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Exploring the role of conversational AI in developing communicative skills: A systematic review

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Abstract

Conversational AI tools, with their capacity for interactive and dynamic language exchanges, offer promising avenues for enhancing language learning. While the potential of these tools is significant, their application in developing learners' communicative skills remains relatively under-explored. This study investigates conversational AI tools and their applications in supporting communicative skills development among language learners. To this end, thirty-one studies published between 2010 and December 2024 were systematically reviewed across seven dimensions: (1) tools; (2) languages and skills; (3) theories and pedagogical approaches; (4) research methodologies; (5) mechanisms of employing conversational AI; (6) findings; and (7) challenges. Based on the results, conversation AI tools were categorized into five distinct types: embodied conversational agents (ECAs), speech recognition systems, chatbots, advanced AI-powered chatbots (such as ChatGPT), and general conversational agents. Advanced AI-powered chatbots emerged as the most prevalent type, likely due to their ability for personalized and real-time feedback. English was the most frequently targeted language, with a primary focus on speaking and writing skills. Most studies tended to adopt mixed methodologies, combining quantitative and qualitative techniques. Improvements were observed in learners' communication skills, alongside increased

motivation and autonomy. Methodological limitations, challenges in technological implementation, and ethical considerations emerged as key challenges. This review recognizes the transformational potential of conversational AI in developing students' communicative skills and recommends strategies for addressing the challenges of scaling up these technologies across diverse language contexts and effectively integrating them into educational practices.

Keywords: Conversational AI; communicative skills; review

Introduction

Education is continuously transformed by technology and in its approaches to language learning. One such innovation taking place in language learning is the emergence of a new convergent conversational form in educational technology which provides an invaluable resource for learning and teaching languages (Liu, 2025). By interacting in a naturalistic and human-like way, conversational AI means chatbots, speech recognition systems, and much more advanced AI-powered platforms like ChatGPT create environments for learners to acquire and develop their primary language competencies in a more dynamic and engaging way than could be achieved purely by human interaction (Busso & Sanchez, 2024; Li et al., 2025).

AI technology is taking the educational paradigm shifts even further away from the traditional language learning (Chang, 2023; Hao et al., 2024; Shadiev et al., 2025b). Conversational AI as the newly emerging discipline of educational technology quickly gears up to serve as an excellent support for teaching and learning languages (Fathi et al., 2024; Xing & Saeed, 2026). Using interactive human-like communication, tools like chatbots based on speech recognition, advanced AI like ChatGPT would provide and enable a very dynamic and quite involved framework for learners to learn and build their primary competencies in the language (Huang & Teng, 2025; Jahan et al., 2023). All this is driven by natural language processing and machine learning algorithms to provide real-time feedback, simulate real streaming conversations, and hyperpersonally address the learner learning needs: making learning languages more approachable, easier, and effective (Huang, 2024; Nguyen & Le, 2024).

As a result of globalization, many languages within the world have become *lingua franca* for communication, education, and even exact goals of participative consideration. It is in the light of this that educators and researchers have been seeking viable solutions to transform lives by learning techniques to address such challenges as motivation, skill building, and reducing anxiety in communication (Rusmiyanto et al., 2023). Conversation tool AIs fulfil the above conditions by providing the opportunity to practice speaking, writing, listening, and pronunciation under pressure-free conditions (Wang et al., 2024). Most of these devices not only improve linguistic competence but also bring about learner autonomy, engagement, and reduced anxiety, hence bringing about confidence in real-life student communication (Tai, 2024).

Though, indeed, they have an impact on the potential use of conversational AI in language learning. Limitations in device technology and accuracy of speech recognition have proven to create obstacles to being effective (Li et al., 2025; Xing & Saeed, 2026). Small sample size features, short duration of study, and few ways of gathering data are among many methodological issues that limit the generalizability of the findings (Wang et al., 2025). Ethical issues such as data privacy and algorithmic bias have remained huge roadblocks to the free adoption of conversational artificial intelligence (Tegos et al., 2014). Meeting these challenges is quite essential in realizing all educational signs of the potential of conversational AI.

The present study reviews 31 studies published from 2010 to 2024 around the use of conversational artificial intelligence (AI) tools in language learning. It reviews the studies through seven dimensions: tools being used, languages and skills targeted, theory and pedagogy, methodology, application of research findings, the nature of findings and challenges faced. Therefore, the following research questions guides the analysis of the reviewed literature:

- (1) What tools and platforms were employed in the reviewed studies when integrating conversational AI into language learning?
- (2) Which target languages and language skills did the reviewed research focus on?
- (3) What theoretical frameworks and pedagogical approaches underpinned the reviewed studies?
- (4) What research designs, methodologies, and data-collection techniques were used?
- (5) In what ways was conversational AI applied to support language learning across the studies?
- (6) What key findings were reported regarding the effectiveness and impact of conversational AI on language learning?
- (7) What challenges and limitations were identified in the reviewed studies, and what solutions or recommendations were proposed?

The above-mentioned dimensions were chosen based on the guidelines provided in prior systematic review studies (Shadiev & Liu, 2023; Shadiev & Sintawati, 2020). These dimensions provide a comprehensive and structured framework for understanding the current state of research on conversational AI in language learning. Examining the tools used clarifies the technological landscape, while analyzing languages and skills targeted reveals areas of emphasis and gaps in coverage. Considering theory and pedagogy allows the review to identify the conceptual foundations guiding instructional design. Evaluating methodology ensures an assessment of research rigor and diversity in study designs. Reviewing applications and findings helps determine how conversational AI has been implemented and what outcomes it has produced. Finally, analyzing challenges and proposed solutions highlights limitations in the field and informs directions for future research and practice.

This review would encapsulate all knowledge gleaned from these studies in order to facilitate teachers, researchers, and practitioners with a more elaborative view of how conversational AI contributes to the language learning, particularly to the development of communicative competence. The paper contributes to the body of knowledge on technology-enhanced language learning and the transformative potential of conversational AI in bridging the gap between traditional and modern-oriented education.

Methodology

This review was conducted to explore the application of conversational AI tools in developing communicative skills in language learning. The study was made after an overview of articles published between 2010 and 2024 (December) in the English language. The methodology of this review was based on previous studies of the scholars such as Zhai and Wibowo (2023), who reviewed the artificial intelligence dialogue systems for enhancing English as a foreign language students' interactional competence; Ayedoun et al. (2015), who reviewed the work of a conversational agent to encourage a willingness to communicate; Chiu et al. (2013), who reviewed primary students' communicative competence in a text-based computer-mediated environment and others, and Shadiev et al. (2025a) who explored the use of 360-degree video-based virtual reality in English language education. Figure 1 summarizes the workflow of review steps employed in this study.

Databases such as Scopus, Web of Science and Google Scholar were used to find relevant studies. The selection process of these studies was arranged according to the PRISMA process, which ensured the proper workflow. To find appropriate papers, keywords such as *Artificial intelligence, AI, conversation*, language learning, communicat*, skills, chatbot, ChatGPT* were used in various combinations with Boolean operators. Only journal articles or conference papers were selected for this study. Books, reviews, opinions, editorials and summaries were excluded.

The systematic search process of the study is shown in Figure 1. A total of 788 papers were found from the search. 721 articles were removed based on the title and abstract. After reviewing the main text of 67 remained articles, 36 articles were excluded due to inconsistency with the criteria, resulting in 31 articles being included in the present review. Four researchers were involved in the search and selection process. They examined all the articles thoroughly and selected relevant ones based on the defined criteria. Discrepancies during the selection process were resolved through discussion until consensus was achieved. The systematic process and collaborative approach ensured the reliability and validity of the review outcomes.

