Artificial Intelligence (AI) in Enhancing Spoken English Proficiency: A Systematic Literature Review

Ainol Mardhiah [a,1,*], Diana Purwati [b,2], Lathifatuddini [c,3], Hayatul Muna [d,4], Helmiyadi [a,5]

[a] English Education Department, Universitas Bumi Persada, Lhokseumawe 24351, Indonesia
[b] English Education Department, STKIP Yapis Dompu,, NTB 84216, Indonesia
[c] English Education Department, STIT Darussalam, Lhokseumawe 24351, Indonesia
[d] English Education Department, IAIN Lhokseumawe 24351, Indonesia
[1] ainolmardhiah@unbp.ac.id*; [2] dianapurwati1801@gmail.com; [3] lathifatuddini@gmail.com; [4] hayatulmuna.ilyas@gmail.com;
[5] helmiyadi.kalam@gmail.com
* Corresponding Author

ABSTRACT

This systematic review explores the use of Artificial Intelligence (AI) tools in enhancing spoken English proficiency among EFL learners, focusing on intelligent tutoring systems, speech recognition applications, and adaptive feedback. Using the PRISMA framework, 38 relevant articles (2020–2024) were identified through Google Scholar searches, with seven additional articles found manually. The review included full-text studies involving higher education participants and AI-based interventions for spoken English, excluding books, theses, and unrelated research. The data was then analyzed using thematic analysis highlighting the benefits and challenges of AI tools. Intelligent Tutoring Systems (ITS), such as chatbots and virtual tutors, improved learners' fluency, pronunciation, and confidence through personalized experiences. Platforms like Duolingo, Alexa, and Replika enhanced engagement but struggled with emotional factors like speaking anxiety and often provided generalized feedback. AI-driven speech recognition tools reduced anxiety, improved pronunciation, and boosted motivation but faced issues with diverse accents and conversational nuances. AI feedback mechanisms delivered real-time, personalized feedback to enhance proficiency, though accuracy and adaptability to diverse learners remain challenges. AI tools show strong potential for enhancing spoken English learning through personalized and interactive methods. However, addressing emotional engagement, learner diversity, and accessibility is crucial for broader adoption in higher education settings.

1. Introduction

In recent era, English has grown to play a crucial role in achieving success across various domains, such as education, employment, and global communication (Lan et al, 2020). Among the fundamental competences in language learning, spoken English remains an important area of focus, particularly for students in English as a Foreign Language (EFL) contexts (Grabe & Stoller, 2002). However, achieving spoken English proficiency presents numerous challenges for learners, especially in contexts where exposure to English outside the classroom is limited. Factors such as insufficient opportunities for authentic communication, anxiety about making mistakes, and irregularities in English pronunciation and spelling often hinder students' progress (Cumming et all, 2018; Tokoz-Goktepe, 2014; Ulicheva et al, 2018).

Artificial Intelligence (AI) has increasingly become a transformative tool in language education, introducing innovative solutions to address challenges in English teaching and learning (Baranwal, 2022; Kannan & Munday, 2018). AI entails a range of technologies, such as intelligent tutoring systems, speech recognition software, as well as adaptive feedback mechanisms, which simulate human cognitive functions and provide personalized learning experiences (Sindermann, 2021; Xiaohong & Yanzheng, 2021). These AI tools are being increasingly utilized in English language education to help the improvement of spoken English skills. Research has shown that AI

ijelle@univetbantara.ac.id

can significantly enhance different aspects of language learning, including improving pronunciation accuracy and boosting learner engagement through interactive and adaptive learning platforms. (Kim, 2019; Noviyanti, 2020; Pokrivčáková, 2019).

In contexts where exposure to English outside the classroom is limited, AI tools provide crucial opportunities for extended practice and skill development, offering a practical solution to overcome challenges in learning English. Artificial Intelligence (AI) has significantly impacted language learning and teaching. AI technologies that have emerged in this field include intelligent tutoring systems, speech recognition software, and adaptive feedback mechanisms. These tools are designed to simulate aspects of human cognitive processes, enabling personalized and efficient learning experiences.

