessment has been explored in various studies. For instance, Lee et al. (2016) constructed a TOCFL learner corpus and used it for Chinese grammatical error diagnosis. Yang et al. (2023) discussed the use of AI speech assessment systems and Automated Writing Evaluation (AWE) programs in EFL instruction. Sultana (2019) emphasized the importance of language assessment literacy for English language teachers. Garrett (2009) explored the use of technology in language teaching and assessment, including online learning and teacher training. Susanti et al. (2018) proposed an automatic distractor generation method for multiple-choice English vocabulary questions. Doyle et al. (2014) discussed the need for structured follow-up programs for high-risk children. Calatayud et al. (2021) conducted a systematic review of the use of AI for student assessment. Zhang et al. (2022) focused on automatic scoring of English essays using machine learning technology. Owan (2023) explored the potential of AI tools in educational measurement and assessment. Qi et al. Qi et al. (2021) proposed an English teaching quality evaluation model based on Gaussian process machine learning.

These studies highlight the diverse applications of AI in language teaching and assessment, including error diagnosis, speech assessment, writing evaluation, language assessment literacy, technology

integration, automatic distractor generation, follow-up programs, student assessment, essay scoring, and teaching quality evaluation. The integration of AI in the English classroom offers opportunities for personalized learning, efficient assessment, and improved teaching practices. However, challenges such as training, reliability, validity, and effective implementation need to be addressed to maximize the benefits of AI in language education.

Multimodal teaching, which combines different modes of communication such as text, audio, video, and visuals, can also benefit from AI integration. AI technologies can support the creation and analysis of multimodal materials, allowing for more interactive and immersive language learning experiences. AI can assist in analyzing and providing feedback on students' multimodal productions, enhancing their language skills in various modes of communication.

The integration of AI in multimodal teaching has been explored in various studies. Lotherington and Jenson (2011) discuss the concept of multimodal literacies, which utilize diverse media to represent different dimensions of communication. They emphasize the importance of incorporating multimodal approaches into language teaching to address the changing communication landscape. Yi and Angay-Crowder (2016) focus on integrating multimodal literacy practices into teacher education for teaching English to speakers of other languages (TESOL). They highlight the challenges and offer suggestions for incorporating multimodal practices into teacher education programs. Choi and Yi (2015) examine how teachers integrate multimodality into their content area classes for English language learners (ELLs). They find that employing multiple modes of instructional support enhances ELLs' understanding and self-esteem. Nabhan and Hidayat (2018) investigate multimodal literacy practices in a university EFL context, emphasizing the need to revise language education to accommodate students' technological access and real-world communication. Grapin (2018) discusses the role of multimodality in the new content standards era and its implications for English learners. They emphasize the centrality of multimodality in language teaching and learning. Yuzkiv et al. (2020) highlight the importance of individualization and personification technologies in the educational process, emphasizing the need to use various information and communication technologies. Pradana et al. (2022) examine the effectiveness of educational technologies in foreign language learning, including the integration of various technologies and their facilitation of the learning process. Tang and Foley (2022) conduct a case study on the effectiveness of applying Content and Language Integrated Learning (CLIL) in an Artificial Intelligence (AI) English reading course, demonstrating the positive impact of CLIL on EFL learners' AI general knowledge. Niu (2022) analyzes the multimodal teaching of college English against the background of artificial intelligence, proposing innovative approaches to multimodal discourse teaching. Baoxin (2022) discusses the construction and application of a human-computer collaborative multimodal practice teaching model for preschool education, emphasizing the use of modern educational tools and multimodal approaches. These studies collectively highlight the significance of multimodal teaching with AI in language teaching, emphasizing its effectiveness in enhancing language learning experiences and addressing the needs of diverse learners.

In conclusion, the integration of AI in the English classroom has shown promising results in various studies. Li and Peng (2022) evaluate the integration of an AI-based language learning platform with a flipped classroom instructional model, showing positive attitudes and increased engagement among students. Zhao and Nazir (2022) explore the use of AI and online reading platforms to enhance English multimode production and usage, providing opportunities for personalized and immersive language learning experiences. Rudolph, Tan and Tan (2023) discuss the potential of AI chatbots, such as ChatGPT, in supporting students' learning and enhancing the English classroom experience. Fitria (2021) examines the impact of AI in the EFL context, highlighting the development of intelligent teaching systems, smart classrooms, and AI-based English teaching support. Alhalangy (2023) focuses on the automation of video assessment in instructional learning, demonstrating the efficiency and reliability of automated scoring systems. Meldia and Zakir (2022) address the challenges faced by teachers in

integrating ICT into English teaching and learning, emphasizing the importance of training, competencies, and technical skills. Roberts et al. (2017) present an automated scoring technique for evaluating teachers' observational skills, offering an efficient and reliable assessment method. Niu (2022) discusses the analysis of multimodal teaching in college English under the background of AI, proposing innovative approaches to enhance multimodal discourse teaching. Han (2020) investigates the effects of voice-based AI chatbots on Korean EFL middle school students' speaking competence and affective domains, showing improvements in speaking ability and positive changes in affective aspects.

However, the use of AI in English education also presents challenges and considerations. Ethical concerns, such as bias in AI algorithms and data privacy, need to be addressed to ensure fair and responsible use of AI technologies (Ninareh et al., 2019; Dignum, 2021). Teacher training and professional development are crucial to equip educators with the knowledge and skills to effectively integrate AI into their teaching practices (Sapci and Sapci, 2020). Additionally, it is important to strike a balance between AI and human interaction in language learning to maintain the human connection and address the unique needs of individual learners (Huang et al., 2021). Additionally, there is a need for ongoing research to explore the long-term effects and optimal integration of AI in language learning environments (Rusmiyanto, 2023).

These studies highlight the potential of AI integration in the English classroom, including the use of AI-based platforms, chatbots, automated assessment, multimodal teaching, and intelligent teaching systems. AI technologies offer opportunities for personalized learning, enhanced engagement, efficient assessment, and immersive language experiences. However, challenges such as training, ethical considerations, technical skills, and effective integration need to be addressed to maximize the benefits of AI in the English classroom.

5. AI-Driven Language Learning Platforms

AI-driven language learning platforms have emerged as powerful tools in the field of language education. These innovative platforms harness the power of artificial intelligence to transform the way people learn and master new languages. By seamlessly integrating advanced algorithms, natural language processing, and personalized learning, the AI-powered language learning platform gives learners a dynamic, personalized experience tailored to their individual needs and preferences. In an age of global connectivity and increasing cultural diversity, these platforms have become valuable tools for breaking down language barriers and promoting effective communication across borders, making language more accessible and engaging than ever before.