The criteria for including articles in this review were as follows: *Empirical focus*. Only empirical studies employing scientific research methods (e.g., experimental, quasi-experimental, qualitative, or mixed-method designs) and presenting original research data were included.

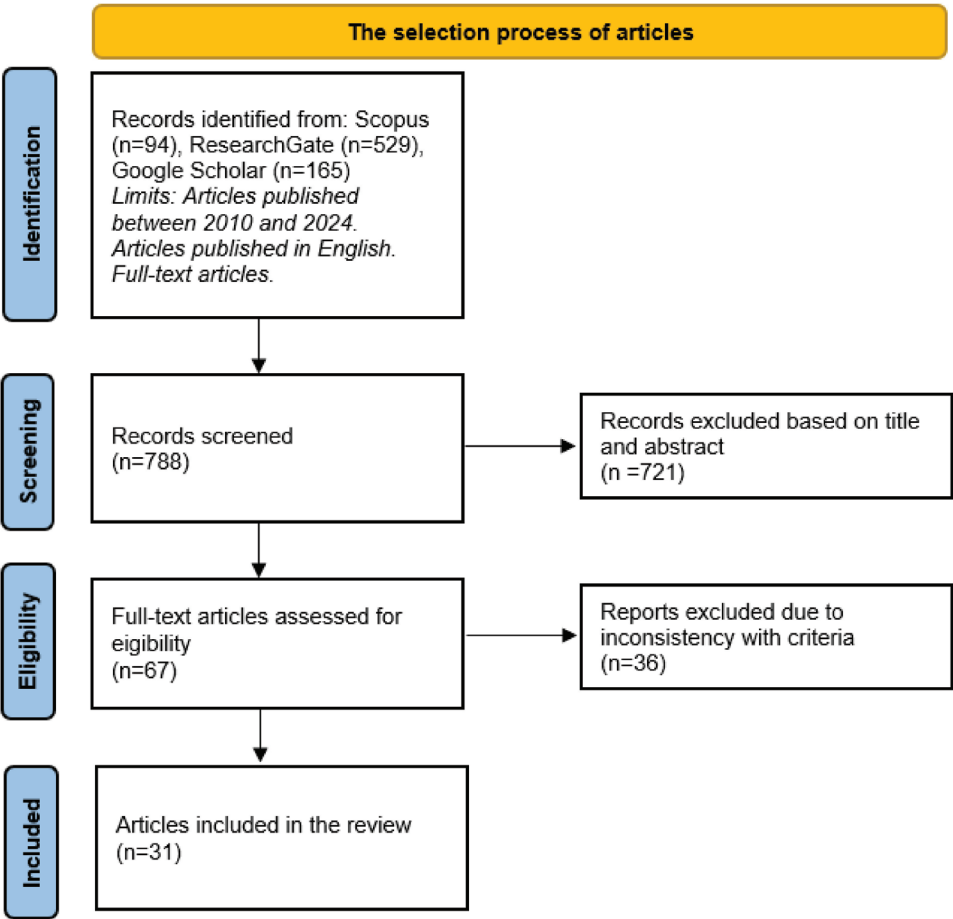


Figure 1 The PRISMA flowchart.

Relevance to conversational AI and communicative skills. Studies were required to explicitly examine the use of conversational AI in the development of communicative skills. *Academic rigor.* Only articles published in peer-reviewed journals or conference proceedings were considered. *Scope and descriptive adequacy.* Selected studies needed to provide sufficient detail regarding how conversational AI was implemented in the learning process and to discuss the specific opportunities or advantages it offered for developing communicative skills. *Timeline and language.* Only studies published in English between 2010 and December 2024 were included.

After selecting the articles, the researchers applied an open coding approach to analyze their content. This method enabled them to divide the information into segments and categorize it based on its relevance to the studied phenomena. Four researchers participated in the coding process by thoroughly reading the selected articles, marking key sections, and coding the content in line with the analytical framework. Subsequently, the codes were organized into distinct categories, with their respective attributes identified. To ensure accuracy, the researchers revisited the reviewed articles and collaboratively addressed any uncertainties or disagreements regarding the codes and categories until they reached a consensus. This systematic and cooperative approach to coding upheld the consistency and reliability of the analysis. Furthermore, we calculated Cohen's kappa to assess inter-coder reliability, and the resulting values exceeded 0.90, indicating a high level of agreement between coders.

The analytical framework was applied to studies that were found. The study investigated how AI tools were used by educators and learners, and what results were gained by researchers. We intensively analyzed and summarized research papers according to the following aspects: (1) the types of conversational AI tools that were employed, (2) the languages and communicative skills that were targeted, (3) the theories and pedagogical approaches used, (4) the research methodologies applied, (5) the specific applications of conversational AI in language learning, (6) the reported findings, and (7) the identified problems with possible solutions.

Results

Tools

The results show that tools can be grouped according to the following five ways of using them: (1) embodied conversational agents (ECAs), (2) speech recognition systems, (3) chatbots, (4) advanced AI-powered chatbots, and (5) conversational agents. The differences between ordinary chatbots and advanced AI-powered chatbots can be understood in terms of technology and interaction.

ECAs are virtual agents that integrate verbal and nonverbal communication in a human-like manner. They are represented as avatars capable of using speech, gestures, facial expressions, and body language to enhance interaction. ECAs are often deployed in immersive settings, such as virtual reality or augmented reality, to create engaging and lifelike communication experiences. They are widely used in applications like language learning, therapy, training, and customer service, where visual cues and a sense of presence improve user experience.

Conversational agents, on the other hand, refer to a broader category of tools designed to simulate human dialogue, which may or may not include a visual or embodied component. Unlike ECAs, conversational agents do not always rely on nonverbal communication like gestures or facial expressions. Instead, they focus on generating coherent, context-aware verbal interactions, whether through text, voice, or a combination of both. While ECAs are specifically designed to enhance user interaction with human-like embodiments.

Speech recognition systems focus on converting spoken language into written text and form the backbone of many conversational tools by enabling machines to process spoken commands

or queries. These systems are commonly found in virtual assistants like Siri, Alexa, or Google Assistant. They are also used in transcription services, accessibility tools for individuals with disabilities, and automated customer support. While they excel in interpreting speech, they are not inherently conversational and require additional AI systems for dialogue generation.

Chatbots perform simple conversations usually following scripts or rule-based algorithms. They might employ some natural language processing (NLP) and understand user input, but again the ability is limited. So, they mostly do structured, repetitive tasks such as answering from a list of FAQs or engaging in very basic dialogues. Examples of such tools are Replika and Andy, which have been designed to parse and have simple conversation but do not have much to offer when the question becomes too difficult or unexpected. Thus, chatbots are rigid because they do not learn or adapt with time.

On the other hand, AI applications such as deep learning and NLP give life to the real chatbots. For instance, such systems as ChatGPT and Google Bard are intelligent enough to be specific and dynamic in response generation, appreciation of context, and adaptability in user input. These perform complex activities and keep learning through reinforcement learning by giving feedback based on interaction. Unlike the older chatbot systems, such future AI models will prove their mettle in the areas requiring high intensity like reasoning, long conversations, or complex tutoring.