Intelligent Tutoring Systems (ITS) are AI-powered platforms which are designed to offer instruction and feedback based on individual learner progress, thereby enhancing language learning through targeted activities and resources (Crompton et al, 2024). Intelligent tutoring systems in EFL contexts offer students a platform for extensive, personalized practice based on their proficiency level. These systems are especially advantageous in contexts with limited access to proficient English speakers, as they emulate interactions with native speakers through AI-driven dialogues and scenarios (Kang, Jeon & Lee, 2024). Such immersive experiences play a critical role in fostering the communicative competence essential for achieving spoken English proficiency.

Intelligent Tutoring Systems (ITS) in EFL settings include platforms such as ELSA Speak, Smalltalk, D-ID Studio, Duolingo, Replika, and HelloTalk. These tools leverage AI to create interactive conversations, deliver pronunciation correction, and tailor learning to individual needs. ELSA Speak, for example, focuses on enhancing pronunciation with instant feedback, while Duolingo gamifies lessons to gradually improve language skills. Replika and HelloTalk enable users to engage in text or voice chats with AI or native speakers, providing authentic practice opportunities. These applications play a crucial role in offering personalized and engaging language practice, supporting learners in developing their English proficiency.

Humans convey information using words, which are made up of phonemes—the fundamental sounds of language. The process of generating artificial speech begins by identifying the intended message and translating it into language (Sutrisno, 2018). Motor neuron signals are then sent to the vocal cords, prompting them to vibrate and produce sound waves, which are carried to the listener. This sequence underpins voice perception. In English as a Foreign Language (EFL) learning, AI-powered speech recognition software is essential in helping learners improve pronunciation and intonation, two key components of effective spoken communication.

Speech recognition software offers substantial advantages for EFL learners by providing a controlled, low-pressure environment where they can practice speaking without the fear of performing in front of peers or instructors. This atmosphere is crucial for enhancing fluency and building learner confidence (Guo et al, 2024). Advanced systems assess speech by analyzing pronunciation, intonation, and fluency, offering corrective feedback to help learners improve their spoken English (Golonka et al, 2014). The instant and accurate feedback encourages consistent practice, which is vital for developing language proficiency. AI-powered chatbots serve as practical examples of speech recognition tools in EFL learning. These chatbots, such as ChatGPT, Replika, and Duolingo's conversational AI, provide learners with opportunities to engage in simulated dialogues which allow them to practice spoken English in real-time.

Adaptive feedback mechanisms are integral to numerous AI-driven language learning platforms, offering personalized responses based on individual learner input. These systems promote an interactive learning atmosphere by addressing each student's unique challenges and enabling real-time adjustments to their learning strategies. Such tailored feedback enhances the effectiveness of the learning process, making it more responsive to the learners' specific needs (Chen et al, 2020). Notable examples include platforms like Speechace, Liulishuo, IELTS Liulishuo, EAP Talk, and Shanbay. The advantages and limitations of using these platforms will be explored further in the findings section.

Despite increased interest in AI's potential for English learning, the specific use of AI technologies in enhancing spoken English remains unexplored. While existing literature has highlighted the benefits of AI in language acquisition, there is a need for a comprehensive evaluation of current research on AI-driven approaches to spoken English proficiency. This is particularly important as educators and policymakers strive to understand how AI might effectively address the challenges faced by EFL learners in Indonesia.

Therefore, this systematic literature review aims to fill this gap by critically reviewing studies on the use of AI tools in enhancing spoken English proficiency. By reviewing 14 selected articles, this study focuses on two key research questions: 1) What is the pedagogical value of AI tools in enhancing spoken English proficiency?; And 2) What are the challenges associated with implementing AI tools in teaching spoken English? These questions are central to understanding both the effectiveness of AI-driven tools and the challenges that educators may face when integrating AI into language instruction.

2. Method

This study collected data using the PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), a systematic research method. PRISMA provides a structured approach for reviewers to comprehensively and transparently report the purpose of their review, the methods used, and the results obtained from their analysis (Page et al, 2021). The articles selected for further review were sourced from Google Scholar. In conducting the search, the researchers used Boolean logic (Libraries, n.d) and Proximity Operators (Elihami, 2022).

Boolean operators include three conjunctions: AND, OR, and NOT. 1) AND is used to combine concepts, ideas, or keywords, serving to narrow the search strategy; 2) OR is employed to connect synonyms or related concepts, thereby broadening the search results; and 3) NOT is used to exclude specific keywords from the search, refining the focus. Additionally, enclosing search strategies within parentheses ( ) allows for more precise results, as search engines prioritize processing the terms inside the parentheses before addressing those outside, ensuring the search results more accurately reflect the intended search.

