

A Systematic Literature Review On The Application Of Artificial Intelligence In English Language Teaching And Learning

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Abstract - Artificial Intelligence (AI) has emerged as a significant force in reshaping English language teaching and learning, offering innovative opportunities to enhance educational practices. This review examines the diverse applications of AI in English language education and its growing influence on language acquisition. The integration of AI into Computer-Assisted Language Learning (CALL) has led to the development of Intelligent CALL (ICALL), enabling more personalized, adaptive, and learner-centered instructional experiences. AI-powered technologies, including virtual assistants, automated writing systems, and intelligent learning platforms, facilitate the development of core language competencies - speaking, writing, reading, and listening - through tailored content delivery and immediate feedback. Furthermore, AI contributes to increased learner engagement, autonomy, and confidence while helping to alleviate language-learning anxiety. Despite these advantages, several challenges remain, including the limited capacity of AI to emulate authentic human interaction, concerns surrounding data privacy and ethical use, and disparities in access to AI-based educational resources. Although AI demonstrates considerable potential for improving language proficiency, it is most effective when integrated with conventional pedagogical approaches rather than replacing them. Future research should address existing limitations, particularly regarding the cultivation of critical thinking, intercultural competence, and nuanced language use, while also promoting equitable access to AI-enhanced learning environments.

Keywords— Artificial Intelligence (AI), English language teaching and learning, language skills, systematic literature review

I. INTRODUCTION

Artificial Intelligence (AI), once regarded as a visionary technological innovation, has become deeply embedded in modern society and daily human activities. As AI technologies continue to expand across various domains, individuals increasingly rely on their functionalities, fundamentally altering interactions with digital systems and transforming everyday experiences. In the field of language education, the adoption of AI has driven the transition from traditional Computer-Assisted Language Learning (CALL) to Intelligent Computer-Assisted Language Learning (ICALL), which incorporates advanced AI technologies to create more efficient and responsive learning environments (Zheng & Yang, 2024). Through its capacity to analyze learner behavior and provide adaptive support, AI has become an important facilitator of language acquisition. One notable contribution lies in its ability to accelerate learning by exposing learners to recurring linguistic patterns, sentence structures, and lexical chunks, thereby promoting a deeper understanding of language use and organization (Huang et al., 2023).

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A prominent illustration of AI application in language learning is Siri, Apple's intelligent voice assistant. Siri provides learners with opportunities to engage in interactive English communication, making it a valuable resource for individuals studying English as a second or foreign language (Dizon, 2023). By delivering immediate responses and corrective feedback, Siri supports the development of speaking proficiency, particularly in pronunciation accuracy and listening comprehension. In addition to Siri, several other AI-powered virtual assistants, such as Google Now and Microsoft Cortana, have demonstrated considerable potential in educational contexts (Huang et al., 2022). These systems are capable of recognizing spoken language and responding to user commands, allowing individuals to perform a variety of tasks, including accessing online information, initiating phone calls, and managing schedules. Nevertheless, the usability of these applications is often limited by device compatibility and operating system requirements.

The growing implementation of AI highlights its capacity to transform language education and redefine conventional teaching and learning practices. Within the context of the Fourth Industrial Revolution, AI has emerged as a valuable educational resource, offering innovative solutions that enhance instructional effectiveness and learner engagement. The increasing sophistication of AI technologies suggests that language learning is no longer confined to traditional classroom settings, as intelligent systems can provide personalized guidance and interactive learning experiences. Consequently, AI-supported learning environments encourage greater learner autonomy, enabling students to manage their own learning processes more effectively while fostering improved language outcomes.

II. METHODOLOGY

This study adopted a qualitative research design, utilizing content analysis as the primary methodological approach to address the proposed research question. According to Harwood and Garry (2003), content analysis refers to a systematic procedure for examining written and visual materials, including textbooks, public communications, political speeches, literary works, essays, reviews, advertisements, and images, with the aim of identifying recurring themes and emerging patterns. In the present study, the analytical focus was placed on an extensive review of scholarly literature. Through the systematic collection, examination, and synthesis of evidence from relevant research articles, the study aims to generate a comprehensive understanding of the topic and provide an informed answer to the research question: "What are the implications for artificial intelligence application in English language teaching and learning?"

