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Enhancing MALL with Artificial Intelligence: Personalized Learning Paths in EFL Teaching

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Abstract

With the rapid development of artificial intelligence (AI) technology, the field of English teaching has ushered in an opportunity for innovation. This study explores the application of AI in mobile Assisted Language learning (MALL) and its impact on English teaching. Through the analysis of relevant literature in the Web of Science database from 2014 to 2024, the study found that AI can personalize learning content, enhance learning engagement and language ability, and significantly improve English learning results. Despite some challenges, the application of AI in English teaching has broad potential to help improve the quality of teaching and meet the needs of diverse learners.

Keywords: EFL teaching, artificial intelligence, personalized learning, educational technology

1. Summary of Project

With the development of artificial intelligence (AI), English as a foreign language (EFL) teaching has more potentials in its method and effects (Yang & Kyun, 2022). As many empirical researches had proved that AI can be integrated with mobile Assisted Language learning (MALL) to improve the personalized learning in EFL education (Liang et al., 2023). This research examines the functions and key aspects of Artificial Intelligence in mobile EFL language education. It covers AI assisted language study research articles from 2014 to 2024 in the Web of Science (WOS) database. The study evaluates few aspects such as research methodologies, participant demographics, technologies used, language competencies, the impact of AI in language education, and educational results. This study aims to explore how MALL integrated AI can affect the EFL learning experience to meet the diverse needs of learners, potentially enhancing motivation, engagement, and language proficiency. The major theory underpinning the project is Vygotsky's Social Constructivism, which posits that individuals construct knowledge through interactions with other people and the world (Vygotsky & Cole, 1978). It implies that the context facilitated by AI will be beneficial to the personalized learning and will also aid in the acquisition of language.

This study adapted the literature research method to systematically search important academic papers and journals related in the field of educational technology, language learning, and artificial intelligence. Research highlighted how AI technologies can be applied to English education and figure out the effectiveness of these applications.

This study found that using AI in mobile assisted Language learning (MALL) can significantly improve English learning outcomes. At the functional level, the use of AI facilitates mobile-assisted interactive learning experiences and real-time feedback. In the dimension of learning engagement, AI increases the relevance of learning and the interest of students. Therefore, artificial intelligence technology can adjust the learning content and difficulty based on multiple aspects such as function and interest in time and give timely feedback. In EFL English teaching, students can make progress in speaking, writing, listening and reading. In addition, although

there are some challenges in the application of artificial intelligence in English teaching, the potential of artificial intelligence is beneficial and will provide a good reference for English educators.

2. Introduction

Since the widespread adoption of mobile technology, Mobile Assisted Language Learning (MALL) has become a significant tool in EFL instruction, offering learners flexible and convenient learning pathways (Chen, 2020). For instance, laptops have well-performing screens which allow language learners to read digital textbooks, write papers, take online assessments and listen to the class in the virtual environment (Zhou, 2021). The smartphone, the most common and prevalent mobile device, has hundreds of languages learning applications such as Duolingo and Busuu which enable students acquire vocabulary and grammar to improve their listening skills (Jie & Sunze, 2023). The integration of Artificial Intelligence (AI) in recent years has introduced new potential for transforming MALL, especially in terms of designing and implementing personalized learning paths. However, despite the broad application of AI in various fields, research on its integration into MALL and its impact on EFL learning is still in its infancy.

Although current studies suggest that AI can enhance the language learning experience through personalized feedback, intelligent assessment, and customized content (Chen et al., 2021). There are still several challenges in practical applications, including teachers' acceptance and capability to apply new technologies, and the lack of deep integration between existing AI tools and specific teaching content and objectives (Karakaya & Bozkurt, 2022). Additionally, the accessibility and quality of technological devices vary across different regions, potentially exacerbating the issue of educational resource inequality.

Given these challenges, this study aims to delve into how AI can optimize MALL applications to provide more effective personalized learning paths for EFL. By systematically reviewing and integrating literature from the past decade and drawing on numerous case studies and practical research, this study will explore the current state of AI applications in MALL, assess their potential in enhancing learner motivation, engagement, and language skills, and identify difficulties and challenges in practical applications.

This research was guided by several specific questions: firstly, how can artificial intelligence (AI) enhance the effectiveness of Mobile-Assisted Language Learning (MALL) in English EFL education; secondly, how can AI technologies be optimized to support the development of specific language skills; thirdly, how to integrate the English content and pedagogy with the AI to meet the diverse needs of learners in EFL teaching.

By addressing these questions, this study will explore what AI technique can be integrated into EFL class. And this study not only aims to reveal the potential applications of AI in MALL but also hopes to identify current challenges and limitations in practice, providing suggestions for future research and teaching practices. The significance of this research lies in providing valuable insights for EFL educators, policymakers, and educational technology developers, helping them better understand and utilize AI technology to improve language teaching and learning. As AI technology continues to advance and educational needs evolve, the findings of this study will provide an important theoretical and practical foundation for creating a more effective, personalized, and inclusive EFL learning environment.

3. Definitions of Key Terms

3.1 Mobile-Assisted Language Learning (MALL)

Mobile Assisted Language Learning (MALL) involves the utilization of mobile devices, predominantly smartphones and tablets, to aid learners in acquiring a new language which provides learners with an opportunity to work with language materials and practice their skills from any place at any time.

