

A Systematic Review on AI Technologies in English as a Foreign Language Education

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Abstract: This systematic review reports an analysis of research articles on AI technologies in English as a foreign language education. The review specifically addresses the limitations reported in the studies conducted between 2020 and 2024 and shows the benefits of AI technologies identified in those studies. Hence, the study aims to provide an understanding of the scope of existing research and, depending on the limitations identified, give insights into further research. The research articles were screened and analyzed using qualitative methods based on the predetermined inclusion and exclusion criteria. The findings indicated that AI technologies may positively affect language development, cultural understanding, learner engagement, learning support, and critical thinking. Nonetheless, the limitations identified - categorized as instructional, methodological, and technological - should be taken into consideration for a more robust investigation.

Keywords: Artificial Intelligence, Review, EFL, Education, Technology

1. Introduction

As a global lingua franca, English has been widely used in international economic, cultural, and digital contexts (Marlina & Xu, 2018), and this has led to a change in the definition of native speakers by redefining English speakers. Hence, the traditional focus on native-speaker accuracy has become less significant. Instead, the ability to negotiate meaning and communicate effectively across different countries and nations has been crucial. Hence, practice and research of English language teaching (ELT) have gained importance by concentrating on other demands in ELT, such as English as a second language, a foreign language, for specific purposes, and academic purposes (Kumar, 2024).

Despite its gained importance, English language education suffers from a lack of resources, and uneven instructional quality or instruction cannot be adapted to students' individual needs or speed depending on the context where English is taught (Cuong, 2021). Modern and technology-driven solutions might assist in handling these challenges. Technological improvements have brought diverse digital tools into ELT, which have significantly affected it by fostering learning, increasing students' engagement, and enabling quality education (Kumar, 2024).

Recently, artificial intelligence (AI) advancements have offered new opportunities for renovating English language learning. To illustrate, Tolstykh and Oshchepkova (2024) explain that AI tools have the potential to act as helpful learning partners for language learners by answering their questions, giving feedback on grammar or vocabulary input, and translating a text into the needed language in a motivating atmosphere. Dennis (2024) expounds that AI enhances language learning by employing the underpinning ideas of the interactionist approach, which is simply based on the idea that language is best learned through meaningful communication and interaction. It undertakes the role of a virtual tutor providing personalized support to language learners (Dennis, 2024). Likewise, Fountoulakis (2024) mentions the effectiveness of AI in creating opportunities for personalized learning experiences and authentic conversation practices. Additionally, Gu (2024) explores the positive impacts of AI tools on language learning. Specifically, the study suggests that AI improves language skills by enabling students to learn more effectively, focus on tasks better, and manage their attention more effectively during the tasks; additionally, the students can process and use new information better, which indicates positive effects of the AI use on improved working memory abilities.

AI has progressed a lot by greatly impacting the educational realm. In language learning and teaching, its use has been profoundly proposed in different studies. The studies have noted its benefits for language learners by also criticizing its points to improve and suggesting how to be aware of its potential drawbacks for the students and the educators. Recently, several research studies have investigated the use of AI technologies in language learning settings by focusing on different periods for the investigation of the studies and by focusing on different aspects of AI use in language learning. One of those reviews is Sharadgah and Sa'di (2022), which explained the practices in the field at the time, encapsulating the years of research (2015-2021) and understanding the difficulties by employing qualitative research methods on 200 articles, which were later decreased to 64 articles. The study was based on English language teaching (ELT) and indicated that AI offered positive outcomes for using language abilities, evaluation, recognition, translation, feelings, thoughts, and fulfillment. The review showed that mixed-methods studies were more common; the education level of the most sampled was higher, and most students were involved in the studies as participants. In another review article, Xing (2023) discusses the use of ChatGPT for listening and a Convolutional Neural Network [CNN] model, which is used for speech and image recognition. The researcher explains that CNN models are effective for giving quick feedback on pronouncing words and adjusting intonation, together with other aspects of verbal interaction. The review suggests combining the features of ChatGPT and the CNN model, thereby joining speech recognition competencies with ChatGPT's communication interface and enabling people to be involved in real-like conversations and obtain input on pronunciation and understanding.

Cromptoni et al. (2023) also examined studies on AI technologies in language education. This study involved searching for the geographical places where AI studies are being conducted, the ages of participants, the ways of using AI in ELT or English language learning (ELL), and the difficulties of using AI in ELT/ ELL. The study used PRISMA techniques. Only peer-reviewed journals were included. The articles were from 2014 to 2023. The search yielded 369 articles for potential analysis in the review. After implementing the inclusion and exclusion criteria, 43 articles were examined using a grounded approach.

Similarly, Shafarini et al. (2023) explored the effects of AI on English language teaching in literature studies. The research was based on qualitative data analysis. Sakach (2022) wrote a review of an AI application on mobile phones and its integration into foreign language learning. The paper showed the positive influence of the app, especially on word stress and pronunciation. In a different review study, AlTwijri and Alghizzi (2024) examined the studies conducted to investigate how useful AI technologies are in higher education in developing affective factors such as motivation, engagement, attitudes, and anxiety. The study investigated research between 2017 and 2023. The review concludes that AI technologies are promising in foreign language education; they enhance motivation, engagement, and attitudes.

1.1. Theoretical framework

This review is based on the theoretical framework of Intelligent Computer-Assisted Language Learning (ICALL), which enhances the language learning process using resources that involve the wide use of sophisticated practices (Ward, 2017). Being based on Natural Language Processing (NLP), ICALL brings new possibilities to education, enabling the interaction between humans and machines and developing learning, cooperation, and commitment (Shardlow et al., 2022). It is based on AI-driven systems, and these systems positively impact language learning by giving authentic interaction opportunities to students (Ji et al., 2023) and offering adaptive feedback based on students' needs (Kamruzzaman et al., 2023). By personalizing the difficult tasks and assessments, AI-driven technologies bring tailored education and more effective assessment of individual progress (Alqahtania et al., 2023).

Starting with the use of computers in the 1960s, AI has a long history in language learning, making language learning more individualized, collaborative, and effective (Sumakul et al., 2022). Despite its

benefits, research has also shown some setbacks in using AI-driven technologies. These include ethical problems, diminished human-student interaction (Zhang & Mao, 2023), and data privacy problems, arising from the potential sharing of personal information with third parties (Adamopoulou & Moussiades, 2020). Given these challenges, it is evident that AI does not yield consistently positive results for all learners. To make the most of this technology, learners should take an active role in their education instead of relying on it passively. Wang et al. (2023) emphasize that the human-to-machine interaction needs to be tailored to the learner. AI technologies need to be approached critically and realistically because the assumption that AI technologies ensure effective education may be mistaken. The benefits depend on learning strategies, views and expectations (Wang et al., 2023). For optimal benefits of AI in language learning, instructional methods and activities should be designed and implemented carefully.