A. Selection of articles

The articles included in this review were retrieved from several reputable academic databases, including ScienceDirect, Scopus, Web of Science, Cambridge Core, and Taylor & Francis. These databases are recognized for their extensive coverage of scholarly publications and rigorous quality assurance procedures, providing a more reliable source of academic literature than general-purpose search engines. By applying clearly defined inclusion criteria, this review ensures that the analysis is based on relevant, high-quality, and up-to-date research concerning the application of artificial intelligence (AI) in English language teaching and learning. The article selection process involved a systematic screening procedure based on the following criteria:

Publication recency: Only studies published within the previous five years were included to ensure that the review reflects the latest developments, innovations, and research trends in AI-assisted language education.

Source credibility: Eligible articles were required to be sourced from established and reputable academic databases. These databases maintain rigorous publication and indexing standards, thereby ensuring the inclusion of reliable and high-quality scholarly work.

Peer-review status: The review exclusively considered peer-reviewed publications to ensure that the selected studies had undergone critical evaluation by subject-matter experts, thereby enhancing the validity and trustworthiness of the findings.

Topical relevance: Studies were included only if they explicitly examined the application of AI within the context of English language teaching and learning. Research addressing AI in other educational disciplines or broader technological contexts was excluded to maintain alignment with the research objective.

Empirical focus: Priority was given to empirical studies that reported data-driven findings, experimental results, survey outcomes, or case-study evidence related to AI in English language education. Nevertheless, theoretically grounded studies were also included when they offered substantial conceptual insights into the topic.

Methodological quality: Selected studies were expected to demonstrate methodological rigor through clearly articulated research designs, appropriate participant selection procedures, and robust data collection and analysis techniques. This criterion was applied to ensure the reliability and credibility of the evidence synthesized in the review.

B. Procedure of data synthesis

The study followed a four-stage procedure for data collection and analysis. The first stage involved identifying appropriate academic databases from which relevant scholarly articles could be retrieved. In the second stage, studies specifically addressing the application of artificial intelligence (AI) in language teaching and learning were screened and selected, with only complete full-text articles considered eligible for inclusion. The third stage consisted of a systematic synthesis of the selected literature, during which the articles were thoroughly examined and interpreted to extract key findings, perspectives, and insights reported by the authors. Finally, thematic categories were generated through the identification of recurring and significant patterns within the literature. These themes served as an analytical framework for organizing and presenting the findings in a manner that directly addressed the research question.

C. Procedure for data analysis

The present study adopted a five-stage analytical procedure to systematically examine the selected research articles. The first stage involved defining the unit of analysis by identifying a range of relevant keywords, phrases, and concepts associated with the research topic. To enhance the comprehensiveness of the search strategy, synonyms and related terms were incorporated through the use of a thesaurus, thereby broadening the scope of database queries.

The second stage consisted of conducting a comprehensive search across multiple academic databases to identify recent studies that corresponded to the predefined unit of analysis. Following the retrieval of relevant literature, the third stage involved a systematic review process that included skimming, scanning, critical analysis, and synthesis of the selected articles. This procedure enabled the researcher to establish a conceptual foundation and develop a coherent rationale for the study.

The fourth stage was carried out concurrently with the literature analysis process and focused on the development of a sampling strategy. Relevant information was extracted from the selected studies through a systematic sampling approach, followed by further cycles of reading, analysis, and synthesis. Throughout this stage, the researcher engaged in continuous reflection and critical interpretation to ensure a comprehensive understanding of the evidence.

