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Artificial Intelligence Tools as Catalysts of Improved Spoken English: A Systematic Review of the Current Applications and Challenges

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Abstract. A goal of English as a Second Language (ESL) learners is to be fluent in spoken English, yet challenges such as pronunciation difficulties, limited fluency, and low confidence persist. With the rise of artificial intelligence (AI), new tools have emerged to support oral language development, and the pedagogical value and limitations of these tools require systematic evaluation. This study conducted a systematic review of empirical research published between 2021 and 2025, was guided by the PRISMA framework and drew on studies in the ERIC and Sage databases. In total 11 studies were analyzed, covering AI applications such as natural language processing-based chatbots (e.g., ChatGPT), AI-powered presentation platforms (e.g., PitchVantage), speech recognition systems (e.g., Speechling, E-platforms), and assessment tools (e.g., Duolingo English Test). Findings show that these tools provide personalized, real-time feedback that enhances pronunciation, fluency, learner autonomy, and engagement. Nevertheless, persistent challenges include the accuracy and precision of feedback, learner dependency on technology, feedback quality and clarity, lack of contextual awareness, technical barriers, and access and inclusive issues, alongside ethical concerns over data privacy. The review concludes that AI tools complement but cannot replace human mediation, and recommends inclusive, context-aware, and ethically governed AI solutions that are integrated with teacher guidance to maximize their effectiveness in developing ESL speaking.

Keywords: AI tools; ESL learners; fluency; language learning; systematic literature review

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1. Introduction

Fluency in spoken English is essential in today's globalized world, where it influences academic success, career development, and effective intercultural communication. For English as a Second Language (ESL) learners, the ability to speak English fluently can unlock numerous opportunities. Nevertheless, many ESL learners encounter challenges, such as pronunciation difficulties, limited fluency, and low self-confidence, which can hinder their communicative competence in real-world settings (Harshalatha & Sreenivasulu, 2024). Traditional language learning methods, though valuable, often fail to address these challenges effectively, especially the need for individualized, real-time feedback. With the rise of artificial intelligence (AI) in language learning, new approaches have emerged to support ESL learners in overcoming these barriers and offering personalized and immediate corrective feedback (Tiwari et al., 2024).

AI-driven tools have the potential to significantly transform ESL instruction by encouraging personalized learning that uses machine learning, natural language processing (NLP), and speech recognition (Yuan, 2025). Intelligent tutoring systems and speech recognition apps have succeeded in improving pronunciation, fluency, and speaking skills (Guo et al., 2025; Nurdiana, 2024). Applications such as ELSA Speak and SpeechAce provide corrective feedback on phonological errors (Zou et al., 2023). AI chatbots and virtual assistants, including Google Assistant and ChatGPT, support natural conversations and deliver instant feedback on grammar, vocabulary, and pronunciation (Ali et al., 2025; Kim et al., 2021). These platforms offer a non-critical space for practice and help learners build confidence without fear of making public mistakes (Shazly, 2021; Sun, 2023).

Furthermore, self-paced practice enables learners to address specific speaking challenges (Guan et al., 2024; Ramalingam et al., 2022), especially in contexts with limited real-time interaction. Platforms such as Duolingo employ gamification and adaptive learning to enhance engagement (Qiao & Zhao, 2023), and its Duolingo English Test provides a more accessible alternative to traditional assessments (Isaacs et al., 2023). However, despite their flexibility and appeal, concerns remain about the extent to which these tools can support comprehensive language development. The emphasis on ease of use and motivation may not fully meet the demands of advanced proficiency required for authentic communication, which warrants further investigation (Chandrasehgaran & Ismail, 2024).

Despite the promising potential of AI tools for ESL learners, several challenges hinder their adoption and effectiveness. A key concern is the accuracy of AI-generated feedback, because speech recognition systems often struggle with non-native accents and dialectical variations, leading to pronunciation being misjudged (Zou et al., 2023). Many models are trained predominantly on native speakers, which limits the responsiveness of the tool to diverse phonetic patterns (Ike et al., 2022). These shortcomings highlight the need for inclusive datasets that reflect global ESL diversity. AI tools also fall short in capturing pragmatic features such as tone, intonation, and cultural context, which are essential for real-world communication (Pituxcoosuvarn et al., 2025). Most systems have limited abilities

to assess these elements (Raman et al., 2023), which makes it difficult for learners to develop sociocultural competence in the absence of human mediation (Wang et al., 2023). While AI excels in giving grammar and vocabulary feedback, it lacks the capacity to foster the conversational dynamics that are vital for language learning (Godwin-Jones, 2024). Ethical concerns complicate adoption further, particularly those around data privacy and algorithmic bias (Klímová et al., 2023). ESL learners from diverse backgrounds may face risks related to informed consent, data ownership, and misuse of personal speech data (Selvam & Vallejo, 2025).

Additionally, increased reliance on AI may reduce face-to-face interaction, which is crucial for developing pragmatic skills and spontaneous communication (Rebolledo Font de la Vall & González Araya, 2023). This shift could hinder learners' ability to engage in the context-driven conversations that are essential for mastering spoken English. Technology-related barriers limit adoption further, especially in low-resource settings where stable internet and advanced hardware are often unavailable (Leong et al., 2024). For learners in these regions, cost and infrastructure remain major obstacles (Shamshul et al., 2024). Addressing these disparities requires coordinated efforts by policymakers, educators, and developers to ensure equitable access to AI-based language learning tools (Amdan et al., 2024). Without such efforts, the transformative potential of AI in ESL education may remain inaccessible to the people who need it most.