1.2. Significance and purpose of the study

AI use in foreign language education has been researched extensively, but the fast development of this technology means the findings of many earlier studies may now be outdated. As a result, an updated review is significant to assess the present effectiveness of AI in language learning contexts and to provide practitioners with an understanding of its merits and weaknesses. The present review is based on the studies conducted between 2020 and 2024 to explore the recent developments that previous reviews may have discounted. Therefore, the aim is to inform educators, researchers, and educational leaders about emerging AI features that can meet the pedagogical needs in the classroom, develop curricula, and open new areas for future research. Based on this purpose, the present review addresses the following research questions:

- What kinds of AI-related benefits were explored in English language education studies between 2020 and 2024?
- What kinds of limitations did the studies of English language education between 2020 and 2024 account for?

The following section details the methodology adopted to explore the research questions above.

2. Methodology

The Preferred Reporting Items for Systematic and Meta-Analyses (PRISMA) guidelines were adopted in the present review to ensure a thorough, transparent, and replicable review process (Page et al., 2021). Based on the research purposes of the present study, inclusion and exclusion criteria were determined when selecting the studies to be analyzed in this review. This section explains the methods employed for the present review's data collection and analysis procedures.

2.1. Eligibility criteria

Depending on the research purposes of the present study, studies to be involved in the present review were determined. In August 2024, the databases EBSCOhost and JSTOR were searched to identify the studies to be included in the current review. These two databases, which have large and quality coverage of peer-reviewed literature in education, were deliberately selected for the current review. EBSCOhost provides access to Education Source, ERIC, and Academic Search Premier, which are other educational databases that present studies on AI in education. JSTOR provides journals in the humanities and social sciences related to language education.

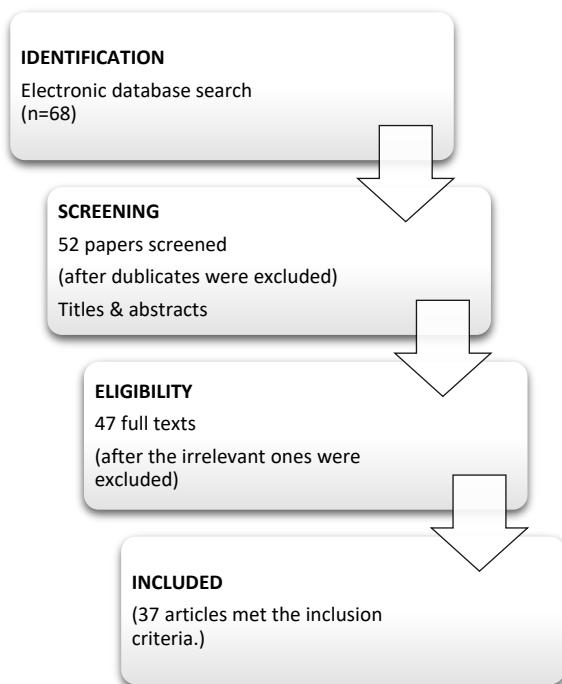
The adopted search strategy involved constructing the search terms 'Artificial Intelligence' or 'AI' and 'Language Learning' or 'English Learning'. These keywords were logged into the databases to retrieve studies. In the search, these keywords were also tried with their alternative versions, for example, in lowercase. The types of AI interventions were not limited to a specific tool or application. Instead, all types were considered, such as AI partners, speech recognition, and mobile applications, in the analysis.

The inclusion criteria encapsulated the search of only peer-reviewed journals and PDF full-text research articles. Also, only English articles were included, and the date range for publication was determined from 2020 to 2024, thereby indicating the up-to-date studies in the field of research. Consequently, the studies were excluded if they were not listed once the keywords in the inclusion criteria were not met, were not published as research articles in peer-reviewed journals, were not written in English, or were not published within the predetermined publication dates in the present review.

In the selection process, each record was screened and retrieved from the database using library automation software, enabling a quick search to locate studies under scrutiny. As a result of the identification of the databases, 68 records were identified from the databases. However, 16 of 68 studies were removed from screening since they were duplicates. Also, 5 studies were marked as ineligible and were not involved in the screening process since they were not accessible. Those studies were indexed in the selected databases in the present review, but the full texts were not available, which might be due to the subscription limitations of the journals on the availability of the full texts. As a result, the titles, keywords, and abstracts of 47 studies were screened. At this stage, 10 records were excluded because they were review articles, not research articles. Eventually, 37 studies met the study's eligibility criteria and were included in the study for the detailed analysis, as shown in the figure below.

Figure 1

The Flow Diagram for the Identification of Studies Via Databases



2.2. Data collection

After the eligible research records were selected, they were downloaded and stored for further analysis. To collect data from the records, a form with data points such as the study design, participants, AI tools used, results, and limitations was prepared to fill out for each record in Excel. Each record was examined in detail, and the researcher, as the reviewer, completed the form with the required information by labeling each study with the necessary information. Later, the completed forms were shared with a second reviewer. The second reviewer holds a PhD in ELT and possesses subject expertise relevant to the present study. She participated in the present study based on her prior experience in qualitative coding. For consistency and effective coding outcomes, several coding meetings were conducted with the second reviewer to ensure consistency and develop coding principles (Hoda, 2024). Therefore, a meeting was held with the second reviewer, and the labels and details on the sheet prepared were

discussed. Subsequently, the reviewer was asked to be involved in verifying data accuracy by checking the completed forms and identifying the missing points, if any, in the forms. To ensure intercoder agreement, Roller and Lavrakas (2015) explain that quantitative agreement methods may simplify the data and decrease validity, so this is not necessarily required. Instead, agreement could be reached through discussions and consensus in the meetings with the coders. As a result, coder agreement in the present study was reached through mutual consensus rather than statistical measures.