The final stage involved the construction of a coding framework to facilitate data organization and interpretation. Through the development of codes, categories, and thematic groupings, relationships among the findings of the reviewed studies were identified and examined. This process, commonly referred to as memoing, involved documenting analytical observations, summarizing key insights, and continuously interrogating the data to uncover meaningful patterns and significant findings derived from the empirical literature.

III. FINDINGS

This review seeks to investigate the multifaceted role of AI in language teaching and learning. Through a comprehensive analysis of the literature, four key themes have emerged in response to the research question posed at the outset.

A. Theme 1: AI technologies for enhancing English language education and personalizing learning experiences

A number of studies have examined the integration of artificial intelligence (AI) into English language learning, particularly within flipped learning environments (Baskara, 2023; Hu, 2021; Lin & Mubarak, 2021; Wu & Wang, 2021). Conducted primarily in blended learning settings, these studies consistently reported that AI-supported flipped learning approaches contributed positively to language development and learning outcomes.

One prominent finding was the improvement in learners' self-efficacy. Students who participated in AI-enhanced learning environments demonstrated greater gains in English-speaking proficiency than those in conventional instructional settings (Baskara, 2023; Lin & Mubarak, 2021). In addition, learners in the experimental groups achieved better performance in listening comprehension, suggesting that AI-assisted flipped learning can effectively foster the development of essential language skills (Hu, 2021; Wu & Wang, 2021).

Another notable contribution of AI lies in its capacity to deliver personalized learning experiences. Through the application of machine learning algorithms, AI systems can identify individual learners' strengths, weaknesses, and learning needs, enabling the provision of customized learning materials and activities (Baskara, 2023; Sasikumar et al., 2023). According to Betaubun et al. (2023), AI-powered personalized language learning platforms can enhance learner engagement and motivation by offering targeted instructional support that addresses specific areas requiring improvement.

Despite these benefits, the literature also highlights several challenges associated with AI-driven personalization. The effectiveness of adaptive learning systems largely depends on the quality, accuracy, and representativeness of the data used to train AI models. When training datasets are incomplete, biased, or insufficiently diverse, AI systems may generate inaccurate recommendations or inappropriate learning pathways, potentially limiting learners' progress and educational outcomes (Betaubun et al., 2023; Hwang et al., 2023; Sasikumar et al., 2023). These findings underscore the importance of ensuring data quality and algorithmic fairness when implementing AI-based personalized learning solutions in English language education.

B. Theme 2: The impact of AI technologies on the development of English language skills

- AI and English writing skills

Artificial intelligence has significantly influenced the development of English writing skills through the introduction of intelligent writing support systems such as Grammarly, QuillBot, and ChatGPT. These tools provide learners with immediate feedback on grammar, vocabulary usage, sentence structure, and writing style, enabling continuous improvement throughout the writing process (Hwang et al., 2023; Raheem et al., 2023; Zhao, 2023). Research suggests that AI-assisted writing platforms contribute to greater writing accuracy by identifying linguistic errors and offering corrective suggestions. Furthermore, AI-generated feedback enhances learners' awareness of recurring mistakes, thereby facilitating gradual improvements in writing proficiency (Giglio & Costa, 2023; Khalifa & Albadawy, 2024).

In addition, automated essay evaluation systems, such as ETS's E-Rater, have emerged as valuable tools for providing rapid and consistent assessments of student writing. Studies indicate that these systems support the revision process by delivering immediate feedback, allowing learners to identify weaknesses and refine their written work more efficiently (Fitria, 2023; Khalifa & Albadawy, 2024).

Despite these advantages, the literature highlights several concerns regarding the extensive use of AI in writing instruction. Overdependence on automated writing assistants may discourage learners from developing independent writing abilities and a deeper understanding of grammatical and rhetorical conventions (Hwang et al., 2023). Moreover, while automated essay scoring systems effectively evaluate surface-level linguistic features, they may inadequately assess higher-order writing qualities such as creativity, originality, argumentation, and critical thinking, thereby limiting opportunities for the development of sophisticated writing competence (Alharbi, 2023).