Across the five categories of conversational AI, studies consistently show substantial pedagogical benefits in supporting language learning, communicative competence, and learner affect (Appendix I). ECAs enhance learners' confidence, willingness to communicate, and fluency through affective backchannels and socially rich simulated environments. Speech recognition systems provide immediate corrective feedback, particularly strengthening pronunciation, intonation, and listening comprehension. Traditional chatbots contribute to fluency development, vocabulary acquisition, negotiation of meaning, and domain-specific communication through repeated, low-anxiety practice. Advanced AI-powered chatbots expand these benefits by delivering adaptive, context-rich interaction, supporting both oral and written skills, fostering intercultural communicative competence, and generating instructional materials. Conversational agents further extend affordances to collaborative learning, prompting explicit reasoning, structured dialogue, and content-integrated communication.

The affordances differ primarily in the modality, sophistication of interaction, and pedagogical scope enabled by each category. ECAs specialize in affective and motivational support due to their embodied presence and ability to simulate social cues. Speech recognition systems excel in micro-skill development, especially pronunciation and listening, through automated, form-focused feedback. Traditional chatbots offer structured conversational practice and are particularly effective for vocabulary building, fluency practice, and task-based or domain-specific communication. Advanced AI-powered chatbots stand apart by providing adaptive, contextually meaningful, and generative interaction that supports both linguistic and intercultural competence, while also contributing to instructional design. Configurable conversational agents expand affordances into collaborative learning environments, supporting reasoning, transactive dialogue, and knowledge building in group discussions, representing a broader pedagogical application beyond individual practice.

Despite their advantages, the five categories present distinct limitations that constrain their instructional value (Appendix II). ECAs and early chatbots suffer from limited realism, contextual errors, unnatural responses, and restricted conversational depth, often reducing authenticity and learner engagement. Speech recognition systems face accent-related inaccuracies, unreliable feedback, and fairness or privacy concerns, limiting their usefulness for diverse learners. Traditional chatbots struggle with shallow language understanding, repetitive dialogue, weak

error correction, and difficulty supporting complex communicative tasks. Advanced AI-powered chatbots, while more capable, show constraints related to contextual misunderstandings, generic responses, surface-level feedback, and risks of over-reliance or diminished learner autonomy, compounded by privacy and ethical concerns. Configurable conversational agents face limitations tied to unnatural voice delivery, design complexity, limited adaptability to unpredictable input, and reliance on teacher configuration.

The limitations diverge according to each category's technological maturity and interaction capabilities. ECAs and early chatbots face limitations tied to simulation fidelity, unnatural responses, lack of contextual understanding, and constrained scenario diversity. Speech recognition systems face technical and ethical constraints, such as inaccurate accent recognition, biased algorithms, unreliable feedback, and privacy risks. Traditional chatbots are restricted by shallow NLP capability, leading to incoherent or repetitive dialogue and insufficient error correction. In contrast, advanced AI-powered chatbots face higher-level pedagogical and ethical limitations, including over-reliance, generic or hallucinated responses, insufficient deep correction, and evolving model reliability, rather than simple technical flaws. Configurable conversational agents present design-dependent limitations, such as unnatural voice, difficulties handling unpredictable learner input, and reliance on educators' ability to configure effective interventions.

The results show that in terms of ECAs researchers used tools such as Animated Pedagogical Agents and MentorChat ($n = 1$). These agents were utilized to create interactive and personalized learning environments for the students. In terms of speech recognition systems, these tools were applied to facilitate real-time interaction and improve language learning. Some studies integrated these systems with natural language processing technologies or paired them with chatbots ($n = 6$). Chatbots in the reviewed studies highlight the use of both text-based and voice-based systems. For instance, Replika ($n = 2$), Andy ($n = 2$), and Google Assistant ($n = 2$) were frequently used. Additionally, chatbots such as AsasaraBot ($n = 1$), Elbot ($n = 1$), EnglishBot ($n = 1$), and Danbee AI ($n = 1$) were also identified in the studies. Researchers also employed intelligent personal assistants (IPAs) like Siri, Alexa, and Google Assistant ($n = 3$) to enhance engagement. In terms of advanced AI-powered chatbots, tools like ChatGPT (OpenAI) ($n = 7$) were the most popular, supporting reinforcement learning and intelligent tutoring. Other notable examples included Google Bard ($n = 1$) and Copilot ($n = 1$). Voice-based AI tools like Call Annie ($n = 1$) and Praktika ($n = 1$) were also utilized. Older-generation AI chatbots such as ELIZA ($n = 1$) and Mitsuku ($n = 1$) were included in specific studies. Finally, researchers noted the use of conversational agents like Cleverbot, ChatScript-based bots, and AIML-based bots in niche applications. These tools offered adaptive capabilities for interactive learning experiences.

Languages and Skills

The analysis of the reviewed studies reveals that English was the most commonly targeted language ($n = 28$), followed by Korean as a foreign language ($n = 1$), German ($n = 1$), and French ($n = 1$). One study examined dual language acquisition involving English and French. The focus on English reflects its dominant role in global education and communication, while the inclusion of other languages highlights the increasing interest in multilingual competence.

In terms of skills, speaking emerged as the primary focus ($n = 21$), followed by writing ($n = 9$), listening ($n = 6$), reading ($n = 3$), and general communication skills ($n = 2$). Some studies extended beyond linguistic competencies to include cultural and linguistic integration ($n = 1$) and fostering self-directed learning through language use ($n = 1$). Many studies explored

multiple skills simultaneously, emphasizing their interdependence and practical application in real-world settings.

The clear dominance of speaking-focused studies signals a strong perception in the field that conversational AI is most naturally aligned with oral communication practice; its affordances in turn-taking, instant feedback, and simulated interaction make speaking the most intuitive skill to target. This emphasis has undoubtedly advanced our understanding of how AI-mediated dialogue can lower anxiety, increase willingness to communicate, and support fluency development. However, such a concentration also creates several important gaps.

First, writing, listening, and reading, although essential components of balanced language proficiency, remain comparatively underexplored. Writing-focused studies tend to emphasize surface-level feedback, leaving open questions regarding higher-order skills such as argumentation, discourse organization, and genre-specific competence. Listening and reading receive even less systematic attention, despite the fact that many AI systems already integrate speech recognition and text-processing capabilities that could meaningfully support comprehension, inference-making, and critical interpretation. Limited empirical work in these areas restricts our ability to understand how AI tools can scaffold receptive skills, manage cognitive load, and facilitate multimodal input processing.

Second, the scarcity of studies addressing broader competencies, such as intercultural communication and self-directed learning, suggests that the field has not yet fully capitalized on the potential of conversational AI as a catalyst for more holistic communicative development. This omission is significant, given the increasing emphasis on cultural adaptability, critical digital literacy, and autonomous learning in contemporary language education.

Finally, the predominance of speaking research risks overgeneralizing the capabilities of conversational AI. Without parallel investigations into receptive and productive textual skills, pedagogical designers and instructors may adopt tools with incomplete evidence of their effectiveness across the full spectrum of language competencies. Balanced research is therefore essential to ensure that conversational AI supports integrated language development rather than reinforcing a narrow focus on oral communication.

Theories and Pedagogical Approaches Employed

The methodology integrates several theories and pedagogical approaches to support language learning effectively. WTC Theory ($n = 3$) forms the foundation, emphasizing learners' readiness to engage in communication based on affective and situational factors. Complementing this, Sociocultural Theory ($n = 2$) underscores the importance of social interaction and cultural context in facilitating language acquisition through collaborative tasks and scaffolding.