While studies have explored the use of AI in language education, a notable gap remains regarding systematic evaluations of the impact of AI on improving the spoken English of ESL learners. A study by Xu and Ismail (2024) found that AI enhances oral expression through personalized learning and instant feedback, while Camp and Johnson (2025) report that tools such as Beautiful.ai improve presentation quality, reduce stress, and sharpen focus.

However, longitudinal evidence on sustained language gains is scarce, and most studies emphasize technological features rather than pedagogical outcomes. Comparative analyses between AI-supported and traditional instruction are also lacking. These gaps highlight the need for research that informs educators, developers, and policymakers on optimizing AI integration to provide better support for ESL learners' speaking development. Although this review draws on varied contexts, the challenges and opportunities identified reflect broader issues in ESL education worldwide, thereby making the findings relevant for diverse linguistic and cultural settings. Therefore, this review addressed two research questions:

1. What AI tools are reported in the reviewed studies as enhancing ESL learners' speaking abilities, and what rationales do researchers give for selecting these tools?
2. What challenges are associated with AI-powered feedback to improve the spoken English of ESL learners?

2. Methodology

This review employed a rigorous and transparent methodology and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 framework, which provides a structured and evidence-based approach to conducting reviews (Page et al., 2021). The framework comprises a 27-item checklist and a four-phase flow diagram for identification, screening, eligibility, and inclusion, which systematically guides the selection and evaluation of relevant studies. This process ensures that the inclusion of sources is based on predefined criteria that are aligned with research objectives; hence, the process of this study focused on integrating AI tools to improve the speaking proficiency of ESL learners, and to address the associated challenges.

Consequently, the application of the PRISMA guidelines guaranteed a comprehensive, transparent, and methodologically sound synthesis of the literature. By following this approach, the review established a solid foundation for addressing the research questions with clarity and reliability. Figure 1 (Appendix 1) presents the PRISMA flow diagram, which outlines the structured process that was used by this systematic review to assess the integration of AI tools to improve the spoken English of ESL learners and to address the associated challenges.

2.1 Identification Phase

To systematically explore the application and challenges relating to AI tools in enhancing the spoken English proficiency of ESL learners, a structured search strategy was implemented across two reputable academic databases: the Education Resources Information Center (ERIC) and Sage. These databases were selected for their comprehensive coverage of peer-reviewed research on education and technology, thereby ensuring relevance and depth in the collected literature.

Although broader databases such as Scopus or Web of Science also index related studies, ERIC and Sage were prioritized for their strong focus on education and pedagogy, which aligns directly with the objectives of this review. The search strategy was designed to capture studies that focused specifically on the use of AI-powered tools, such as chatbots, speech recognition systems, virtual tutors, and intelligent feedback applications, to improve speaking skills in ESL contexts. The inclusion and exclusion criteria outlined in Table 1 (Appendix 3) were used to filter and select relevant research articles for the study.

Building on this framework, the study employed a systematic search strategy to identify relevant literature on the integration of AI tools to enhance spoken English proficiency of ESL learners. Keywords such as "AI tools," "speaking," "English," "Challenge," "Application," and "ESL" were used, and combined using Boolean operators, particularly AND, OR, and NOT, to enhance the precision of the search. These search strings were applied across two major academic databases, ERIC and Sage. The search was limited to articles published between 2021 and 2025, that had been written in English and were explicitly focused on ESL learners. Articles that did not meet these criteria were excluded. A thorough

search was conducted across both databases, yielding a total of 1,725 records from studies published between 2021 and 2025.

2.2 Screening Phase

The initial screening process involved reviewing article titles and abstracts to assess relevance, followed by a full-text evaluation to ensure alignment with the objectives of the review. Only studies with full-text access were included in the final selection. The inclusion criteria focused on studies published between 2021 and 2025 that been written in English, and that specifically addressed ESL learners and the application of AI for improving speaking skills. Studies that emphasized general language learning without a specific focus on speaking, or those that dealt with non-AI technologies, were excluded. Only studies that explicitly described the use of AI-driven tools, such as chatbots, speech recognition systems, virtual tutors, and intelligent feedback applications, were retained for further analysis.

The screening phase began with title screening, which resulted in the exclusion of 1,475 articles due to reasons such as irrelevance or failure to meet the inclusion criteria. The remaining 250 articles underwent abstract screening, resulting in the exclusion of 200 records, primarily due to insufficient focus on AI tools, ESL learners, or challenges related to spoken English. This process narrowed the selection to 50 articles, ensuring that the final pool consisted of current, accessible, and directly relevant research for detailed analysis.

2.3 Eligibility Phase

This systematic literature review focused on analyzing AI tools for improving ESL learners' speaking abilities, by examining the justification for their selection. Studies were categorized by research methods, participant demographics, and AI tool features beneficial for speaking proficiency. Challenges such as accuracy, speech recognition limitations, and learner engagement with AI feedback were explored. The findings reveal both benefits and constraints, with a particular emphasis on education equity in under-resourced settings. Full-text articles were assessed for theoretical grounding, clarity in explaining AI's role, and practical relevance, including real-world applications and classroom integration.

Studies were, furthermore, evaluated for their practical relevance, especially those detailing real-world applications, learner experiences, and classroom-based implementations. Furthermore, articles that highlighted technical limitations, such as misinterpretation of diverse accents, delayed or inaccurate feedback, or barriers related to digital access, were noted for their contribution to a balanced understanding of the topic. By focusing on studies that addressed both the benefits and limitations of AI tools in authentic learning contexts, the review ensured a comprehensive and critical synthesis of the current landscape.

