

A Systematic Review of Intelligent Chatbots Supporting English Speaking Instruction

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ABSTRACT

The application of intelligent chatbots in English speaking instruction has garnered increasing attention. This study conducted a literature review of relevant studies published between 2015 and 2025, ultimately incorporating 56 high-quality documents for in-depth analysis. The number of studies on intelligent chatbots in English speaking instruction has been growing rapidly, especially after 2022. The review systematically organized the research information, research methods, technical features, application scenarios, teaching effects, and challenges. The study summarized the technical characteristics of chatbots in terms of goal-oriented design, immersive experiences, and multimodal presentation, identified their primary functions and typical application scenarios in English speaking instruction, and constructed an impact analysis framework encompassing skills, emotions, and behaviour three dimensions. Additionally, it revealed challenges faced by teachers and students during chatbot using in English speaking learning, including insufficient technical support, difficulties in integrating teaching, and fluctuations in learning motivation. The study indicates that current academic focus is shifting from “tool usability” to “human-machine collaboration effectiveness.” Future research should strengthen exploration of the mechanisms underlying human-machine interaction processes and further clarify the efficacy boundaries of intelligent technologies in oral English instruction.

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Contribution/Originality: This study systematically analyzes the main functional characteristics and typical application scenarios of intelligent chatbots in English speaking instruction. Combining technological advancements and instructional practice needs, the study constructs an analysis framework for the impact, proposes a developmental concept for constructing a human-machine collaboration English speaking learning model.

1. Introduction

In English as a Foreign Language (EFL) teaching, the cultivation of oral communication skills has always been a core objective. However, traditional teaching methods face numerous challenges in cultivating oral communication skills, including insufficient classroom interaction, widespread language anxiety, and a lack of personalized feedback (Tang & Putra, 2025). Low willingness to engage in English communication, difficulty in speaking English, challenges in improving language communication and expression abilities are common phenomena (Zheng et al., 2019). With the rapid development of artificial intelligence technology, chatbots, as intelligent tools that support real-time interaction, continuous practice, and feedback generation, are gradually becoming an important auxiliary means of improving the effectiveness of English-speaking instruction (Ge & Zheng, 2025; Jeon et al., 2023a).

Intelligent chatbots refer to computer programs that engage in text or voice conversations with humans using natural language (Belda-Medina & Kokošková, 2023). Intelligent chatbots integrate technologies such as natural language processing, speech recognition, and machine learning to enable natural and fluent language interaction with learners, providing personalized learning support and instant feedback. Scholars from the University of Cambridge conducted a systematic meta-analysis, delving into the application of voice-enabled intelligent chatbots in English language learning, providing a crucial theoretical foundation for the field (Koç & Savaş, 2024). Du and Daniel (2024) found that AI chatbot-based learning methods aim to accelerate the English learning process and help students achieve course objectives, demonstrating significant advantages in alleviating speaking anxiety and improving speaking skills. Scholars have reviewed the core technologies, tool types, teaching functions, usage patterns, and application outcomes of intelligent chatbots in language education (Kartal & Yeşilyurt, 2024). Research shows that learners can improve their fluency and accuracy in spoken expression through dialogue practice with chatbots in a more realistic and less anxiety-inducing environment. At the same time, chatbots also provide learners with more personalized practice paths and emotional support (Huang et al, 2022).

Although existing reviews have provided preliminary overviews from perspectives such as tool classification, functional positioning, and cognitive mechanisms, systematic research specifically focused on “English speaking instruction” remains scarce. Existing research on English-speaking learning is mostly composed of independent empirical studies, lacking systematic and comprehensive theoretical analysis. Considering the rapid development of technological applications, it is necessary to revisit the educational characteristics of intelligent chatbots. This study aims to comprehensively examine and deeply analyse the current state of intelligent chatbot applications, influence mechanisms, and future trends in English-speaking instruction and answer the following core questions:

- i. Research Question 1: What are the key technical functions and applications of intelligent chatbots in English-speaking instruction?
- ii. Research Question 2: How do intelligent chatbots influence English-speaking instruction across multiple dimensions?
- iii. Research Question 3: What are the major challenges and limitations associated with the integration of intelligent chatbots in English-speaking instruction?

2. Methodology

This study employs a systematic literature review method, guided by the PRISMA framework (Moher et al., 2010), to systematically integrate research literature on the application of chatbots in English-speaking instruction in recent years.