Self-Determination Theory ($n = 3$) is incorporated to foster motivation by addressing autonomy, competence, and relatedness, while the Affective Filter Hypothesis ($n = 2$) highlights the role of emotions, such as anxiety or motivation, in influencing language learning outcomes. Additionally, Constructivist Learning Theory ($n = 1$) and Zone of Proximal Development ($n = 1$) guide task design by connecting new information to prior knowledge and providing appropriate scaffolding to help learners achieve higher levels of understanding. Interest Development Theory ($n = 1$) supports sustained engagement by examining how interest evolves over time.

The pedagogical approaches applied include Task-Based Language Teaching ($n = 19$) and Communicative Language Teaching ($n = 1$), both prioritizing authentic, meaningful interaction and real-world language use. Problem-Based Learning ($n = 1$) and Experiential Learning ($n = 2$) encourage active, reflective, and hands-on engagement, while Flipped Learning ($n = 1$) combines independent pre-class study with collaborative in-class activities. Gamification ($n = 1$) and Adaptive Learning ($n = 1$) enhance motivation and customize learning experiences to

individual needs. The Competency-Based Approach ($n = 1$) focuses on developing specific skills for effective communication, and the Interaction Hypothesis ($n = 1$) highlights the role of interaction in facilitating language acquisition through input, output, and feedback.

These interconnected theories and approaches provide a robust framework for designing learner-centered methodologies that enhance both motivation and communication skills.

Research Methodologies in Reviewed Studies

The research methodologies adopted in the reviewed studies reflect a wide range of approaches tailored to investigate the application and effectiveness of conversational AI in language learning. These methodologies were strategically chosen to align with the research objectives, varying from quantitative to qualitative and mixed-method approaches.

Quantitative methods were frequently employed, with pre- and post-tests being a prominent choice. These tests aimed to assess measurable improvements in language skills such as speaking, writing, and listening after the integration of conversational AI tools into the learning process. For instance, studies utilizing ECAs often applied quantitative methods to evaluate changes in learners' communicative abilities or their WTC.

Qualitative approaches were also widely used, particularly case studies and observational methods. Case studies often involved designing specific scenarios, such as virtual learner personas, to analyze learner interactions with conversational AI tools in controlled settings. Interviews and surveys were commonly employed to capture in-depth insights into the perceptions of learners and teachers. These tools provided a nuanced understanding of the challenges and benefits associated with the use of conversational AI in language education.

Mixed-methods research, combining both qualitative and quantitative approaches, featured prominently in many studies. These designs often incorporated surveys, interviews, and statistical analyses to triangulate findings. For instance, some studies paired WTC surveys with classroom observations and pre- and post-test data to gain a holistic understanding of the tools' effectiveness in fostering communicative competence.

Lastly, literature reviews and systematic analyses of existing studies served as a foundation for a number of articles. These reviews synthesized findings across multiple studies to identify trends, challenges, and potential solutions in the implementation of conversational AI in language teaching. Data synthesis approaches provided a meta-perspective on the role of AI-driven tools in addressing common issues in language learning, such as learner anxiety, skill gaps, and engagement barriers.

Overall, the diverse methodological landscape underscores the comprehensive effort to evaluate conversational AI's pedagogical impact, providing robust evidence to support its integration into modern language education.

Applications of Conversational AI in Language Learning

Conversational AI tools have emerged as versatile resources in language learning, offering applications that address various linguistic skills and pedagogical objectives. These tools significantly enhance teaching and learning processes by fostering authentic communication, promoting learner engagement, and enabling skill-specific interventions.

One of the primary applications of conversational AI is the simulation of real-world communication scenarios. ECAs and chatbots allow learners to engage in interactive dialogues that replicate authentic conversational contexts. These simulations help learners develop fluency, confidence, and pragmatic competence by exposing them to realistic language use. For instance, ECAs facilitate role-playing exercises, providing opportunities for learners to practice cultural and situational appropriateness in communication.

Another critical application lies in the enhancement of writing skills. Text-based conversational AI systems, such as ChatGPT, assist learners in developing written communication by providing real-time feedback on grammar, vocabulary, coherence, and structure. These tools support iterative improvement as learners revise and refine their drafts based on the feedback received. For instance, ChatGPT has been utilized to design well-structured course content for English as a Second Language (ESL) learners, particularly in teaching business English writing.

Conversational AI tools also play a significant role in improving speaking and pronunciation skills. Speech recognition systems and chatbots offer real-time feedback on pronunciation accuracy, fluency, and intonation, enabling learners to identify and correct errors autonomously. These tools create a non-threatening environment for oral practice, reducing anxiety and fostering learner confidence. Additionally, they adapt to individual proficiency levels, offering personalized feedback that aligns with the learner's specific needs.

Listening skills are another area where conversational AI demonstrates its utility. AI-powered systems engage learners in interactive dialogues and listening exercises that are contextually relevant and adapted to their skill levels. These tools not only improve comprehension but also enhance learners' ability to interpret spoken language in diverse settings. For instance, ECAs guide learners through graded listening activities, helping them build contextual understanding and conversational responsiveness.

Furthermore, conversational AI supports the development of communication strategies, such as paraphrasing, turn-taking, and clarification. By encouraging learners to actively employ these strategies during interactions, AI tools increase their willingness to communicate and boost confidence in using the target language. Research has shown that such tools are effective in fostering learners' strategic competence, which is essential for successful communication.

Personalized and adaptive learning is another hallmark of conversational AI applications. These tools employ sophisticated algorithms to tailor feedback and exercises based on the learner's strengths and weaknesses. By addressing individual needs, they enable more efficient learning and ensure that learners focus on areas requiring improvement. Such personalization not only improves skill acquisition but also enhances motivation and engagement.

In addition to individual learning, conversational AI facilitates collaborative activities, encouraging peer interaction through shared virtual environments. These tools support group tasks, enabling learners to collaborate synchronously or asynchronously in both in-class and remote learning contexts. Collaborative learning through AI tools fosters a sense of community and enhances learners' communication and teamwork skills.

Finally, conversational AI applications extend beyond English to include other languages, such as Japanese, Spanish, and French. Tools offering multimodal interfaces, which combine text, voice, and visuals, cater to diverse learning preferences, making language acquisition more engaging and effective.

In conclusion, conversational AI tools offer a broad spectrum of applications in language learning, addressing skills such as speaking, listening, writing, and pronunciation. By integrating these tools into educational settings, educators can create dynamic, learner-centered environments that not only support skill development but also enhance learner autonomy, motivation, and confidence. These tools represent a significant advancement in language pedagogy, bridging the gap between traditional methods and modern technological capabilities.

Reported Findings

Findings reported in the reviewed studies are summarized below. Scholars frequently reported findings related to learning outcomes ($n = 18$), perceptions of using AI tools ($n = 11$), and

learner confidence ($n = 9$). Additionally, scholars reported findings related to motivation ($n = 8$), reduced language anxiety ($n = 6$), and personalized learning experiences ($n = 4$).

Findings related to learning outcomes included improvements in speaking performance ($n = 12$), writing performance ($n = 6$), pronunciation ($n = 6$), fluency ($n = 4$), vocabulary acquisition ($n = 4$), intercultural communicative competence ($n = 3$), listening performance ($n = 2$), and problem-solving abilities ($n = 1$). Language behavior findings included improved willingness to communicate ($n = 5$), autonomous learning tendencies ($n = 3$), and collaboration ($n = 2$).

Other findings highlighted the affordances of conversational AI tools: their role in creating structured environments for practice ($n = 7$), providing real-time feedback ($n = 6$), fostering creativity ($n = 3$), supporting emotional and communicative strategies ($n = 3$), reducing speaking anxiety ($n = 2$), and increasing task engagement ($n = 2$).

