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A SYSTEMATIC REVIEW OF GENERATIVE AI APPLICATIONS IN ENGLISH LANGUAGE TEACHING (2022–2025)

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ABSTRACT

This systematic review analyzes research articles on the use of AI technologies in English as a Foreign Language (EFL) education. Focusing on studies published between 2022 and 2025, it examines the limitations reported in the literature and highlights the benefits of AI integration identified across these works. The review aims to clarify the current scope of research and, by synthesizing documented limitations, provide insights to guide future investigations. A set of predetermined inclusion and exclusion criteria was applied, and the selected studies were screened and analyzed using qualitative methods. The findings indicate that AI technologies can positively influence language development, cultural understanding, learner engagement, learning support, and critical thinking. However, several limitations categorized as instructional, methodological, and technological must be considered to ensure more comprehensive and rigorous future research.

KEYWORDS: Artificial Intelligence, Systematic Review, EFL, Education, Technology

1. INTRODUCTION

Artificial intelligence (AI) applications in education have grown rapidly and received considerable attention over the past few years. AI and adaptive learning technologies were identified as major developments in educational technology in the 2018 Horizon Report (Educause, 2018), with an estimated adoption timeline of two to three years. The report predicted that AI in education would increase by 43% between 2018 and 2022, while the Horizon Report 2019 Higher Education Edition (Educause, 2019) projected an even more substantial rise in AI applications related to teaching and learning. Contact North, a prominent Canadian non-profit online learning organization, similarly stated that "there is little doubt that the [AI] technology is inexorably linked to the future of higher education" (Contact North, 2018, p. 5). Significant investments by private companies—such as Google's acquisition of the European AI start-up DeepMind for $400 million—and by public–private organizations such as the German Research Centre for Artificial Intelligence (DFKI) [1] further suggest that AI is poised to exert a major influence on higher education institutions (Popenici & Kerr, 2017). Reflecting this momentum, the Technical University of Eindhoven in the Netherlands recently announced the establishment of an Artificial Intelligence Systems Institute, supported by 50 new professorships dedicated to AI research and education. [2]

AI in education (AIEd) has been a research focus for nearly three decades. The International AIEd Society (IAIED), founded in 1997, publishes the International Journal of AI in Education (IJAIED) and organizes an annual international conference, which has now reached its 20th edition. Nevertheless, despite this longstanding academic engagement, educators more broadly are only beginning to explore the pedagogical opportunities that AI technologies offer for supporting learners throughout the student life cycle. [3]

Alongside these opportunities, the growing adoption of AI in higher education also raises ethical implications and institutional risks. In contexts affected by financial constraints, administrators may be tempted to replace aspects of teaching with cost-efficient automated AI solutions. Such developments may generate concerns among faculty members, teaching assistants, student counsellors, and administrative staff regarding the potential impact of intelligent tutors, expert systems, and chatbots on their professional roles. Furthermore, although AI can enhance the capabilities of learning analytics, these systems rely on extensive data collection, including sensitive information about students and faculty. This reliance raises critical questions about privacy, data governance, and information security. To address such issues, several organizations have emerged, including the Institute for Ethical AI in Education in the UK and the Analysis & Policy Observatory in Australia, which published a discussion paper in 2019 proposing an AI ethics framework for the educational sector. [4]

As a global lingua franca, English is widely used across international economic, cultural, and digital contexts (Marlina & Xu, 2018), which has contributed to a reconceptualization of the notion of "native speakers" and the broader understanding of English users. Consequently, the traditional emphasis on native-speaker norms has become less central, while communicative effectiveness and the ability to negotiate meaning across diverse cultural and national contexts have gained prominence. [5] This shift has strengthened the focus of English language teaching (ELT) research and practice on varied instructional demands, including English as a second or foreign language, English for specific purposes, and English for academic purposes (Kumar, 2024). [6] Despite this importance, English language education continues to face challenges such as inadequate resources, uneven instructional quality, and limited adaptability to learners' individual needs and learning pace, depending on the instructional context (Cuong, 2021). [7] In response, technology-driven solutions have increasingly been adopted to help address these issues. Advances in digital tools have positively influenced ELT by supporting learning, enhancing student engagement, and facilitating access to quality instruction (Kumar, 2024).