2.3. Data analysis

The present research involved qualitatively analyzing the extracted data by performing content analysis. An inductive approach was adopted during the analysis, which required building themes and categories from the data instead of the existing frameworks. For systematic analysis, qualitative data analysis software NVivo was employed during the analysis process. Using qualitative data analysis software such as NVivo helps to organize and manage a large amount of data effectively and provides quick retrieval of the data (Silverman, 2010). In this study, the dataset was first imported into NVivo, where the reviewers examined it. Using the software, the reviewers identified the codes and developed themes from the data. The software facilitated the process by generating organized word frequency reports and coding summaries, which enhanced the efficiency and clarity of analysis.

3. Findings

The purpose of the present review is to present the main themes related to AI use in English as a Foreign Language between 2020 and 2024. This section presents the study's key findings, providing a detailed explanation of the themes and codes in alignment with the research purpose. The findings are presented under the general themes of the positive effects of AI technologies and the limitations of using AI technology.

3.1. The general features of the studies

This section presents the general features that studies involve. Specifically, the section displays the education levels, participants, and study contexts based on geographical scopes and the research methods adopted in this study to better understand the studies reviewed in the current paper.

3.1.1. Research methods of the studies

The studies that were analyzed in the present research had various designs for investigation and analysis. Detailed analysis indicated that most of the studies adopted a quasi-experimental research design, which involved investigating a particular type of AI technology with a structured experiment, with a comparison to a control group. Accordingly, 57,14% of the studies were reported as having experimental research design. 28,57 % were based on qualitative research design. 14,29% of the studies were reported as case studies.

The data collection processes of these studies encapsulated qualitative and quantitative methods. Various methods such as semi-structured interviews, surveys, self-reports, questionnaires, class observations, voice recordings, dialogue, and information memory of chatbots were employed to collect data in the studies. Likewise, the data analysis methods involved qualitative and quantitative methods. The studies indicated that qualitative data were analyzed using thematic analysis methods and open coding methods. The data collected through quantitative methods were analyzed utilizing statistical tests such as ANCOVA, paired samples t-test, descriptive statistics, and non-parametric tests such as Kruskal-Wallis and Wilcoxon Signed Rank test.

3.1.2. Context, participant profiles, and geographical scope

When the contexts where the studies were conducted were examined, the findings indicated that most of the studies were conducted at the university level (62,5 %), which showed that the studies were

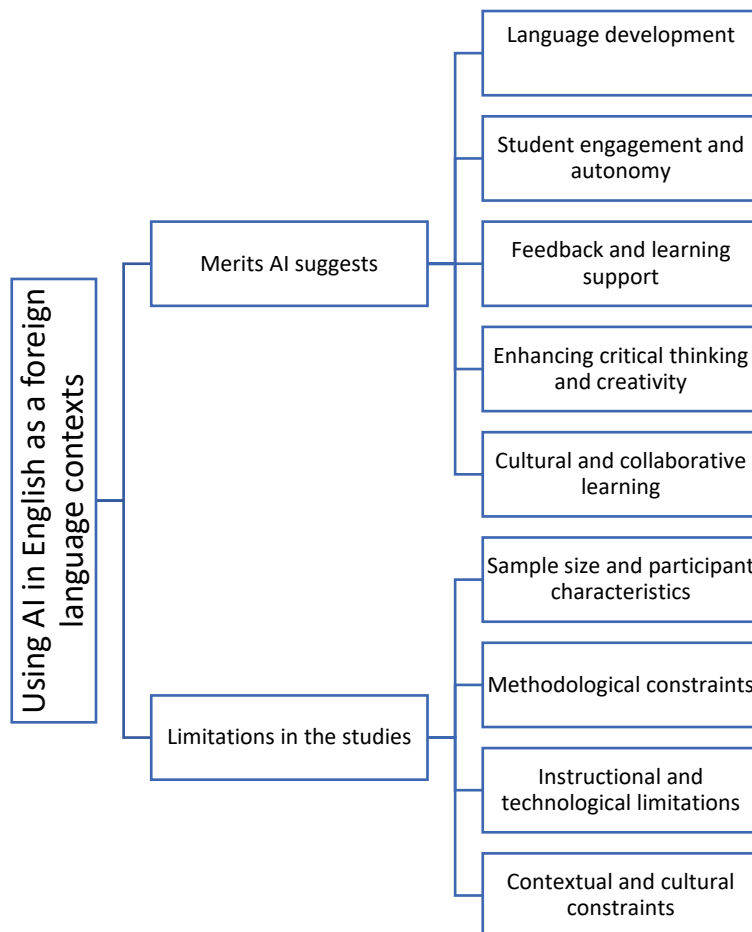
performed at higher education institutions such as universities, colleges, undergraduate, and vocational schools. The next education level at which the studies were done was high schools (18,75 %). Few studies were conducted at primary schools (grade 3 and grade 5) (6,25 %) and secondary schools (6,25 %), while 6,25 % did not indicate a particular education level to introduce the participants. Rather, the participants were introduced as EFL test takers, for example.

When the participant profiles were examined, it was found that most of the studies (68,75 %) investigated the EFL learners' perceptions, attitudes, or practices of AI in their language learning processes. Despite the low number of studies, 31,5 % of the studies under review in the present paper researched the use of AI in language contexts from language teachers' perspectives.

The geographical scopes of the studies were various. The specified countries in the studies included Thailand, Ukraine, South Korea, Saudi Arabia, the Philippines, and China. Most of the studies were carried out in China. Thus, the studies entail a diverse geographical representation reflecting a cultural and educational context ranging from Eastern Europe, the Middle East, and Asia.

Figure 2

The Positive Effects of AI Technologies and the Constraints in the Studies



3.2. The positive effects of AI technologies on language learning

The analysis of the studies indicates that the use of AI in EFL contexts positively influences language development, student engagement and autonomy, critical thinking and autonomy, language development, feedback and learning support, and cultural and collaborative learning, as seen in Figure 2. In this part, the details regarding the findings are presented thoroughly.

3.2.1. Language development

The studies in the present review showed that different AI technologies effectively improve students' language development. The potential of AI technologies can be beneficial for different language skills such as writing (Praphan & Praphan, 2023), vocabulary (Hsu et al., 2023), grammar (Xiao & Zhi, 2023), listening (Betaubun et al., 2023; Xing, 2023), and speaking. The analysis of the studies under review revealed that using AI technologies positively affected students' language achievement by positively impacting linguistic variety, correctness, and accuracy (Fathi et al., 2024).