Additionally, several proximity operators are employed to refine searches: 1) Quotation marks (" ") are used to indicate that the words must appear together as an exact phrase, such as "information and communication technology"; 2) The wildcard (*) is used for truncation, substituting for one or more characters in a word, for example, comput* can represent compute, computer, computing, or computed; and 3) The question mark (?) is used to replace one character within a word. For example, wom?n can be used to search for both woman and women.

The researchers employed the following search query on Google Scholar: ("Artificial Intelligence" OR "AI") AND ("spoken English proficiency" OR "oral English skills") AND AND ("EFL learners" OR "ESL learners") AND ("Indonesia" OR "university" OR "higher education") AND (2020..2024). This search retrieved 38 relevant articles. Furthermore, an additional manual search identified seven articles. Subsequently, the researchers delineated criteria for inclusion and exclusion to refine the selection process for the articles under review. The criteria for including and excluding reviewed articles were based on the following considerations, summarized in the table below:

Table 1. Inclusion and Exclusion Criteria of Reviewed Articles

No.	Criteria	Inclusion	Exclusion
1	Full paper access	✓	
2	Abstract	✓	
3	Articles published within the last five years, from 2020 to 2024.	✓	
4	Participants are from higher education level	✓	
5	Using AI as tools	✓	
6	Improving spoken English	✓	
7	Proceeding paper		X
8	Book		X
9	Monograph		X
10	Thesis and Dissertation		X
11	Participants are below higher degree education		X
12	Inaccessible journal		X
13	Not related topic and subject		X
14	Articles are not in English		X

Based on the aforementioned criteria, the researchers then organized the articles into the PRISMA flow diagram, illustrated as follow:
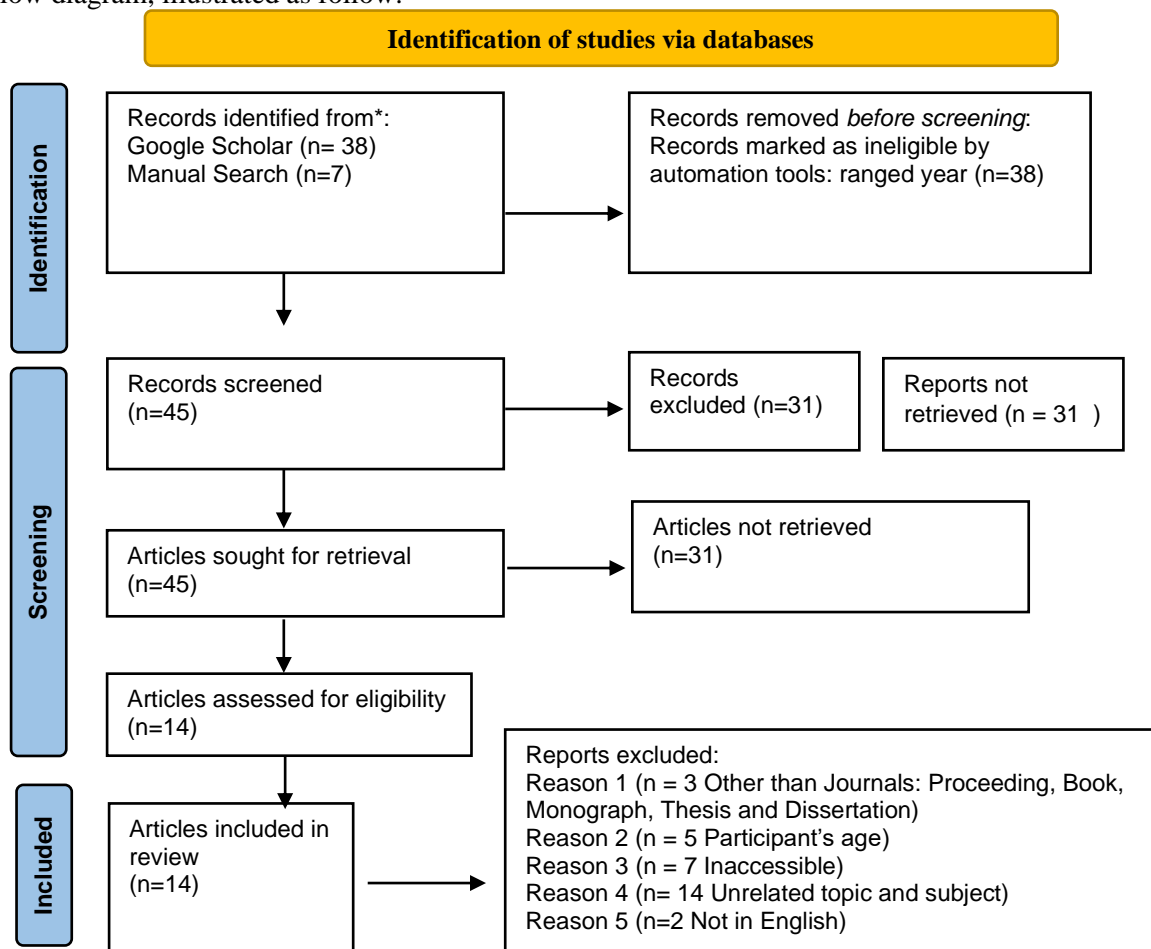