Recent developments in artificial intelligence (AI) have further expanded opportunities for transforming English language learning. Tolstykh and Oshchepkova (2024) note the potential of AI tools to act as supportive learning partners, offering assistance such as answering learner questions, providing feedback on grammar and vocabulary, and translating texts within a motivating digital environment. Dennis (2024) argues that AI contributes to language learning by drawing on the principles of the interactionist approach, which emphasizes that language is best acquired through meaningful communication and interaction. In this regard, AI functions as a virtual tutor that offers personalized guidance to learners. [8] Similarly, Fountoulakis (2024) highlights AI's capacity to create personalized learning opportunities and provide authentic conversational practice. [9] Gu (2024) also reports positive effects of AI tools on language

learning, suggesting that their use enhances learners' ability to engage effectively with tasks, manage attention, process new information, and develop improved working memory skills. [10]

Given these rapid developments, AI has begun to exert considerable influence on educational practices more broadly. In language learning and teaching, its benefits and limitations have been explored across a growing body of research. Numerous studies have examined the potential of AI technologies for language education, often focusing on specific timeframes or particular aspects of AI integration.

One review by Sharadgah and Sa'di (2022) analyzed research published between 2015 and 2021, initially screening 200 articles and narrowing them to 64 through qualitative selection criteria. [11] Focusing on ELT, the review found that AI supported various aspects of language learning, including linguistic ability, assessment, recognition, translation, and learners' emotions and satisfaction. The study also noted that mixed-methods approaches were most common, that higher-education learners formed the majority of samples, and that students were the primary participant group.

In another review, Xing (2023) examined the use of ChatGPT for listening skills and discussed the application of Convolutional Neural Network (CNN) models for speech and image recognition. [12] The study emphasized the effectiveness of CNN models in providing rapid feedback on pronunciation, intonation, and other components of spoken interaction. It further proposed combining ChatGPT with CNN capabilities to integrate real-time speech recognition with interactive conversational interfaces, thereby offering learners more authentic speaking practice and pronunciation support.

Cromptoni et al. (2023) similarly reviewed studies on AI technologies in language education. [13] Using PRISMA guidelines, the researchers screened peer-reviewed articles published between 2014 and 2023. From an initial pool of 369 studies, 43 met the inclusion criteria and were analyzed using a grounded theory approach. The review mapped the geographical distribution of AI-related research, participant age groups, pedagogical applications of AI in ELT/ELL, and challenges associated with AI implementation.

Additional reviews have further contributed to understanding AI's role in language education. Shafarini et al. (2023) conducted a qualitative review of the impact of AI on English language teaching in literary studies. [14] Sakach (2022) examined mobile-based AI applications for foreign language learning, highlighting their positive effects, particularly on word stress and pronunciation. [15] Another review by AlTwijri and Alghizzi (2024) explored how AI technologies influence affective factors such as motivation, engagement, attitudes, and anxiety in higher education language learning, analyzing studies published between 2017 and 2023. Their findings indicate that AI tools can significantly enhance learners' motivation, engagement, and attitudes toward language learning. [16]

1.1. AI in Education (AIEd)

The origins of artificial intelligence can be traced back to the 1950s when John McCarthy organized a two-month workshop at Dartmouth College in the USA. In the workshop proposal, McCarthy used the term artificial intelligence for the first time in 1956 (Russel & Norvig, 2010, p. 17). [17] The proposal stated: "The study [of artificial intelligence] is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves."

Baker and Smith (2019) offer a broad definition of AI as "computers which perform cognitive tasks, usually associated with human minds, particularly learning and problem-solving" (p. 10). [18] They emphasize that AI is not a single technology but an umbrella term encompassing a range of technologies and techniques, including machine learning, natural language processing, data mining, neural networks, and algorithms.

AI and machine learning are frequently discussed together. Machine learning is a method within AI that supports supervised and unsupervised classification and profiling, such as predicting a student's likelihood of dropping out of a course, estimating admission probabilities, or identifying themes in written assignments. Popenici and Kerr (2017) describe machine learning "as a subfield of artificial intelligence that includes software able to recognize patterns, make predictions, and apply newly discovered patterns to situations that were not included or covered by their initial design" (p. 2). [19] The concept of rational agents is central to AI: "An agent is anything that can be viewed as perceiving its environment through sensors and acting upon that environment through actuators" (Russel & Norvig, 2010, p. 34). Even simple devices, like vacuum-cleaner robots, qualify as intelligent agents, though complexity increases dramatically when considering autonomous systems such as self-driving taxis.