Future studies could focus on optimizing emotional support and expanding the contexts where these tools are applied to address broader learner needs and long-term language proficiency.

Reported Problems in Reviewed Studies and Possible Solutions

The reviewed studies identified various problems related to the use of AI tools in language learning, which can be grouped into three main categories: methodology, technology implementation, and the learning process.

Methodological issues were common, with studies frequently reporting small sample sizes ($n = 7$), short study durations ($n = 5$), and the absence of control groups ($n = 4$). Inadequate data collection strategies were also highlighted ($n = 6$). Less frequently mentioned issues included challenges related to participants ($n = 2$), limitations in experimental design ($n = 1$), and the absence of formal assessments for English proficiency ($n = 1$). These limitations hindered the generalizability and reliability of findings. To address these challenges, researchers recommended conducting larger, more diverse studies, employing control groups, and extending the duration of research to provide more meaningful insights.

Technological challenges were another significant concern. Physical problems with devices were the most frequently reported ($n = 9$), followed by technical difficulties ($n = 7$). Other issues included low-quality videos ($n = 2$), lengthy or limited video content ($n = 2$), a shortage of devices ($n = 2$), and novelty effects ($n = 2$). There were also some less common problems like unknown technology ($n = 1$), missing texts ($n = 1$), and increased cognitive load ($n = 1$). Recommendations were made to ameliorate better quality usage of AI tools, include better speech recognition capabilities, and add contextual features to conversational instances for more natural and engaging interaction.

The learning process identified problems such as inadequate feedback from teachers ($n = 2$), little regard for learners' technological competence ($n = 1$), and understanding task difficulties ($n = 1$). There were distractions ($n = 1$), vocabulary ($n = 1$), and problems with pronunciation ($n = 1$). Suggestions include provision of instructor support, designing clear and structured tasks, and matching tasks with learners' proficiency levels.

Some of the issues that arose included those of ethical interest like data privacy and algorithmic bias. To redeem such issues, the emphasis of researchers was on needing ethical guidelines, data privacy as well as responsible integration of AIs into learning environments. Suggestions were made with regard to integrating AIs with traditional teaching modes along with being teacher-guided to get the best of the tools and mitigate their demerits.

Discussion

Tools

Five main categories were identified regarding conversational AI tools for language learning. ECAs are virtual agents designed to interact with users in a human-like manner, combining

speech with nonverbal cues to enhance communication. ECAs, such as Animated Pedagogical Agents (Ayedoun et al., 2015) and MentorChat (Tegos et al., 2014), are tools that simulate real-life conversations through avatars capable of verbal and nonverbal communication, including gestures, facial expressions, and body language. These tools help create interactive and personalized learning environments, making learning more engaging. However, ECAs were only used in one study, leaving room for further exploration of their effectiveness across different languages and cultures.

Speech recognition systems, which are tools designed to convert spoken language into written text, were commonly used to improve pronunciation and support real-time conversations (Rusmiyanto et al., 2023). These systems enable users to practice speaking while receiving feedback, and in some cases, they were combined with chatbots to create more interactive learning experiences (Khatamova et al., 2024). While promising, speech recognition systems can struggle with different accents and speech patterns, which is an area for potential improvement (Shadieff & Liu, 2023).

Chatbots, defined as tools that engage in simple, rule-based conversations to simulate human interaction, were widely used in language learning (Mahmoud, 2022). Examples include text- and voice-based options like Replika (Kim et al., 2021), Andy (Mahmoud, 2022), and Google Assistant (Tai, 2024). These tools provide learners with opportunities for independent practice, while specialized tools such as AsasaraBot (Mageira et al., 2022) and EnglishBot (Ruan et al., 2021) served specific purposes. However, the variety of chatbots used indicates a lack of standardization, and a more consistent approach could enhance their effectiveness in language learning.

Advanced AI-powered chatbots, which are conversational tools leveraging deep learning and advanced natural language processing (NLP) to generate adaptive, context-aware interactions, were the most widely used in this category. Tools like ChatGPT (Wang et al., 2024) offer smarter, more personalized interactions, making them particularly effective for language practice and cultural exchange. However, their reliance on proprietary technology raises concerns about cost and privacy (Kovačić & Bubaš, 2024). It will be essential to make these tools more accessible while addressing ethical considerations (Busso & Sanchez, 2024).

Conversational agents, defined as tools designed to simulate human-like dialogue through text or voice interactions, were used in smaller, more specific applications. Examples include Cleverbot (Chang (2023) and AIML-based bots (Haristiani, 2019), which provide adaptive learning experiences for niche purposes. Although less advanced than tools like ChatGPT, these agents still contribute to interactive learning experiences in specialized contexts.

Overall, there is a clear trend toward using AI-powered tools to create more engaging and personalized learning experiences. Tools like ChatGPT and MentorChat show significant potential, but their implementation must carefully consider factors like cost, accessibility, and ethical concerns. Future research should focus on balancing innovation with practicality to ensure these tools can be widely and effectively used. This shift toward AI and conversational agents presents exciting opportunities for language education, offering new ways to meet diverse learner needs.

The main differences between these tools lie in their complexity and capabilities. ECAs combine verbal and nonverbal communication through embodied avatars, making them uniquely immersive. Speech recognition systems focus on analyzing and responding to spoken input, primarily aiding pronunciation. Chatbots are simpler, rule-based tools offering structured interactions, while advanced AI-powered chatbots use deep learning and natural language processing for dynamic, adaptive communication. Conversational agents sit between traditional chatbots and ECAs, providing basic adaptability but lacking embodiment or advanced AI capabilities. Each tool serves distinct purposes, catering to different aspects of language learning.

Languages and Skills

The results from the analysis of the reviewed studies reveal that English remains the dominant target language, which aligns with its global importance in education and communication. The presence of other languages such as Korean (Kim & Su, 2024), German (Mazzilli, 2021), and French (Mageira et al., 2022), though less common, highlights the increasing interest in multilingualism and the expansion of language education beyond English. This trend suggests that as language learning technologies and methods continue to evolve, there is an opportunity for further research into less commonly taught languages and dual-language acquisition, which may offer unique challenges and learning benefits.

The predominant focus on speaking skills is reflective of the growing recognition that verbal communication is central to real-world language use. Speaking subskills such as pronunciation, fluency, and conversational competence were examined in various contexts (Ayedoun et al., 2015; Tai, 2024; Wang et al., 2024), underscoring the importance of creating authentic learning environments where learners can practice these skills. The integration of speaking with other skills, like listening and writing (Ayedoun et al., 2029; Wei, 2023), indicates that language development is rarely isolated to one area, but rather involves the simultaneous improvement of multiple competencies. For instance, the studies that focused on writing skills in combination with speaking, such as business email composition and grammar refinement, suggest that learners benefit from a comprehensive approach that mirrors real-world communication scenarios (Kim et al., 2023).

Listening skills (Dizon, 2017) were less frequently explored but were often linked with real-world applications, such as conversational fluency and detail extraction in spoken interactions. This connection between listening and other communication skills demonstrates that these abilities are interdependent. Despite the fewer studies on reading (Rusmiyanto et al., 2023), the integration of reading into broader frameworks of communication and learner autonomy is a valuable approach for supporting comprehensive language development.

The inclusion of non-traditional language skills, such as intercultural communication, problem-solving, and fostering learner autonomy (Chan, 2023; Chang, 2023), reflects the growing recognition of the importance of holistic language education. By addressing areas such as reducing foreign language speaking anxiety (FLSA) and enhancing learners' WTC and self-perceived communicative competence (SPCC), these studies are advancing the field by promoting both the technical and psychological aspects of language learning (Kim & Su, 2024; Wang et al., 2024).