Figure 1. PRISMA flow diagram for systematic reviews including searches of databases (Adapted from Page et al., 2021)

3. Results and Discussion

3.1. Results

Studies highlight the efficacy of AI-driven Intelligent Tutoring Systems in enhancing language skills. For instance, Pangestu and Suwartono (2024) reported that students using virtual tutors and chatbots demonstrated notable improvements in their spoken English proficiency, fluency, and self-confidence. Likewise, Dizon and Tang (2020) highlighted the advantages of conversational AI tools like Alexa, which helped learners boost their vocabulary, language skills, and engagement. Besides, Yin and Wei (2023) created an AI-based system to enhance both university students' English listening and speaking proficiency. This system provided real-time feedback and personalized learning suggestions, resulting in measurable improvements in pronunciation, fluency, and grammatical accuracy. Furthermore, Patino et al. (2024) found that AI tools like Smalltalk and Elsa Speak enhanced pronunciation, fluency, and motivation through personalized feedback. Similarly, Betaubun (2023) highlighted how AI tools such as Duolingo and Replika boost language skills and confidence.

However, Intelligent Tutoring Systems (ITS) like AI chatbots, Alexa, Duolingo, and Replika face several challenges in enhancing students' spoken English proficiency. One key issue is their inability to address emotional factors, such as speaking anxiety, which can hinder performance and engagement (Qiao & Zhao, 2023). Additionally, ITS often provide generalized feedback that fails to meet individual learner needs. The lack of human interaction can also lead to diminished motivation over time (Zou et al, 2023). Moreover, ITS struggle to adapt to diverse learner needs, limiting their ability to provide tailored support. Despite their convenience and cultural integration, learners often prefer face-to-face interactions for more complex topics. Betaubun (2023) also adds that limited free access to these platforms further raises equity concerns, restricting comprehensive language development.

From the above explanation, it can be implied that Intelligent Tutoring Systems (ITS) enhance EFL learning by offering personalized, AI-driven practice, simulating native speaker interactions. ITS help improve students' speaking skills, fluency, and learner engagement through tools like virtual tutors and conversational AI. However, these systems face challenges, such as addressing speaking anxiety, providing tailored feedback, and maintaining motivation without human interaction. Limited free access also raises equity concerns.

Research also shows the positive impact of AI speech recognition tools on language learning. Du and Daniel (2024), in a review of 24 studies, found that AI chatbots alleviate speaking anxiety, enhance pronunciation, and increase confidence, engagement, and motivation. Li (2024) also emphasized the value of speech recognition systems in identifying and correcting pronunciation errors, further proving their importance in language education. Huang et al (2024) examined a 12-week undergraduate flipped decoding course using the SEF-ARCS model, enhanced by chatbots. Their study found that this chatbot-supported online course was as effective as traditional flipped classrooms in decoding performance and notably better at boosting student engagement. Additionally, it reduced the teacher's workload and reliance on individual teaching skills, with students responding positively to this platform (Huang, 2024).