2.1. Data collection

The researcher conducted an academic search within Web of Science, Scopus, and CNKI (China National Knowledge Infrastructure). To ensure coverage of the diverse expressions of chatbots in English-speaking teaching, the search keywords covered the following combinations of terms (and were appropriately expanded according to database specifications) (Table 1). The search language is limited to English and Chinese, and the time range is limited to 2015 to 2025. Empirical research and systematic review literature are given priority.

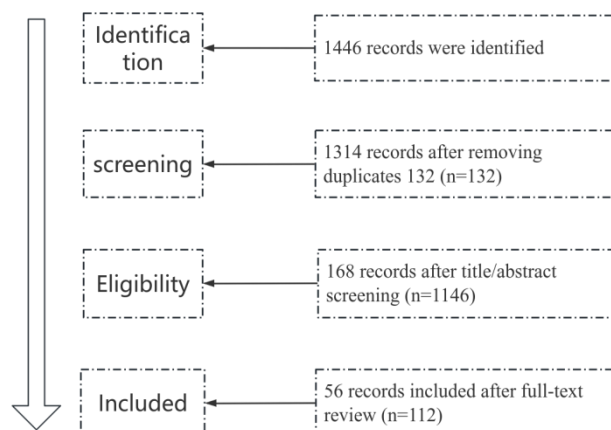
Table 1: Keyword search scheme

Technology		Language
Chatbot Technology		English speaking instruction
Chatbot		English speaking
Conversational Agent	and	Oral English
AI tutor		Speaking skills
Intelligent Personal Assistant		EFL Language Learning
Large Language Model		Language Teaching

2.2. Literature screening process

The literature screening process strictly followed the four-step PRISMA process for systematic operation (Figure 1).

Figure 1: Literature search and selection process



In the identification stage, a total of 1,446 initial documents were obtained through searches of multiple academic databases. After deduplication, 132 duplicate documents were deleted, leaving 1,314 documents. In the initial screening stage, 1,146 documents unrelated to the research topic were excluded through careful reading of the titles and abstracts. In the eligibility phase, the remaining literature was subjected to full-text

reading and in-depth evaluation. Following the inclusion and exclusion criteria (Table 2), an additional 112 studies that did not meet the requirements were excluded. Ultimately, 56 high-quality relevant studies successfully passed all screening stages and were formally included in the analysis scope of this systematic review, providing a robust literature foundation for subsequent in-depth analysis and comprehensive discussion.

Table 2: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Focus on English speaking instruction (including conversation, speech, expression training, etc.)	Does not involve English speaking instruction (e.g., limited to writing, listening, or grammar)
Use chatbots or AI dialogue systems as teaching or intervention tools	Only describes technical development or tool design, lacking teaching applications
Include clear learner behaviour or learning outcome data (quantitative or qualitative)	Studies in languages other than English and Chinese

2.3. Data analysis

To ensure the systematic and scientific nature of the literature analysis, this study drew on the basic paradigms of systematic review research proposed by Zheng et al. (2024) and Jeon et al. (2023a), and constructed a content analysis framework for this study (Table 3). The included literature was categorized and coded based on three dimensions: technical functions, teaching applications, learning effectiveness and challenges.

Table 3: Content analysis framework for a systematic literature review of intelligent chatbot support for English-speaking instruction

Main Category	Subcategory	Analysis Points
Technology Function	Goal orientation	Interactive activity design based on expected learning objectives
	Embodiment	Human-like interactive experiences
	Multimodality	Integrated interaction of voice, text, and images
Application Scenarios	Situational conversation	Personalized conversational partner
	Gamified learning	Autonomous learning facilitator
	Opinion expression	Integration with think-pair-share activities, Speech
	Proficiency assessment	Pronunciation training
Learning Effectiveness	Skill Level	Improved speaking fluency, accuracy, complexity Comprehensive language competence development
	Psychological Impact	Significant reduction in speaking anxiety Increase in learning motivation Enhanced language enjoyment

	Behavioural Level	Enhanced learning autonomy Social function support Positive transformation in learning behaviours
Challenges	Technical Challenges	Limitations in natural language understanding Insufficient contextual awareness capabilities Information accuracy issues
	Challenges for teacher	Role redefinition requirements Technology integration competency demands Professional development adaptation needs
	Challenges for students	Time limitations of novelty effects Cognitive load management difficulties Technology dependency risk