The development of speaking proficiency thanks to AI technologies is the most highlighted effect in the studies examined in the current paper. When the studies were examined closely, it was found that, for example, students' interaction with an AI bot such as ChatGPT improved their speaking skills by decreasing students' speaking anxiety and increasing their confidence to speak (Park, 2022). In another study, the students were engaged in interaction in a virtual reality setting; hence, their identities were not apparent, which helped them to be more active in speaking (Mabuan, 2024). Regarding the positive impact of AI on speaking skills, the studies mention that AI tools provide quick feedback on pronunciation and intonation as well as other aspects of communication (Khalifia & Ginting, 2024; Xing, 2023). For example, Chen (2024) showed that mobile-assisted instruction helped learners effectively control their speaking speed, intonation, and the use of fillers in speech. Fathi et al. (2024) indicated that using such tools enabled students to speak without restrictions and increase their fluency. With the indulgent environment, they facilitate an anxiety-free atmosphere by creating exciting classes that enhance students' speaking (Yeh, 2024).

3.2.2. Student engagement and autonomy

In the studies, the positive effects of AI tools on the encouragement of students for active participation, motivation, and independent learning in EFL settings have been given. Specifically, the studies indicate that AI tools present individualized and autonomous learning prospects (Horn, 2024; Sütçü & Sütçü, 2023). AI-supported learning has the potential to improve student engagement. For instance, learners can improve their vocabulary acquisition by utilizing self-regulated learning strategies (Ivanytska et al., 2024). Also, it can enhance language learning by tailoring the instruction according to the learners' requirements and capabilities (Yang, 2024).

3.2.3. Feedback and learning support

One of the themes from the data is that AI tools provide students with feedback and learning support. The studies under review feature the effectiveness of these technologies in providing immediate feedback (Xiao & Zhi, 2023) by revising the texts (Shen et al., 2023) or giving content-related suggestions. Using AI technologies, learners can receive personalized feedback, for example, on their speaking performance (Chen, 2024).

3.2.4. Enhancing critical thinking and creativity

Utilizing AI tools, the findings indicate that students can develop their critical thinking skills by analyzing the information produced by AI (Abdalgane & Othman, 2023; Xiao & Zhi, 2023). Xiao and Zhi (2023) indicated that when modifying the prompts, training the bot, verifying, and accepting the outputs, students use critical thinking skills, which enhances students' language proficiency. The researchers also mention the positive effect of ChatGPT on generating ideas. Xiao and Zhi (2023) explain that as students in their study got help from ChatGPT for revising the texts, content-related suggestions, and supporting ideas for their arguments, ChatGPT holds the place of a tutor.

3.2.5. Cultural and collaborative learning

The studies under examination highlighted the effect of AI tools on cultural awareness and collaboration among learners. Using technology, including culturally responsive instruction, could enhance learning

outcomes and support the development of cross-cultural communication (Larasati & Ginting, 2024; Mageira et al., 2022; Zhang, 2022). Besides, Horn (2024) underscores that AI-supported instruction, for instance, with ChatGPT, can provide an active classroom dynamic as they can work in groups and individually. Hence, the studies show that AI technologies impact cultural understanding (Zhang, 2022) and collaboration among learners (Lee et al., 2022).

3.3. Limitations of the AI technologies in the studies investigated

Limitations found in the AI studies were organized under five titles: sample size and participant characteristics, methodological constraints, technological limitations, and contextual and cultural constraints (shown in Figure 2).

3.3.1. Sample size and participant characteristics

The limitations under this title were mainly based on a constraint of the studies, as the number of participants (e.g., Chen, 2024; Jia et al., 2022; Jin, 2019; Qiao & Zhao, 2023; Zhang et al., 2024). In the same vein, another limitation of the studies was noted, as the participants were from a single institution, which also limited the study in terms of representing a larger community (Fathi et al., 2024). In some of the studies, the researchers asserted that there was limited diversity in the participants' backgrounds, ages, motivations, and academic contexts (Liu et al., 2023; Liu et al., 2024). Also, some studies lacked the representation of diversity in the sample. For instance, Zheng et al. (2024) explain that teachers' perspectives were not investigated in their study; only the students' perspectives were examined.

3.3.2. Methodological constraints

The studies suffered from a short duration of intervention and longitudinal studies, which were carried out to reveal the effectiveness of AI technologies (Mabuan, 2024). Also, in some of the studies, the intervention was context-specific. For example, only a single mobile phone app was investigated, or only a particular university was involved in the study (Li & Chan, 2024). Additionally, some studies encapsulated an investigation of only one single skill, such as writing or speaking, which was noted as a limitation of the studies (Liu et al., 2023). Other studies mentioned the limited consideration of additional variables such as self-efficacy, learner motivation, or technology acceptance (Zheng et al., 2024). In addition, some studies had only an experimental group and lacked a control group for comparison (Shen et al., 2023). Therefore, the suggested future studies involve study designs that would have a control group, and the data could be gathered in various ways rather than relying on self-reported data, which may lead to bias.

3.3.3. Instructional and technological limitations

Limited timeframe and instructional approaches (Qiao & Zhao, 2023) were mentioned as the points that need to be improved in future studies. Also, the studies indicated a need for more user-friendly technology interfaces and training for teachers and students (Yeh, 2024). In the same vein, it could also be added that due to the evolving nature of technology, further studies are necessary to be done for updated information (Horn, 2024).

3.3.4. Contextual and cultural constraints

Some of the limitations mentioned in the studies were grouped under the title of contextual and cultural constraints. One of the findings here shows that because the studies were carried out in one cultural and educational setting, the results cannot be generalized (Zhi & Wang, 2024). Due to a localized study environment, the results had limited generalizability (Zhang et al., 2024). The need for the expansion of research to different education levels is noted in the studies. Another limitation was the researcher serving as the instructor. This negatively influenced objectivity, so Horn (2024) suggests the positive effect of conducting the research in a different context where the researcher is not the teacher of the class.

4. Discussion

The analysis of the studies in this paper yielded profound insights into the benefits and limitations associated with integrating AI into EFL settings. This section discusses the findings in detail based on the relevant literature.

Depending on the investigation of the impact of AI on language development, an improvement in writing, speaking, and listening skills, together with grammatical and lexical skills, has been found as a result of the use of AI technologies in learning settings. Of the skills noted in the studies under review, the most highlighted one is speaking. Regarding the enhancement of speaking, pronunciation studies are foremost. Related to the positive effect on speaking, the literature shows that AI seems to be a conversation partner and a language coach. (Cromptoni et al., 2023). Similarly, Zhang et al. (2024) explain that using Lora, a bot, positively influenced learners' foreign language enjoyment and willingness to communicate. Besides, students' foreign language anxiety declined remarkably. In a different study, Qiao and Zhao (2023) state that AI-based instruction effectively augments students' speaking skills and is good for their self-regulatory processes by helping them adjust their learning processes and set goals more effectively. AI-based instruction contributed to students' control in their learning processes and helped them cultivate metacognitive strategies required for speaking skills.