Nevertheless, AI speech recognition systems, such as chatbots, face certain limitations. Li (2024) pointed out that speech recognition systems need improvements in speech clarity and algorithmic enhancements to better accommodate diverse accents and languages. Moreover, while these systems excel in providing personalized practice, they often require further development to match the nuances of natural conversation and human interaction. Huang et al (2024) also highlighted a significant drawback such as frequent communication issues due to the chatbots not being tailored to specific age groups, despite their wide user range.

AI-powered speech recognition helps EFL learners by offering a stress-free way to practice, improving fluency, and boosting confidence with instant feedback. It reduces anxiety, increases engagement, and lightens the teacher's workload. Nonetheless, it has challenges, such as difficulty

handling different accents. It also struggles with natural conversation and can have issues with communication and lack of age-specific customization.

Furthermore, AI feedback mechanisms offer utmost benefits in language learning, particularly in enhancing the effectiveness and efficiency of feedback. According to Evenddy (2024), AI significantly outperforms traditional methods in terms of speed, accessibility, and personalization (Evenddy, 2024). Tabassum and Saad (2024) further corroborate this, showing that AI with automated feedback markedly improve EFL learners' speaking abilities. Similarly, Zainuddin and Mohamad (2024) found that students viewed Speechace as highly effective and user-friendly, fostering both positive attitudes and strong intentions for continued use. Teachers also affirmed the value of Speechace in ESL contexts. Zou et al. (2023) added to this evidence by demonstrating that AI-driven automated feedback led to substantial improvements in students' speaking skills and test performance, underscoring their effectiveness in language acquisition (Zou et al, 2023).

Despite the above advantages, several challenges persist in the use of AI feedback mechanisms. Evenddy (2024) highlights critical issues such as accuracy limitations, the need for extensive datasets, and institutional resistance, which may impede broader implementation. Zainuddin and Mohamad (2024) observed that AI tools like Speechace could potentially diminish the role of direct teacher involvement and may not sufficiently address the diverse needs of all students. Additionally, Zou et al. (2023) identified several obstacles, including insufficient feedback on content, accuracy concerns, difficulties in monitoring learner progress, and a disconnect between the feedback provided and learners' preferences. These challenges indicate a need for adaptation of AI feedback mechanisms to enhance their effectiveness and integration in educational settings.

Chen et al (2020) highlight that AI language learning tools with adaptive feedback provide personalized, real-time responses that improve engagement and learning. They speed up and refine feedback, enhancing speaking skills and test scores (Evenddy, 2024; Tabassum & Saad, 2024; Zainuddin & Mohamad, 2024; Zou et al., 2023). However, they face challenges like accuracy issues, reliance on large datasets, and difficulty in addressing diverse learner needs. These problems suggest that further improvements are needed to make AI feedback tools more effective and adaptable in education. The following table summarizes a systematic literature review of the benefits and challenges of specific AI tools in developing university students' spoken English proficiency:

Table 2. A systematic review of benefits and challenges of AI tools for improving students' spoken English

No	Journal/ Author(s)	Methodology	AI Tool(s) Used	Results	
				Benefits	Challenges
1	Du & Daniel (2024)	A systematic review analyzing 24 studies on chatbot applications in English language learning contexts, published between 2017 and 2023.	AI powered chatbots	The AI chatbot approach enhances English learning by speeding up acquisition, alleviating speaking anxiety, and improving pronunciation, while boosting students' confidence, engagement, and motivation.	It is difficult to include all proficiency levels and the course content and format are relatively repetitive.
2	Evenddy (2024)	Literature Review	AI focusing on Feedback mechanisms	AI feedback generally excels over traditional methods in speed, availability, and personalization,	Challenges such as accuracy issues, reliance on large datasets, and institutional resistance that may impede wider adoption in education are noted.