In terms of the dimensional classification of the technical tool subcategories, the study primarily referenced the three core features of intelligent chatbots proposed by [Jeon et al. \(2023b\)](#), including: goal-orientation (G), embodiment (E), and multimodality (M). Goal-oriented intelligent chatbots achieve precise design of teaching tasks and systematic organization of language resources by encoding teaching concepts and objectives, serving as language learning assistants with guidance functions. Multimodality refers to the system's ability to comprehensively process multimodal inputs and outputs such as text, speech, images, and videos, enhancing the system's language comprehension and response robustness, and improving learners' engagement and interaction satisfaction. Embodiment emphasizes enhancing learners' immersion and realism during interactions by constructing the physical appearance and perceptual mechanisms of robots or virtual characters. The teaching integration methods are categorized based on the review by [Zhang et al. \(2023\)](#), focusing on the types of activities of technological tool applications and integration stages in teaching. In constructing the sub-dimensions of implementation effectiveness, based on the classification criteria proposed by [Zheng et al. \(2025\)](#) and further expanded and categorized, the study covers learning psychology, learning behaviour, knowledge and skills aspects, to comprehensively evaluate the educational benefits of human-machine interaction. In response to the issues and future directions of chatbot applications, this paper also draws on existing research to identify challenges for teachers and students. It further summarizes the corresponding response strategies in the discussion part.

3. Results

3.1. Research overview

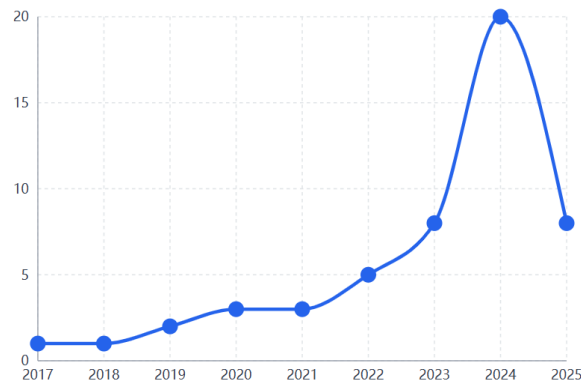
Based on a systematic analysis of literature related to the use of intelligent chatbots to support English-speaking instruction, this study identified the following characteristics in this field:

3.1.1. Publication years

From the perspective of publication time distribution, the 56 included studies exhibit a distinct temporal concentration. The number of studies has significantly increased in recent years, particularly during the period from 2022 to 2024, with a substantial proportion of studies published during this timeframe ([Figure 2](#)). Several systematic reviews published during this period have provided important theoretical summaries for the field ([Kuhail et al., 2022](#); [Peña & Corga, 2024](#)). This trend reflects the growing

academic interest in the educational applications of chatbots amid the rapid development of artificial intelligence technology.

Figure 2: Numbers of publications by year



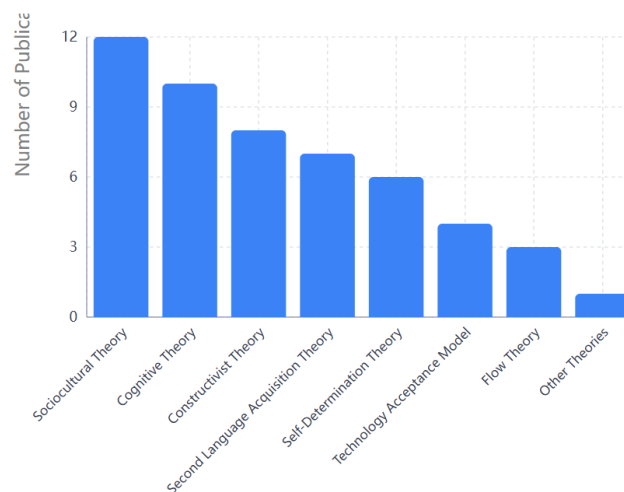
3.1.2. Research participants

In terms of research participants, the included literature covers English learners across all educational stages from elementary school to university. The research participants primarily include ESL/EFL learners, university English majors, elementary and secondary school English learners, and adult English learners, among other groups. In terms of geographical distribution, the research covers multiple regions, including Asia, Europe, and North America, with a relatively higher number of studies from Asian countries. This is closely related to the urgent demand for English-speaking instruction and the proactive adoption of technology in these regions. Some studies specifically focus on the application of large language models such as ChatGPT in ESL/EFL instruction (Du & Daniel, 2024), reflecting the contemporary characteristics of the research subjects selected.