3.2 English as a Foreign Language (EFL)

English as a Foreign Language is a term used to describe English learning and teaching in non-English speaking communities where the language is not used daily which provides EFL students proficiency in the fundamental language skills — reading, writing, listening, and speaking.

3.3 Artificial Intelligence (AI)

Artificial intelligence (AI) is the development of systems and algorithms that can perform functions that need human intelligence. AI makes it possible to personalize education by offering learners adaptive learning opportunities based on individual needs.

3.4 Personalized Learning

Personalized Learning is a pedagogical practice that focuses on the individual learning needs, preferences and goals of the student. Using learner performance data, AI frameworks can propose adapted learning paths, including practice exercises that align with a student's current ability and achievement goal.

3.5 Learner Engagement

Learner engagement is the degree to which students actively participate in their learning process. In MALL, AI-powered platforms can enhance engagement by incorporating interactive activities like gamified vocabulary exercises and simulated conversations.

4. Rationale and Aims of the Project

Mobile assisted language learning (MALL) is a term used to describe language learning that takes place through the use of mobile devices in language learning. Increasingly, learners are using mobile devices to learn languages in personal learning environment, marking a new trend of language learning (Stockwell, 2022). The integration of artificial intelligence (AI) with mobile Assisted Language Learning (MALL) is a huge progress in English as a foreign language (EFL) education, since it is on technological trends and demands of education. The potentials of AI in the language education domain, despite the challenges of AI integration into English teaching practices. A frequent barrier is the reluctance of teachers to implement new technologies, not infrequently from the mere lack of training and fear of replacing traditional tracks with digital tracks (Butler-Pascoe, 2011).

Addressing these issues, this project seeks to examine exactly how AI can be effectively incorporated into MALL systems to enhance EFL teaching, by taking on existed challenges. This requires an in-depth view at the ways in which AI helps students to learn (i.e., vocabulary learning, grammar understanding). For example, Yang & Kyun (2022) investigated that AI-enhanced MALL, using an engaging and AI personalized feedback approach, can dramatically increase the accuracy in pronunciation and listening skill. This project will extend such findings by exploring additional dimensions of language learning, such as writing and speaking, where AI's impact has been less explored.

In addition, this study is based on Vygotsky's constructivism theory. Vygotsky's constructivism holds that learners acquire mainly through social interaction (Vygotsky & Cole, 1978). The artificial intelligence technology based on Mall enables learners to have a more immersive learning interactive experience through the construction of learning situations (Warschauer & Grimes, 2007). In line with this theory, the project will examine how AI tools can promote more effective social interactions while learning a language, thereby improving learners' communicative skills.

The purpose of this study is to realize a more comprehensive and comprehensive vision of guiding the application of AI research to the practice of English teaching. The study will extend prior empirical research, such as the meta-analysis by Xie et al. (2019), conclusions delivered by Nguyen et al. (2019), which amalgamated multiple study results, giving powerful answers regarding the technology and education combination. Research would inspire educators on how to handle the opportunities and issues AI offers to a more effective use of the spectrum of human languages, which EFL teachers and learners are confronting.

To sum up, this research will contribute to the theoretical and practical understanding of AI in EFL education. It provides practical answers that can make the promise of technology in education a reality, improving language teaching world-wide. The study does not only extend the academic line, it also makes a reference for technology applications in language learning.

5. Research Questions

This study seeks to explore the integration of Artificial Intelligence (AI) within Mobile-Assisted Language Learning (MALL) frameworks, particularly for English as a Foreign Language (EFL) learners. Central to our investigation are three pivotal questions as bellow:

1) How can artificial intelligence (AI) enhance the effectiveness of Mobile-Assisted Language Learning (MALL) in English EFL education? (PL, adaptive learning system?)

2) How can AI technologies be optimized to support the development of specific language skills (e.g., speaking, listening, reading, writing) in EFL learners using MALL? (student engagement and motivation)

3) How to integrate the English content and pedagogy with the AI in EFL teaching?

6. Research Process

The research process on the integration of Artificial Intelligence (AI) into Mobile-Assisted Language Learning (MALL) in EFL setting mainly includes three steps which is a well-structured and allows analyzing the effect of AI on language studies in detail. During certain stages of this process, each new step is intended to be developed on the basis of the findings obtained at the previous step while covering all the research goals.

The first step is literature review which encompass an exhaustive literature of the available sources closely connected with AI, MALL, and EFL education. The role of the above review is to give a broad outline of the up-to-date knowledge on the topic. Moreover, it should include the areas of research already covered and the topics that require further studies. For this purpose, academic journals, reports, conference proceedings, and technical papers will be analyzed, with the focus on combining and summarizing previous findings.

Secondly, a bibliometric analysis was conducted using the visualization software tool CiteSpace (Chwo et al., 2018). This quantitative research approach analyzed the current research status of AI in MALL for EFL learning. Utilizing the core collection of Web of Science as the data retrieval source, the search strategy was configured as follows: TS (theme) = ("AI", "MALL", and "EFL"), WC (subject category) — ("Education") and time range was set to 2014-2024. After excluding non-representative literature such as notes, 164 records were retained as research samples. These records will undergo statistical analysis, and the trends of specific annual publications were visualized in Figure 1, providing a clear graphical representation of the research dynamics over time.