One aspect of AI-driven language learning platforms is the use of corpus linguistics and data-driven learning (DDL) techniques (Boulton and Cobb, 2017). AI-powered platforms can provide language learners with access to large corpora and assist them in working with corpus data to improve their language skills (Boulton and Cobb, 2017). These platforms allow learners to work with written or spoken corpus data, enabling them to analyze and explore language patterns and structures (Boulton and Cobb, 2017). They can help learners identify patterns, analyze language usage, and enhance their vocabulary and grammar knowledge. By engaging with authentic language data, learners can improve their language skills and gain a deeper understanding of the language.

Natural Language Processing Technologies (NLPTs) are another key component of AI-driven language learning platforms (Pérez-Paredes et al., 2018). NLPTs, such as chatbots and voice command devices, can interpret user requests and provide interactive language learning experiences (Mata et al., 2018). These technologies enable learners to engage in meaningful conversations and receive immediate feedback, enhancing their language proficiency. AI-driven language learning platforms also make use of natural language processing technologies as Open Educational Resources (OERs) (Pérez-Paredes et al., 2018). These technologies, combined with the ubiquity of mobile devices, offer learners individualized and

personalized learning experiences (Pérez-Paredes et al., 2018). They can provide language learners with access to online dictionaries, collocation dictionaries, spell checkers, and other language processing tools to support their language learning journey. AI algorithms can analyze learners' performance data and provide tailored recommendations and exercises based on their specific needs (Li and Peng, 2022). This adaptive learning approach allows learners to focus on areas that require improvement and progress at their own pace.

Generative models, such as hierarchical recurrent encoder-decoder neural networks, have also been employed in AI-driven language learning platforms (Serban et al., 2016). These models generate system responses autonomously, allowing for realistic and flexible interactions with learners (Serban et al., 2016). By simulating human-like conversations, these platforms provide learners with opportunities to practice their language skills in a conversational context. These systems use generative models to produce system responses that simulate realistic and flexible interactions with learners (Serban et al., 2016). By leveraging large dialogue corpora, AI models can generate contextually appropriate responses and engage learners in conversational practice.

Virtual reality (VR) technology has also been integrated into language learning platforms, offering immersive and interactive language learning experiences (Chen et al., 2022). VR-assisted language learning has been found to have positive effects on the linguistic gains and affective gains of learners (Chen et al., 2022). These platforms provide learners with virtual environments where they can practice language skills, engage in realistic scenarios, and enhance their language proficiency.

The most commonly used AI-driven language learning tools include:

1. Corpus Linguistics Tools: Corpus linguistics tools, such as concordancers and corpus databases, allow learners to work with authentic language data and explore patterns in language usage (Boulton and Cobb, 2017; Başal, 2017).
2. Dialogue Systems: Dialogue systems, also known as interactive conversational agents or chatbots, provide language practice opportunities and can be used as conversational partners for learners (Serban et al., 2016; Kasneci et al., 2023).
3. Natural Language Processing Technologies (NLPTs): NLPTs, including language processing algorithms and tools, can be used as Open Educational Resources (OERs) to promote individualized and personalized language learning (Pérez-Paredes et al., 2018).
4. Data-Driven Learning (DDL): DDL approaches utilize AI technologies to analyze and explore language data, enabling learners to discover language patterns and enhance their language awareness (Boulton and Cobb, 2017; Başal, 2017).
5. Adaptive Learning Platforms: Adaptive learning platforms leverage AI algorithms to personalize instruction and provide tailored learning experiences based on individual learner needs (Nami, 2019).
6. Online Dictionaries and Language Tools: Online dictionaries, collocation dictionaries, spell checkers, and other language tools with AI capabilities support vocabulary acquisition and language production (Nami, 2019; Pérez-Paredes et al., 2018).
7. Large Language Models: Large language models, such as ChatGPT, can serve as conversational partners, provide language practice opportunities, and support learners in various language learning tasks (Kasneci et al., 2023).

These AI-driven language learning tools offer opportunities for personalized learning, authentic language practice, and individualized instruction. They leverage AI technologies to enhance language learning experiences and provide learners with valuable resources and support.

Despite the potential benefits, there are challenges associated with AI-driven language learning platforms. Teachers' familiarity and use of these platforms are relatively low, and there is a need for teacher training and professional development (Pérez-Paredes et al., 2018). To effectively integrate AI-driven language learning platforms, teacher training and professional development are crucial (Pokrivčáková, 2019). Educators need to be familiar with the potential of AI technologies and how to leverage them in language teaching. Additionally, the quality and effectiveness of AI-powered language learning apps need to be carefully evaluated (Moulieswaran and Prasantha Kumar, 2023). Ethical considerations, such as data privacy and security, also need to be addressed to ensure responsible use of AI technologies in language learning (Adiguzel et al., 2023).

In conclusion, AI-driven language learning platforms have the potential to revolutionize language education by providing personalized and interactive learning experiences. These platforms leverage corpus linguistics, generative models, NLPTs, and adaptive learning approaches to enhance language learning outcomes. However, challenges such as teacher training, app quality, and ethical considerations need to be addressed to ensure the responsible and effective integration of AI in language learning environments.

6. Evaluation and effectiveness of popular AI language learning apps and tools

There are several studies that provide insights into the use and effectiveness of AI-driven language learning apps and tools. Some of the studies are summarized below.

Nami (2019) explores students' choices and perceptions of language learning apps in higher education. This study aimed to investigate the use and effectiveness of smartphone language learning applications in higher education. The study surveyed students' choices and perceptions of language learning apps. The findings revealed that students commonly used language learning apps for vocabulary acquisition, grammar practice, and listening comprehension. The study also found that students perceived language learning apps as effective tools for language learning, particularly in terms of convenience, accessibility, and engagement. However, the study highlighted the need for further research to evaluate the effectiveness of specific language learning apps in achieving language learning outcomes (Nami,2019).

Rosell-Aguilar (2017) presents a taxonomy and framework for evaluating language learning apps. They review current research on the potential of apps for language learning and propose categories and criteria for evaluating their effectiveness. The taxonomy categorizes language learning apps based on their features and functionalities, such as vocabulary practice, grammar exercises, and pronunciation practice. The framework consists of four categories for evaluating language learning apps: technology, pedagogy, user experience, and language learning. Within each category, specific criteria are provided to assess the effectiveness and quality of language learning apps. The paper emphasizes the need for further research and evaluation of language learning apps to inform their design and implementation in language learning contexts (Rosell-Aguilar, 2017).

Berns et al. (2016) aim to investigate the impact of the app on motivation, perceived usefulness, and language learning outcomes. The app combines individual and collaborative learning opportunities to enhance language learning. The study assesses participants' motivation levels, perceived usefulness of the app, and language learning outcomes after using the app. The findings of the study indicated that the hybrid game-based app had a positive influence on participants' motivation levels. They found the app engaging and enjoyable. Participants also perceived the app as useful for their language learning as it provided interactive and immersive learning experiences. Moreover, the study demonstrated that the app had a positive impact on language learning outcomes, as participants showed improvements in their language skills (Berns et al.,2016).