1.2. Theoretical Framework

This review draws on the theoretical framework of Intelligent Computer-Assisted Language Learning (ICALL), which enhances language learning through the use of sophisticated computational practices (Ward, 2017). [20] Grounded in Natural Language Processing (NLP), ICALL introduces new possibilities for education by enabling interaction between humans and machines and fostering learning, cooperation, and engagement (Shardlow et al., 2022). [21] As an AI-driven approach, ICALL positively influences language learning by providing students with opportunities for authentic interaction (Ji et al., 2023) and offering adaptive, individualized feedback based on learners' needs (Kamruzzaman et al., 2023). [22] Through tasks and assessments that are personalized to learners' proficiency levels, AI-driven technologies support tailored instruction and more effective evaluation of individual progress (Alqahtania et al., 2023). Since the introduction of computers in the 1960s, AI has played an increasingly important role in language education, contributing to individualized, collaborative, and efficient learning processes (Sumakul et al., 2022). [23]

Despite these advantages, research has also identified several challenges associated with AI-driven technologies. These include ethical concerns and reduced human–student interaction (Zhang & Mao, 2023), as well as data privacy issues arising from the potential sharing of personal information with third parties (Adamopoulou & Moussiades, 2020). [24-25] Given these challenges, it is clear that AI does not produce consistently positive outcomes for all learners. To maximize its benefits, learners must take an active role rather than relying passively on AI tools. Wang et al. (2023) argue that human–machine interaction must be tailored to individual learners and that AI technologies should be approached critically and realistically, as assumptions about guaranteed effectiveness may be misleading. The usefulness of AI depends on learners' strategies, expectations, and beliefs. For optimal outcomes, instructional methods and activities involving AI should be thoughtfully designed and carefully implemented (Wang et al., 2023). [26]

1.3. Significance and Purpose of the Study

Although the use of AI in foreign language education has been widely investigated, the rapid pace of technological advancement means that many earlier findings may no longer reflect the current state of AI-supported learning environments. Consequently, an updated review is essential to evaluate the present effectiveness of AI in language learning and to provide practitioners with a contemporary understanding of its strengths and weaknesses. The present review focuses on studies published between 2022 and 2025 to capture recent developments that may not have been addressed in earlier reviews.

Accordingly, this review aims to inform educators, researchers, and educational leaders about emerging AI features that can support pedagogical needs, contribute to curriculum development, and identify new avenues for future inquiry. Based on these aims, the study addresses the following research questions:

- What kinds of AI-related benefits were explored in English language education studies between 2022 and 2025?
- What kinds of limitations were reported in English language education studies between 2022 and 2025?
- The following section outlines the methodology adopted to investigate these research questions.

2. METHODOLOGY

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were employed in this review to ensure a comprehensive, transparent, and replicable research process (Page et al., 2021). [27] Based on the research purpose, predetermined inclusion and exclusion criteria guided the selection of studies. This section details the procedures used for data collection and analysis.

2.1. Eligibility Criteria

The selection of studies was determined in accordance with the aims of the present review. In September 2025, searches were conducted in EBSCOhost and JSTOR to identify relevant studies. These databases were chosen because of their extensive and reputable coverage of peer-reviewed educational research. EBSCOhost provides access to Education Source, ERIC, and Academic Search Premier databases known for publishing research on AI in education while JSTOR indexes journals in the humanities and social sciences, including those related to language education.

The search strategy used combinations of the terms "Artificial Intelligence", "AI", "Language Learning", and "English Learning." Variations of these keywords, such as lowercase forms, were also tested. No restrictions were placed on the types of AI interventions; the review considered all AI-related applications, including AI partners, speech-recognition tools, and mobile applications.

The inclusion criteria consisted of: peer-reviewed journal articles, full-text PDF availability, studies written in English, and publications dated between 2022 and 2025.

Studies were excluded if they did not meet the keyword criteria, were not peer-reviewed research articles, were not written in English, or fell outside the specified publication date range. Library automation software was used to retrieve and screen records efficiently.

The database search initially yielded 68 records. After removing 20 duplicate entries, 48 records remained. Of these, 7 studies were marked as ineligible because the full texts were inaccessible likely due to subscription restrictions despite their database indexing. Thus, 43 titles, keywords, and abstracts were screened. At this stage, 11 records were excluded because they were review articles rather than empirical research studies. Ultimately, 35 studies met all eligibility criteria and were included for detailed analysis, as illustrated in the figure below.