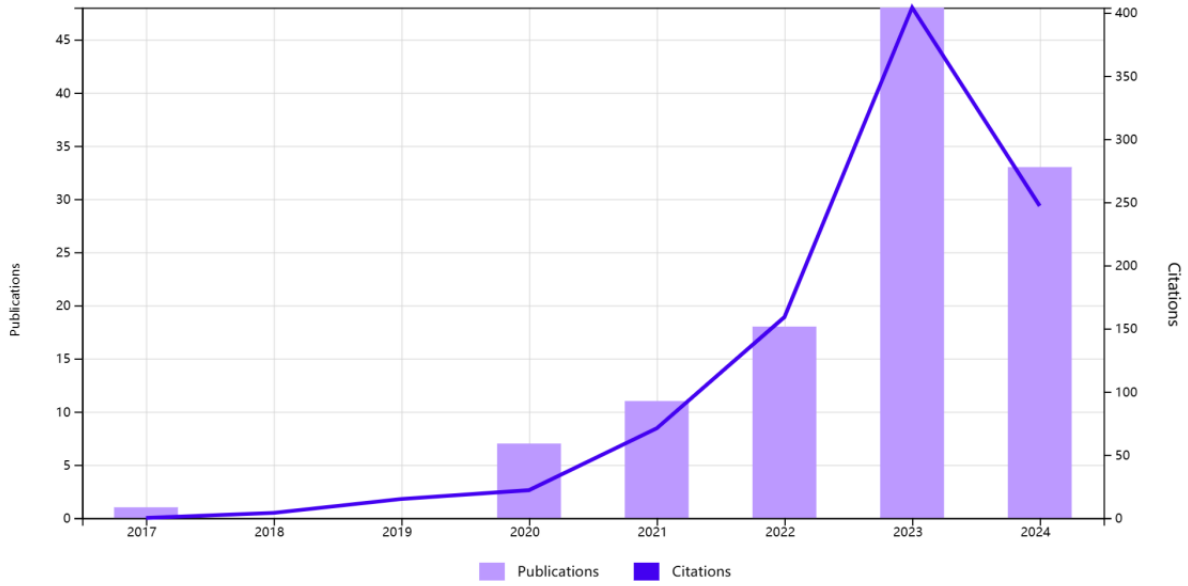

Figure 1. The publications and citations over 10 years

Third, this study used CiteSpace to visualize the collected data in detail. This step is essential to cluster keywords and to visualize the initial and emerging trends in publications over the years (Van & Waltman, 2014). A visual chart can provide a visual representation of publishing trends on related topics over the years. And, using CiteSpace, keywords in the collected records can be analyzed to identify the main research themes and trends in the application of AI in English learning malls. This visualization will not only illustrate the volume of research activity over time but also highlight the evolution of focus areas within the field.

Furthermore, this step involves a detailed discussion of the major trends identified from the keyword clusters (Figure 2). By examining the clusters, the study will delve into the overarching trends of AI application in MALL, such as adaptive learning technologies, natural language processing for language assessments, and the integration of AI-driven chatbots for conversational practice. Each cluster will be analyzed to determine its significance and contribution to addressing the research questions posed in this study.

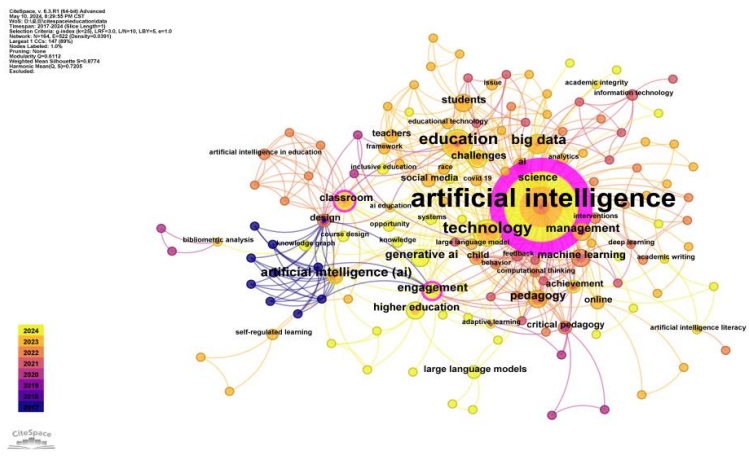

Figure 2. The cluster graph of publications key words over ten years

Then this study categorizes the keywords into groups related to AI in MALL (Mobile Assisted Language Learning). These categories could be centered around themes like teaching methodologies, AI technologies, learner engagement, and challenges in MALL. The study proceeds with categorizing these keywords and then create a table to display the frequency of keywords within each category (Figure 3).