After the eligibility assessment, 50 articles were selected for in-depth review, based on their alignment with the research questions. These articles were evaluated for their relevance in relation to the use of AI tools to improve spoken English and the challenges associated with AI-powered feedback. A further 39 articles were excluded because of factors such as the failure to identify a specific

target group or insufficient focus on the central themes, which resulted in 11 articles being selected for qualitative synthesis.

2.4 Inclusive Phase

The next phase of this review involved a qualitative synthesis of 11 selected articles to identify recurring patterns, thematic consistencies, and pedagogical insights. In addition to summarizing individual findings, the synthesis focuses on AI tool types, selection rationale, and challenges facing the integration of AI-powered feedback in ESL instruction. A six-step thematic analysis, following Braun and Clarke (2006), guided the process. Repeated readings enabled identification of key concepts: AI-based speech recognition, real-time feedback, and learner engagement, which were systematically coded and organized into broader themes, such as technological effectiveness and learner challenges.

Subthemes captured specific topics, including feedback accuracy and learner perceptions. The resulting themes, categories, and codes are summarized in Table 2 (Appendix 4). The table's structure was adapted from Sam and Hashim (2022), while the specific themes and codes reflect the findings of the present study. In addressing the research questions of this study, data extracted from 11 selected articles were analyzed thematically. For the first research question, the integration of AI tools with codes such as real-time feedback, gamification, and learner autonomy was investigated. These tools were categorized as psychological and pedagogical, technological and instructional, and accessibility and equity. The themes that emerged from these tools are motivation and engagement, personalized learning, technological innovation, teacher support, assessment and evaluation.

In response to the second research question, on the challenges of AI-powered feedback, six themes emerged, namely accuracy, dependency, feedback clarity, and contextual awareness, which reflect categories related to feedback limitations, usability, and accessibility. Drawing from these thematic insights, this review addresses the research questions by providing insight into the types of AI tools that can used to improve spoken English and the challenges learners face when they receive AI-powered feedback. By synthesizing the studies, this review provides a nuanced perspective on the current applications of AI in ESL learning, and highlights both the benefits and challenges of these technologies in improving learners' speaking skills.

3. Findings and Discussion

3.1 Data Collection and Analysis

The systematic review analyzed 11 peer-reviewed articles published between 2021 and 2025 that examined the use of AI tools to enhance spoken English proficiency. The studies were selected according to inclusion criteria that refer to empirical data, the role of AI in improving English speaking skills, and the relevance of the tools to both formal and informal learning environments. The summary of findings is presented in Table 3 (Appendix 5).

The 11 reviewed studies refer to eight AI tools that are commonly used to enhance spoken English: augmented reality (AR), Speechling with AI-powered speech recognition technology, AI-powered presentation platforms such as PitchVantage and MySpeaker Rhetorich, AI-supported formative assessment tools (Automated Speech Recognition, (ASR), and Automated Writing Evaluation, (AWE), EAP Talk, ChatGPT, NLP-based chatbots, and the Duolingo English Test, (DLT). These tools leverage AI-driven automation, interactive learning, and real-time feedback to improve learners' speaking proficiency.

Most studies focused on university students, particularly in China, Finland, Saudi Arabia, Ethiopia, and the United States, with only one study addressing secondary school learners in Malaysia. AI applications were used primarily to develop pronunciation accuracy, public speaking confidence, conversational skills, presentation delivery, and assessment efficiency. Tools such as ChatGPT and NLP-based chatbots were explored for their potential to enhance student engagement, interaction, and autonomy in speaking practice. Meanwhile, AI-powered speech recognition and automated assessment platforms provided personalized feedback, and to help learners refine their pronunciation and reduce speaking anxiety. These findings suggest that AI tools are becoming integral to language learning, particularly in higher education, by offering structured, adaptive, and interactive support for speaking development.

3.2 Main Findings

A total of 11 peer-reviewed articles published between 2021 and 2025 were reviewed and analyzed to answer two research questions.

3.2.1 AI Tools and Their Application in Enhancing ESL Learners' Speaking Abilities

Table 4 (Appendix 6) outlines three thematic aspects derived from the reviewed studies: psychological and pedagogical, technological and instructional, and accessibility and equity. The first highlights learner motivation, engagement, and personalized support; the second focuses on AI-driven feedback and teacher assistance; the third emphasizes inclusive, scalable solutions for diverse learning contexts. Together, these aspects form a framework for understanding the role of AI in ESL speaking development.

Building on this framework, Figure 2 (Appendix 2) visualizes the rationale behind AI tool selection across studies, structured around the same three aspects. Pedagogical support appears most frequently (nine mentions), followed by Motivation and engagement (seven) and Personalization (six). Technological innovation and Teacher support occur five times each, while Assessment and evaluation appears four times. Accessibility and flexibility, along with Resource bridging, are most cited (nine each), with Scalability noted three times. These patterns reflect a consistent emphasis on learner support, instructional enhancement, and equitable access to AI tools in ESL education.

3.2.1.1 Psychological and Pedagogical Aspects

Regarding psychological and pedagogical aspects, motivation and engagement are critical factors that influence the effectiveness of AI tools in improving ESL learners' speaking skills. Several studies report that AI-powered tools, such as

Speechling and ChatGPT, increase learners' motivation by providing a supportive and non-judgmental environment that encourages continuous practice and fosters confidence (Dennis, 2024; Sayed et al., 2024; Wang, 2025). The interactive and gamified nature of AI tools, such as that of AR filters and chatbots, also captures learners' interest and sustains their engagement by making speaking practice more enjoyable and less stressful (Mohd Nabil et al., 2024; Su et al., 2025; Zhang, 2025). These tools help reduce anxiety and embarrassment, which are common barriers for ESL learners, thereby enabling them to participate more actively and frequently in speaking tasks.