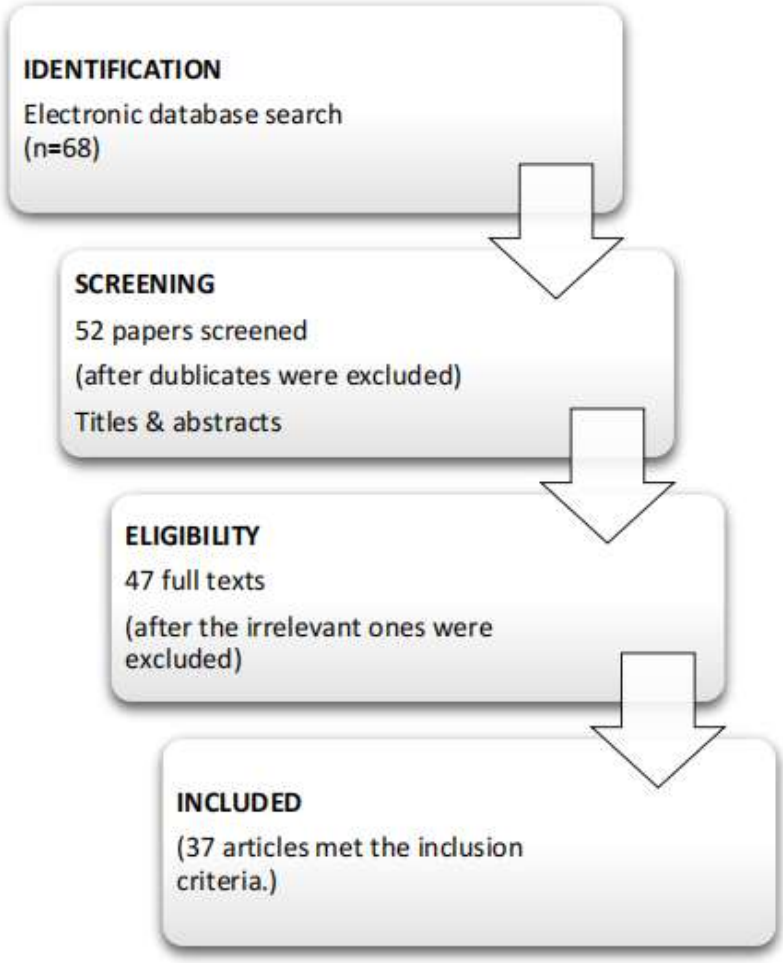

Figure 1:

2.2. Data collection

After the eligible research records were identified, they were downloaded and stored for subsequent analysis. A data-extraction form was created in Excel to document essential information from each study, including the study design, participants, AI tools used, results, and reported limitations. Each record was examined thoroughly, and the researcher completed the form by labeling each study with the necessary information.

Following this initial phase, the completed forms were shared with a second reviewer. The second reviewer holds a PhD in ELT and has substantial subject-matter expertise relevant to the present study, as well as prior experience in qualitative coding. To promote consistency and reliability in coding, several meetings were conducted to align coding procedures and establish coding principles (Hoda, 2024). [28] During these meetings, the labels and extracted details were reviewed collaboratively.

The second reviewer then verified data accuracy by checking the completed forms and identifying any missing or unclear information. Roller and Lavrakas (2015) argue that quantitative agreement measures may oversimplify qualitative data and potentially reduce validity; therefore, achieving intercoder agreement through discussion and consensus is both appropriate and methodologically sound. As such,

coder agreement in this study was reached through mutual consensus rather than statistical indices. [29]

2.3. Data Analysis

The extracted data were analyzed qualitatively using content analysis. An inductive approach guided the process, allowing themes and categories to emerge from the data rather than relying on predetermined frameworks. To facilitate systematic coding and organization, the qualitative analysis software NVivo was used throughout the analysis process. Using NVivo helped manage large amounts of qualitative data efficiently and supported rapid data retrieval (Silverman, 2010). [30]

The datasets were imported into NVivo, where the reviewers examined them in detail. Using the software, the reviewers identified initial codes and subsequently developed broader themes. NVivo further contributed to the analysis by generating structured word-frequency reports and coding summaries, which enhanced both the clarity and efficiency of the analytical process.

3. FINDINGS

The aim of this review is to identify and present the main themes related to the use of AI in English as a Foreign Language (EFL) contexts between 2022 and 2025. This section outlines the key findings, offering a detailed explanation of the codes and themes in relation to the research questions. The findings are organized around two overarching themes:

3.1. The positive effects of AI technologies, and the limitations associated with their use.

3.2. General Features of the Studies

This subsection presents an overview of the characteristics of the studies reviewed. It summarizes the educational levels involved, participant profiles, geographical contexts, and research methods used, providing a clearer understanding of the scope of the included studies.

3.3. Research Methods of the Studies

The reviewed studies employed diverse research designs. A detailed analysis revealed that quasi-experimental designs were the most frequently used, typically involving structured interventions with AI tools and comparisons with control groups. Specifically, 57.14% of the studies adopted an experimental research design. Additionally, 28.57% used qualitative research designs, while 14.29% were case studies.

Data-collection methods varied and included semi-structured interviews, surveys, self-reports, questionnaires, classroom observations, voice recordings, dialogue interactions, and chatbot log data. Similarly, data-analysis methods incorporated both qualitative and quantitative approaches. Qualitative data were analyzed through thematic analysis and open coding, whereas quantitative data were examined using statistical techniques such as ANCOVA, paired-samples t-tests, descriptive statistics, and non-parametric tests including Kruskal–Wallis and Wilcoxon Signed Rank tests.