Ninareh et al. (2019) discuss bias and fairness in machine learning, including its applications in different domains, such as natural language processing. The study highlights the importance of addressing bias in

AI applications. The authors investigate real-world applications that have shown biases and list different sources of biases that can affect AI systems. They create a taxonomy for fairness definitions in machine learning and examine different domains and subdomains in AI to understand unfair outcomes and how researchers have attempted to address them. The paper emphasizes the need for future research and solutions to mitigate bias in AI systems (Ninareh et al., 2019).

Sun and Kumar (2020) present the design of an online intelligent English teaching platform that utilizes AI techniques. The study focuses on the use of decision tree algorithms and neural networks to enhance the efficiency of English language teaching. The researchers discuss the integration of these AI techniques into the platform to provide personalized learning experiences for students. The decision tree algorithms are employed to analyze students' learning data and generate adaptive learning paths, while the neural networks are utilized for natural language processing tasks such as automated essay scoring and language generation. The paper highlights the potential of AI in improving the effectiveness and individualization of English language teaching in an online learning environment (Sun and Kumar, 2020).

Matheny et al. (2020) explore the effectiveness of a dialogue-based agent called QuizBot for learning factual knowledge. The researchers compare QuizBot with a flashcard app to assess learning gains and student engagement. The study finds that QuizBot leads to better learning outcomes and higher levels of student engagement compared to the flashcard app. The dialogue-based interaction with QuizBot allows for a more interactive and engaging learning experience, which contributes to improved learning gains. The findings suggest that dialogue-based agents like QuizBot have the potential to enhance factual knowledge acquisition and student engagement in educational settings (Matheny et al., 2020).

Ruan et al. (2019) investigate the utilization of AI technology in English teaching and learning. The study explores the potential of AI to create personalized learning environments and enhance English language skills. The researchers discuss how AI can be applied in various aspects of English education, such as adaptive learning systems, intelligent tutoring systems, and language assessment tools. They highlight the benefits of AI in providing individualized instruction, personalized feedback, and targeted language practice. The study emphasizes the potential of AI technology to improve the effectiveness and efficiency of English language teaching and learning processes (Ruan et al., 2019).

Fitria (2021) explores the role of AI in English language teaching (ELT) and investigates the application of AI technologies in ELT. The study emphasizes the benefits of AI in creating personalized learning environments and enhancing English language skills. The author discusses how AI can be utilized in various aspects of ELT, including adaptive learning systems, intelligent tutoring systems, and language assessment tools. The paper highlights the potential of AI to provide individualized instruction, personalized feedback, and targeted language practice, leading to improved learning outcomes. Overall, the study underscores the positive impact of AI in ELT and its potential to enhance the effectiveness and efficiency of English language teaching (Fitria, 2021).

Based on the findings of these studies, the advantages of AI in education can be summarized:

1. Personalized Learning: AI enables personalized learning experiences, allowing students to learn at their own pace and according to their individual needs and preferences.
2. Enhanced Efficiency: AI technologies can automate administrative tasks, such as grading and scheduling, saving time for educators and improving overall efficiency.
3. Improved Learning Outcomes: AI-powered tools can provide targeted feedback, adaptive learning paths, and personalized recommendations, leading to improved learning outcomes.
4. Access to Resources: AI can provide students with access to a wide range of educational resources, including online libraries, language processing tools, and interactive learning materials.

5. Engagement and Motivation: AI technologies, such as chatbots and interactive platforms, can enhance student engagement and motivation by providing interactive and immersive learning experiences.
6. Data-Driven Decision Making: AI can analyze large amounts of data to provide insights and inform data-driven decision making in education, helping educators tailor instruction to meet students' needs.

Based on the findings of these studies, the disadvantages of AI in education can be summarized:

1. Privacy and Security Concerns: The use of AI in education involves collecting and analyzing student data, raising concerns about privacy and data security.
2. Ethical Considerations: AI systems may have biases or perpetuate inequalities, requiring careful consideration of ethical implications and the need for transparency and fairness.
3. Cost and Accessibility: Implementing AI technologies in education may require significant financial resources, and there may be disparities in access to AI tools and resources among different educational institutions.
4. Teacher Training and Support: Educators need training and support to effectively integrate AI into their teaching practices and to understand the limitations and potential biases of AI systems.
5. Overreliance on Technology: Overreliance on AI technologies may lead to a reduction in human interaction and the development of essential social and emotional skills.
6. Lack of Human Connection: AI technologies cannot fully replace human interaction and the role of teachers in providing guidance, mentorship, and emotional support to students.

These studies provide valuable insights into the use and effectiveness of AI-driven language learning apps and tools, highlighting their potential benefits and areas for further research. It is important to note that these advantages and disadvantages may vary depending on the specific context and implementation of AI in education.

7. AI in Language Assessment and Evaluation

The use of AI in language evaluation and assessment in the field of education offers numerous benefits. AI-based assessment methods provide personalized feedback, ensuring tailored guidance and support for language learning (Sapci and Sapci, 2020). These systems also offer objective evaluation, reducing biases and ensuring fairness in assessment (Sapci and Sapci, 2020). Continuous monitoring allows for timely interventions and targeted support, while data-driven insights provide valuable information on students' learning patterns and areas for improvement (Sapci and Sapci, 2020). Additionally, AI tools automate assessment processes, saving time and effort for educators (Sapci and Sapci, 2020). In short, AI-based assessment methods provide personalized feedback, ensuring tailored guidance and support for language learning. These systems also offer objective evaluation, reducing biases and ensuring fairness in assessment. Continuous monitoring allows for timely interventions and targeted support, while data-driven insights provide valuable information on students' learning patterns and areas for improvement. Additionally, AI tools automate assessment processes, saving time and effort for educators.

Advantages of the use of AI in language assessment and evaluation in education can be observed in several studies. Spencer et al. (2012) highlights the advantages of standardized language assessments in identifying language abilities and potential areas of improvement in students (Spencer et al. (2012). Sapci and Sapci (2020) discusses the potential of AI applications, such as natural language processing (NLP), in providing feedback and improving medical education (Sapci and Sapci (2020). Kasneci et al. (2023) explores the use of AI-powered tools, like large language models, in language education, which can enhance student-computer interaction and improve foreign language learning (Kasneci et al. (2023).

Additionally, Calatayud et al. (2021) emphasize the benefits of AI in student assessment, including formative evaluation and automatic grading, which can save time and provide personalized feedback (Calatayud et al. (2021).