Since technology is convenient and accessible, learners can receive personalized training and feedback for speaking in an anxiety-free atmosphere at any time (Chen, 2024). Learners' speaking skills improve when the learners are engaged in interaction with an AI chatbot (Park, 2022), and learners can learn how to control their speaking speed, intonation, and the use of fillers (in speech) effectively (Chen, 2024). This is because of low-level anxiety, increased interest, and self-confidence while speaking because of chatting with an AI bot (Park, 2022). Fathi et al. (2024) also explain the chatbot's positive impact on developing students' speaking skills and the students' positive attitudes and thoughts about AI-supported speaking learning. Similarly, Chen et al. (2022) revealed the participants' positive attitudes toward using the robot because it increased their motivation and engagement. In addition, the study indicated that the research positively affected the students' speaking skills, fluency, and vocabulary knowledge. When all the positive influences of AI-supported learning are considered, it might be assumed that technology-supported learning presents opportunities for improving speaking in a foreign language. Therefore, it is necessary to integrate AI-based activities in speaking classes to develop learners' speaking skills and to increase students' engagement with their peers and AI through speaking activities (Qiao & Zhao, 2023). Hence, students can receive input from their peers and use AI technology since AI technology can contribute to the educational realm by creating more meaningful, engaging, and communicative learning settings (Almira, 2023).

Another significant finding emerging from this study is that AI-enhanced language learning fosters greater collaboration among learners. To elucidate, Horn (2024) states that AI was effective in giving real-time input and assistance to large groups of students. Students were motivated due to the innovation and effectiveness of ChatGPT. The researcher stated that students could work individually and in groups, and ChatGPT enabled an active classroom dynamic. It also helps foster cultural understanding by engaging learners with authentic cross-cultural scenarios (Zhang, 2022). In a separate study, Mabuan (2024) also highlights that ChatGPT may promote cultural awareness. He (2024) exemplifies that on AI-supported platforms, such as English cultural exchange platforms, learners can engage in cross-cultural interactions, which is effective in enhancing language learning and promoting cultural understanding. Thus, language learning can be supported with authentic cultural exposure and linguistic input. Technology eases the transfer of learning to the outside of the classroom by creating more learning opportunities (Lin & Mubarok, 2021).

The analysis of the studies indicated that integrating AI into the learning environment positively influences student engagement and autonomy, as also revealed by AlTwijri and Alghizzi (2024).

Similarly, Ivanytska et al. (2024) explored the positive influence of social media and AI-supported apps on vocabulary learning, engagement of students, and their language proficiency. Therefore, by considering the crucial importance of technology in the education field, it seems that it is essential to form an educational pedagogy according to the advancements in technology. Likewise, Wei (2023) supports the positive effect of AI-based instruction on learners' engagement by also having a positive impact on motivation. Despite the positive aspects of AI, Ivanytska et al. (2024) explain that it is necessary to have an attitude towards the use of AI-driven applications and social media platforms in language education, and accordingly, the potential advantages of such technologies should be balanced with taking required precautions not to lose the quality and integrity of the learning and teaching process.

A different finding in the present study showed that although the research contexts are diverse with respect to education level and geographical scopes, research at the higher education level is more common than at other levels, such as elementary and secondary school, in the studies examined. Undoubtedly, AI incorporation into all education levels is pervasive, and the literature suggests that young learners' interaction with AI-based bots can boost their cognitive abilities, affective engagement, and learning skills (Kewalramani et al., 2021). Thus, it might be concluded that there is a tendency to conduct research with adult learners. Future research based on investigations with younger age groups might give insights into how to integrate these technologies into the lower age groups.

As evidenced in the current review, the studies that were examined exhibited limitations, primarily classed as instructional, methodological, and technological. The analysis indicated that the studies lacked a long timeframe of training for the participants in a study (Horn, 2024) or a different study; without highlighting the insufficiency of the training, the researchers explain the lack of complete training to use a particular technology (Xiao & Zhi, 2023). Also, the research shows that some limitations might emerge because the control group, for example, received ineffective or uncontrolled instruction in the research design compared to the experimental group receiving AI-supported instruction. In such cases, Qiao and Zhao (2023) explain that the result could be different from the present with a diverse technique to enhance a skill such as speaking. Therefore, when the instructional constraints are considered, the findings here suggest the necessity for both comprehensive training (Zhang et al., 2024) and methodologically sound research design, which could enable us to draw more reliable conclusions regarding the effectiveness of AI technologies in education.

When the methodological constraints are analyzed closely, they show that the research design adopted in the studies under review lacked longitudinal research, which could have revealed the effects more robustly. Such studies present a more thorough and precise depiction of the developing relationship between AI technologies and learners (Polyportis, 2024). This finding implies the need for research to uncover technology's long-term effects. Additionally, the limitation of the study was the absence of a control group for comparison. A study designed with a control group would leverage the reliability of the relationship between the two constructs to be measured (Shen et al., 2023). A different constraint that should be considered in the next studies is the reliance on self-reported data instead of more objective data collection methods, yielding more effective results by avoiding bias (Li, & Chan, 2024; Zhang et al., 2024). Using self-reported data can bring about certain disadvantages, such as the negative impact of wording and format of questions on the accuracy, systematic tendencies to respond unrelatedly to the content, and biased responses, such as extreme responding, answering depending on the social desirability, as explained in McDonald (2008). Despite the disadvantages of self-reported data, their advantages, such as being practical and efficient, easy to administer, and providing direct insight into unique personal information, make them more commonly used in research. Therefore, strengthening the methodological weaknesses of research with self-reported data and using more behavioral and multiple methods could be effective in enriching the research data and making it more

reliable and valid (McDonalds, 2008). Another constraint specified in the findings of this research is technological constraints such as temporal factors of technology, such as the novelty effect of technology and its implication, and the evolving nature of technology (Horn, 2024) could be examined better by understanding how the novelty effect of AI could be pursued by the learners and in what ways the educators and policymakers improve it in education.