3.1.3. Theoretical basis

From a theoretical perspective, the literature reviewed primarily draws on classical educational theories such as second language acquisition theory, constructivist learning theory, and sociocultural theory (Figure 3).

Figure 3: Theoretical basis

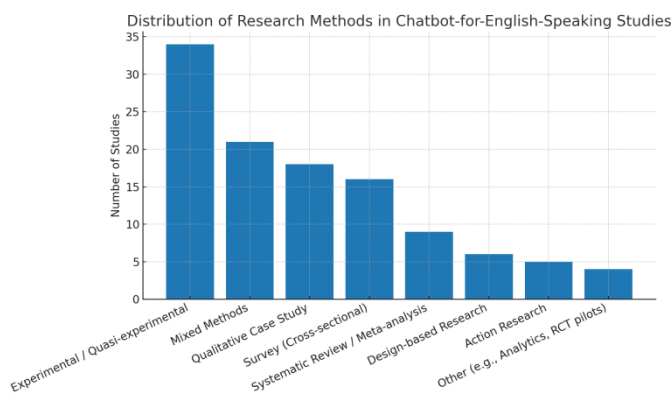


Sociocultural theory has been widely cited as the theoretical foundation for chatbot-based language instruction applications. Cognitive theory, constructivist theory and second language acquisition theory are also reflected in some studies (Lyu et al., 2024). These diverse theoretical foundations provide rich theoretical support for the application of chatbots in English-speaking instruction.

3.1.4. Research methods

Research methods exhibit diverse characteristics, with quantitative research, qualitative research, and mixed-method research coexisting (Figure 4). A systematic meta-synthesis research method was used to analyse relevant literature from 2010 to 2023 (Labadze et al., 2023). Experimental research designs play a significant role in evaluating the teaching effectiveness of chatbots, with most studies employing pre- and post-test comparisons and control group experiments to validate the teaching effectiveness of chatbots. Some studies employ quasi-experimental designs to explore the impact of chatbots on EFL learners' willingness to communicate (Fryer et al., 2019). Qualitative research methods such as interviews, observations, and case studies are also widely applied to deeply explore learners' experiences and emotional responses toward chatbots.

Figure 4: Distribution of Research Methods



3.2. Technical functions of intelligent chatbots in English-speaking instruction

The technical form of chatbots currently applied in English-speaking instruction has undergone a rapid evolution from speech recognition-based to generative AI-driven systems. Their functional characteristics are characterized by three key features: Goal orientation, Embodiment, and Multimodality (Ge & Zheng, 2025).

3.2.1. Goal orientation

Goal orientation is a typical feature of educational AI chatbots, such as language learning chatbots. They can be integrated with classroom teaching to provide learners with teaching support, learning materials, learning tasks, etc. Goal orientation is primarily manifested in chatbot settings, clear communication objectives around teaching tasks, such as role-playing, expressing opinions, and speech practice, thereby enhancing the purposefulness and interactive collaboration of spoken output. Wu et al. (2024) in an empirical study on university students noted that task-based conversational teaching using Chatbot significantly improves students' clarity of expression and logical coherence. Chatbots demonstrate a clear goal-oriented teaching approach. Zheng et al. (2025) pointed out that ChatGPT can simulate real-life language tasks such as interviews, self-

introductions, and shopping conversations based on pre-set task scenarios, providing learners with clear contextual and goal-oriented feedback.

3.2.2. Multimodality

Multimodality is a key feature of intelligent chatbots, offering advantages in promoting immersive learning and guiding learners to engage in self-monitoring and self-correction. Multimodality enhances the sensory coverage of interactions and the diversity of learning paths. Jeon et al. (2023b) point out that many chatbots combine multiple input and output methods, such as text, voice, images, and videos, which not only cater to the cognitive preferences of different learners but also provide teachers with more diverse combinations of teaching resources. Compared to single-audio formats, intelligent chatbots that combine audio and text are more effective in improving learners' English-speaking skills and eliciting positive emotional responses (Tai & Chen, 2022). Some systems support voice input recognition, voice synthesis responses, and even utilize image materials to assist with expression tasks, thereby meeting the language reception and production needs of learners with different cognitive preferences (Wang et al., 2024). Research shows that chatbots employ diverse presentation methods, with device types including smartphones, tablets, smart speakers, and desktop computers, enabling multimodal interaction through voice, text, and visual elements.