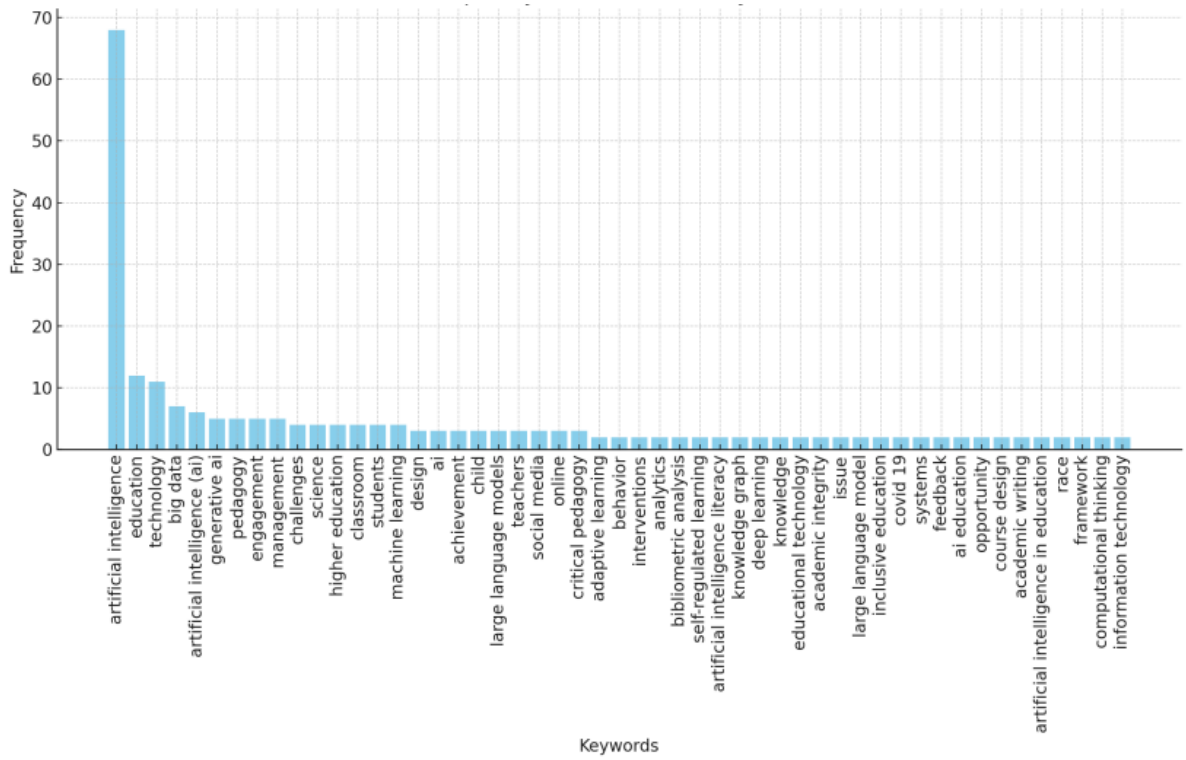

Figure 3. The frequency distribution of keywords

By addressing these clusters and trends, the study aims to provide substantive answers to the research questions, particularly how AI can enhance the effectiveness of MALL in EFL education and how it can be optimized to support specific language skills development. The insights gained from this bibliometric analysis will directly inform the strategies for integrating AI with English content and pedagogy in EFL teaching, aiming to provide inspirations for both current and future applications of technology in language learning.

7. Answers to Research Questions

7.1 How Artificial Intelligence (AI) Enhances the Effectiveness of Mobile-Assisted Language Learning (MALL) in EFL Education

Through literature research, artificial intelligence (AI) can improve EFL learning efficiency in mobile Assisted Language learning (MALL) by personalizing the learning experience, improving interaction, and providing real-time feedback (Zhou, 2021; Jie & Sunze, 2023). This integration of artificial intelligence and MALL makes education more targeted and responsive, making EFL English learning work in countries and regions with different economic backgrounds.

The first Is that artificial intelligence will revolutionize the way individuals learn language (Kim & Kim, 2020). AI can adapt the learning content to the needs of each learner to cope with different learning speeds and styles (Ghufron & Rosyida, 2018; Zhai et al., 2021). Personalized learning path, through an adaptive learning system, can analyze learner interactions and outcomes to adjust course material. For example, in Japan, an AI application connected to a mobile phone provides tailored English vocabulary exercises, changes the challenge level according to the student's progress, and utilizes gamification elements to stay engaged (Tanaka, 2023). Personalized English learning application in China, taking Baicizhan as an example, users can carry English vocabulary in their English learning route through smartphones, iPads and other devices, so as to effectively achieve the effect of learning and improve their English and vocabulary learning efficiency (Zou et al., 2018). Learning machines equipped with adaptive systems have been put into use in schools in Guangzhou and other regions of China and can be personalized based on students' homework feedback and scores (Zhou, 2021). These

apps help learners focus on their areas of weakness and make language learning more effective.

Similarly, Mall-based AI applications can increase learner engagement. Interactive AI features, such as chatbots and virtual tutors, mimic human interaction to provide a responsive and engaging learning experience. In Brazil, an English project implemented a chatbot that could talk to students in English, allowing them to practice their language skills in a stress-free environment outside the classroom (Qiao, & Zhao, 2023). Chatbots use natural language processing to evaluate user input and provide personalized feedback to help learners improve their conversational skills (Silva et al., 2024). In traditional EFL classrooms, students often lack situational English communication, thus students' oral expression and enthusiasm was limited. According to studies, students in East Asia, such as China, tend to perform better on English proficiency tests in writing and reading than in listening and speaking. Therefore, context-based interactive speaking practice software such as AI language tutor (Figure 4), Cambly, Duolingo, Lingbe, and Rosetta Stone can enable English learners to interact with AI avatars contextually by creating learners' personal avatars.