- AI and English speaking skills

The application of AI in speaking instruction has expanded considerably through the use of conversational agents and intelligent chatbots. Language-learning platforms such as Duolingo, ChatGPT, and Rosetta Stone utilize Natural Language Processing (NLP) technologies to simulate authentic conversational exchanges and provide learners with opportunities for interactive speaking practice. A growing body of research consistently demonstrates that regular interaction with AI conversational agents contributes to improvements in speaking fluency, communication confidence, and overall oral proficiency (Ahmed et al., 2022; Cooray et al., 2024; Fathi et al., 2024; Ruan et al., 2021; Smith et al., 2024).

One of the most notable benefits of AI-powered speaking tools is the creation of a low-anxiety learning environment. The anonymous and non-judgmental nature of chatbot interactions encourages learners to engage in speaking practice without fear of negative evaluation, making these technologies particularly beneficial for individuals experiencing language anxiety (Yang et al., 2022).

Nevertheless, existing studies also emphasize important limitations. AI conversational systems often struggle to provide detailed feedback regarding pronunciation accuracy, intonation patterns, pragmatic language use, and cultural appropriateness—elements that are essential for effective spoken communication (Ruan et al., 2021; Smith et al., 2024). Consequently, although AI can facilitate the development of foundational speaking skills, it remains insufficient as a complete substitute for human instructors, who are better equipped to provide contextualized and culturally informed guidance.

- AI and English reading skills

AI technologies have also been widely incorporated into reading instruction through adaptive learning platforms such as Newsela and ReadTheory. By leveraging machine learning algorithms, these systems tailor reading materials to learners' proficiency levels, ensuring that texts are appropriately challenging and aligned with individual learning needs. Research indicates that such adaptive platforms contribute positively to reading comprehension by offering personalized content and immediate vocabulary support, thereby facilitating gradual improvements in reading performance (Alshriedeh & Mohammed, 2021; Salam et al., 2023).

The adaptive capabilities of AI-based reading systems enable learners to engage with texts that correspond to their current proficiency levels, supporting incremental language development and sustained learning progress (Mohamed Haggag, 2021; Fitria, 2024). This personalized approach can enhance learner engagement and improve comprehension outcomes by reducing cognitive overload.

However, concerns have been raised regarding the potential drawbacks of excessive personalization. Scholars argue that adaptive algorithms may unintentionally restrict learners' exposure to complex, unfamiliar, or diverse reading materials if recommendations are consistently aligned with existing proficiency levels (Alshriedeh & Mohammed, 2021; Makhoulf, 2021). As a result, learners may have fewer opportunities to engage with challenging texts that are necessary for developing advanced reading abilities, critical thinking, and analytical skills.

- AI and English listening skills

The integration of AI into listening instruction has been facilitated by advancements in speech recognition technologies and intelligent language-learning applications. Tools such as Google Speech-to-Text and ELSA Speak enable learners to practice listening and pronunciation through interactive exercises and real-time feedback mechanisms. Research suggests that these technologies enhance learners' ability to recognize spoken English across different accents and dialects, thereby strengthening listening comprehension and auditory processing skills (Hu, 2024; Suryana et al., 2020; Yu et al., 2023).

Another notable advantage of AI-powered listening tools is their capacity to provide immediate corrective feedback on pronunciation and listening performance, allowing learners to identify weaknesses and refine their skills more effectively (Mohammed & Elsayed, 2021; Wu & Wang, 2021). Such instant feedback contributes to more efficient learning and supports continuous skill development.

Despite these benefits, the literature identifies several limitations associated with AI-supported listening instruction. In particular, AI-based listening platforms may struggle to replicate the dynamic and unpredictable nature of authentic spoken interactions. Because many applications rely on scripted dialogues and structured language input, learners may not be adequately prepared for real-world communication characterized by rapid speech, informal language, colloquial expressions, and spontaneous conversational exchanges (Al-Mawaly & AL-Jamal, 2022). Consequently, while AI technologies serve as valuable supplementary tools for listening practice, they may not fully capture the complexity of natural language use encountered in everyday communication.