Pedagogical support and personalization strengthen the role of AI in language learning further by providing tailored, immediate feedback that addresses individual learner needs. AI systems can analyze pronunciation errors, fluency, and vocabulary use in real time, and guide learners to focus on specific areas that need improvement (Dennis, 2024; Zou et al., 2024). This personalized feedback allows learners to practice at their own pace and style, supports autonomous learning and boosts self-confidence (Sayed et al., 2024; Wang, 2025; Zou et al., 2024). Furthermore, AI tools supplement traditional teaching by offering additional speaking practice beyond classroom hours, and help bridge gaps where human resources are limited (Cherner et al., 2023; Zou et al., 2024). Such support enhances the overall learning experience by making it more flexible, adaptive, and learner-centered.

3.2.1.2 Technological and Instructional Aspects

Technological and instructional aspects refer to the way AI innovations contribute to improving ESL learners' speaking skills through advanced tools and teacher support. Studies report that technologies such as AI-powered speech recognition, Speechling, and presentation platforms, including PitchVantage, provide precise, data-driven feedback on pronunciation, fluency, and other speaking attributes (Cherner et al., 2023; Dennis, 2024). These tools help learners identify specific areas for improvement, and allows targeted practice that enhances speaking accuracy and confidence. Moreover, AI tools support teachers by automating routine assessment tasks, thereby reducing their workload and enabling them to focus on more interactive and personalized instruction (Zou et al., 2024).

Assessment and evaluation also play a key role in this aspect, with AI systems offering timely and objective analysis of learners' speaking performance. Automated feedback platforms enable continuous formative assessment outside the classroom, and encourage learners to practice regularly and track their progress (Zou et al., 2024). However, limitations remain, such as the occasional lack of nuance in AI feedback, and challenges in fully capturing complex language skills, including interaction and content relevance (Cherner et al., 2023). Despite these challenges, AI-driven technological tools enhance instructional quality by providing consistent, scalable, and flexible support that complements traditional teaching methods.

3.2.1.3 Accessibility and Equity Aspects

The aspect of Accessibility and equity refers to the importance of making AI tools available and effective for all ESL learners, including those in under-resourced or rural areas. Numerous studies emphasize that AI-powered language learning platforms offer flexible and scalable solutions that enable learners to practice speaking at any time and from anywhere, without being limited by classroom hours or geographical constraints (Sayed et al., 2024; Wang, 2025; Zou et al., 2024). This flexibility helps bridge gaps caused by limited teaching resources or lack of qualified instructors, especially in regions where access to quality language education is scarce (Dennis, 2024; Isbell et al., 2024). By expanding learning opportunities beyond traditional settings, AI tools promote more inclusive access to language learning.

Despite these advantages, challenges related to access to technology and digital literacy affect the equitable use of AI tools. Some learners face barriers such as poor internet connectivity, a lack of suitable devices, or insufficient skills to effectively navigate AI applications (Dennis, 2024; Su et al., 2025; Zhang, 2025). Additionally, concerns about cultural relevance and data privacy have been raised, underscoring the need for AI solutions that respect diverse learner backgrounds and protect personal information (Su et al., 2025; Zhang, 2025). Addressing these issues is essential to ensure that AI-supported speaking programs do not widen existing inequalities but, rather, contribute to fairer and more accessible ESL education worldwide.

In essence, while AI tools offer flexible and scalable opportunities for autonomous learning, their pedagogical value is significantly enhanced when they are integrated with teacher mediation. Overreliance on technology may limit learners' access to nuanced feedback, pragmatic competence, and culturally responsive guidance—areas where human instructors remain essential (Godwin-Jones, 2024). Therefore, AI-supported speaking practice should be positioned as a complement to, rather than a replacement for, guided instruction, to ensure that learner autonomy is balanced with pedagogical intentionality and contextual relevance (Yang & Kyun, 2022).

3.2.2 Challenges in AI-Powered Feedback for ESL Learners' Spoken English

This section outlines the challenges associated with AI tools in ESL speaking instruction, as detailed in Table 5 (Appendix 7). The table uses ✓ to indicate that a challenge is discussed in the study, and ✕ to indicate that it is not explicitly addressed. The six recurring issues are: accuracy and precision of feedback, learner dependency on technology, feedback quality and clarity, lack of contextual awareness, technical barriers and usability issues, and access and inclusivity challenges.

Accuracy concerns are evident in tools such as Speechling and E-platform, which often fail to detect subtle errors. Learner dependency is noted in Speechling and the Duolingo English Test, where users rely heavily on automated feedback. PitchVantage and E-platform frequently produce generalized responses lacking instructional clarity, while EAP Talk and ChatGPT show limited sensitivity to

speech context. Technical and usability issues are reported in AR Filters, PitchVantage, and Speechling. Access-related challenges persist in tools such as ChatGPT and Speechling, particularly for learners in low-resource environments.