However, there are also potential disadvantages to consider. Pokrivčáková (2019) raises concerns about the lack of human interaction in AI-powered language education, which may limit the understanding of context and cultural factors. It is important to address ethical considerations such as privacy, data security, and fairness (Banerjee et al., 2021; Pokrivčáková, 2019; Kasneci et al., 2023; Reddy et al., 2018; Sun and Kumar, 2020). Maintaining a balance between AI-generated feedback and human interaction is crucial to provide personalized guidance (Sapci and Sapci, 2020). Adequate technical infrastructure, teacher training, and continuous evaluation are essential for effective implementation (Pokrivčáková, 2019; Chen and See, 2020; Klimova et al., 2023). Furthermore, Mageira et al. (2022) acknowledge the need for further research and teacher training to fully understand the possibilities and educational aspects of AI chatbots in language learning. By considering these factors, AI can enhance language evaluation and assessment, aligning with educational goals and improving the learning experience for students (Lentez, 2023; Doroudi, 2022; Calatayud et al., 2021).

In summary, the advantages of using AI in language assessment and evaluation include standardized assessments, personalized feedback, improved medical education, enhanced student-computer interaction, and efficient evaluation processes. However, potential disadvantages include limited human interaction, implementation challenges, ethical concerns, and the need for further research and teacher training. Striking a balance between AI and human involvement is crucial to ensure effective and responsible use of AI in language assessment and evaluation in education.

Factors to consider when using AI in language evaluation and assessment in education include the following:

1. Pedagogical Alignment: Ensure that the use of AI aligns with the pedagogical goals and objectives of language education (Banerjee et al., 2021; Pokrivčáková, 2019).
2. Validity and Reliability: Evaluate the validity and reliability of AI-based assessment methods to ensure accurate measurement of language skills (Banerjee et al., 2021; Kalafatis et al., 2021).
3. Ethical Considerations: Address ethical considerations such as privacy, data security, and fairness in AI-based assessment (Banerjee et al., 2021; Moulieswaran and Prasantha, 2023; Reddy et al., 2018).
4. Human Interaction and Feedback: Maintain a balance between AI-generated feedback and human interaction to provide personalized guidance and support (Gonzalez et al., 2019; Moulieswaran and Prasantha, 2023).
5. Technical Infrastructure and Support: Ensure the availability of appropriate technical infrastructure and support for effective use of AI tools (Sun and Kumar, 2020; Tang and Hai, 2021).
6. Teacher Training and Professional Development: Provide educators with training and professional development to effectively use and interpret AI-based assessment tools (Fırat, 2023; Sapci and Sapci, 2020).
7. Continuous Evaluation and Improvement: Continuously evaluate and improve AI-based language assessment systems to ensure their effectiveness and relevance (Chen and See, 2020; Tang and Hai, 2021).

By considering these factors, educators can make informed decisions about the use of AI in language evaluation and assessment, ensuring that it aligns with educational goals, maintains ethical standards, and enhances the learning experience for students.

8. Comparison of automated language evaluation with traditional methods

When comparing AI-powered language evaluation with traditional methods, several factors come into play. AI-powered language evaluation tools offer advantages such as enhanced efficiency, personalized feedback, and objective evaluation. They can automate assessment processes, saving time and effort for educators. AI tools can also provide continuous monitoring of students' progress and data-driven insights into their learning patterns. Additionally, AI-based assessment can adapt to individual learners' needs and provide tailored learning experiences (Ruan et al., 2021).

Firstly, AI-based evaluation tools can provide personalized feedback and adaptive learning experiences, catering to individual student needs (Ruan et al., 2021). They can analyze large amounts of data quickly and efficiently, allowing for more comprehensive and detailed assessment (Castiglioni et al., 2021). AI tools can also automate the assessment process, saving time and effort for educators (Musliner et al., 1993). Additionally, AI-powered evaluation methods can offer objective and standardized evaluation, reducing potential biases in grading. They can provide real-time feedback and support, enabling immediate intervention and targeted instruction (Ruan et al., 2021). Moreover, AI-based evaluation tools can track students' progress over time, providing insights into their language development and identifying areas for improvement (Yap et al., 2020).

On the other hand, traditional methods of language evaluation have their own merits. Traditional methods often involve human assessors who can consider context, nuances, and cultural factors that AI systems may struggle with (Musliner et al., 1993). Human interaction in traditional assessment methods allows for a more personalized and nuanced evaluation (Musliner et al., 1993). Traditional methods also have a long-standing history and established practices in language assessment (Yap et al., 2020). Traditional methods of language evaluation often rely on manual grading and subjective judgment. They may be time-consuming and prone to biases and inconsistencies in assessment. They may also lack the ability to analyze large datasets and provide immediate feedback to students (Ruan et al., 2021). However, they can offer a more holistic and contextual understanding of language proficiency, considering factors such as cultural nuances and creativity (Vall and Araya, 2023). They may also provide opportunities for direct interaction and personalized feedback from teachers, fostering a deeper understanding of students' language abilities (Vall and Araya, 2023).

However, there are also considerations when using AI-powered language evaluation. One challenge is the need for careful validation and calibration of AI models to ensure their accuracy and reliability (Castiglioni et al., 2021). Ethical considerations, such as privacy, data security, and fairness, must be addressed to protect student information and ensure equitable assessment practices (Musliner et al., 1993). Additionally, the interpretability of AI models can be a concern, as they are often seen as "black boxes" that lack transparency in decision-making (Castiglioni et al., 2021). It is important to strike a balance between AI-driven evaluation and human interaction, as the human element is crucial for providing nuanced feedback and understanding the context of language use (Vall and Araya, 2023). Furthermore, the implementation of AI-powered evaluation methods may require technical infrastructure and training for educators to effectively utilize these tools (Musliner et al., 1993). Additionally, teacher training and professional development are crucial to effectively using and interpreting AI-based assessment tools (Ruan et al., 2021).

In summary, AI-powered language evaluation tools offer advantages in terms of efficiency, personalized feedback, and data-driven insights. However, traditional methods provide the human element and consider context and cultural factors. However, considerations such as validation, ethics, interpretability,

and the balance between AI and human interaction should be considered. Traditional methods, while having their own strengths, may be more subjective and time-consuming. The implementation of AI in language evaluation requires attention to technical infrastructure, ethical considerations, and teacher training. A balanced approach that combines the strengths of AI and traditional methods can lead to effective language evaluation practices in education (Castiglioni et al., 2021; Mogadala et al., 2021; Lee et al., 2020; Vall and Araya, 2023; Day and Holladay, 2012; Ding, 2022). A thoughtful integration of AI-powered evaluation with traditional methods can lead to more comprehensive and effective language assessment practices in education.