3.4. Context, Participant Profiles, and Geographical Scope

Analysis of the study contexts showed that most research was conducted at the university level (62.5%), indicating a predominance of studies taking place in higher education institutions such as universities, colleges, undergraduate programs, and vocational schools. High schools accounted for 18.75% of the studies. A small number of studies were conducted in primary schools (grades 3 and 5) (6.25%) and secondary schools (6.25%). Additionally, 6.25% of the studies did not specify an educational level; instead, participants were identified as EFL test takers or categorized in more general terms.

Regarding participant profiles, most studies (68.75%) focused on EFL learners' perceptions, attitudes, or practices related to AI in language learning. Although fewer in number, 31.5% of the studies explored AI use from the perspective of language teachers.

The geographical distribution of the studies was diverse. Research was conducted in countries such as Thailand, Ukraine, South Korea, Saudi Arabia, the Philippines, and China. The majority of studies originated from China, indicating a strong research focus on AI-supported language learning in the Asian context. Overall, the studies represented a broad cultural and educational range across Eastern Europe, the Middle East, and Asia.

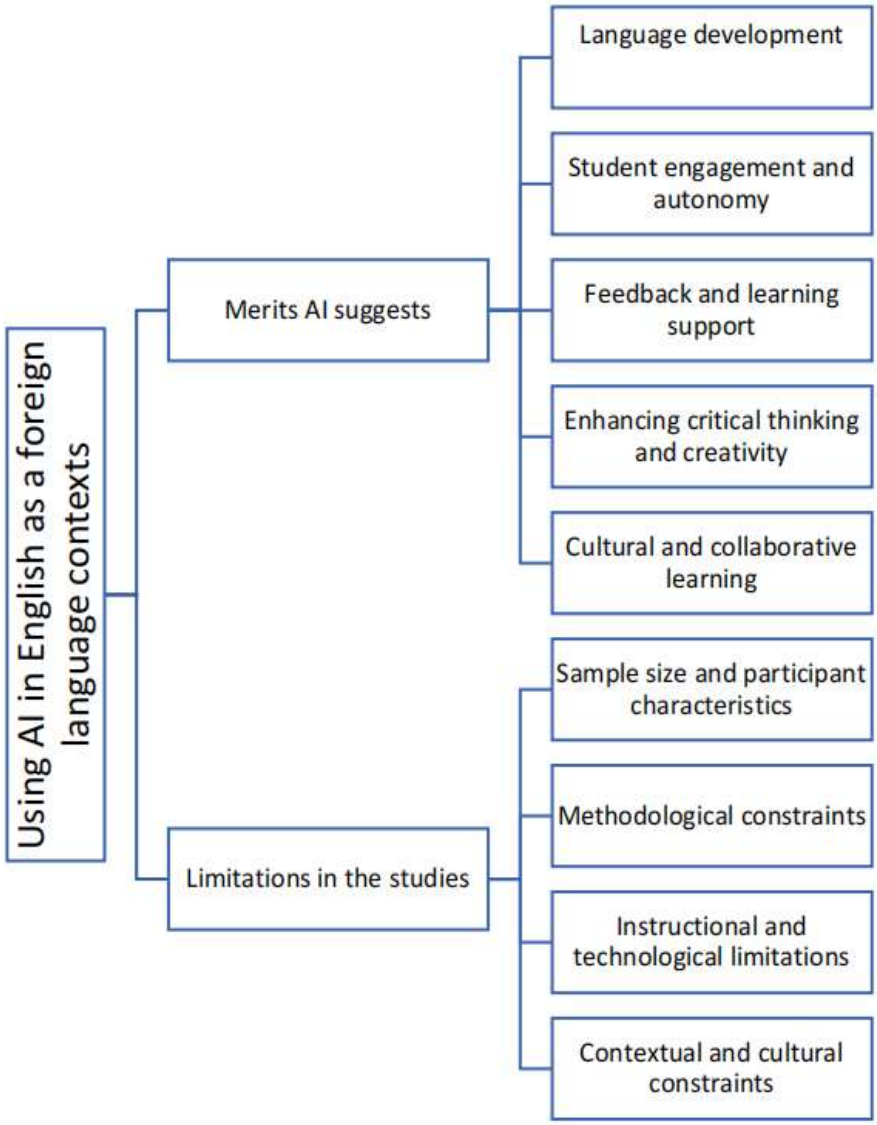

Figure 2: The Positive Effects of AI Technologies and the Constraints in the Studies

3.5. The positive effects of AI technologies on language learning

The analysis of the reviewed studies shows that AI integration in EFL contexts positively influences language development, student engagement and autonomy, critical thinking and creativity, feedback and learning support, and cultural and collaborative learning (Figure 2). The detailed findings are presented below.