3.2.3. Embodiment

Embodiments are typically associated with intelligent chatbots featuring multimodal presentation characteristics, aimed at enhancing learners' sense of presence and interest in language learning. Some studies emphasize that AI systems create embodied communicative experiences through anthropomorphic dialogue styles, voice and tone feedback, or virtual character settings, enabling students to feel immersed and resonate during interactions, thereby enhancing their desire to express themselves (Zhou et al., 2025). Students using chatbots are more likely to enter an "immersive role-playing" state, creating a genuine communicative experience. Some research (Divekar et al., 2021) combines VR/AR technology to create more immersive embodied experiences, allowing learners to engage in face-to-face conversations with chatbots in virtual environments.

3.3. Application scenarios of chatbots in English-speaking instruction

Based on the technical characteristics of chatbots, intelligent chatbots provide teaching support for teachers and students in oral language teaching. Intelligent chatbots are widely used in various English-speaking teaching activities, forming flexible, diverse, and highly interactive teaching support formats. Common application activities include dialogue practice, gamified learning, opinion expression, and speaking assessment.

3.3.1. Situational conversation

Chatbots support a variety of spoken conversation exercises and can provide multiple virtual characters and realistic conversation scenarios. The primary function of dialogue practice is to enrich learners' language application scenarios, such as ordering food at a restaurant, purchasing tickets at a station, shopping at a supermarket, or borrowing books at a library (Hsieh et al., 2023; Morton & Jack, 2010). This supports multi-round interactions among students, enhancing their language organization and pragmatic strategies. Chatbots continuously prompt information gaps to reinforce the language

construction process. Teaching scaffolds are typically set based on the difficulty level of learning tasks to assist learners in successfully completing tasks (Bear et al., 2024). Building on this foundation, teachers can purposefully cultivate learners' pragmatic abilities and communicative strategies by increasing dialogue turns and setting communicative intentions (Yang et al., 2022).

3.3.2. Gamified learning

Chatbots can provide gamified learning to stimulate and enhance learners' interest in language learning. Storytelling activities can exercise learners' story comprehension and narration skills. In Kim's (2018) study, during an eight-week intervention period, students interacted with the chatbot for 10 minutes weekly, discussing various chat topics related to school life and movies. Chatbots can provide diverse vocabulary suggestions, synonym replacements, and lists of antonyms and synonyms to help students enrich their expression. Some research mentioned that the chatbot designs a series of coherent tasks, and learners need to advance the development of the "adventure story" by completing oral challenges (Khlaisang & Sukavatee, 2023). Personalized creation is an activity that uses intelligent chatbots for creative production, enhancing learners' sense of achievement through the creation of visible works and stimulating sustained motivation for English learning. For example, using Smart Vpen for English drama creation and rehearsal and using the chatbot for Vlog production and evaluation (Liu et al., 2023).

3.3.3. Opinion expression

Chatbots are not only tools for language practice in English-speaking learning, but also important mediators for promoting cognitive development and cross-cultural understanding. Leveraging their extensive corpora and generative capabilities, chatbots can provide multi-perspective, cross-disciplinary insights and information tailored to learners' specified topics. This interactive process encourages students to continuously refine, expand, and deepen their arguments during expression, thereby effectively enhancing logical thinking and critical communication skills. In Goda et al. (2014)'s experiment, the experimental group engaged in a 10-minute conversation with an online chatbot to prepare for a group discussion on the topic of "the ideal family." Students were required to use Socratic questions, resulting in a significant improvement in critical thinking skills. Intelligent chatbots can address the shortcomings of personalized instructional guidance by evaluating and optimizing learners' speaking skills from the perspectives of experts such as TED speakers and business consultants (Muniandy & Selvanathan, 2024).

3.3.4. Proficiency assessment

A chatbot can be used for initial screening or formative assessment of oral proficiency. The robot provides real-time feedback, scoring, or suggestions for revisions based on students' oral output. Some studies have introduced AI systems for formative evaluation, offering immediate feedback on vocabulary usage, sentence structure diversity, and grammatical accuracy (Zhou et al., 2025). In terms of pronunciation training, chatbots utilize speech recognition and synthesis functions to provide real-time comparison and correction of students' pronunciation, stress, intonation, and connected speech, thereby solidifying foundational oral language skills (Yang et al., 2025). Belda-Medina and Calvo-Ferrer (2022) found that students using AI speech feedback showed significant improvements in phoneme clarity and rhythm control. Some systems can also combine

IELTS assessment standards to conduct a multi-dimensional analysis of language performance. Intelligent chatbots can also guide learners in self-assessment (Zhang & Huang, 2024).