9. The most commonly used AI-powered language assessment tools

In the field of education, several commonly used AI-powered language assessment tools have emerged. Assessment literacy tools are essential for teachers to develop competence, knowledge, and practices in language assessment. Educational assessment attitude tools help explore teachers' attitudes, competence, knowledge, and practices in assessment, contributing to effective assessment practices. Performance-based assessment tools, including oral reports, essays, and interviews, are increasingly utilized in language education to enhance learners' language knowledge and skills. CEFR-aligned assessment tools align with the Common European Framework of Reference for Languages (CEFR) and are implemented in ESL classrooms to ensure standardized language assessment. Language portfolio tools provide platforms for students to document and showcase their language proficiency and progress, fostering self-directed learning and reflection. These AI-powered language assessment tools play a crucial role in promoting effective assessment practices and enhancing the language learning experience for students.

The most commonly used AI-powered language assessment tools in the field of education include:

1. Chatbots: Chatbots have been utilized to stimulate and sustain interest in language courses, providing interactive and engaging language practice (Fryer et al., 2017). The most used AI-powered language assessment tools in the field of education include chatbots (Pokrivčáková, 2019). Chatbots are interactive conversational agents that simulate human-like conversations and provide language practice for learners. They offer personalized feedback, adapt to individual learning needs, and provide immediate responses, enhancing the learning experience (Pokrivčáková, 2019). These chatbots can engage students in language learning activities such as vocabulary practice, grammar exercises, and conversation simulations. They can track students' progress, identify areas for improvement, and offer targeted language instruction. By leveraging natural language processing and machine learning algorithms, chatbots can understand and respond to students' queries, providing interactive and engaging language assessment experiences. They offer a convenient and accessible platform for language practice, allowing students to practice their language skills anytime and anywhere. However, it is important to ensure that chatbots are designed with appropriate pedagogical principles, maintain accuracy in language assessment, and address potential biases. Additionally, human oversight and support are necessary to address complex language queries and provide a human touch in the learning process. Overall, chatbots serve as valuable tools in language assessment, offering interactive and personalized language practice for students.

2. AI-based Psychometric Instruments: AI has been applied to develop and validate psychometric instruments for assessing language-related constructs. AI-based psychometric instruments used in education encompass a range of applications, ranging from measuring implementation outcomes to assessing attitudes and resilience. AI-based machine learning approaches are discussed and their potential in psychometrics and psychological research is highlighted (Orrù et al., 2020). Some studies explore the use of instruments in various domains, including AI literacy, capability assessment, and attitudes toward ICT in higher education (Wood et al., 2021; Helter et al., 2019; Guillén-Gámez and Fernández, 2020). The use of AI technologies in psychometrics offers opportunities for more accurate and efficient assessment methods, contributing to the advancement of educational research and practice.

3. Educational Assessment Tools: AI has been integrated into educational assessment practices, including language assessment, to enhance classroom instruction and student performance (Alkharusi et al., 2012). In the field of language assessment, AI has been utilized to create tools for assessing language proficiency, such as the development of a brief executive language screen for frontal aphasia (Robinson et al., 2021). These AI-based educational assessment tools offer innovative approaches to evaluating various skills and competencies in education, supporting personalized instruction, and enhancing the learning experience for students.

4. Performance-based Assessment Tools: Performance-based assessments, facilitated by AI, have been employed to evaluate language knowledge and skills, providing practical tools for improving education (Espinosa, 2015). AI-based performance-based assessment tools used in language education include communicative tasks (Nunan, 1991), performance-based accountability measures (Shin, 2009), performance-based assessments for identifying language knowledge and skills (Espinosa, 2015), CEFR-aligned assessment tools (Azli and Akmar, 2019), oral proficiency assessments (Fortune and Tedick, 2015), and team performance-based compensation schemes (Blazovich, 2013). These tools aim to evaluate language proficiency and skills through practical tasks, authentic assessments, and performance-based indicators. They provide insights into learners' abilities, facilitate curriculum planning, and inform instructional practices. AI technologies enable the automation and efficient administration of these assessments, enhancing their scalability and objectivity. However, it is important to ensure the validity, reliability, and fairness of these AI-powered performance-based assessment tools, as well as address challenges such as implementation issues and the need for teacher training (Sapci and Sapci, 2020; Pokrivčáková, 2019; Kasneci et al., 2023). By leveraging AI, these tools contribute to more comprehensive and accurate language assessment practices in education.

6. AI-driven Language Learning Platforms: AI-powered platforms have been designed to support language learning, providing personalized instruction, feedback, and adaptive learning experiences (Sapci and Sapci, 2020). AI-driven language learning platforms used in language education include Duolingo, which is a web-based platform that utilizes digital-based capabilities to make language learning easier and more accessible (Febriani et al., 2022). Another commonly used platform is ChatGPT, a large language model that serves as a conversational partner for language practice and task-oriented dialogues (Kasneci et al., 2023). Additionally, AI-enabled automatic scoring applications are employed to provide feedback on pronunciation and other language skills, enhancing learners' continuous learning intention (Fu et al., 2020). Educational institutions also utilize learning management systems (LMS) such as Google Classroom for language instruction and assessment (Amin and Sundari, 2020). These platforms leverage AI technologies to provide personalized instruction, interactive language practice, and automated assessment, enhancing the language learning experience for students. However, it is important to address ethical challenges associated with AI in education, such as privacy, bias, and transparency, to ensure responsible and equitable use (Akgun and Greenhow, 2021).

7. Language Portfolio Tools: AI has been utilized to develop language portfolio tools, enabling students to document and showcase their language proficiency and progress (Pokrivčáková, 2019). AI-driven Language Portfolio Tools are utilized in language education to facilitate the documentation and presentation of students' language proficiency and progress (Robinson et al., 2021). These tools leverage AI technologies to provide a platform for students to showcase their language skills, track their language development, and create a comprehensive language portfolio (Robinson et al., 2021). Language portfolio tools often include features such as self-assessment, goal setting, evidence collection, and reflection (Robinson et al., 2021). They enable students to compile samples of their work, such as written assignments, audio recordings, and speaking performances, to demonstrate their language abilities (Robinson et al., 2021). AI-driven language portfolio tools can also provide automated feedback and suggestions for improvement based on the analysis of students' language artifacts (Robinson et al., 2021).

These tools support self-directed learning, reflection, and goal-oriented language development, empowering students to take ownership of their language learning journey (Robinson et al., 2021).

These AI-powered language assessment tools offer innovative approaches to language evaluation and assessment in education, enhancing the learning experience and promoting personalized instruction. They leverage AI technologies to provide interactive, adaptive, and efficient assessment methods, supporting both teachers and learners in the language learning process.

However, the problem of cheating during online exams has become a significant concern in the context of remote teaching and learning. The lack of direct supervision by instructors during online exams poses a significant risk of academic misconduct (Kweh et al., 2021). Studies have shown that students employ various methods of cheating during online exams, such as using online sources to copy and paste answers, consulting with others, using personal class notes, and accessing course materials during exams (Valizadeh, 2022). The COVID-19 pandemic and the shift to online education have further exacerbated this issue (Pleasants et al., 2022).