The research highlights the positive impact of culturally sensitive and AI-supported technologies on skills such as critical thinking and creativity (Larasati & Ginting, 2024). Related to creativity, Zhang et al. (2024) also mentioned that one of the positive effects of AI-based assistants is “they can create a translanguaging space for students,” which enables students to think more productively and critically and speak without restrictions (p. 12). Thus, AI-based technologies foster more prolific and unlimited expression of critical thinking. Furthermore, Chen (2024) reported the participants’ positive feedback on the effect of novelty on their interest, which implies that such technologies enhance the connection between modern learning environments and student engagement. On the other hand, Horn (2024) highlights that it could be good to conduct the study in different contexts where the researcher is not the teacher of the class. As an explanation for this, the researcher mentions the students’ inhibition in expressing their opinions openly toward their teachers/researchers. When all the findings here are pondered, it is evident that the potential of AI for learners cannot be disregarded. It is effective in the betterment of the language learning process. Culturally sensitive and creative AI tools can improve learning; however, there is a need for meticulously designed and controlled research settings to confirm the findings.

5. Conclusion

This review paper aims to describe recent research on the use of AI in EFL contexts. For this purpose, a systematic analysis was carried out, and the findings revealed the general features of the studies, the gains of using AI in language learning settings, and the limitations of the studies. The present paper indicates the existing research and key methods adopted to guide future research on AI in language learning settings. Also, the review highlights the limitations in the studies, which may help researchers avoid the same limitations in the next studies, displaying the research that needs to be improved.

This paper indicates that AI use in language learning settings has various advantages, from developing language skills to enhancing cultural and collaborative learning. For educators, these insights suggest incorporating AI tools in a decisively and instructionally grounded way so that they can meet learning objectives and respond to learners’ needs. However, the limitations based on sample size and methodological and instructional constraints underscore the need for flexible and tailored approaches, which highlights that educators should employ AI tools within their specific contexts and adapt their practices accordingly. For policymakers, the findings suggest investing in infrastructure, supporting AI training, and providing access to AI-supported learning opportunities in different educational settings, and supporting longitudinal studies with varying technologies in diverse contexts.

5.1. Limitations and suggestions for future research

Despite the implications that could be derived from the present review, it suffers from certain limitations that need to be considered in future studies. For instance, the results in this paper were based on the findings from the studies conducted in the period 2020-2024 (August), focusing only on the language learning setting. However, as discussed in this present paper, technological advancements are occurring at an increasingly rapid pace. Novel applications and new generation language models such as DeepSeek and Qwen are emerging, and as educators and learners become more familiar with these technologies, their experiences and perceptions evolve very quickly. Consequently, the findings of earlier studies might quickly become outdated. As a result, changing the period and scope of future studies, for example, including the studies in 2025, might alter the conclusions presented in this review.

Also, the databases in the present review were kept limited to EBSCOhost and JSTOR since these databases closely align with the education and language studies field, thereby helping the research to be conducted without less relevant and lower-quality results. However, conducting research based on a search of the studies on different databases such as Scopus, Web of Science, and Eric could bring about different results. Another limitation of the present review is that it focuses on language learning from a holistic approach, so the conclusions regarding one language skill might fall short in the present review; however, a different review adopting an approach mainly focusing on one aspect of language learning, for example, writing or speaking would yield more comprehensive conclusions regarding the skill. Similarly, educational levels were not limited to only a particular level in this review to reach a general understanding of AI use. This might have posed a limitation because the variation in age groups, institutional goals, and pedagogical approaches makes it difficult to derive a cohesive understanding of AI use in education. Therefore, more focused reviews that address particular education levels would be more effective in understanding the context-specific effects of AI tools better.

References

- Abdalgane, M., & Othman, K. A. J. (2023). Utilizing artificial intelligence technologies in Saudi EFL tertiary level classrooms. *Journal of Intercultural Communication*, 23(1), 92-99. <https://doi.org/10.36923/jicc.v23i1.124>
- Adamopoulou, E., & Moussiades, L. (2020). Chatbots: History, technology, and applications. *Machine Learning with Applications*, 2, 1-18. <https://doi.org/10.1016/j.mlwa.2020.100006>
- Almira, T. (2023). The role of AI in EFL teaching and learning. *German International Journal of Modern Science*, 71, 30-34. <https://doi.org/10.5281/zenodo.10459832>
- Alqahtani, T., Badreldin, H. A., Alrashed, M., Alshaya, A. I., Alghamdi, S. S., bin, Saleh, K., & Albekairy, A. M. (2023). The emergent role of artificial intelligence, natural learning processing, and large language models in higher education and research. *Research in Social and Administrative Pharmacy*, 19(8), 1236-1242. <https://doi.org/10.1016/j.sapharm.2023.05.016>
- AlTwijri, L., & Alghizzi, T. M. (2024). Investigating the integration of artificial intelligence in English as foreign language classes for enhancing learners' affective factors: A systematic review. *Heliyon*. <https://doi.org/10.1016/j.heliyon.2024.e31053>
- Betaubun, M., Rokhmah, D. E. L., & Budiasto, J. (2023). Personalized pathways to proficiency: Exploring the synergy of adaptive learning and artificial intelligence in English language learning. *Technium: Romanian Journal of Applied Sciences and Technology*, 17, 60-66.
- Chen, Y., Hsu, C., Lin, C., & Hsu, H. (2022). Robot-assisted language learning: Integrating artificial intelligence and virtual reality into English tour guide practice. *Education Sciences*, 12(7), 1-20. <https://doi.org/10.3390/educsci12070437>
- Chen, Y. (2024). Effects of technology-enhanced language learning on reducing EFL learners' public speaking anxiety. *Computer Assisted Language Learning*, 37(4), 789-813. <https://doi.org/10.1080/09588221.2022.2055083>
- Cromptoni H., Edmett, A., & Ichaporia, N. (2023). Artificial intelligence and English language teaching: A systematic literature review. *British Council*, 1-76. <https://doi.org/10.1515/jccall-2023-0032>
- Cuong, P. H. (2021). English language education in rural areas: Current issues, complexities and ways forward. *VNU Journal of Science Research*, 37(4),39-48. <https://doi.org/10.25073/2588-1159/vnuer.4538>
- Dennis, N. K. (2024). Using AI-powered speech recognition technology to improve English pronunciation and speaking skills. *IAFOR Journal of Education*, 12(2), 107-126.
- Gu, J. (2024). Digital tools in language learning: Optimizing memory and attention for college students. *International Journal of Human-Computer Interaction*, 41(12), 1-11. <https://doi.org/10.1080/10447318.2024.2400384>
- He, Y. (2024). Artificial intelligence-assisted teaching strategies for English cultural communication in colleges and universities. *Applied Mathematics and Nonlinear Sciences*, 9(1), 1-14. <https://doi.org/10.2478/amns-2024-2080>
- Fathi, J., Rahimi, M., & Derakhshan, A. (2024). Improving EFL learners' speaking skills and willingness to communicate via artificial intelligence-mediated interactions. *System*, 121, 1-17. <https://doi.org/10.1016/j.system.2024.103254>
- Fountoulakis, M. S. (2024). Evaluating the impact of AI tools on language proficiency and intercultural communication in second language education. *International Journal of Second and Foreign Language Education*, 3(1), 12-26. <https://doi.org/10.33422/ijfsfle.v3i1.768>