3.4. The multidimensional effectiveness of chatbots on English speaking learning

With the rapid development of artificial intelligence technology, chatbots have gradually become an important auxiliary tool for English-speaking learning. By simulating human conversation, providing instant feedback, and designing personalized tasks, chatbots not only demonstrate potential in enhancing language skills but may also exert multidimensional influences on psychological regulation and learning behaviour.

3.4.1. Spoken skills improvement

At the skill level, research generally indicates that chatbots can significantly improve students' language output fluency, sentence variety, and expression accuracy. Klímová and Ibna Seraj (2023) found that after using chatbots, learners showed improvements in spoken language skills such as intonation, stress, and fluency. A synthesis of 30 empirical studies indicates that the use of chatbots leads to significant improvements in core language skills, particularly in productive skills (Zhang & Huang, 2024). The unique advantages of virtual avatar interaction promote the development of communicative abilities, with significant progress in topic expansion and enhanced ability to complete complex task outputs. But Human-machine dialogue has limitations in enhancing learners' knowledge and skills. Human-machine dialogue can improve learners' basic oral skills such as pronunciation, vocabulary, and grammar, but its effect on improving listening skills is not significant (Dizon, 2020).

3.4.2. Psychological anxiety reduction

Intelligent chatbot creates a low-pressure practice environment, effectively alleviating language anxiety and enhancing learning motivation. Research indicates that learners experience relatively less anxiety in second language speaking under human-machine dialogue conditions (Koç & Savaş, 2024). Wu et al. (2025) found that integrating chatbots into think-pair-share activities has a positive impact on EFL speaking anxiety, language enjoyment, and speaking performance. Intelligent chatbots support learner autonomy by providing personalized learning experiences and allowing learners to control the pace and content of interactions. They also enhance learners' sense of competence through scaffolding support and adaptive feedback (Xiao et al., 2024). Interaction based on virtual avatars creates a more emotionally engaging and psychologically supportive learning environment. However, Jeon et al. (2023b) pointed out that due to the fading of the novelty effect of technology, learners' motivation to learn and willingness to engage in human-computer dialogue may decline. El Shazly (2021) found that after an 8-week instructional intervention, learners' oral anxiety was not effectively alleviated; nearly half of the learners expressed concerns about speaking English in public.

3.4.3. Impact on learning behaviour

At the behavioural level, chatbots encourage learners to actively increase the frequency of oral practice, enhancing the continuity and autonomy of learning. Students gain learning assistance, personalized learning experiences, and the development of various skills from chatbots (Labadze et al., 2023). In self-directed learning environments,

learners spend more time interacting with chatbots. Compared to traditional teaching, the level of engagement in conversations is higher. Research also indicates that learners with high self-concept are less willing to participate in human-machine dialogue, while those with low self-concept but high self-efficacy are more willing to engage in such interactions (Fryer et al., 2020). Some researchers pointed out that counting the number of times students interact with chatbots does not indicate the quality of their language learning. Interactions focused on cognitive outcomes should emphasize qualitative characteristics rather than quantitative measurements (Garrison & Cleveland-Innes, 2005).

3.5. Challenges of chatbots in English-speaking instruction

Although intelligent chatbots show great potential in English-speaking instruction, they still face multiple challenges and limitations in practical application. Research clearly indicates that there are numerous concerns regarding the use of chatbots in education, including accuracy, data security, and ethical issues. From the perspectives of teachers and students, the main challenges include the following aspects.