To address the problem of cheating during online exams, researchers have proposed various approaches. One approach involves using machine learning techniques to detect potential cases of cheating. This approach treats the identification of cheating as an outlier detection problem and utilizes students' continuous assessment results to identify abnormal scores on the final exam (Kweh et al., 2021). Another approach involves implementing technologies such as lockdown browsers or webcam-based monitoring services to enable remote proctoring and deter cheating (Pleasants et al., 2022).

The reasons behind students engaging in academic dishonesty during online exams are multifaceted. Some students may find online exams more conducive to cheating due to factors such as technical problems, lack of supervision, and the perception that cheating is easier to get away with (Kartallioğlu, 2022). Additionally, the COVID-19 pandemic and the transition to online learning have introduced new challenges and stressors for students, which may contribute to an increased likelihood of cheating (Lee and Aslam, 2023).

The prevalence of academic dishonesty in online exams highlights the importance of addressing this issue to ensure the integrity of assessments and the fairness of evaluation processes. Educators and institutions need to implement strategies and measures to prevent and detect cheating during online exams. This may include designing secure online exam environments, implementing proctoring technologies, and promoting academic integrity through education and awareness campaigns (Lee and Aslam, 2023).

Preventing students from cheating during online exams is a significant concern for educators and institutions. Several strategies and technologies have been proposed to address this issue.

One approach is the implementation of an institution-wide code of honor for online examinations. This code sets clear expectations and standards for academic integrity and emphasizes the importance of honesty and ethical behavior during exams (Iglesias-Pradas et al., 2021). Educating students about the consequences of cheating and the importance of academic integrity is crucial. By fostering a culture of honesty and integrity, students are more likely to refrain from engaging in dishonest behavior (Lee and Aslam, 2023).

Proctoring is another method commonly used to prevent cheating during exams. Proctoring involves monitoring students during the exam to ensure that they are not engaging in dishonest behavior. However, it is important to note that proctoring can raise privacy concerns and may not be feasible in all situations (Iglesias-Pradas et al., 2021; Teng et al., 2021). To address this, optimization-based anti-collusion approaches have been developed. These approaches optimize the sequencing and timing of exam questions to minimize collusion among students, reducing the potential for cheating (Teng et al., 2021).

Technological solutions can also play a role in preventing cheating during online exams. For example, the use of fingerprint readers and eye-tracking technology can help authenticate students' identities and monitor their behavior during exams (Bawarith et al., 2017). Webcam-based proctoring can also be employed to monitor students in real-time and deter cheating (Valizadeh, 2022; Özdemir et al., 2022). Additionally, the development and implementation of intelligent online proctoring systems, which utilize artificial intelligence technology to monitor students' behavior during exams, can be effective in detecting and preventing cheating (Jia and He, 2021). In addition, plagiarism detection software, such as Turnitin, can also be utilized to identify instances of academic dishonesty. These tools compare students' submitted work against a vast database of sources to detect any potential plagiarism (Iglesias-Pradas et al., 2021). By using such software, educators can identify and address instances of cheating, promoting a fair and honest assessment process.

Educators can also design exams that discourage cheating. By creating assessments that require critical thinking, problem-solving, and application of knowledge, students are less likely to rely on cheating as a shortcut (Pleasants et al., 2022). Additionally, randomized question banks and time limits can make it more challenging for students to collaborate or seek external assistance during exams (Adanır et al., 2020). Creating individualized exams can also be an effective strategy. By designing exams that are unique to each student, it becomes more difficult for students to share answers or collaborate on cheating (Suryani, 2020).

In conclusion, the problem of cheating during online exams is a significant challenge in the context of remote teaching and learning, and no single solution can guarantee its elimination. It undermines the integrity of assessments and poses ethical concerns. However, by implementing a combination of strategies such as institution-wide code of honor, using plagiarism detection software, considering proctoring options, utilizing technology-based solutions, creating individualized exams, promoting a culture of academic integrity, optimized question sequencing, and technological monitoring, educators can create an environment that discourages cheating and promotes academic integrity during online exams (Iglesias-Pradas et al., 2021; Teng et al., 2021; Daffin and Jones, 2018; Lee and Aslam, 2023; Özdemir et al., 2022; Suryani, 2020; Kartallioğlu, 2022; Jia and He, 2021; Bawarith et al., 2017; Valizadeh, 2022; Pleasants et al., 2022; Kweh et al., 2021).

10. Ethical Considerations in AI-Driven English Education

In today's rapidly changing educational landscape, integrating artificial intelligence (AI) into English teaching both offers unprecedented opportunities and poses complex ethical challenges. Ethical considerations in AI-driven English education are crucial to ensure responsible and equitable implementation. From questions about bias and fairness in AI algorithms to concerns about data privacy and the relationship between humans and AI, ethical considerations require a balanced and thoughtful approach to harnessing the power of AI. technology while protecting the rights, privacy, and well-being of learners and educators.

Firstly, AI technologies have the potential to collect and process large amounts of personal data, raising concerns about privacy and data security (Fiske et al., 2019). Ethical considerations ensure that students' personal information is protected, and that data is used responsibly and transparently (Pflanzer et al., 2022). Secondly, AI algorithms can introduce biases and discrimination if not properly designed and trained (Zhou and Nabus, 2023). Ethical considerations help address these biases and ensure fairness and equality in language education (Ghoz and Hendawy, 2023). Thirdly, the use of AI in language education raises questions about the role of human teachers and the potential impact on employment (Zhou and Nabus, 2023). Ethical considerations help navigate these concerns and ensure that AI technologies complement and enhance human teaching rather than replace it (Yau et al., 2022). Additionally, ethical considerations guide the responsible use of AI in language assessment, ensuring that evaluation methods are accurate, reliable, and unbiased (Fiske et al., 2019). They also promote transparency and

accountability in the development and implementation of AI-driven educational technologies (Morley et al., 2022). Lastly, ethical considerations foster trust and confidence in AI-driven English education among students, teachers, and other stakeholders (Textor et al., 2022). By addressing ethical considerations, educators can ensure that AI technologies are used ethically, responsibly, and in a manner that benefits learners while upholding ethical principles and societal values.