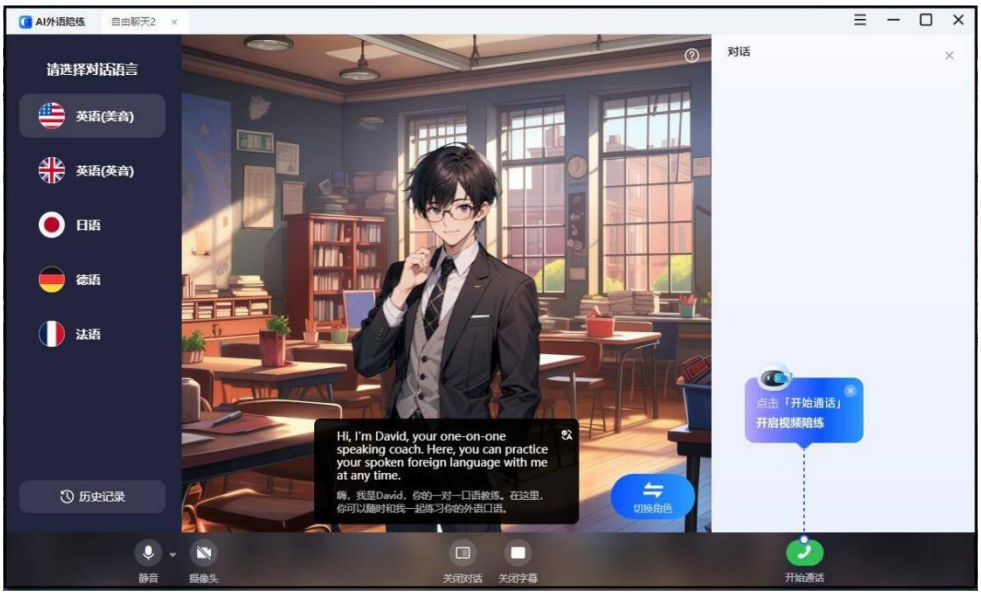

Figure 4. The AI avatar in the App (AI Language Tutor)

In addition, AI is good at providing immediate feedback, which is crucial for language learning (Ai, 2017). Speech recognition technology assesses speech, intonation, and fluency in real time, providing suggestions for correction and improvement. In South Korea, a study showed that English students who used AI-enabled mobile apps for speech exercises improved their English pronunciation faster than those who used traditional methods. Artificial intelligence systems provide them with immediate visual and auditory feedback, highlighting pronunciation errors and suggesting ways to improve (Kim & Park, 2023). In Shanghai, China, the AI-powered MALL app is being used to enhance English learning for middle school students. These apps all analyze responses to make tasks more or less difficult to challenge a student without frustrating them. In a move to enhance English Teaching, an initiative in New Delhi, India, deploys AI to deliver English language learning tools as mobile-assisted learning with input and feedback on English conversation, breaking the digital divide and thereby reducing reliance on physical classrooms (Patel & Kumar, 2024).

Another way in which AI is assisting educators is the use of data to analyze the student performance that will further help students to adapt the teaching strategies. However, a mobile app in Spain tracks data on student activity and grades, and teachers use dashboards to check how well they are doing and where they face recurring problems. This information allows educators to adjust their instruction so that they can help students where the class is struggling the most (Garcia & Lopez, 2023). These implementations have been recorded in the Tanaka (2023) and Silva et al. (2024) that demonstrate success in using AI to improve language learning goals. Similarly, the research of Kim and Park (2023) suggests that the pronunciation of English learners through the use of AI-based methods can be considerably advanced.

Overall, AI improves student learning by creating responsive and a socially-engaged, supportive, learning experience, tailored to the needs of each student in every mall. This technology makes learning more personalized as well as helps educators with strong tools that let them become more effective as an instructor.

There is reason to believe that AI technology will be increasingly combined MALL, and this will have the potential to revolutionize English education in a variety of global contexts.

7.2 How Can AI Technologies Be Optimized to Support the Development of Specific Language Skills?

In order to cultivate the specific language skills for L2 development among EFL learners by leveraging AI technologies through Mobile-Assisted Language Learning, it is critical that AI functionalities be combined and finetuned to cater to the unique needs of individual language domains, which include listening, writing, speaking, and reading. The following are findings of how AI could be effectively leveraged in order to improve these vital language facets:

In the aspect of EFL listening learning, AI can adjust how learners interact with listening exercises via personalized audio exercises with real-time speech recognition feedback (Yu et al., 2023). Based on the content that learners listen to, AI-powered listening platforms can give comprehension and analysis for language learners. For example, Zhang and Wang (2022) investigated how a listening platform based on AI helping higher language level students learning in Chinese universities. Researchers discovered that when students practiced with the AI-supported tools, their comprehension of spoken English significantly improved. The features in these tools included interactive listening exercises that adapted to the listening comprehension levels of various students, presenting hearing exercises that become more advanced as the students' abilities improve. This type of customization promoted an auditory learning cognition which resulted in a much more authentic and textured understanding of using a complex language. The work of Patel and Jones (2023) explored English learners' experiences with AI-enabled listening platforms that individually personalized audio content and listening assessment. In this case, students' listening comprehension proficiency scores increased by 35% in one semester, and that was mostly due to the AI providing a level of individualization that he claimed is nearly impossible for language educators to deliver. Additionally, AI is used in tools like ELSA Speak to boost listening performance through human-like engagement by mimicking authentic speech patterns, pronunciation stress, and linguistic subtleties.