3.2.2.1 Accuracy and Precision of Feedback

The challenges related to the accuracy and precision of feedback, as well as learner dependency on technology, are discussed for various AI tools used in ESL teaching. Some AI tools, including Speechling and E-platform, address accuracy and precision issues by offering AI-powered feedback that helps learners improve their pronunciation. However, they sometimes struggle to detect subtle errors, which may affect the overall accuracy of feedback (Dennis, 2024). Although these tools offer personalized, instant feedback, which supports learner autonomy and motivates practice, there is concern that excessive dependence on technology may limit learners' critical thinking and self-correction abilities (Sayed et al., 2024; Wang, 2025). Tools such as PitchVantage and MySpeaker Rhetorich emphasize the importance of balancing AI feedback with human interaction to provide practical learning experiences, because AI feedback is sometimes perceived as insufficient or overly generalized (Cherner et al., 2023). Therefore, while these AI tools are effective in providing immediate feedback, they are not a replacement for traditional learning methods that require human interpretation and nuanced feedback.

3.2.2.2 Learner Dependency on Technology

Learner dependency on technology is a recurring challenge across AI tools. While platforms such as Speechling and ChatGPT provide instant, personalized feedback that supports pronunciation, fluency, and anxiety-free practice, they risk fostering overreliance. Studies on Speechling found that, despite its tailored feedback, learners could neglect self-reflection and exercising initiative in refining their critical thinking skills. Similarly, ChatGPT encourages continuous use in a non-judgmental environment but may limit the development of critical thinking and real-time problem-solving needed for complex interactions (Sayed et al., 2024; Wang, 2025). Such dependence reduces opportunities for contextual, human-driven learning. Integrating AI with teacher-led guidance and peer interaction is, therefore, essential to balance technological benefits with cultivating independent speaking competence.

3.2.21.1Feedback Quality and Clarity

Feedback quality and clarity is a common challenge across various AI tools, because the feedback provided is often too general, unclear, or lacks actionable guidance for learners. For instance, PitchVantage users reported that the AI-generated feedback was often vague and not specific enough to help them improve their speaking skills. Participants found the input to be more focused on quantifiable speech features, such as pitch, volume, and pace, rather than on the meaningfulness or relevance of the content of the presentation (Cherner et al., 2023). This limitation caused frustration, because users expected more nuanced, human-like feedback but received generalized responses that did not address the specific areas learners needed to work on. Similarly, EAP Talk addressed challenges by providing detailed corrective guidance. Feedback was mainly

limited to scores and colors, without thorough explanations or suggestions for improvement, which hindered deeper learning (Zou et al., 2024). These challenges reflect the difficulty AI systems face in accurately replicating the complex and nuanced nature of human feedback, which is often essential for effective language learning. Therefore, further advancements in NLP and AI algorithms are necessary to ensure that feedback is more precise, detailed, and contextually relevant to learners' speaking tasks.

3.2.21.2Lack of Contextual Awareness

A significant issue with many AI tools is that they lack contextual awareness. Thus, feedback often overlooks the broader context of the learner's speech, including the topic, audience, or the situation in which the speech is delivered. For instance, MySpeaker Rhetorich focuses on paralinguistic features such as pitch, volume, and facial expressions but cannot assess content relevance or audience appropriateness (Isotalus et al., 2024). Learners highlighted the need for more contextual guidance, yet current systems cannot provide such nuanced insights. Similarly, ChatGPT faces this issue too, because its feedback does not necessarily align with conversational or presentation contexts.

In dynamic interactions, ChatGPT often falls short regarding appropriateness or emotional tone, which are both crucial for effective communication (Sayed et al., 2024; Wang, 2025). In the absence of contextual sensitivity, AI feedback neglects interactional and discourse-level competence needed for real-world communication. This finding highlights the need for AI tools to incorporate more sophisticated algorithms that can better understand and adapt to the contextual elements of speech, to provide learners with more relevant and practical guidance.

3.2.21.3Technical Barriers and Usability Issues

AR filters often encounter technical difficulties related to the complexity of AR technology and user interface issues, which can create a steep learning curve for both teachers and students. These barriers can prevent the effective use of the tool, especially in classroom settings where time constraints limit troubleshooting and adaptation (Mohd Nabil et al., 2024). Likewise, Speechling faces challenges with system precision and interface design, which sometimes impact the accuracy of its feedback. The AI struggles to detect subtle pronunciation errors, and the interface can be unintuitive, resulting in a less-than-optimal user experience (Dennis, 2024).

PitchVantage also experiences technical limitations, including problems with third-party software such as eye tracking and body tracking, which affect the reliability of its performance assessments (Cherner et al., 2023). These technical issues hinder the full potential of these tools being realized, because glitches or system malfunctions disrupt the learning process. By improving the design, interface, and reliability of these tools, we can ensure smoother and more effective experiences for learners and educators.

F. Access and Inclusivity Challenges

Access and inclusivity challenges pose significant barriers for many AI tools for ESL learning, because they restrict certain learners from benefiting fully from these technologies. For instance, Speechling and ChatGPT face accessibility issues because of socioeconomic factors and digital literacy, which may prevent some learners from using the tools effectively. Learners from low-income backgrounds or areas with limited internet access could struggle to afford the necessary devices or high-speed internet required to use these AI tools (Dennis, 2024; Ramanujam & Ismail, 2024). Similarly, ChatGPT and E-platforms can pose challenges for learners who are not digitally literate, because these tools require a certain level of technical competence to navigate successfully (Sayed et al., 2024; Wang, 2025; Zheng et al., 2024).