- Hoda, R. (2024). *Qualitative research with socio-technical grounded theory: A practical guide to qualitative data analysis and theory development in the digital world*. Springer International Publishing.
- Horn, K. R. V. (2024). ChatGPT in English language learning: Exploring perceptions and promoting autonomy in a university EFL context. *The Electronic Journal for English as a Second Language*, 28(1), 1-26. <https://doi.org/10.55593/ej.28109a8>
- Hsu, T., Chang, C., & Jen, T. (2023). Artificial Intelligence image recognition using self-regulation learning strategies: Effects on vocabulary acquisition, learning anxiety, and learning behaviours of English language learners. *Interactive Learning Environments*, 3(6), 3060-3078. <https://doi.org/10.1080/10494820.2023.2165508>
- Ivanytska, N., Koliassa, O., Kovalevska, T., Matsera, O., & Tkachuk, T. (2024). Analyzing the possibilities of implementation of AI and social networks in teaching foreign language students: Ukrainian universities case study. *Arab World English Journal (AWEJ)*, 306-318. <https://dx.doi.org/10.24093/awej/ChatGPT.21>
- Jia, F., Sun, D., Ma, Q., & Looi, C. (2022). Developing an AI-based learning system for L2 learners' authentic and ubiquitous learning in English language. *Sustainability*, 14(23), 1-18. <https://doi.org/10.3390/su142315527>
- Jin, F. (2019). Output analysis in voice interaction in AI environment. *Informatica*, 43, 321-324.
- Kamruzzaman, M. M., Alanazi, S., Alruwaili, M., Alshammari, N., Elaiwat, S., Abu-Zanona, M., Innab, N., MohammadElzaghmouri, B., & Ahmed Alanazi, B. (2023). AI- and IoT-Assisted Sustainable Education Systems during Pandemics, such as COVID-19, for Smart Cities. *Sustainability*, 15(10), 1-17. <https://doi.org/10.3390/su15108354>
- Kewalramani, S., Kidman, G., & Palaiologou, I. (2021). Using Artificial Intelligence (AI)-interfaced robotic toys in early childhood settings: A case for children's inquiry literacy, *European Early Childhood Education Research Journal*, 29(5), 652-668. <https://doi.org/10.1080/1350293X.2021.1968458>
- Khalifia, N. F., & Ginting, P. (2024). Exploring EFL students' cognition and practices in applying English speaking through the use of AI (Artificial Intelligence). *Journal of Language Teaching and Learning, Linguistics and Literature*, 12(1), 417-440.
- Kumar, D. (2024). Global perspectives on English language teaching: Pedagogical trends, challenges, and innovations. *International Journal of Innovative Research in Technology*, 11(7), 424-428.
- Larasati, A., & Ginting, P. (2024). Culturally responsive teaching integrated skill AI based learning applicator to elevate learners' critical thinking and writing proficiency. *Journal of Language Teaching and Learning, Linguistics and Literature*, 12(1), 396-416.
- Lee, C., Wang, M., Kuan, W., Huang, S., Tsai, Y., Ciou, Z., Yang, C., & Kubota, N. (2023). BCI-based hit-loop agent for human and AI robot co-learning with AIoT application. *Journal of Ambient Intelligence and Humanized Computing*, 14, 3583-3607. <https://doi.org/10.1007/s12652-021-03487-0>
- Li, Q., & Chan, K. K. (2024). Test takers' attitudes of using exam-oriented mobile application as a tool to adapt in a high-stakes speaking test. *Education and Information Technologies*, 29, 219-2237. <https://doi.org/10.1007/s10639-023-12297-0>
- Lin, C., & Mubarak, H. (2021). Learning analytics for investigating the mind map-guided AI chatbot approach in an EFL flipped speaking classroom. *Educational Technology & Society*, 24(4), 16-35.

- Liu, C., Hou, J., Tu, Y., Wang, Y., & Hwang, G. (2023). Incorporating a reflective thinking-promoting mechanism into artificial intelligence-supported English writing environments. *Interactive Learning Environments*, 31(9), 5614-5632. <https://doi.org/10.1080/10494820.2021.2012812>
- Liu, G. L., Darvin, R., & Ma, C. (2024). Exploring AI-mediated informal digital learning of English (AI-IDLE): A mixed-method investigation of Chinese EFL learners' AI adoption and experiences. *Computer Assisted Language Learning*, 1-29. <https://doi.org/10.1080/09588221.2024.2310288>
- Mabuan, R. A. (2024). ChatGPT and ELT: Exploring teachers' voices. *International Journal of Technology in Education (IJTE)*, 7(1), 128-153. <https://doi.org/10.46328/ijte.523>
- Mageira, K., Pittou, D., Papasalouros, A., Kotis, K., Zangogianni, P., & Daradoumis, A. (2022). Educational AI Chatbots for Content and Language Integrated Learning. *Applied Sciences*, 12(7), 1-16. <https://doi.org/10.3390/app12073239>
- Marlina, R., & Xu, Z. (2018). English as a Lingua Franca. In J. I. Liontas & M. DelliCarpini (Eds.), *The TESOL Encyclopedia of English Language Teaching* (pp. 1-13). John Wiley & Sons. <http://dx.doi.org/10.1002/9781118784235.eelt0667>
- McDonald, J. D. (2008). Measuring personality constructs: The advantages and disadvantages of self-reports, informant reports, and behavioral assessments. *Enquire*, 1(1), 75-94.
- Ji, H., Han, I., & Ko, Y. (2023). A systematic review of conversational AI in language education: Focusing on the collaboration with human teachers. *Journal of Research on Technology in Education*, 55(1), 48-63. <https://doi.org/10.1080/15391523.2022.2142873>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., & Mulrow, C. D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Research and Methods and Reporting*, 372(1). <http://dx.doi.org/10.1136/bmj.n71>
- Park, H. (2022). Effects of virtual reality-based English learning on Korean university students' speaking ability. *Multimedia-Assisted Language Learning*, 25(4), 93-119. <https://doi.org/10.15702/mall.2022.25.4.93>
- Polyportis, A. (2024). A longitudinal study on artificial intelligence adoption: Understanding the drivers of ChatGPT usage behavior change in higher education. *Frontiers in Artificial Intelligence*, 6. <https://doi.org/10.3389/frai.2023.1324398>
- Praphan, P. W., & Praphan, K. (2023). AI Technologies in the ESL/ EFL writing classroom: The villain or the champion? *Journal of Second Language Writing*, 62. <https://doi.org/10.1016/j.jslw.2023.101072>
- Roller, M. R., & Lavrakas, P. J. (2015). *Applied qualitative research design: A total quality framework*. Guilford Publications.
- Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: Illuminating the impact on speaking skills and self-regulation in Chinese EFL context. *Frontiers in Psychology*, 14, 1-15. <https://doi.org/10.3389/fpsyg.2023.1255594>
- Sakach, A. N. (2022). Blue Canoe. *CALICO Journal*, 39(2), 248-256. <https://doi.org/10.1558/cj.18393>
- Shafarini, R., Sariyati, I., & Saehu, A. (2023). Artificial intelligence on ELT for literature studies. *IDEAS*, 11(2), 1688-1702.
- Sharadgah, T., & Sa'di, R. A. (2022). A systematic review of research on the use of artificial intelligence in English language teaching and learning (2015-2021): What are the current effects? *Journal of Information Technology Education: Research*, 21, 337-358. <https://doi.org/10.28945/4999>