3.6. Language Development

The studies in this review demonstrate that various AI technologies effectively enhance students' overall language development. These technologies support multiple language skills, including writing (Praphan & Praphan, 2023), vocabulary (Hsu et al., 2023), grammar (Xiao & Zhi, 2023), listening (Betaubun et al., 2023; Xing, 2023), and speaking [31–33]. The analysis also shows that AI-assisted learning contributes to improvements in linguistic variety, correctness, and accuracy (Fathi et al., 2024). [34]

Speaking proficiency emerged as the most frequently reported improvement across the studies. Interaction with AI bots, such as ChatGPT, was shown to reduce speaking anxiety and boost learners' confidence (Park, 2022). [36] Similarly, virtual reality environments allowed learners to speak more freely by masking their identities, increasing participation (Mabuan, 2024). [36] AI tools provided immediate feedback on pronunciation and intonation (Khalifia & Ginting, 2024; Xing, 2023) [36], enabling learners to refine their speech. Chen (2024) found that mobile-assisted learning helped students control speaking speed, intonation, and filler use. [37] Fathi et al. (2024) further noted that AI-enabled environments promoted unrestricted speaking practice and improved fluency [34], while creating enjoyable, low-anxiety learning atmospheres (Yeh, 2024). [38]

3.7. Student Engagement and Autonomy

Several studies emphasized the effectiveness of AI tools in promoting active participation, motivation, and self-directed learning. AI platforms enabled individualized learning experiences and increased learner autonomy (Horn, 2024; Sütçü & Sütçü, 2023). [40] AI-supported self-regulated learning also improved vocabulary acquisition (Ivanytska et al., 2024). [41] Additionally, adaptive AI systems enhanced language learning by tailoring instruction to learners' needs and proficiency levels (Yang, 2024). [42]

3.8. Feedback and Learning Support

Another prominent theme is the role of AI in delivering immediate and personalized feedback. The reviewed studies highlight that AI tools effectively revise written texts (Shen et al., 2023) [43] and offer content-related suggestions (Xiao & Zhi, 2023). Learners also benefit from personalized feedback on speaking performance (Chen, 2024). These features collectively enhance learner support and scaffold language improvement.

3.9. Enhancing Critical Thinking and Creativity

The findings indicate that AI tools can stimulate critical thinking by encouraging learners to evaluate, verify, and refine AI-generated information (Abdalgane & Othman, 2023; Xiao & Zhi, 2023). Xiao and Zhi (2023) showed that modifying prompts, training AI models, and assessing outputs required learners to engage in critical decision-making, ultimately improving their language proficiency. AI tools also served as a source of idea generation, particularly when students sought assistance with text revision and content enhancement, positioning AI as a form of digital tutor.

3.10. Cultural and Collaborative Learning

AI technologies also contributed to enhanced cultural awareness and collaboration among learners. Studies incorporating culturally responsive instructional approaches reported improvements in cross-cultural understanding and communication (Larasati & Ginting, 2024; Mageira et al., 2022; Zhang, 2022). [45] Furthermore, AI-supported activities—such as those involving ChatGPT—encouraged both group and individual learning, promoting dynamic classroom interaction (Horn, 2024). Other studies show that AI tools facilitate cultural understanding (Zhang, 2022) and foster collaborative learning environments (Lee et al., 2022). [46]

3.12. Limitations of AI Technologies

The limitations identified in the studies are categorized under four main themes: sample size and participant characteristics, methodological constraints, instructional and technological limitations, and contextual and cultural constraints (Figure 2).

3.13. Sample Size and Participant Characteristics

Several studies reported limitations due to small sample sizes (e.g., Chen, 2024; Jia et al., 2022; Jin, 2019; Qiao & Zhao, 2023; Zhang et al., 2024). [47] The frequent use of participants from a single institution further restricted the generalizability of findings (Fathi et al., 2024). Moreover, limited diversity in participants' backgrounds, ages, motivations, and academic contexts was reported (Liu et al., 2023; Liu et al., 2024). [48-49] Some studies excluded important stakeholder groups—for instance, teachers' perspectives were not considered (Zheng et al., 2024).[50]

3.14. Methodological Constraints

Methodological issues were common, including short intervention durations and a lack of longitudinal designs (Mabuan, 2024). [51] Some interventions were highly context-specific, focusing on a single app or institution (Li & Chan, 2024). Other studies examined only one language skill at a time, such as writing or speaking (Liu et al., 2023). [52]

The limited inclusion of variables such as learner motivation, self-efficacy, or technology acceptance was also noted (Zheng et al., 2024). Additionally, several studies lacked control groups, relying solely on experimental groups (Shen et al., 2023). Consequently, future research should adopt more rigorous designs, incorporate multiple data sources, and avoid over-reliance on self-reported measures.