Overall, the findings suggest that language education is moving toward a more comprehensive, learner-centered approach that integrates a range of linguistic and non-linguistic skills. This shift acknowledges the multifaceted nature of language acquisition, emphasizing the need for diverse teaching strategies that account for both language mastery and personal development, including cultural awareness and autonomous learning. Future studies could explore the effectiveness of these integrated approaches in various educational settings, as well as the potential for technologies to support a wider variety of skills in diverse language contexts.

Theories and Pedagogical Approaches Employed

The results underscore the effectiveness of integrating diverse theoretical frameworks to support language learning. WTC Theory, as a foundational element, highlights the critical role of affective and situational factors in encouraging active participation in communication, aligning with studies that emphasize reducing communication barriers to enhance learner confidence (Ayedoun et al., 2019; Kim & Su, 2024). Sociocultural Theory further validates the importance of collaborative tasks and interaction in building language proficiency (Tai, 2024).

Self-Determination Theory (Fryer et al., 2019) and the Affective Filter Hypothesis (Busso & Sanchez, 2024) complement this by addressing motivational and emotional aspects, fostering autonomy while reducing anxiety, thereby creating an environment conducive to engaging with challenging language tasks. Similarly, Constructivist Learning Theory and the Zone of Proximal Development (Haristiani, 2019) illustrate how scaffolding and connecting new information to prior knowledge facilitate meaningful learning experiences, while Interest Development Theory (Fryer et al., 2019) ensures sustained engagement over time.

The pedagogical approaches applied demonstrate practical relevance and effectiveness. Task-Based Language Teaching and Communicative Language Teaching (Jahan et al., 2023; Kim et al., 2023) emphasize authenticity and real-world application, meeting learners' practical needs through interaction and meaningful use of language. Problem-Based Learning and Experiential Learning (Chang, 2023; Fryer et al., 2019) further enhance this by promoting critical thinking and reflection, enabling learners to bridge theory and practice. Flipped Learning (Chang, 2023) maximizes classroom interaction through pre-class preparation, while Gamification and Adaptive Learning (Abdurazakova, 2024; Rusmiyanto et al., 2023) contribute to dynamic, personalized learning experiences. The Competency-Based Approach (Khatamova et al., 2024) ensures the acquisition of specific skills, and the Interaction Hypothesis (Kim, 2017) underscores the necessity of ample opportunities for input, output, and feedback.

This interconnected framework fosters learner-centered language education by addressing both motivation and communication skills. However, there are opportunities for further development, particularly in areas such as intercultural competence and advanced cognitive skills. Incorporating these elements, especially in multicultural settings, could enhance learners' ability to navigate diverse communicative contexts. Additionally, the potential of technology-enhanced methods like adaptive learning and gamification warrants deeper investigation to optimize their application for specific learner profiles and contexts. Overall, the results affirm the efficacy of a multi-theoretical, multi-approach methodology while highlighting the need for continued exploration to broaden its impact.

Research Methodologies

The reviewed studies employed a variety of research methodologies, reflecting a comprehensive approach to understanding the impact of conversational AI in language learning. These methodologies were carefully chosen to align with specific research objectives, encompassing quantitative, qualitative, and mixed-method approaches.

Quantitative methods were frequently utilized, particularly through pre- and post-tests (Mageira et al., 2022; Minh & Khanh, 2024) aimed at measuring improvements in language skills such as speaking, writing, and listening. ECAs were often assessed using quantitative techniques to evaluate changes in communicative abilities and learners' WTC, providing clear, data-driven insights into AI tools' effectiveness.

Qualitative methods, including case studies and observational research (Haristiani, 2019; Dizon, 2017), were also prevalent. Case studies typically involved designing virtual scenarios to observe learner interactions with AI tools. Interviews and surveys (Khatamova et al., 2024; Kim & Su, 2024) offered deeper insights into learners' and teachers' perceptions, highlighting both the challenges and benefits of using conversational AI in language education. These methods captured the nuanced experiences and contextual factors influencing AI integration.

Mixed-methods research (Belda-Medina & Calvo-Ferrer, 2024), combining quantitative and qualitative approaches, featured prominently in many studies. This triangulation of data often involved surveys, interviews, and statistical analyses, providing a holistic view of AI tools' effectiveness. For example, some studies paired WTC surveys with classroom observations and

pre- and post-test data, allowing for a well-rounded assessment of communicative competence development (Fryer et al., 2019).

Additionally, literature reviews and systematic analyses synthesized findings from multiple studies, offering meta-perspectives on trends, challenges, and solutions related to conversational AI in language learning. These reviews helped identify recurring issues such as learner anxiety, skill gaps, and engagement barriers, further underscoring the tools' potential to address these challenges (Rusmiyanto et al., 2023).

Overall, the diverse methodological landscape reflects a thorough effort to evaluate conversational AI's pedagogical impact. The combination of quantitative, qualitative, and mixed-method approaches has provided robust evidence supporting the integration of AI-driven tools into modern language education. This methodological variety ensures a comprehensive understanding of AI's role in fostering language learning outcomes.

Applications of Conversational AI in Language Learning

Conversational AI tools have emerged as powerful resources in language learning, offering diverse applications that cater to various linguistic skills and pedagogical objectives. Their ability to simulate real-world communication, personalize learning, and foster engagement makes them essential in modern language education.

A key application of conversational AI is the simulation of authentic communication scenarios (Ayedoun et al., 2015). ECAs and chatbots provide learners with interactive dialogues that mimic real-life conversations, helping them develop fluency, confidence, and pragmatic competence (Chang, 2023; Mahmoud, 2022). Role-playing exercises facilitated by ECAs allow learners to practice cultural and situational nuances, enhancing their ability to communicate effectively in different contexts (Kovačić & Bubaš, 2024; Shorey et al., 2019).

Writing skills also benefit significantly from conversational AI (Kim et al., 2023). Text-based systems, such as ChatGPT, offer real-time feedback on grammar, vocabulary, coherence, and structure, enabling learners to refine their writing iteratively (Jahan et al., 2023). These tools are particularly effective in teaching specialized forms of writing, such as business English, where learners can design and revise content with guided support (Kim et al., 2023).

In speaking and pronunciation, AI tools such as speech recognition systems and chatbots provide real-time feedback on accuracy, fluency, and intonation (Rusmiyanto, et al., 2023). This personalized feedback helps learners self-correct and build confidence in a low-pressure environment (Abdurazakova, 2024). By adapting to individual proficiency levels, these tools foster autonomous learning and reduce anxiety associated with oral practice (Mahmoud, 2022).

Conversational AI also enhances listening skills by engaging learners in contextually relevant dialogues and exercises tailored to their skill levels (Dizon, 2017). ECAs guide learners through graded listening activities, improving comprehension and responsiveness in diverse settings (Chang, 2023). This contextual approach helps learners build both language understanding and conversational agility (Ayedoun et al., 2019).

Additionally, these tools support the development of communication strategies, such as paraphrasing, turn-taking, and clarification (Mazzilli, 2021). Encouraging the active use of these strategies during interactions boosts learners' willingness to communicate and enhances strategic competence, which is critical for effective language use (Ayedoun et al., 2019).

Personalization is a standout feature of conversational AI (Belda-Medina & Calvo-Ferrer, 2024). Through sophisticated algorithms, these tools tailor feedback and activities to individual needs, ensuring efficient skill acquisition and targeted learning (Fryer et al., 2019). This personalized approach not only improves outcomes but also enhances motivation and engagement, keeping learners focused and inspired (Jahan et al., 2023).