Besides, AI technologies can support the development of writing skills by offering automated feedback on grammar, syntax, and style (Chen et al., 2021). Platforms like Grammarly and Hemingway employ natural language processing (NLP) to provide real-time, detailed feedback on writing errors and suggestions for improvement, which helps learners refine their writing skills over time. Additionally, AI-driven writing assistants can help learners generate ideas, organize thoughts, and even draft essays, which can be particularly helpful in structured writing exercises or for learners struggling with writer's block. The effectiveness of AI in improving writing skills has been well-documented in a series of studies across different educational contexts. For instance, a longitudinal study conducted by Johnson et al. (2023) in a U.S. high school setting showed that students using Grammarly for six months improved their writing scores by an average of 30%. The AI provided feedback not only on grammar and punctuation but also on style and coherence, which significantly helped students enhance their writing quality over time. Another experiment research by Thompson & Lee (2024) focused on university students using an AI-driven writing assistant that provided real-time editing suggestions. Results showed a notable increase in the quality of academic essays, with a particular improvement in coherence and argumentative structure.

In case of spoken practice, AI technologies such as speech recognition and analysis tools can come in handy. These applications can judge pronunciation, fluency, accent and give learners feedback to improvise on their spoken English (Смуглякова & Пономаренко, 2023). SpeakPlus, for example, and Duolingo and others use a system that allows an AI to "listen in" while the learner is speaking, quickly give them feedback on how good their pronunciation was, and even suggest exercises to practice aside to enhance their more difficult areas (Moreno & Rodriguez, 2024). As a result, it uses AI-driven conversational agents (chatbots) to create dialogues that imitate real conversations, in order to have the well-constructed experience to practice speaking in practice, without burden of real-world discussions.

In addition, AI can help EFL students with reading comprehension by adjusting the complexity of text and personalizing reading experiences interactively. AI systems are able to analyse reading habits and comprehension levels and suggest learners with personalized reading pathway and materials (Ahmad, et al., 2021). Amazon's Kindle and other e-reading tools use AI metrics every user's reading habits, monitors reading speeds, learns about vocabulary challenges, and even collects data from comprehension to summaries and quizzes. Furthermore, multi-lingual support systems that translate text or give definitions and synonyms in real-time as the learner reads the material which can be facilitated by AI. Sharma and Gupta (2023) collected the data in a university in India where an experiment was conducted to observe the literacy levels in students using AI adaptive reading systems. Due to the algorithms, the complexity of the text has been adjusted depending on the learner previous interactions and quiz results. After the AI system introduced students to progressively more difficult material, they wound up demonstrating a 40% higher ability to understand complex texts. It used an AI platform to deliver

dynamic reading passages with comprehension questions to a wide audience of EFL students across the world. This was determined to increase reading comprehension scores by more than 30%, particularly in understanding inferential questions, and in interpreting complex narrative structures (Moreno & Rodriguez, 2024). Valuable insights into progression and maintenance can also take place when linked to a cloud-based learning management systems (LMS) that track students across all four skills. (Alenezi & Akour, 2023) Furthermore, the inclusion of adaptive learning algorithms can make every learning process in accordance with their learning curves, thereby improving the engagement and effectiveness of the overall experience.

Ultimately, through these targeted uses of AI, MALL platforms can become the complete immersive learning experience driving language acquisition and opening listening, writing, speaking, and reading skills in a short time. Although each of these AI applications is designed to support the development of a specific area of skills, their effective use as tools contributes to the overall enhancement of the EFL environment and can be used dynamically for the development of language skills.

7.3 How to Integrate the English Content and Pedagogy with the AI in EFL Teaching?

Integrating English content and pedagogy with AI in EFL teaching involves several pedagogical strategies that align with the capabilities of AI to enhance learning outcomes. Here are key approaches to effectively combine AI with English teaching methods:

Firstly, AI can be integrated into the EFL curriculum by adapting and personalizing content based on learner data. AI systems analyze performance and engagement levels to tailor lessons that fit the learning curve and preferences of each student. Teachers can use AI to automatically adjust the difficulty of texts and the complexity of language exercises. For example, AI can suggest simpler synonyms for complex vocabulary or provide more advanced grammatical structures as students progress. Kirsch (2016) used the iTEO storytelling app on iPad to engage primary school students in Luxembourg in oral storytelling tasks. Teachers divided children into small groups and used the app to collaborate on oral story text. The iTEO app allows children to record and edit their recordings and modify the text of the stories they co-create. The results indicate that the iTEO app functions as a tool with which the young language learners can create collaborative learning events that improve their skills in oral storytelling. Thus, this study illustrates how a combination of these well-designed MALL teaching tasks or applications can support the implementation of learner-centered teaching and provide a theoretical basis for the successful use of mobile learning by teachers.