Several ethical dimensions have been identified in the literature:

1. Transparency and Explainability: The need for transparency and explainability in AI systems is essential to understand how decisions are made and to address concerns related to bias, fairness, AI systems should be transparent, providing clear explanations of how they make decisions. This transparency helps build trust and allows students and educators to understand and challenge the outcomes (Amann et al., 2020; Conijn et al., 2023).
2. Privacy and Data Protection: AI systems collect and analyze vast amounts of student data. It is essential to protect student privacy, ensure data security, and comply with relevant regulations (Amann et al., 2020; Akgun and Greenhow, 2021).
3. Equity and Inclusion: AI algorithms can inadvertently perpetuate biases present in the data they are trained on. They should be designed and implemented in a way that promotes equity and avoids perpetuating biases or discrimination (Akgun and Greenhow, 2021; Yu and Yu, 2023).
4. Trust and Reliability: Building trust in AI systems is crucial, and educators need to consider how AI tools impact student trust and motivation (Conijn et al., 2023; Textor et al., 2022).
5. Accountability and Responsibility: Clear lines of accountability should be established to address potential issues or errors in AI-driven systems. It is important to define who is responsible for the decisions and actions taken by AI systems (Textor et al., 2022).
6. Ethical Guidelines and Regulations: Adhering to ethical guidelines and regulations, such as those provided by regulatory bodies or educational institutions, is important to ensure responsible use of AI in education (Akgun and Greenhow, 2021).
7. Human Oversight and Decision-Making: Maintaining human oversight and involvement in the decision-making process is crucial to address complex ethical considerations and ensure the ethical use of AI in education (Lee, 2023).
8. Ethical Literacy and Education: Educators and students should be equipped with ethical literacy skills to critically engage with AI technologies and understand their ethical implications (Yu and Yu, 2023).
9. Informed Consent and Autonomy: Students and their guardians should be informed about the use of AI in education and have the right to provide informed consent. They should also have the ability to opt-out or request alternative methods if desired (Yau et al., 2022).
10. Pedagogical Considerations: The use of AI should align with pedagogical principles and educational goals. It should enhance, rather than replace, human interaction and support effective teaching and learning practices (Harry, 2023).
11. Continuous Evaluation and Improvement: Ethical considerations should include ongoing evaluation of AI systems to identify and address any unintended consequences or ethical issues that may arise during their use (Huriye, 2023).

These ethical considerations highlight the importance of responsible and ethical implementation of AI in English education. Addressing these ethical considerations requires collaboration among educators, policymakers, researchers, and technology developers. It is essential to establish guidelines, policies, and

frameworks that promote ethical AI practices in English education and ensure that AI-driven systems are designed and implemented in a manner that respects the rights and well-being of students.

11. Challenges and Limitations

Integrating AI-based technologies into English teaching promises unprecedented opportunities for learners around the world, delivering personalized learning experiences, instant feedback, and accessibility. more than ever. Amid these promises, however, are a series of complex challenges that must be overcome to fully realize the potential of AI-based English teaching. From issues related to equity and inclusion to concerns about the role of human educators, this growing field faces multifaceted obstacles that require careful consideration and innovative solutions.

Firstly, there may be concerns about the reliability and accuracy of AI systems in language instruction and assessment (Kasneci et al., 2023). AI models may not always produce correct or appropriate responses, leading to potential errors or misunderstandings in language learning (Yang et al., 2020). Additionally, AI systems may struggle with understanding context, cultural nuances, and the complexities of language use, which can impact the quality of instruction and feedback provided (Kasneci et al., 2023). Furthermore, biases in AI algorithms can perpetuate inequalities and discrimination, particularly if the training data is not diverse or representative. Ensuring the accuracy, reliability, and transparency of AI algorithms and models is crucial for their effective use in English education (Matheny et al., 2020). The rapid advancement of AI technologies requires ongoing research and development to address emerging challenges and ensure that AI-driven English education remains effective, relevant, and aligned with educational goals (Kasneci et al., 2023).

Secondly, ethical considerations are also important in AI-driven English education. There may be concerns about data privacy and security, as AI technologies often require the collection and processing of personal information (Matheny et al., 2020). Ethical considerations are paramount in ensuring the responsible and fair use of AI technologies in education (Duan et al., 2019). It is crucial to ensure that student data is protected and used responsibly. Ethical considerations help address these biases and ensure fairness and equity in language education by addressing issues such as privacy, data security, bias, and accountability (Haenlein and Kaplan, 2019). Ethical guidelines and frameworks are needed to guide the development and implementation of AI-driven educational systems (Borenstein and Howard, 2020).

Another challenge is the potential impact on the role of teachers. While AI technologies can enhance language instruction, there may be concerns about the potential replacement of human teachers. It is important to strike a balance between AI-driven tools and the expertise and guidance provided by human educators. Teachers need to be prepared and equipped with the necessary skills to effectively integrate AI technologies into their teaching practices (Pokrivčáková, 2019; Kasneci et al., 2023). Educators must also navigate the balance between AI-driven instruction and the importance of human interaction and personalized learning experiences (Kasneci et al., 2023). Additionally, there may be concerns about the impact of AI on employment in the education sector. The role of teachers and their expertise in language instruction should be preserved and complemented by AI technologies, rather than replaced (Yung, 2014).

Technical challenges also exist, such as the need for robust and reliable AI systems, access to appropriate technology infrastructure, and ongoing maintenance and support (Kasneci et al., 2023). AI technologies may require significant resources and expertise to implement and maintain effectively. Furthermore, the availability and accessibility of AI technologies can create disparities in access to quality English education, particularly for marginalized or underprivileged students (Yung, 2014). Efforts should be made to ensure equitable access to AI-driven educational resources and opportunities.

Lastly, there may be challenges related to student acceptance and adaptation to AI-driven English education. Some students may have reservations or discomfort with relying heavily on AI systems for language learning, preferring more human interaction and personalized instruction (Yung, 2014). It is important to address these concerns and ensure that AI technologies are designed to enhance the learning experience and meet the needs of diverse learners.

Overall, addressing these challenges requires collaboration among researchers, educators, policymakers, and stakeholders to develop ethical guidelines, provide training and support for educators, ensure transparency and accountability in AI systems, and promote equitable access to AI-driven educational resources. By addressing these challenges, educators can harness the potential of AI technologies to enhance language learning and instruction effectively.

To address the challenges of AI-driven English education, several possible solutions can be considered:

1. Ethical Frameworks: Develop and adhere to ethical frameworks that guide the responsible use of AI in language education. These frameworks should address privacy, data security, fairness, transparency, and accountability (Liao et al., 2020). Ensure that student data is collected, stored, and used responsibly. Implement robust data protection measures and adhere to privacy regulations to safeguard student information (Arora et al., 2021). Establish clear guidelines and protocols for data collection, storage, and usage in AI-driven English education. Ensure that student data is protected, anonymized when necessary, and used only for educational purposes (Arora et al., 2021).
2. Teacher Training: Provide comprehensive training for teachers to understand AI technologies, their benefits, limitations, and ethical considerations. Teachers should be equipped with the knowledge and skills to effectively integrate AI tools into their teaching practices (Yung, 2014).
3. Explainable and Transparent AI: Focus on developing explainable AI systems that provide clear and understandable explanations of how AI algorithms make decisions. This helps students and teachers understand the reasoning behind AI-driven assessments and instructional recommendations (Liao et al., 2020; Arora et al., 2021).
4. Fairness and Bias Mitigation: Implement measures to identify and mitigate biases in AI systems. Regular audits and evaluations should be conducted to ensure fairness and inclusiveness in language education (Agarwal and Agarwal, 2023).
5. User-Centered Design: Adopt a user-centered design approach that considers the needs, preferences, and experiences of students and teachers. Involve stakeholders in the design and development process to ensure that AI-driven solutions meet their requirements (Liao et al., 2020).
6. Contextualized Learning: Ensure that AI-driven English education takes into account the specific needs, backgrounds, and cultural contexts of learners. Tailor AI tools and content to address the diverse learning requirements of students (Yung, 2014). AI can adapt instruction, provide targeted feedback, and offer individualized support based on students' unique learning needs and preferences (Yung, 2014).
7. Collaboration and Interdisciplinary Research: Foster collaboration between researchers, educators, AI experts, and policymakers to address the challenges of AI-driven English education. Interdisciplinary research can provide insights and solutions that consider the educational, technological, and ethical aspects (Harnal et al., 2022). This interdisciplinary approach ensures that educational expertise and ethical considerations are integrated into the development and implementation of AI technologies (Arora et al., 2021).