C. Theme 3: AI applications and the affective dimensions of English language learning

The influence of artificial intelligence (AI) in language education extends beyond the development of cognitive and linguistic competencies to encompass affective dimensions of learning, including motivation, anxiety, confidence, and learner autonomy. The reviewed studies suggest that AI technologies play a significant role in shaping learners' emotional experiences and attitudes toward English language learning.

One of the most frequently reported affective benefits of AI-based learning environments is the enhancement of learner motivation. AI-powered platforms such as Duolingo and Babbel integrate features including gamification, adaptive learning pathways, and real-time feedback, all of which contribute to increased learner engagement. Research indicates that learners who utilize AI-supported language learning applications often demonstrate higher levels of motivation due to personalized progress monitoring and adaptive challenges that align with their proficiency levels (Moybeka, 2023; Wei, 2023). Furthermore, individualized learning experiences enable learners to achieve attainable goals and experience a sense of accomplishment, thereby fostering intrinsic motivation and sustained participation in the learning process (Syifaiddin & Yuliansyah, 2023). Nevertheless, concerns have been raised regarding the long-term effectiveness of motivational mechanisms based primarily on external rewards. Specifically, the reliance on gamified elements such as badges, points, and learning streaks may encourage short-term engagement without necessarily supporting enduring motivational development (Silitonga et al., 2023).

Another important contribution of AI technologies lies in their ability to reduce language learning anxiety. This benefit is particularly evident in speaking activities, where AI conversational agents and chatbots provide learners with a supportive and non-threatening environment for communication practice. Unlike traditional classroom interactions, AI systems allow learners to experiment with language use without fear of criticism or negative evaluation. Hawanti and Zubaydulloevna (2023) reported that learners who engaged in speaking practice through AI chatbots experienced lower levels of anxiety than those interacting with human instructors. Similarly, the anonymity, flexibility, and opportunities for repeated practice offered by AI applications have been shown to increase learners' confidence and willingness to communicate, helping them overcome apprehension associated with making mistakes (El Shazly, 2021; Syifaiddin & Yuliansyah, 2023).

In addition to enhancing motivation and reducing anxiety, AI technologies have been found to promote learner autonomy. The flexibility of AI-supported learning environments enables students to access educational resources at any time and progress according to their individual learning pace. Research suggests that learners who utilize AI-driven tools exhibit greater self-regulation and independence in managing their language learning activities (Wei, 2023). Through personalized feedback and continuous performance monitoring, AI systems encourage learners to take greater responsibility for their own progress, thereby strengthening self-efficacy and autonomous learning behaviors. However, the literature also highlights potential drawbacks associated with excessive reliance on self-directed learning. Xia et al. (2023) caution that high levels of autonomy without adequate instructional guidance may lead to feelings of isolation, frustration, or cognitive overload, particularly when learners encounter challenging content that requires human explanation and support.

Overall, the reviewed studies suggest that AI technologies can positively influence the affective aspects of English language learning by enhancing motivation, alleviating anxiety, and fostering learner autonomy. Nevertheless, these benefits appear to be most effective when AI-based learning is complemented by appropriate pedagogical support, ensuring that learners remain engaged, emotionally supported, and adequately guided throughout the learning process.

D. Challenges and limitations of AI in English language learning

Despite the considerable benefits associated with the integration of artificial intelligence (AI) in English language education, the literature consistently identifies several challenges and limitations that may affect its effectiveness and broader implementation. One of the most frequently cited concerns relates to the limited capacity of AI systems to replicate authentic human interaction. Language learning is fundamentally a social and communicative process that requires meaningful interpersonal engagement. Although AI-powered tools can facilitate language practice and provide immediate feedback, they often struggle to capture the complexity of human communication, particularly in areas involving pragmatics, humor, sarcasm, emotional expression, and

culturally embedded meanings (Lesia Viktorivna et al., 2022; Muthmainnah et al., 2024). Consequently, scholars argue that AI should be viewed as a complementary instructional resource rather than a substitute for human teachers and peer interaction, both of which remain essential for developing communicative competence and intercultural understanding (Schmidt & Strasser, 2022).