3.5.1. Challenges faced by teachers

a) Technical literacy requirements

Insufficient technical literacy and AI capabilities are the primary challenges teachers face when integrating chatbots into English-speaking instruction. Research indicates that the challenges of such integration include the need for comprehensive educator training and curriculum adaptation. AI literacy is considered crucial, including an understanding of AI technology and its broader societal impacts (Koç & Savaş, 2024). Many intelligent chatbots are new to teachers, who may lack the technical knowledge to use them to enhance teaching, let alone cultivate students' AI digital competencies. Challenges in AI literacy include: (1) teachers' lack of AI knowledge, skills, and confidence; (2) lack of curriculum design; (3) lack of instructional guidance (Wollny et al., 2021). This deficiency in technical capabilities directly impacts teachers' ability to effectively utilize chatbots for teaching. The rapid development of technology will continue to pose challenges, indicating that English teachers particularly need to possess the corresponding capabilities. Han and Lee (2024) emphasized the urgent need for teachers to engage in continuous learning and adaptation in an environment of rapid technological development.

b) Transformation of the teacher role

The transition from traditional teaching models to intelligent teaching models is another significant challenge teachers face. This transformation not only requires teachers to be familiar with and master the operation of intelligent tools such as chatbots, but also requires them to shift their teaching design philosophy from a 'teacher-centred' knowledge transfer model to a 'human-machine collaboration, student-centred' learning support model. Teachers need to design oral activities chatbots, monitor the quality of student-robot interactions and correct any potential language errors or cultural misinterpretations (Wilson et al., 2020). Additionally, issues such as balancing human-machine interaction with teacher-student interaction, designing human-machine dialogue tasks suitable for different learner levels, and evaluating the effectiveness of human-machine collaborative learning all require teachers to possess higher teaching design capabilities. Teachers must have solid language proficiency and pedagogical

knowledge, as well as a certain understanding of artificial intelligence technology and data analysis skills (Mendoza et al., 2023). This is a challenging adaptation process for many teachers.

3.5.2. Challenges faced by students

Although chatbots offer numerous conveniences and innovations for English-speaking learning, learners still face multiple challenges in practical application. These challenges not only involve technical limitations but also reflect the inherent complexity of human-computer interaction learning models.

a) Novelty effect and lack of sustained motivation

AI chatbots do have a significant impact on students' learning outcomes, but research indicates that short-term interventions yield stronger effects than long-term ones. Learners' initial interest in chatbots often diminishes over time. The 'novelty effect' can quickly attract learners, but its sustained motivational impact is limited (Fryer et al., 2017). As usage time increases, learners may develop expectations about the chatbot's response patterns, leading to a lack of surprise and challenge. When learners discover the chatbot's limitations in handling complex contexts or creative expressions, they may experience disappointment (Huang et al., 2022). A systematic review notes that while chatbots have advantages in terms of immediacy and personalization, the 'novelty effect' is a significant challenge, and learners may become bored due to monotonous content design and mechanized interaction formats.

b) Excessive cognitive load and technology dependency

For students, simultaneously processing the chatbot's voice output, text prompts, and any accompanying multimedia resources can increase external cognitive load (Plass et al., 2010). This multimodal information processing requires learners to perform multiple tasks simultaneously within limited cognitive resources. Excessive cognitive load may hinder learning outcomes, leading to increased learning anxiety and reduced motivation. When learners need to quickly switch between understanding chatbot instructions, processing feedback, organizing language expression, and monitoring dialogue progress, the dispersion of cognitive resources may result in inattention, affecting the depth and quality of language learning. Additionally, long-term reliance on chatbots for language learning may lead to a decline in learners' autonomous learning abilities and critical thinking skills (Ayedoun et al., 2020). Once learners become accustomed to the instant feedback and guided learning mode provided by chatbots, they may lack the ability to think independently and self-correct. This technological dependency not only limits learners' creative expression but may also impair their ability to use language effectively in situations without technological support.

4. Discussion

4.1. Changing landscape and trends of research on chatbots in English-speaking instruction

In recent years, research on chatbots in English-speaking instruction has undergone significant technological and application evolution. From early rule-based or template-based dialogue systems to voice interaction relying on automatic speech recognition

(ASR), and then to multimodal dialogue platforms integrating large language models (LLMs) and generative AI, the number and diversity of studies have significantly increased since 2020 (Jeon et al., 2023a). Recent meta-analyses and systematic reviews indicate that chatbots generally exhibit moderate positive effects in second language learning, with effect influenced by accessibility, modality type, and the use of generative AI (Lyu et al., 2024; Şahin Kızıl et al., 2025). The focus of research has gradually shifted from “whether it is effective” to “how to make it effective” and “how to achieve human-machine collaborative teaching.” Meanwhile, task design, the stage of integration into teaching, and comparisons of hybrid modes emerge as new trends (Huang et al., 2022; Jeon et al., 2023a). Against the backdrop of technological evolution shaping the educational landscape, research has begun to critically examine the necessary factors influencing the chatbot in language teaching (Hwang et al., 2022). Intelligent chatbots have revolutionized education by serving as automated mentors in both virtual and traditional classrooms, providing real-time support and personalized learning experiences (Wollny, 2021). This transformative impact has driven a shift in research paradigms from improving traditional teaching models to exploring entirely new educational ecosystems.