Collaborative learning is another significant application (Busso & Sanchez, 2024; Tegos et al., 2014). AI tools facilitate group tasks and peer interactions in virtual environments, supporting both synchronous and asynchronous collaboration (Kovačić & Bubaš, 2024). These activities foster a sense of community and enhance teamwork and communication skills, crucial for language learners.

Moreover, conversational AI is not limited to English; it supports multiple languages, including Korean, German, and French (Kim & Su, 2024; Mageira et al., 2022; Mazzilli, 2021). Multimodal interfaces, combining text, voice, and visuals, cater to diverse learning preferences, making language acquisition more engaging and effective.

In conclusion, conversational AI offers a broad range of applications in language learning, addressing critical skills such as speaking, listening, writing, and pronunciation. By integrating these tools into educational settings, educators can create dynamic, learner-centered environments that promote autonomy, motivation, and confidence. These tools represent a significant advancement in language pedagogy, bridging traditional methods with modern technological capabilities.

Reported Findings

The results highlight the potential of AI and conversational agents to transform language learning, particularly in developing communication skills (Kim et al., 2021; Rusmiyanto, et al., 2023). Significant improvements were observed in pronunciation, fluency, and vocabulary acquisition, showing how effective these tools are in targeting critical aspects of language learning. Additionally, many learners reported feeling more confident and less anxious when speaking, suggesting that AI provides a supportive, low-pressure environment for practice (Mahmoud, 2022; Wei, 2023).

Conversational agents like chatbots stood out as particularly effective, offering learners opportunities to practice real-world conversations (Abdurazakova, 2024). These tools were shown to enhance learners' willingness to communicate, and studies found that combining emotional support (affective strategies) with communication practice yielded the best results (Kim & Su, 2024).

Another key benefit of AI tools is their ability to deliver personalized learning experiences (Jahan et al., 2023). Instant feedback and tailored responses allowed learners to focus on their individual needs (Mazzilli, 2021), while collaborative tools like blogs and videos encouraged creativity and active engagement (Khatamova et al., 2024). Gamified features further boosted motivation, making learning more enjoyable and interactive (Dizon, 2017).

AI also helped address common challenges in traditional language education, such as limited practice opportunities and high anxiety levels (Rusmiyanto, et al., 2023). By creating structured and accessible environments, these tools made it easier for learners to overcome these barriers and practice effectively.

These findings show that AI and conversational agents hold great promise for language education. Future studies could focus on how these tools impact learner autonomy and long-term language proficiency. It would also be valuable to explore ways to optimize the use of emotional support and communication strategies to benefit a wider range of learners.

Reported Problems in Reviewed Studies and Possible Solutions

The studies reviewed highlighted several challenges in using AI tools for language learning, focusing on methodology, technology, and the learning process. Addressing these issues is crucial for making AI integration more effective and beneficial.

Methodological challenges were common, e.g. small sample sizes, short study durations, and the absence of control groups (Ruan et al., 2021). Although many reviewed studies report

increased motivation, reduced anxiety, and perceived gains in communicative competence, these conclusions are often based on short-term interventions and small samples, which limits the reliability of the evidence. Brief exposure to conversational AI tends to amplify the novelty effect, making it likely that improvements in willingness to communicate or confidence reflect temporary enthusiasm rather than sustained pedagogical impact. In several cases, chatbots were tested through scripted or highly structured tasks, meaning that reported gains in fluency or pronunciation may not transfer to authentic, spontaneous communication. Studies such as Ruan et al. (2021) even found minimal long-term improvements, highlighting the need for caution when interpreting positive results derived from limited or controlled scenarios.

Furthermore, many findings rely heavily on self-reported perceptions, which are sensitive to learners' expectations and cannot fully capture actual proficiency growth. At the same time, persistent issues, such as limited contextual understanding, inaccurate speech recognition, and shallow conversational depth, indicate that current AI tools may support basic practice but still fall short in developing higher-order communicative competence and intercultural skills. These methodological constraints suggest that the evidence base may overstate the effectiveness of conversational AI unless validated by more robust, longitudinal research designs.

Researchers also pointed out such issues as inadequate data collection methods and, in some cases, the lack of formal assessments for learners' English proficiency (Kim & Su, 2024). This limits the precision with which learning gains can be measured, as self-report data or informal observations cannot substitute for standardized proficiency evaluations. Without rigorous assessment procedures, it becomes difficult to determine whether improvements arise from genuine language development or merely reflect learners' positive perceptions of using novel AI tools.

To improve future research, it's recommended to conduct larger, longer-term studies with diverse participants and robust experimental designs, including control groups, to provide more meaningful insights.

Technological challenges were another significant hurdle. Physical problems with devices and technical difficulties were the most frequently cited, but other issues like low-quality videos, limited or overly long content, and a shortage of devices also affected the learning experience (Fryer et al., 2019; Mageira et al., 2022). Some learners struggle with unfamiliar technology or find the novelty of AI tools distracting (Kim & Su, 2024). Such barriers can reduce learners' cognitive capacity for meaningful language practice, as attention is diverted from communication tasks to troubleshooting technical glitches. They also create unequal learning conditions, where students with better devices or stronger digital literacy benefit more than those with limited access or experience. To address these issues, researchers suggested improving the usability and reliability of AI tools, enhancing speech recognition features, and expanding conversational contexts to create more engaging and realistic interactions.

In terms of the learning process, learners faced challenges such as insufficient feedback from instructors, difficulties understanding tasks, and gaps in technological proficiency (Tai, 2024). Other issues included distractions and struggles with vocabulary and pronunciation (Kim et al., 2021). These challenges can hinder learners' ability to engage meaningfully with AI-supported activities, as unclear guidance or limited feedback reduces opportunities for corrective learning. They also highlight the need for pedagogical scaffolding, since learners may become frustrated or disengaged when the cognitive demands of tasks exceed their technological or linguistic readiness. Proposed solutions include increasing instructor support, designing clear and structured tasks, and tailoring activities to match learners' proficiency levels, ensuring a better fit for their needs.

Finally, ethical concerns, such as data privacy, algorithmic bias, and transparency, were raised. Yet, the implications for educational practice are more serious than the literature currently

reflects. Advanced systems such as ChatGPT collect and process sensitive learner data, raising questions about consent, storage, and the potential for misuse, especially in institutions lacking strong regulatory frameworks (Busso & Sanchez, 2024; Kovačić & Bubaš, 2024). Bias in speech recognition or contextual interpretation disproportionately affects learners with diverse accents or cultural communication styles, potentially reinforcing inequities in language development (Jahan et al., 2023).

Moreover, the fact that leading AI systems are commercially owned introduces challenges for equitable and sustainable access (Minh & Khanh, 2024). Subscription costs, changing service conditions, and dependence on proprietary technologies risk creating new forms of digital divide (Abdurazakova, 2024). Educational institutions may become reliant on systems whose internal operations are opaque, limiting their ability to guarantee fairness, accountability, or long-term integration. Addressing these concerns requires clearer guidelines for responsible AI use, transparent communication about risks, and exploration of more accessible or open-source alternatives to ensure that AI-enhanced language learning remains inclusive and sustainable (Kovačić & Bubaš, 2024). Combining AI tools with traditional teaching methods and incorporating teacher-led guidance are also recommended to maximize the benefits of AI while addressing these concerns.

Overall, these findings highlight the need for collaboration between educators, researchers, and technologists to address these challenges. By improving research methods, enhancing technology, and focusing on ethical and learner-centered approaches, AI tools can better support language learning and create a more effective and inclusive educational experience.