- Shardlow, M., Sellar, S., & Rousell, D. (2022). Collaborative augmentation and simplification of text (CoAST): Pedagogical applications of natural language processing in digital learning environments. *Learning Environments Research*, 25, 399-421. <https://doi.org/10.1007/s10984-021-09368-9>
- Shen, C., Shi, P., Guo, J., Xu, S., & Tian, J. (2023). From process to product: Writing engagement and performance of EFL learners under computer-generated feedback instruction. *Frontiers in Psychology*, 14, 1–13. <https://doi.org/10.3389/fpsyg.2023.1258286>
- Silverman, D. (2010). *Doing qualitative research* (3rd ed.). SAGE Publications.
- Sumakul, D. T., Hamied, F. A., & Sukyadi, D. (2022). Artificial intelligence in EFL classrooms: Friend or foe? *LEARN Journal: Language Education and Acquisition Research Network*, 15(1), 232-256.
- Sütçü, S. S., & Sütçü, E. (2023). English teachers' attitudes and opinions towards artificial intelligence. *International Journal of Research in Teacher Education*, 14(3), 183-193. https://ijrte.inased.org/files/5/manuscript/manuscript_4071/ijrte-4071-manuscript-200459.pdf
- Tolstykh, O. M., & Oshchepkova, T. (2024). Beyond ChatGPT: Roles that artificial intelligence tools can play in an English language classroom. *Discover Artificial Intelligence*, 4(1), Article 60. <https://doi.org/10.1007/s44163-024-00158-9>
- Wang, X., Liu, Q., Pang, H., Tan, S. C., Lei, J., Wallace, M. P., & Li, L. (2023). What matters in AI-supported learning: A study of human-AI interactions in language learning using cluster analysis and epistemic network analysis. *Computers & Education*, 194, 1-17. <https://doi.org/10.1016/j.compedu.2022.104703>
- Ward, M. (2017). ICALL's relevance to CALL. In K. Borthwick, L. Bradley & S. Thouësny (Eds), *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017* (pp. 328-332). Research-publishing.net. <https://doi.org/10.14705/rpnet.2017.eurocall2017.735>
- Wei, L. (2023). Artificial intelligence in language instruction: Impacts on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in Psychology*. 14, 1-14. <https://doi.org/10.3389/fpsyg.2023.1261955>
- Xing, R. (2023). Advancements in English listening education: ChatGPT and convolutional neural network integration. *Journal of Pedagogical Research*, 7(5), 287–291. <https://doi.org/10.33902/JPR.202323980>
- Xiao, Y., & Zhi, Y. (2023). An exploratory study of EFL learners' use of ChatGPT for language learning tasks: Experience and perceptions. *Languages*, 8, 1–12. <https://doi.org/10.3390/languages8030212>
- Yang, K. (2024). Research on personalized English language learning based on artificial intelligence. *Applied Mathematics and Nonlinear Sciences*, 9(1), 1–17. <https://doi.org/10.2478/amns-2024-2151>
- Yeh, H. (2024). Revolutionizing language learning: Integrating generative AI for enhanced language proficiency. *Educational Technology & Society*, 27(3), 335–353. [https://doi.org/10.30191/ETS.202407_27\(3\).TP01](https://doi.org/10.30191/ETS.202407_27(3).TP01)
- Zhang, C., Meng, Y., & Ma, X. (2024). Artificial intelligence in EFL speaking: Impact on enjoyment, anxiety, and willingness to communicate. *System*, 121. <https://doi.org/10.1016/j.system.2024.103259>

- Zhang, B., & Mao, J. (2023). On the teaching and learning in the information age of “big data + internet?” – Some thoughts on the application of ChatGPT in teaching. In C. F. Peng, A. Asmawi, & C. Zhao (Eds.), *Proceedings of the 2023 2nd International Conference on Educational Innovation and Multimedia Technology (EIMT 2023)* (pp. 1005-1016). Atlantis Press.
- Zhang, Z. (2022). The cultivation of cross-cultural communicative competence in English teaching under the background of artificial intelligence and big data. *Wireless Communications and Mobile Computing*. <https://doi.org/10.1155/2022/9566066>
- Zheng, Y., Wang, Y., Liu, K. S., & Jiang, M. Y. (2024). Examining the moderating effect of motivation on technology acceptance of generative AI for English as a foreign language learning. *Education and Information Technologies*, 29. <https://doi.org/10.1007/s10639-024-12763-3>
- Zhi, R., & Wang, Y. (2024). On the relationship between EFL students’ attitudes toward artificial intelligence, teachers’ immediacy and teacher-student rapport, and their willingness to communicate. *System*, 124. <https://doi.org/10.1016/j.system.2024.103341>

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