8. Continuous Evaluation and Improvement: Regularly evaluate the effectiveness and impact of AI-driven English education. Collect feedback from students, teachers, and other stakeholders to identify areas for improvement and refine the implementation of AI technologies (Christodoulou and Iordanou, 2021).
9. Public Awareness and Engagement: Promote public awareness and engagement regarding AI-driven English education. Foster discussions, share best practices, and involve the wider community in shaping the ethical and responsible use of AI in language education (Christodoulou and Iordanou, 2021). Involve students, teachers, parents, and other stakeholders in the decision-making process regarding the use of AI in English education. Their perspectives and feedback can inform the development and implementation of AI-driven solutions (Misra et al., 2020).
10. Addressing Technical Challenges: Address technical challenges related to AI-driven English education, such as algorithmic biases, interpretability, and generalization. Collaborate with AI researchers and experts to develop robust and reliable AI systems for language learning (Hagendorff and Danks, 2022).

By implementing these solutions, educators can harness the potential of AI-driven English education and navigate the challenges of AI-driven English education and create a responsible and effective learning environment that leverages the benefits of AI technologies while upholding ethical principles and ensuring student well-being.

12. Conclusion

The advancements in technology have had a significant influence on language learning, particularly with the integration of AI. As the technology matures and research progresses, AI-supported English language education has transitioned from technical inquiry to pedagogical practice (Zhu, 2022). The emergence of AI in English education has led to the development of AI-driven language learning platforms, which optimize learning effects and improve teaching quality (Zhu, 2022). These platforms utilize data-driven machine learning models to automate language assessment and evaluation, providing a more efficient and accurate approach compared to traditional methods (Xu and Wang, 2022). Some commonly used AI-powered language assessment tools include automated Chinese word segmentation and POS tagging models (Xu and Wang, 2022). However, the integration of AI in English education also raises ethical considerations. Local startups often overlook embedded biases and ethical concerns when developing AI systems, highlighting the need for greater awareness and consideration of ethical implications (Mancilla-Caceres and Estrada-Villalta, 2022). Overall, the integration of AI in language learning and education presents both opportunities and challenges. While AI-driven platforms and tools enhance learning experiences and assessment processes, ethical considerations must be carefully addressed to ensure fairness, transparency, and accountability (Huriye, 2023). Collaboration between stakeholders, including policymakers, researchers, and local communities, is crucial in developing and implementing ethical guidelines (Huriye, 2023). Additionally, a human-centered approach that prioritizes the well-being of learners and considers the moral considerations of nonhuman entities can contribute to the responsible development and use of AI in language education (Owe and Baum, 2021).

Given the current situation, it would not be an exaggeration to assume that the future of AI in language teaching will be remarkably transformative and innovative. As technology continues to advance, AI-powered language learning platforms will become increasingly personalized and adaptive. Students will benefit from AI-powered virtual tutors who tailor lesson plans to individual needs, providing real-time feedback and targeted exercises to improve their skills. their language skills. Natural language processing capabilities will enable these platforms to engage in lifelike conversations, allowing learners to practice in authentic, real-world contexts. Additionally, AI will facilitate the creation of rich virtual environments in which students can interact with AI-generated characters and situations to improve their language skills.

Additionally, AI will play a key role in eliminating language barriers, providing instant translation and interpretation services, enabling global communication, and making it easier for people around the world to access learn more languages. The future of AI in language teaching promises a more effective, personalized and comprehensive approach to language mastery. However, when integrating AI into language teaching, it is important to be cautious on several fronts. Above all, it is essential to maintain a balance between AI-based tools and human interaction. While AI can improve the learning experience, it should not replace the personalized guidance and emotional support provided by educators. Second, privacy issues must be addressed diligently. Protecting students' personal data and ensuring compliance with data protection regulations is paramount. Additionally, the potential for bias in AI algorithms must be continuously monitored and mitigated to avoid reinforcing stereotypes or promoting unfair advantages. Additionally, AI tools should always be viewed as a support rather than a replacement, as they may not fully meet individual learning needs or adapt to the unique challenges students face. face. Finally, educators must stay informed about advances in AI and continually evaluate the effectiveness of AI-based solutions to ensure they align with educational goals and ethical standards. Therefore, more research is needed to be conducted on the use of AI in every field of education.

In conclusion, this study aims to provide a comprehensive overview of the advancements in technology and their influence on language learning, as well as the emergence and integration of AI in various fields, including English education. The article discusses the integration of AI in the English classroom and the use of AI-driven language learning platforms. It also evaluates the effectiveness of popular AI language learning apps and tools and compares automated language evaluation with traditional methods. The ethical considerations in AI-driven English education are addressed, along with the challenges and limitations of AI in this context. The potential of AI to transform education is highlighted, with personalized learning experiences, intelligent tutoring systems, and natural language processing being key areas of focus. The article also discusses the use of gamification and AI in increasing student engagement and motivation. However, the ethical considerations surrounding privacy, bias, and transparency are acknowledged. The article concludes by summarizing the current trends and future directions in the use of AI in education. It emphasizes the transformative potential of AI in enhancing teaching and learning experiences, fostering personalized instruction, and driving educational advancement. However, it also acknowledges the challenges and limitations that need to be addressed for the effective integration of AI in education. Overall, this article provides a comprehensive and insightful analysis of the advancements in technology and the integration of AI in language learning and education. It highlights the potential benefits and challenges of AI in this context and emphasizes the need for responsible and ethical implementation. By understanding the current state of research and exploring the opportunities and challenges presented by AI, educators and policymakers can make informed decisions to harness the benefits of AI in language learning and education (Pendy, 2023; Pokrivčáková, 2019; Kumar, 2023; Kasneci et al., 2023; Rusmiyanto, 2023).

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