3	Huang, W., Jia, C., Hew, K. F., & Guo, J. (2024)	A preliminary study conducted over 12 weeks focused on an undergraduate flipped decoding course, designed using the flipped SEF-ARCS decoding model.	Chatbots	The chatbot-supported fully online course was as effective as the traditional flipped classroom in decoding performance but better at enhancing student engagement. It also reduced teacher workload and reliance on individual skills. Students responded positively to the chatbot-supported learning approach.	Frequent disconnections in communication as chatbots are not being tailored to specific age groups, despite a wide user range.
4	Shi, J., Sitthiworachart, J., & Hong, J. C. (2024)	Eighty Business English majors enrolled in a "Hotel English" course were randomly assigned to four groups: traditional, PjBL, iVR, and PjVR (PjBL supported by iVR). Following the intervention, participants completed a post-oral English test and an engagement questionnaire.	Virtual Reality	The PjVR group performed notably better in oral English skills than the other groups, particularly in grammar, vocabulary, pronunciation, and engagement. These results show the effectiveness of combining iVR and PjBL for immersive, contextualized language learning.	Students still struggle with phonetic and technical challenges, as well as certain words after repeated practice,
5	Tabassum & Saad (2024)	Qualitative case study using interviews with ten EFL lecturers from a private university in	Adaptive Feedback Mechanism	AI speech with automatic feedback significantly improved EFL learners' speaking skills.	Not mentioned

			Bangladesh.		
6	Li (2024)	A descriptive Analysis	Speech knowledge recognition	The system's scoring mechanism allow learners to assess and correct their pronunciation errors effectively.	Speech clarity and developing algorithms adaptable to various accents and languages should be enhanced.
7	Patino et al (2024)	Mixed-methods design to employing standardized tests, surveys, and class observations over 16 weeks.	Smalltalk, Elsa-speak, and D-Id-studio	AI improved participants' English pronunciation, intonation, fluency, spelling, motivation, and efficiency with personalized feedback.	AI was valued for its convenience and cultural integration, however, participants still preferred face-to-face interactions for complex discussions and theoretical lessons.
8	Betaubun (2023)	A comprehensive Literature Review	Duolingo, Elsa Speak, Replika, Hello Talk	AI has transformed language learning by enhancing students' skills, confidence, and global communication.	Restricted free access to AI-powered language learning platforms raises equity concerns and limits opportunities for holistic skill development.
9	Khalizah & Damanik (2024) (Sinta 2)	Experimental Study	Elsa Speak (Intelligent Tutoring Systems (ITS))	The ELSA Speak app significantly improves students' speaking proficiency across five key areas: grammar, vocabulary, pronunciation, fluency, and content. It also effectively engages students who previously demonstrated low motivation to learn and practice English.	Not mentioned
10	Pangestu & Swarsono (2024)	A descriptive qualitative approach with interviews, involving four sixth-semester students from a private university in Purwokerto who utilize AI to improve their spoken English proficiency.	Duolingo, DeepL, Google Translate, ChatGPT, ELSA Speak, and Gemini.	AI significantly enhances English language learning through personalized instruction and automated assessments.	Limited human interaction, restricted features, and difficulty in handling complex situations.

11	Qiao & Zao (2023)	An experiment using a pre-test and post-test design, employing the Duolingo application for AI-based instruction. The application features natural language processing, interactive exercises, personalized feedback, and speech recognition to enhance learning outcomes.	Duolingo (Intelligent Tutoring Systems (ITS))	The experimental group, which received AI-based instruction, showed significant improvement in their English speaking skills compared to the control group. Furthermore, the experimental group demonstrated higher levels of self-regulation.	Limited support for broader language skills, inability to adapt to students' emotion such as speaking anxiety, lack of personalized interventions
12	Zainuddin & Mohamad (2024)	A mixed-method approach was used, involving questionnaires completed by 121 pre-university students and semi-structured interviews with two lecturers.	Speechace (Adaptive Feedback Mechanism)	Students find Speechace useful and easy to use, showing a positive attitude and strong intent to continue using it. Teachers also support Speechace as a valuable tool for ESL classrooms.	AI may limit direct guidance from teacher and cannot adapt to students' diverse needs.
13	Zuo et al (2023)	Seventy students from Chinese universities practiced speaking skills using AI apps over a five-week period. The students were divided into two	Yidian English, IELTS Liulishuo, English Liulishuo, EAP Talk	Students preferred interactive AI apps and found that social network interactions improved their speaking skills.	Hard to sustain long-term engagement and difficult to tailor interactions for diverse learners.

		groups: one engaged in interactive activities, while the other did not. Data were collected through questionnaires, interviews, and tests.			
14	Zou et al (2023)(b)	A mixed-method approach was used, involving forty Chinese undergraduates recruited through convenience and snowball sampling. The group, consisting of 12 males and 28 females, was predominantly from Chinese universities (97.5%), with the remainder studying abroad. Participants were in their first (20%), second (60%), or third year (15%) and represented a variety of academic majors.	Liulishuo, IELTS Liulishuo, EAP Talk, and Shanbay	Most participants believed that AI feedback helped improve their speaking skills as significant improvements were observed in their mean scores from pre- to post-tests.	Limited feedback for content, accuracy issues, difficulty tracking progress, and a mismatch between learner preferences and feedback use.