Additionally, concerns have been raised about the inclusivity of AI tools in terms of cultural sensitivity and relevance. Some tools may not fully cater to the diverse cultural and educational backgrounds of learners, thereby limiting their effectiveness in specific regions or contexts (Su et al., 2025; Zhang, 2025). Therefore, efforts must be made to ensure that AI tools are accessible to a wider range of learners, including those from disadvantaged backgrounds, by making them more affordable, user-friendly, and culturally adaptable.

In response to these challenges, recent studies have introduced targeted technical and ethical improvements. To enhance speech recognition accuracy, researchers are developing accent-adaptive algorithms (Qian et al., 2021), phoneme-level feedback systems (Bashori et al., 2024), and inclusive multi-dialect datasets. Privacy concerns are being addressed through anonymized data handling and transparent governance. Similarly, accessibility and inclusivity are being improved through mobile-friendly designs, simplified user interfaces, and culturally responsive content. These developments reflect a growing commitment to ethical AI design and practical reliability, thereby reinforcing the pedagogical value of these tools in diverse ESL contexts.

3.3 Comparative Summary of AI Tools in ESL Speaking Practice

To enhance analytical clarity, the reviewed AI tools were grouped into four functional categories: conversational AI, speech recognition tools, presentation platforms, and assessment systems. This classification, presented in Table 6 (Appendix 8), enables a structured comparison of their core functions, and highlights how each tool supports distinct aspects of ESL speaking development. Specifically, conversational AI fosters learner autonomy and engagement, but lacks contextual sensitivity. In contrast, speech recognition tools offer targeted feedback but struggle with accent variability. Meanwhile, presentation platforms enhance delivery and confidence, though they remain confined to formal contexts. Lastly, assessment systems provide scalable evaluation with minimal developmental feedback. Collectively, these insights underscore the need for integrated, context-aware solutions and support for hybrid models that combine AI with human instruction to address the multifaceted nature of spoken English proficiency.

In addition to functional analysis, the pedagogical relevance of AI tools becomes clearer when viewed through established language acquisition theories. Conversational AI supports low-stakes, anxiety-reducing practice aligned with Long's interaction hypothesis and Krashen's affective filter hypothesis. Speech recognition tools reflect Schmidt's noticing hypothesis by helping learners attend to phonological features, while presentation platforms reinforce affective and performance-based principles. Cumulatively, these tools embody sociocultural and communicative approaches to language learning, though gaps remain in the way pragmatic competence and intercultural awareness are addressed.

By recognizing the pedagogical potential of AI alongside its limitations in human interaction, ESL teachers can strategically combine AI tools with classroom-based speaking activities. For instance, ChatGPT can be used for pre-task rehearsal or role-play preparation, which is followed by in-class peer interaction and teacher-led reflection. PitchVantage could support presentation practice, which can be complemented by live feedback and pragmatic instruction. Similarly, speech recognition tools such as Speechling can be paired with teacher-guided pronunciation drills to address accent variability and prosodic features. These blended approaches ensure that AI tools function as pedagogical aids rather than substitutes, and reinforce communicative competence through structured mediation (Zhou et al., 2025).

3.4 Limitations

This review is bounded by several constraints. The 2021–2025 publication window excludes both earlier foundational work and emerging developments. Moreover, the search strategy did not systematically focus on major databases such as Scopus or Web of Science, which may have led to the omission of relevant peer-reviewed or indexed studies from the analysis. Additionally, potential publication bias may have favored studies with positive outcomes. Hence, future reviews should adopt broader timeframes and more inclusive search strategies to enhance coverage and balance.

4. Conclusion

This review explored the integration of AI tools to improve the spoken English proficiency of ESL learners and challenges associated with AI-powered feedback. AI tools such as Speechling, ChatGPT, and PitchVantage have shown significant potential in improving pronunciation, fluency, and learner engagement. Nevertheless, challenges persist, including low feedback accuracy for non-native accents, insufficient contextual awareness of tone and cultural nuance, and technical barriers in low-resource settings. These limitations highlight the need for more inclusive and context-sensitive AI solutions.

A critical gap identified in this review is the limited attention given by prior syntheses to the pedagogical and contextual dimensions of AI-assisted speaking practice. Earlier reviews largely emphasized technological affordances, and they have failed to sufficiently address how AI tools support the development of pragmatic skills such as intonation, intercultural communication, and sustained oral proficiency. Moreover, little is known about the effectiveness of AI tools in

multilingual and multicultural contexts, particularly in regions such as Malaysia, where linguistic diversity and education inequities present unique challenges. This underexplored area underscores the importance of examining not only tool performance but also learner diversity, inclusivity, and equity in AI-driven language learning. Future research should, therefore, prioritize the development of AI systems trained on diverse linguistic datasets, which are capable of delivering context-aware and culturally sensitive feedback. Greater attention should also be given to hybrid human–AI instructional models, intelligent tutoring systems, and longitudinal studies that examine sustained learner outcomes over time. By addressing these gaps, AI can evolve from a supplementary tool to a transformative force for ESL education, by fostering equity and reducing barriers for learners worldwide.