3.15. Instructional and Technological Limitations

Some studies highlighted challenges related to limited instructional time and instructional design (Qiao & Zhao, 2023). Others called for more user-friendly AI interfaces and adequate training for both teachers and students (Yeh, 2024). [39] Given the rapid pace of technological change, the studies also emphasized the need for ongoing research to remain aligned with emerging developments (Horn, 2024).

3.16. Contextual and Cultural Constraints

A number of limitations stemmed from the localized nature of the studies. Conducting research within a single cultural or educational context restricts the generalizability of findings (Zhi & Wang, 2024). [53] Studies carried out in isolated educational levels also limit broader applicability, prompting recommendations to extend research across diverse contexts. Some studies noted that having the researcher serve as the instructor may compromise objectivity; therefore, conducting research in settings

where the instructor is not the researcher is recommended (Horn, 2024)

4. DISCUSSION

The analysis of the studies reviewed in this paper provides comprehensive insights into both the benefits and limitations of integrating AI into EFL contexts. This section discusses the findings in relation to the current literature. Concerning the impact of AI on language development, the studies demonstrated improvements across a range of linguistic skills, including writing, speaking, listening, grammar, and vocabulary. Among these skills, speaking received the greatest emphasis. Research on AI-supported speaking highlights the role of pronunciation-focused tools, suggesting that AI can act as both a conversational partner and a language coach (Cromptoni et al., 2023). Similarly, Zhang et al. (2024) reported that interacting with Lora, an AI bot, enhanced learners' foreign language enjoyment and willingness to communicate, while also reducing language anxiety.

AI-based instruction was also shown to support learners' self-regulatory processes, enabling them to set goals, adjust learning strategies, and gain greater control over their speaking development (Qiao & Zhao, 2023). Because AI technologies are accessible and convenient, learners can obtain personalized feedback and practice opportunities in low-anxiety environments at any time (Chen, 2024). Interactions with AI chatbots have been shown to improve fluency, intonation, speech rate control, and filler usage (Park, 2022; Chen, 2024). These improvements appear to stem from reduced anxiety, increased confidence, and heightened engagement. Fathi et al. (2024) also highlighted students' positive attitudes toward AI-supported speaking, noting improvements in both skills and perceptions. Chen et al. (2022) similarly found that robot-assisted instruction boosted motivation, engagement, and speaking fluency.

Considering these positive outcomes, integrating AI-based activities into speaking courses is crucial for fostering communicative competence and enhancing engagement with peers and AI tools (Qiao & Zhao, 2023). [50] AI also enhances interaction-driven learning by creating more meaningful, engaging, and communicative environments (Almira, 2023). [54] Another important finding is the role of AI in promoting collaboration. Horn (2024) observed that AI facilitated real-time support for large groups, supporting both individual and group work and contributing to more active classroom dynamics.

AI was also found to support cultural awareness. Zhang (2022) demonstrated that AI-enabled learning activities enhanced students' cross-cultural understanding, while Mabuan (2024) showed that AI-supported cultural exchange platforms facilitated authentic intercultural communication. By extending learning beyond classroom boundaries, such environments provide more opportunities for linguistic and cultural exposure (Lin & Mubarok, 2021). [55-56]

Moreover, the studies indicated that AI integration contributes positively to student engagement and learner autonomy, consistent with findings from AlTwijri and Alghizzi (2024) and Ivanytska et al. (2024). The latter also pointed to the effectiveness of AI and social media platforms in improving vocabulary learning, engagement, and overall proficiency. Because technology plays a central role in education, pedagogical frameworks must adapt accordingly. Wei (2023) further supported the claim that AI-enhanced instruction promotes motivation and sustained learning engagement. Nonetheless, the literature emphasizes the importance of maintaining a balanced approach when adopting AI technologies to safeguard instructional quality and learning integrity. [57]

A further finding of this review concerns the distribution of research across educational levels. Most studies were conducted in higher education contexts, with relatively limited research focusing on elementary and secondary school learners. Given that AI interaction may support young learners' cognitive and affective development (Kewalramani et al., 2021), future research should explore AI integration in earlier stages of education to better understand developmental considerations and pedagogical adaptation. [58]

The limitations identified in the reviewed studies were mainly instructional, methodological, and technological. Instructionally, several studies lacked sufficient training time or failed to provide comprehensive training for the use of AI tools (Horn, 2024; Xiao & Zhi, 2023). [59] Additionally, some studies included control groups that received weaker or inconsistent instruction, potentially influencing treatment effects (Qiao & Zhao, 2023). These findings underscore the need for robust training protocols and more rigorous instructional design to ensure reliable evaluation of AI-supported learning outcomes.