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The table summarizes the impact of AI tools on improving university students' spoken English proficiency, highlighting both their benefits and challenges. AI tools, such as chatbots, adaptive feedback mechanisms, and virtual reality, have proven effective in enhancing speaking skills and boosting student engagement. They provide personalized, immediate feedback, which supports accelerated learning. Nonetheless, challenges persist, including issues with accuracy, limited adaptability to diverse learner needs, and institutional resistance. Despite these obstacles, AI tools are significantly advancing language learning, though further development is needed to address these limitations and optimize their integration into educational practices.

3.2. Discussion

The findings of this study reveal that AI-driven tools like Intelligent Tutoring Systems (ITS), speech recognition, and AI-based feedback mechanisms significantly enhance EFL learners' spoken English proficiency. These findings align with previous studies, such as Pangestu and Suwartono (2024) and Dizon and Tang (2020), highlighting the benefits of AI tools like chatbots and virtual tutors in improving speaking skills, confidence, and learner motivation, echoing AI's role in promoting autonomous learning.

AI's ability to reduce speaking anxiety, as evidenced by Du and Daniel (2024), creates a low-stress practice environment, aligning with Krashen's (1982) affective filter hypothesis (Krashen, 1982). He believes that emotions such as anxiety and motivation significantly affect language learning. When learners experience high anxiety or low motivation, their "affective filter" is high, making it harder for them to engage and learn. On the other hand, a supportive and stress-free environment lowers this filter, helping learners process language more easily and participate more actively. However, according to Betaubun (2023), sustaining long-term engagement remains a challenge, as learners prefer face-to-face conversations for complex discussions. Hybrid models combining AI tools and human interaction, as suggested by Almusaed (2023), may address this issue.

Evenddy (2024) notes that while AI feedback is faster and more personalized, concerns about accuracy and relevance persist. AI feedback often lacks the depth of human responses, as Zou et al. (2023) point out. This limitation is further exemplified in virtual reality (VR) applications for language learning, as shown by Shi et al (2024). Their study found that while immersive VR tools significantly improved students' spoken English proficiency, grammar, vocabulary, and engagement, they also revealed persistent issues with phonetic and technical challenges. Such findings underscore the necessity of combining AI tools with traditional teaching methods to address these gaps effectively. Regarding this, Zainuddin and Mohamad (2024) emphasize that AI tools should complement, not replace, teacher involvement to address the diverse needs of students. This is in line with the study conducted by Ghamrawi et al (2024) as they believe that integrating AI tools with teacher instruction can more effectively enhance students' learning outcome.

While AI-driven tools significantly enhance EFL learners' spoken English proficiency through personalized feedback, anxiety reduction, and increased engagement, they face challenges such as feedback accuracy and the depth of human interaction. The study highlights that while AI tools like Intelligent Tutoring Systems, speech recognition, and feedback mechanism applications improve various aspects of spoken English, including grammar, vocabulary, and pronunciation, they also present persistent issues that traditional methods can address. Integrating AI with conventional teaching approaches and human interaction, as supported by previous studies, can effectively bridge these gaps and further enhance students' spoken English proficiency. This combined approach ensures a more comprehensive and adaptive learning experience, optimizing outcomes for diverse learners.

4. Conclusion

This study underscores the substantial benefits AI-tools in improving spoken English proficiency among EFL learners. Intelligent Tutoring Systems, speech recognition technologies, and AI-based feedback mechanisms effectively enhance speaking abilities, fluency, and confidence. These tools help reduce speaking anxiety and increase learner engagement, making language practice more accessible and effective.

Yet, there are still challenges to overcome, such as issues with feedback accuracy and the challenge of keeping learners engaged over time. To address these, blending AI tools with traditional teaching methods is essential. By combining the strengths of AI with human interaction, a richer and more adaptable learning experience that better meets the diverse needs of students can be realized. Thoughtful integration of these technologies will be key to enhancing spoken English proficiency and achieving more impactful learning outcomes.

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