On the other hand, AI can enrich the interactive learning with multi-modal activities, such us games, quizzes and simulations. In this way, students can be more involved with these innovative educational practices. A study was conducted by Xie (2019) employed AI in a personalized reading platform for elementary school students in China. These studies have shown that when the platform adjusts reading materials to students' reading levels and preferences, students' scores for learning engagement and comprehension significantly improve. Based on this, teachers can benefit from using AI to understand students' learning difficulties, design lessons for students, and predict students' future academic performance. Applying AI-driven games to allow students to practice vocabulary and grammar in the right context is one of the new trends in EFL teaching (Schmidt & Strasser, 2022). For example, artificial intelligence Chatbots can simulate the process of oral communication, which provides students with an opportunity to apply English to real life (Kim et al., 2019). This combined with the Communicative Language Teaching (CLT) approach to learning, is another practical way to create language use opportunities for EFL students.

Third, AI is capable of providing instant and tailored feedback, which is an integral feature of EFL English language learning. Artificial intelligence can recognize spoken and written language and provide real-time adjustments and recommendations. Regarding automated essay scoring, Attali and Burstein (2006) analyzed the performance of an application (E-rat), a system developed by Educational Testing Services. On the GRE analytical writing test, this software can provide scores similar to human scores. This research was supported by Ranalli's (2008) study, which explored how AI games can be used to acquire vocabulary in a foreign language. According to the study, EFL students who use games remember and use vocabulary better than students who use other traditional learning methods. With AI-based algorithm recommendations, the software provides students with real-time assistance with verbal pronunciation or writing structure, such as grammar, style, or syntax. This immediate feedback enables students to complete self-directed learning and be able to self-correct and quickly correct errors, thus entering a virtuous learning cycle.

To sum up, integrating AI into English teaching means adapting educational content, enhancing interactivity, and enhancing feedback and assessment. Combined with data-driven instruction, it fosters learner autonomy and gives teachers the ability and knowledge they need to use AI properly. This integration must be designed very carefully to avoid increasing the learning burden on teachers and students. It must meet and support the humanization of education while maximizing the power of technological developments to take language learning outcomes to the next level.

8. Limitations of Past and Recent Research

In recent years, research on the application of artificial intelligence in MALL English teaching has some limitations. First of all, the number of relevant literatures is not large, and the empirical research cycle is not long. The development and application of artificial intelligence is a relatively new topic in recent years, which can also be found from the previous publication of Figure 1. Therefore, there is no way to assess the feasibility of AI in long-term educational scenarios, so many results have not been validated over time. Diaz and Nussbaum (2024) pointed out that the current combination of AI and education is mainly based on six categories: behaviorism, cognitivism, constructivism, social constructivism, experiential learning, and community of practice. The study shows that while technological advances have improved AI capabilities, the application of AI in education largely follows the same principles as prior technologies. Therefore, how to combine traditional teaching principles with educational technology still needs more empirical research.

Secondly, the coverage of the study is not extensive enough. Most of the studies were conducted in economically developed countries and regions, so the results of the studies are not universal enough. The application of MALL and AI requires quality literacy and basic hardware equipment, so the application in some underdeveloped areas still needs to be verified. Therefore, the development of AI will also have an impact on educational equity and social divides. Researches showed that the digital divide exacerbates income inequality between urban and rural areas, as well as between developed and developing regions which also influences the educational equity (Peng & Dan, 2023). There are disparities in access to technology and internet connectivity among students from different socioeconomic backgrounds, age groups, and geographic locations (Afzal et al., 2023). Hence, it is necessary to conduct more detailed studies in regions with different economic backgrounds.

At the same time, AI tools are not well integrated into existing teaching frameworks. Recent studies highlight the need for well-rounded implementation strategies that consider both the capabilities and limitations of AI tools in educational settings (Ateeq et al., 2024). Most AI tools are self-contained and do not integrate well with existing teaching systems. Similarly, there are barriers for effectively integrating the technology into teaching content. One of the key barriers is the readiness and preparedness of educators to incorporate AI tools into their pedagogical approaches (Medina et al., 2024). Therefore, the effective integration of AI for Mall personalized learning requires a holistic approach that integrates AI tools with existing teaching practices, competency frameworks, and educational goals.

To sum up, future research should contribute to the above aspects, especially in terms of length of follow-up, type of participants, quantitative plus qualitative, assessment and elimination of technical bias, accessibility, and close integration of existing teaching embodiments of AI tools, so as to improve the integration of AI and EFL English teaching content, so as to better meet the various needs of learners.

9. Implications for Teaching and Learning

The integration of Artificial Intelligence (AI) in English as a Foreign Language (EFL) teaching brings significant implications for both teaching and learning, reshaping educational strategies and experiences in profound ways. For teachers, AI offers enhanced pedagogical tools that allow for more adaptive, personalized, and data-driven instruction. Therefore, educators need continuous professional development to upgrade their digital literacy. The integration of technology and curriculum content in teaching requires a certain level of expertise. If technology is forced into the classroom, it will only increase the burden on teachers and students. In addition, the content of EFL courses should also keep pace with The Times to provide students with better language situations.

From the perspective of EFL learners, students should also take the initiative to improve their digital literacy. AI-powered personalized learning software can provide students with learning materials tailored to their needs and provide timely feedback. This high degree of personalization encourages greater autonomy and motivation in learners, which is essential for mastering a foreign language. If students lack context and cannot use the support of auxiliary AI tools, mastering a foreign language will become less efficient and more difficult.