Another major challenge concerns the ethical implications of AI adoption in educational settings. As AI-powered learning platforms increasingly collect, process, and analyze learner data, concerns regarding privacy, security, and responsible data management have become more prominent. The extensive collection of information related to learners' performance, behaviors, and learning patterns raises questions about data ownership and the potential misuse of personal information. Hockly (2023) emphasizes that the commercialization of educational data through AI technologies may expose learners to risks associated with unauthorized access, data exploitation, or third-party use of sensitive information. These concerns highlight the need for transparent data governance policies and ethical frameworks to ensure the responsible use of AI in education.

Issues of equity and accessibility also emerge as significant barriers to the widespread implementation of AI-assisted language learning. Although AI technologies have the potential to expand educational opportunities and support more inclusive learning environments, access to such technologies is often unevenly distributed. Socioeconomic disparities may prevent learners from obtaining the necessary digital devices, stable internet connectivity, or subscription-based AI services required for effective participation in AI-enhanced learning environments (Creely, 2023; Schmidt & Strasser, 2022; Xia, Chiu, & Chai, 2023). As a result, the integration of AI may inadvertently reinforce existing educational inequalities by providing greater advantages to learners with better technological resources while limiting opportunities for those from disadvantaged backgrounds.

Overall, the reviewed studies suggest that while AI offers substantial potential for enhancing English language learning, its implementation is accompanied by pedagogical, ethical, and socioeconomic challenges. Addressing these limitations is essential to ensuring that AI technologies are utilized in ways that are equitable, ethical, and pedagogically effective, thereby maximizing their benefits while minimizing potential risks.

IV. CONCLUSION

This review sought to examine the diverse applications of artificial intelligence (AI) in English language teaching and learning and to synthesize current evidence regarding its educational implications. The findings reveal that AI has emerged as a valuable tool for supporting language education by enhancing the development of key language competencies and facilitating more personalized learning experiences. Across the reviewed studies, AI technologies demonstrated considerable potential in areas such as natural language processing, speech recognition, adaptive learning systems, and flipped learning environments, all of which contributed to improved learner performance and engagement.

The evidence further suggests that AI can support language acquisition by providing individualized feedback, promoting learner autonomy, and enabling continuous access to learning resources. These capabilities allow learners to engage in more flexible and self-directed learning while receiving tailored support that addresses their specific needs and proficiency levels. As a result, AI has become an increasingly important component of contemporary language education and a valuable resource for both learners and educators.

Despite these advantages, the review also highlights several limitations associated with the implementation of AI in language learning contexts. Current AI technologies remain limited in their ability to facilitate deeper forms of language development, including critical thinking, pragmatic competence, intercultural communication, and the interpretation of culturally nuanced meanings. Furthermore, concerns related to data privacy, ethical use, and unequal access to technological resources continue to pose challenges to the effective and equitable adoption of AI in educational settings.

Given these findings, AI should be viewed as a complementary instructional tool rather than a replacement for human teachers. The integration of AI is most effective when combined with established pedagogical practices that provide meaningful social interaction, contextualized feedback, and emotional support. Future research should therefore focus on enhancing the capacity of AI systems to accommodate authentic and complex language use, while also addressing issues of accessibility, inclusivity, and ethical implementation.

In summary, the findings of this review underscore the transformative role of AI in English language teaching and learning. By capitalizing on its strengths and addressing its current limitations, educators and institutions can more effectively integrate AI technologies into language education, thereby promoting improved learning outcomes, greater learner engagement, and more personalized learning experiences.

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