4.2. Research gaps and limitations

Despite this, existing research still has significant shortcomings. There is a lack of research targeting preschool children, primary and secondary school students, and teachers. As the primary users of intelligent technology, if teachers do not fully understand and master the characteristics and methods of human-computer interaction, they cannot fully leverage the potential of intelligent chatbots to assist in oral language instruction. There is a lack of longitudinal, systematic empirical research on the effectiveness of intelligent chatbots in English-speaking instruction. Intervention periods are generally short, and there is a lack of long-term tracking and effect maintenance studies, making it difficult to assess the role of chatbots in the long-term development of speaking skills (Lyu et al., 2024). There is also a lack of research on human-machine interaction behaviour and its impacts. Human-computer interaction is an individualized behaviour of learners, and different learners exhibit distinct behavioural characteristics, which are influenced by various factors. In English-speaking instruction, the specific speech behaviours elicited by this human-computer relationship are currently under-researched. Existing studies also lack sufficient analysis of the mechanisms for evaluating learning outcomes in chatbot-supported speaking instruction (Shum et al., 2023).

4.3. Implications and suggestions

Given the current research gaps and technological trends, future research on chatbots in English-speaking learning could move toward more systematic, diverse, and in-depth directions. In-depth exploration of the impact of chatbots on education, including long-term effects, optimal integration strategies, and addressing ethical considerations, may be at the forefront of research. Chatbots based on large language models differ from traditional machine learning systems in their ability to simulate the complexity of human language and provide real-time responses (Lyu et al., 2024). This technological advancement opens new possibilities for future research. Research has identified some key factors influencing chatbot design as self-directed learning, content and interaction design for speaking skill development, implementation and usage considerations, and flexible and alternative learning methods (Labadze et al., 2023). These findings provide an important reference framework for future design and application research.

In the era of digital intelligence, characterized by volatility, uncertainty, complexity, and ambiguity, intelligent technologies are advancing rapidly. Research on the effectiveness of intelligent chatbot applications in education seems to struggle to keep pace with the rapid development of technological tools. In response, educational researchers need to move beyond evaluating the effectiveness of intelligent chatbots and instead focus on their educational efficacy. This involves conducting systematic and in-depth studies on the impact of intelligent chatbots on learners' cognitive thinking, ethical values, and social interactions. In the current English-speaking instruction supported by intelligent chatbots, special attention should be paid to the developmental changes of children, primary and secondary school students, and teachers. Through the collaborative efforts of educational research experts, intelligent technology experts, frontline teachers, and educational management experts, a human-machine collaborative language education model can be achieved.

5. Conclusion

This study analysed recent empirical and review literature to explore the various teaching applications of chatbots in English-speaking instruction and their impact on learners' language proficiency and learning motivation. The results indicate that chatbots demonstrate potential to enhance learners' oral skills, reduce anxiety, and increase their willingness to communicate in various educational settings. Interactive activities designed with clear learning objectives can significantly increase learners' opportunities for oral practice and engagement, and promote self-expression in real-life contexts. However, the integration of chatbots into oral English instruction still faces significant challenges, including communication barriers caused by limitations in speech recognition and natural language understanding, a decline in usage enthusiasm after the novelty effect wears off, and increased cognitive load for both teachers and students. Teachers may need to invest additional time in technical adjustments and task design during the usage process, which could encroach on classroom teaching time. Students may become distracted by multitasking requirements and interface complexity when operating chatbots, affecting the fluency and accuracy of their oral expression. In future research, studies should be conducted to assess the long-term impact and sustained effects of chatbots on language learning, explore the adaptability and effectiveness differences of chatbots across different cultural contexts and educational systems, and investigate the transformation of teachers' roles and professional development in chatbot-assisted environments.

In summary, intelligent chatbots hold significant innovative potential and application value in English-speaking instruction. However, achieving sustainable and effective teaching practices requires continuous progress in technological optimization, instructional design, and language learning mechanisms.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

The authors declare no conflict of Interest.

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