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Appendix 1

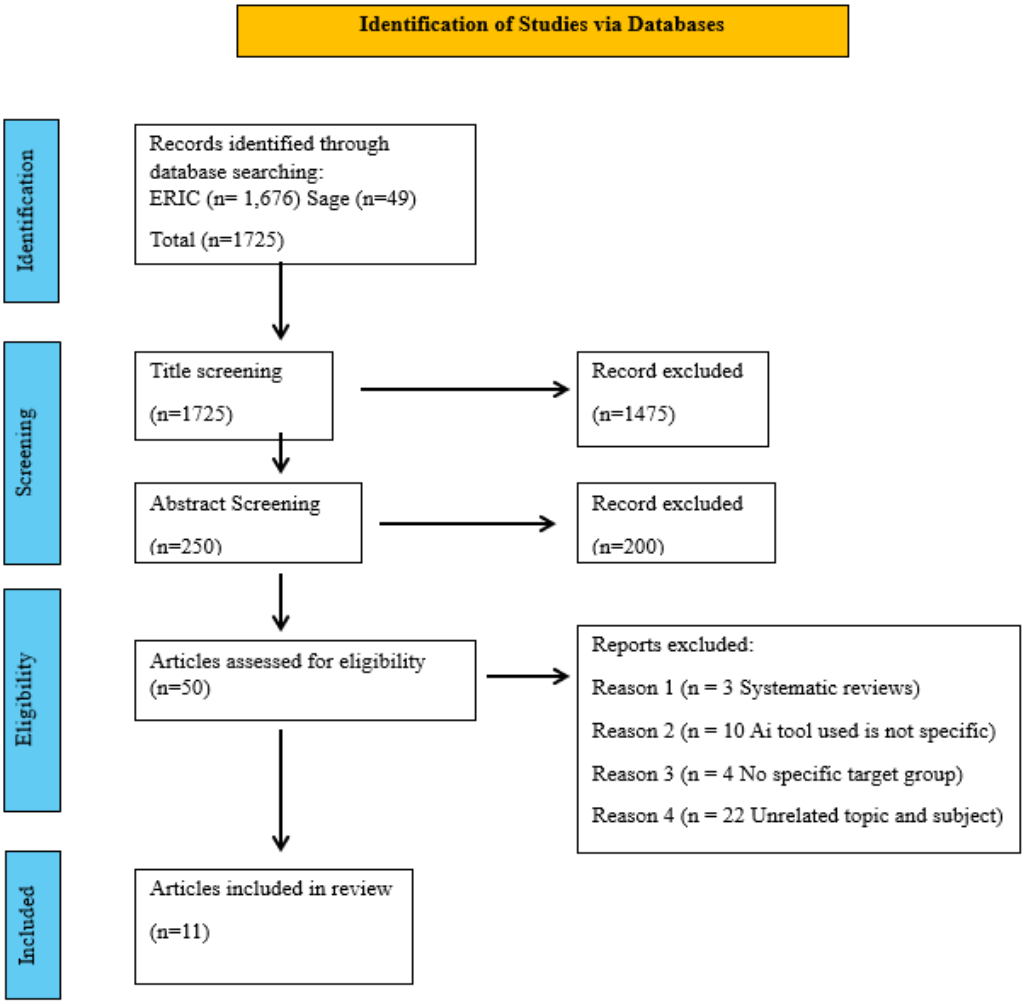

Figure 1: PRISMA flow diagram (Adapted from Page et al., 2021, p. 372)

Appendix 2

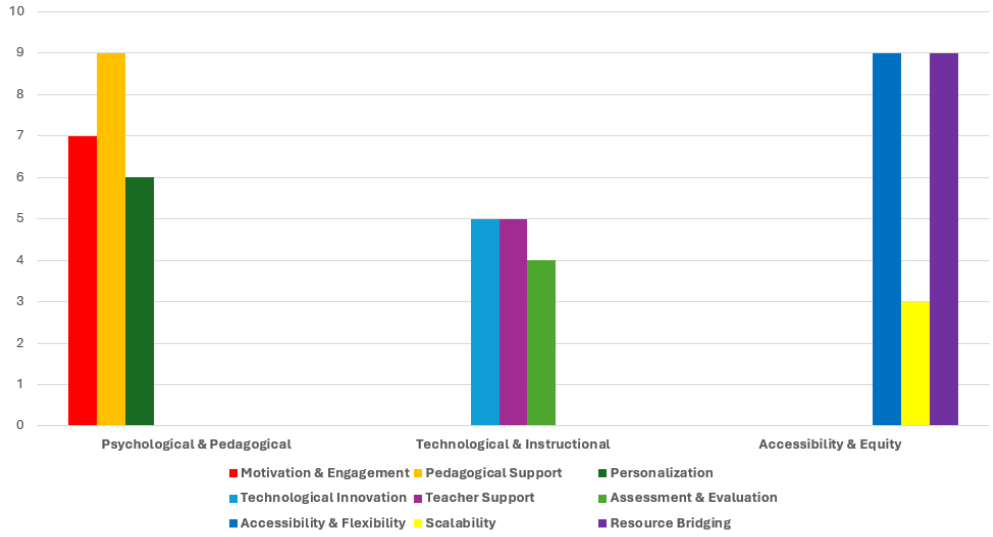

Figure 2: Frequency of justification themes in AI tools for ESL speaking

Appendix 3

Table 1: Inclusion and exclusion criteria for articles

Criteria		**Combine**	
Databases		ERIC and Sage	
Search strategy	**Keywords** a. AI tools b. speaking c. English d. ESL	Combined using Boolean operators AND, OR, and NOT	ERIC: "AI tools" and "speaking" and "English" and "ESL" and "challenges" and "application" Sage: "AI tools" AND "speaking" AND "English"
Inclusion criteria a. Publication: between 2021 and 2025 b. Language: written in English c. Focus on ESL learners		**Exclusion criteria** a. Published before 2021 b. Papers not written in English c. Not ESL learners d. Screened according to titles and abstracts	
Evaluation		Assessed for eligibility (suitable articles according to the keywords), must have open access to the full text	
Data extraction		Data extracted according to a. Key findings b. Outcomes	
Data synthesis		Thematic analysis	