Methodologically, a notable constraint was the scarcity of longitudinal research, which is essential for understanding the long-term effects of AI in language learning (Polyportis, 2024). [60] Another limitation involved the absence of control groups, restricting the ability to draw causal inferences (Shen et al., 2023). The dependence on self-reported data

also emerged as a consistent issue, with concerns about biases such as social desirability, extreme responding, and question wording effects (McDonald, 2008). [61] While self-reported data offer benefits, such as efficiency and insight into personal experiences, future research should incorporate more objective and multimodal data collection to enhance validity and reliability (Li & Chan, 2024; Zhang et al., 2024).

Technological constraints were also identified, particularly concerning the novelty effect and the rapidly evolving nature of AI (Horn, 2024). Understanding how learners sustain engagement beyond initial novelty and how educators can adapt to technological change remains an important area for investigation. Some studies demonstrated that culturally responsive AI technologies positively influenced critical thinking and creativity (Larasati & Ginting, 2024), [62] while Zhang et al. (2024) noted that AI tools create translanguaging spaces that encourage productive and unrestricted expression. These findings highlight the potential of AI to foster creativity and critical thinking across linguistic and cultural contexts.

Despite these advantages, several studies cautioned against researcher–instructor dual roles, as students may feel inhibited in expressing honest opinions (Horn, 2024). This points to the importance of researcher neutrality in designing and implementing AI-related research. Overall, the findings of this review demonstrate that AI has significant potential to enrich language learning processes. While culturally sensitive and creative AI tools can enhance learners' linguistic and cognitive development, more rigorously designed studies are needed to confirm these effects and support evidence-based integration of AI in EFL education.

5. CONCLUSION

This review paper aimed to synthesise recent research on the use of AI in EFL contexts. Through a systematic analysis, the study identified the general characteristics of the reviewed research, the benefits associated with AI integration in language learning settings, and the limitations that constrain current findings. The review illustrates the scope of existing work and highlights the methodological approaches commonly used in the field, thereby offering guidance for future research on AI in language education.

The findings indicate that AI-enhanced instruction offers numerous advantages, including improved language skills, greater learner engagement and autonomy, enhanced cultural and collaborative learning, and enriched learning support. For educators, these insights underscore the need to integrate AI tools deliberately and pedagogically, ensuring alignment with learning objectives and responsiveness to learners' needs. However, limitations related to sample size, methodological design, and instructional implementation point to the importance of flexible and context-sensitive approaches. This implies that educators should contextualise AI-based practices within their specific settings and adapt them appropriately.

For policymakers, the review highlights the importance of investing in technological infrastructure, providing continuous AI training for educators, expanding access to AI-supported learning opportunities across diverse educational settings, and prioritising longitudinal studies using varied technologies. Such initiatives can support the sustainable and equitable integration of AI into language learning environments.

5.1. Limitations and Suggestions for Future Research

Despite its contributions, this review has several limitations that should be addressed in subsequent studies. First, the findings are based on research conducted between 2022 and 2025 and focus exclusively on language learning contexts. Given the rapid pace of technological development—especially the emergence of novel applications and advanced language models such as DeepSeek and Qwen—learners' and educators' experiences are evolving quickly. Consequently, conclusions derived from earlier studies may become outdated in a short time. Future reviews should therefore expand their temporal scope, including more recent studies from 2025 onwards, to capture these shifts.

Second, the databases employed in this review were limited to EBSCOhost and JSTOR, selected due to their strong alignment with education and language studies. While this helped maintain the relevance and quality of retrieved studies, expanding the database selection to include Scopus, Web of Science, or ERIC may yield broader or more diverse findings.

Another limitation concerns the holistic approach taken toward language learning. Although the review sought to present a comprehensive understanding of AI use across all language skills, this broad focus may have constrained the depth of conclusions related to specific skills. Future research adopting a skill-specific approach—for example, studies centred exclusively on writing, speaking, or vocabulary—would provide deeper insight into the

mechanisms through which AI benefits particular areas of language competence.

Similarly, this review did not restrict studies based on educational level, which allowed a broad overview of AI use across varied contexts. However, differences in age groups, institutional goals, and pedagogical approaches may reduce the coherence of conclusions across levels. More targeted reviews focusing on particular educational stages such as primary, secondary, or tertiary settings would offer a clearer understanding of how AI tools function within specific developmental and instructional contexts

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