Conclusion

This study explored the use of AI-powered tools in language learning, particularly focusing on their impact in creating engaging, personalized learning environments. The findings indicate that tools like ECAs, speech recognition systems, chatbots, and advanced AI-powered tools such as ChatGPT are gaining traction in language education, offering varied applications that address different linguistic skills. These tools help enhance speaking, writing, pronunciation, and listening skills while promoting learner autonomy and reducing anxiety, especially when offering personalized feedback and real-time interactions. While AI technologies demonstrate promising potential, there is still much room for exploration in their integration into diverse educational settings across multiple languages and cultures.

In summary, the shift toward AI in language learning presents an exciting opportunity for educators and learners alike, creating dynamic, learner-centered environments that promote effective language acquisition. However, their implementation must carefully balance factors such as accessibility, cost, and ethical considerations. Future research is essential to refine these tools, optimize their use for diverse learner needs, and address the challenges posed by AI integration in educational contexts.

Recommendations

Educators and researchers should carefully select AI-powered tools based on the specific language learning goals, learners' proficiency levels, and available technological resources. It is essential to consider the technological capacity of the tools, the learners' skills, and the learning environment to ensure that these tools are used effectively. Future research should extend beyond English to include less commonly taught languages and explore how AI tools can support various language skills, including speaking, writing, listening, and intercultural communication.

Additionally, studies would benefit from being guided by robust theoretical frameworks, such as Willingness to Communicate, Sociocultural Theory, or Self-Determination Theory. These

theories can provide a structured and scientific approach to understanding the role of AI in language learning. Beyond Task-Based Language Teaching, educators should experiment with other pedagogical approaches, such as experiential learning, collaborative learning, and problem-based learning, to fully utilize the interactive potential of AI tools. Research methodologies should involve larger sample sizes and longer study durations to produce more robust findings. A mixed-method approach, combining both qualitative and quantitative data, will provide a more comprehensive understanding of the impact of AI-powered tools on language acquisition.

Limitations

This study acknowledges several limitations that should be considered in future research. One challenge is the rapid pace of technological development, with some tools quickly becoming outdated or unsupported, as seen with platforms like Google Expeditions. As new tools emerge, some of those identified in this study may become obsolete, while others may continue to evolve.

Another limitation is the variability in research design. The studies included in this review may have used different data sources, inclusion/exclusion criteria, and selection methods, which could lead to discrepancies in the findings. Furthermore, some studies did not provide complete information about the tools, theories, or methodologies used, limiting the depth of analysis in the current review.

Lastly, while the field of AI in language learning is gaining attention, the available body of research remains relatively small. Only a limited number of studies met the inclusion criteria for this review. Therefore, more research is needed to explore AI's applications across diverse educational contexts and languages, as well as to examine its impact on various aspects of language learning beyond what is currently studied.

Conflict of Interest

No conflict of interests.

Data Availability Statement

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Appendix I: Pedagogical affordances of conversational AI across five categories

A. Embodied Conversational Agents (ECAs)

- Simulation of real-world/authentic conversations in diverse contexts.
- Support for improving speaking fluency, confidence, and willingness to communicate (WTC).
- Reduction of nervousness and anxiety during communication.
- Provision of verbal and affective backchannels to enhance communicative confidence.
- Use of communicative and affective strategies to foster interactional fluency and reduce anxiety.
- Facilitation of socially supportive learning environments aligned with Social Agency Theory.

B. Speech recognition systems

- Enhancement of pronunciation, intonation, phonological accuracy, and fluency.
- Real-time, automatic feedback for pronunciation and listening comprehension.
- Development of listening skills through immediate corrective input.
- Improved learner autonomy by enabling self-paced oral practice.
- Support for multi-skill development (listening, speaking, reading, writing) through multimodal inputs.

C. Chatbots

- Opportunities for speaking practice, pronunciation improvement, and fluency development.
- Support for real-time oral communication through text or voice interaction.
- Enhancement of lexical range, vocabulary development, and syntactic accuracy.
- Motivation and confidence building through low-anxiety conversational environments.
- Facilitation of negotiation of meaning (e.g., confirmation checks, clarification requests).
- Support for domain-specific communication (e.g., Tourism English, conflict solving, intercultural communication).
- Opportunities for asynchronous practice and role-play tasks.
- Development of sociolinguistic and strategic competence.
- Fostering self-regulated and autonomous learning.
- Availability as accessible, ubiquitous conversational partners beyond class hours.

D. Advanced AI-powered chatbots

- Generation of well-structured instructional content, tasks, and assessment activities.
- Provision of personalized, adaptive, and contextually meaningful communication exercises.
- Instant, human-like responses supporting interactive learning.
- Improved WTC, reduced anxiety, and enhanced communicative competence.
- Support for writing skills (e.g., business email composition, tone adjustment, grammar handling).
- Facilitation of multi-turn dialogue, role-play, and context-driven communicative scenarios.
- Capability to boost motivation, promote extended conversation, and strengthen learner engagement.

- Ability to model intercultural sensitivity and support ICC development.
- Assistance in asynchronous communication skill development (verbal expressivity, composure).

E. Conversational agents (non-embodied, configurable language-learning agents)

- Triggering of productive dialogue in group work through configured interventions.
- Promotion of explicit reasoning, collaborative problem solving, and transactive dialogue.
- Enhancement of vocabulary recall and domain understanding in group discussions.
- Support for real-world simulations for professional communication (e.g., nursing counseling dialogues).
- Integration of adaptive, data-driven, and gamified learning experiences.

Appendix II: Limitations of conversational AI across the five categories

A. Embodied Conversational Agents (ECAs)

- Limited diversity and realism of conversational contexts.
- Learner hesitation, anxiety, and limited emotional support in some scenarios.
- Contextual errors and unrealistic interactions from agents.
- Speech recognition problems reducing interaction quality.

B. Speech recognition systems

- Difficulty recognizing non-standard accents or low-proficiency learners' speech.
- Inaccurate or unreliable corrective feedback.
- Algorithmic bias affecting fairness.
- Privacy and data protection concerns regarding voice data.
- Lack of nuanced feedback and insufficient depth in listening-skill scaffolding.

C. Chatbots

- Limited conversational depth and contextual understanding.
- Repetitive, mechanistic, or incoherent responses.
- Failure to correct errors consistently.
- Limited ability to handle complex tasks (e.g., problem-solving, abstract reasoning).
- Credibility issues: perceived as lacking authenticity.
- Memory and dialogue-flow limitations.
- Learners' unfamiliarity with technology or discomfort using chatbots.
- Reduced engagement for challenging tasks; variability in learner motivation.
- Constraints in providing nuanced sociocultural appropriateness.

D. Advanced AI-powered chatbots

- Limited feedback depth for complex language issues, tendency toward surface-level correction.
- Over-reliance risk leading to diminished learner autonomy or critical thinking.
- Contextual misunderstandings and generic responses.
- Lack of active learner interaction modes (limited speaking/listening in text-only models).
- Accent recognition challenges for oral tasks.
- Ethical concerns (privacy, evolving model behavior, reliability of outputs).
- Novelty effects and variable long-term learning impact.

E. Conversational agents

- Unnatural voice or robotic delivery reducing authenticity.
- Inconsistent student engagement with intervention strategies.
- Technical limitations in speech recognition and natural language understanding.
- Communication gaps between educators and developers during system design.
- Difficulties handling unpredictable learner input.
- Limited adaptation to learner-generated texts or contributions.