Appendix 4

Table 2: Codes, categories and themes that emerged from analysis

Research question	Codes	Categories	Themes
1. What AI tools are used to enhance the speaking abilities of ESL learners, and what justifications support their selection?	- Real-time feedback - AI chatbots - AI speech recognition - Personalized learning - Pronunciation correction - Gamification and engagement. - Presentation tools - Adaptive assessments - Learner autonomy	- Psychological and pedagogical - Technological and instructional - Accessibility and equity	- Motivation and engagement - Pedagogical support - Personalization - Technological Innovation - Teacher support - Assessment and evaluation - Accessibility and flexibility - Scalability - Resource bridging
2. What challenges are associated with AI-powered feedback in improving spoken English for ESL learners?	- Inaccurate speech recognition - Feedback lacks contextual awareness - Overreliance on AI - Unclear or vague feedback - Usability issues (AR filters, interfaces) - Technical limitations - Internet/device access issues - Socioeconomic barriers - Cultural sensitivity	- Feedback limitations - Overdependence on technology - Contextual gaps - Technical barriers - Accessibility issues	- Accuracy and precision of feedback -Learner Dependency on technology - Feedback quality and clarity - Lack of contextual awareness - Technical barriers and usability issues - Access and inclusivity challenges

Appendix 5

Table 3: Summary of findings

Author and publication date	AI tools	Article Title	Level	Country
Mohd Nabil et al. (2024)	AR filters	Immersive language learning evaluating augmented reality filter for ESL speaking fluency teaching	Secondary school	Malaysia
Dennis (2024)	Speechling (AI-powered speech recognition technology)	Using AI-powered speech recognition technology to improve English pronunciation and speaking skills	University	Saudi Arabia
Cherner et al. (2023)	PitchVantage (AI-powered presentation platform)	AI-powered presentation platforms for improving public speaking skills: Takeaways and suggestions for improvement	University	United States
Isotalus et al. (2024)	MySpeaker Rhetorich	Artificial intelligence as a feedback provider in practicing public speaking	University	Finland
Sayed et al. (2024)	ChatGPT	To be with AI in oral test or not to be: A probe into the traces of success in speaking skill, psychological well-being, autonomy, and academic buoyancy	University	Ethiopia
Zheng et al. (2024)	E-platform (DLT, ASR, AWE)	Automated versus peer assessment: Effects on learners' English public speaking	University	China
Zou et al. (2024)	EAP Talk	Exploring EFL learners' perceived promise and limitations of using an artificial intelligence speech evaluation system for speaking practice	University	China
Zhang (2025)	Chatbot (NLP)	Integrating chatbot technology into English language learning to enhance student engagement and interactive communication skills	University	China
Wang (2025)	ChatGPT	A study on the efficacy of ChatGPT-4 in enhancing students' English communication skills	University	China

Su et al. (2025)	Chatbot, ChatGPT (NLP)	To chat or not: Pre-service English teachers' perceptions of and needs in chatbot's educational application	University	China
Isbell et al. (2024)	Duolingo English Test	Speaking performances, stakeholder perceptions, and test scores: Extrapolating from the Duolingo English Test to the university	University	United States

Appendix 6

Table 4: Categorization of themes in AI tools to improve ESL learners' speaking skills

Aspect	Themes included
Psychological and pedagogical	Motivation and engagement, Pedagogical support, Personalization
Technological and instructional	Technological innovation, Teacher support, Assessment and evaluation
Accessibility and equity	Accessibility and flexibility, Scalability, Resource bridging

Appendix 7

Table 5: Challenges associated with AI tools in ESL learning

AI tools	Challenges in AI-powered feedback					
	Accu-racy and precision of feedback	Learner dependency on technology	Feedback quality and clarity	Lack of contextual awareness	Technical barriers and usability issues	Access and inclusivity challenges
AR filters	✗	✗	✗	✓	✓	✗
Speechling (AI-SRT)	✓	✓	✗	✗	✓	✓
PitchVantage	✓	✗	✓	✓	✓	✗
MySpeaker Rhetorich	✓	✓	✓	✗	✓	✓
ChatGPT	✓	✓	✗	✓	✗	✓
EAP Talk	✓	✓	✓	✓	✓	✓
Chatbots	✗	✓	✗	✗	✓	✓
Duolingo English Test	✗	✓	✗	✗	✗	✓
E-platform (DLT, ASR, AWE)	✓	✓	✓	✗	✓	✓

Appendix 8

Table 6: Comparison of the 11 AI tools used for ESL speaking practice

Category	AI tools	Functions	Advantages	Limitations
Conversational AI and chatbots	ChatGPT, NLP Chatbot, EAP Talk	Dialogue, grammar, vocabulary practice	Builds confidence, instant feedback, autonomous practice	Limited context, vague feedback, risk of overuse
Speech recognition and pronunciation	Speechling, E-platform DLT/ASR/ AWE	Pronunciation analysis, fluency tracking	Personalized feedback, reduces anxiety, supports self-study	Accent errors, usability issues, misses subtle features
Presentation and public speaking	PitchVantage, MySpeaker Rhetorich, AR filters	Public speaking rehearsal, delivery feedback	Boosts confidence, lowers anxiety, immersive practice	Feedback is too general, context-specific only, tech barriers
Testing and assessment	Duolingo English Test	Adaptive speaking assessment	Affordable, accessible, scalable	Limited learning feedback, test-oriented focus