However, using AI in education comes with significant ethical and privacy concerns as well. Privacy and security measures related to our personal data have to be peremptory and universal in any public policy. More radically, transitioning from teacher-center teaching models more towards learner-centered to experience-based approaches will be needed to transition to higher levels of AI-powered educational models. This in turn provides a teacher-friendly and student-outcomes accountable locus of control.

Furthermore, the impact of AI on education to establish global competency. By exposure to different languages and cultures with the help of AI-enhanced tools, students can develop global awareness and be ready to work more efficiently in the globalized system. With ongoing developments in AI set to shape educational practices in new ways, this review thus points to an urgent need for more research, more adaptive responses, and a level of implementation that does not exacerbate existing, and create new, inequities in access to the benefits of AI for all learners. The shifting sands of this landscape underscore the inexorable rise of AI in education, with its

potentially game-changing advancements and attendant hurdles that must be deftly cleared.

10. Recommendations for Future Research

There are great potential benefits that AI can have on EFL teaching, but to fully optimize these benefits and to remove some of the challenges that exist more research needs to be done on the application and integration of AI within EFL classrooms. We need to have more longitudinal studies to investigate the delayed effects of AI-based intervention on language learning outcome. These investigations could reveal whether learning gains were enduring and that AI tools remained effective over time.

Secondly, research should aim to diversify participant profiles to include a broader range of learner demographics, including different age groups, educational backgrounds, and socio-economic statuses. This would enhance the generalizability of research findings and ensure that AI tools are effective and accessible for diverse student populations.

Second, research on how AI can support EFL education should be more extensive. Later studies can better broaden the pool of participants, thereby placing different learner demographics (such as age, educational background, socioeconomic, etc.) in the context of the study. This will make research more generic and improve the effectiveness and accessibility of AI tools for a larger sample pool of students. In the future, it will make sense to investigate how AI can be better integrated into existing teaching frameworks.

Furthermore, researchers need to explore how current technologies can be better integrated into current teaching frameworks. There is an emerging concept called pedagogical intelligence, which refers to one of Gardner's ninth types of intelligence (Díaz & Nussbaum, 2024). Although technological advances have improved the capabilities of AI, the application of AI in education is still following the principles of previous teaching. Therefore, the application of technology in education should be studied more critically to improve the relevant software and instructional design.

In conclusion, more research is needed on the impact of AI on teacher roles and teacher professional development. From the dimension of teaching administrators, we need to think about what kind of support to provide educators to help them use new types of technology. For example, relevant courses or training programs allow educators to practice the use of AI in teaching. From the dimension of teachers, teachers themselves should improve their quality and professional teaching level. From the perspective of students, students should adapt to the changes brought by technology for personalized learning and make better use of learning resources. From the perspective of researchers, more empirical studies need to be carried out. These recommendations simply attempt to point out how future research should target practical and ethical issues related to the implementation of AI education to make it more effective and inclusive.

11. Conclusion

To sum up, incorporating Artificial Intelligence (AI) in the teaching of English as a Foreign Language (EFL) is indeed an educational paradigm shift that comes with various advantages as well as drawbacks. AI technologies have great promises in terms of effectiveness of personalization, scale, and data resulting in both practical and theoretical benefits of language learning. AI also tailors instruction to meet the specific needs of individual students by adjusting educational content and assessments, which supports a more engaging and effective learning environment.

Nonetheless, AI in English teaching needs to carefully consider ethical issues such as data privacy and avoid the risks posed by the technology. Relevant laws and regulations need to be formulated, and AI users should also abide by the corresponding rules. Secondly, the training of teachers is necessary to ensure that educators can adapt to the changes in technology and make proper use of new teaching tools. In addition, future research needs to consider the long-term impact of AI interventions, learner heterogeneity, and incorporating AI into existing teaching methods to truly harness AI's potential in an equitable and inclusive way.

In short, with the continuous development of artificial intelligence in the field of education, it means both opportunities and challenges. Therefore, educators, policy makers, researchers, and learners themselves should enhance their professional capabilities to adapt to the changes that technology brings to life and learning.

12. Personal Reflection

Integrating artificial intelligence into MALL English teaching has both opportunities and risks, so I feel that the new technology is actually a double-edged sword. The benefits of AI in education, such as enabling personalized, interactive and whole-person education, are exciting. Indeed, AI in language learning, especially EFL learning, is capable of creating a diverse, flexible and inclusive educational space that allows students to learn at their own pace and in the way they like. On the other hand, there are significant ethical and practical concerns about AI's implementation. Privacy issues, potential algorithms' bias, and the overall influence of these risks on educational equity and accessibility are highly pressing. This also indicates that AI can improve educational outcomes; it has

limitations and risks and should be used prudently. Furthermore, the discussion of AI-centered education reiterates the necessity of a new paradigm in helping and curriculum creation. As a future educator, this makes me question my future role. I do not believe that it would diminish it — on the contrary, it would only become more vital. Educators are not just providers of information; we would also become curators in a digital world whose role would be to apply AI responsibly to the learning process and to teach our students, so they use shadow AI. My reflection leads me to believe that including the balance between AI and learning is the answer. This concept suggests finding a way to leverage AI to improve learning outcomes while paying attention to the ethical aspects of its use. It implies that there is a need for ongoing research, careful planning in terms of implementing AI in the educational environment, and a conversation between participants in educational processes. In the future, it would be crucial to remember that education is about human contact, and AI exists to improve it and not as an alternative to it.

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