



EXAMINING THE ROLE OF AI CONVERSATIONAL BOTS, SPEAKING SKILLS, AND SPEAKING ANXIETY AMONG PAKISTANI ESL UNDERGRADUATE LEARNERS

Muhammad Raza
m.raza@zu.edu.pk

English Lecturer & Academic Coordinator, College of Language,
Literature and Culture, Zia Uddin University, Karachi, Pakistan.

Farhana Yasmeen Qadri
farhana.yasmeen@bbsul.edu.pk

Assistant Professor, Department of English, Benazir Bhutto Shaheed
University, Lyari, Karachi, Pakistan.

Shazia Naz
shazia.naz@zu.edu.pk

English Lecturer, College of Language, Literature and Culture,
Ziauddin University, Karachi, Pakistan.

Abstract

This study explores the role of AI conversational bots in enhancing English speaking skills and reducing speaking anxiety among Pakistani ESL undergraduate learners. In Pakistan, many university students face difficulties in speaking English fluently due to limited opportunities for oral communication, lack of confidence, and fear of making mistakes. The study adopted a qualitative research design to investigate students' perceptions and experiences regarding the use of AI-powered conversational tools for speaking practice. Data were collected through semi-structured interviews with undergraduate ESL learners from universities in Karachi, Pakistan. Thematic analysis was employed to analyze the interview data. The findings revealed that students perceived AI conversational bots as supportive tools for improving speaking fluency, pronunciation, vocabulary, and confidence in English communication. Participants also reported that interacting with AI bots created a low-anxiety learning environment that reduced fear of judgment and increased motivation to practice speaking regularly. Moreover, the accessibility and interactive nature of AI-based applications encouraged autonomous learning and continuous engagement in speaking activities. The study highlights the potential of AI conversational bots as innovative technological tools for improving speaking proficiency and minimizing speaking anxiety in Pakistani ESL contexts. The findings may assist language teachers, curriculum developers, and educational institutions in integrating AI-assisted language learning strategies into English language classrooms.

Keywords: *Artificial Intelligence (AI), Conversational Bots, ESL Learners, Speaking Anxiety, Speaking Skills.*

Corresponding Author: Muhammad Raza (English Lecturer & Academic Coordinator, College of Language, Literature and Culture, Zia Uddin University, Karachi, Pakistan)
Email: m.raza@zu.edu.pk

1. Introduction

Building strong second language (L2) speaking competence is a fundamental component of language acquisition and effective communication (Horwitz et al., 1986). Nevertheless, Foreign Language Speaking Anxiety (FLSA)—defined as the apprehension and psychological unease experienced when attempting to speak in a non-native language—continues to pose a significant barrier for a large number of English as a Second Language (ESL) learners (Bárkányi, 2021; Horwitz et al., 1986). This form of anxiety, widely documented among language learners globally (MacIntyre, 2017), commonly leads to avoidance behaviors and obstructs the development of oral proficiency (Ozdemir & Papi, 2022; Woodrow, 2006). At a deeper level, it undermines broader language acquisition processes by weakening learners' readiness to communicate and their active participation in language use (MacIntyre et al., 1998; Zhou et al., 2023). These realities make it increasingly urgent for researchers and practitioners to develop and test interventions that can meaningfully reduce FLSA while simultaneously advancing L2 speaking proficiency.

In response to this need, scholars and language educators have examined a broad spectrum of instructional strategies and interventions, ranging from conventional classroom-based activities (Horwitz et al., 1986) to technology-mediated language learning programs (Aktaş, 2023; Chen, 2022; Derakhshan et al., 2024b). Yet a thorough understanding of how various pedagogical approaches, learning contexts, and individual learner characteristics collectively shape FLSA and its enduring consequences remains insufficiently explored in the existing literature. This gap is particularly pronounced in the Pakistani ESL context, where English occupies a complex sociolinguistic position as both a medium of instruction and a marker of social and professional mobility (Rahman, 2004; Shamim, 2011). Despite its official status, widespread deficiencies in spoken English proficiency persist among university students, largely attributed to inadequate communicative practice opportunities, teacher-centered pedagogical traditions, and deeply ingrained fear of oral error (Shamim, 2011; Coleman, 2011).

One promising pathway for addressing FLSA involves incorporating Artificial Intelligence (AI) technologies into second language education. While conventional L2 speaking practices—including structured classroom interactions, peer-based discussions, and instructor-led sessions—remain foundational to language learning, they frequently fall short in meeting the needs of learners who experience heightened levels of FLSA. The fear of being evaluated and the social pressure inherent in peer-facing performance can suppress participation, particularly among anxious learners who feel inhibited by the possibility of making mistakes (MacIntyre, 2017; Renandya & Nguyen, 2022). Additionally, conventional methods often lack the capacity to deliver individualized and sufficiently frequent practice, a limitation that becomes especially problematic in large

classrooms or resource-constrained educational settings. Research has further demonstrated that traditional instructional approaches tend to neglect the psychological dimensions of language learning, thereby intensifying anxiety, particularly among adult learners or those at beginner proficiency levels (Çakmak, 2022; Zhou et al., 2023). These systemic gaps have accelerated interest in innovative alternatives, positioning AI technologies as transformative agents in contemporary language education.

AI-driven conversational chatbots, powered by natural language processing (NLP) and machine learning algorithms, represent a particularly promising solution for addressing both FLSA and speaking proficiency gaps (Xin & Derakhshan, 2025; Wang et al., 2024). By simulating authentic conversational exchanges in environments free from social evaluation, these tools allow learners to practice speaking without the fear of judgment from peers or instructors (Çakmak, 2022). The capacity of chatbots to deliver immediate, contextualized feedback on grammatical accuracy, pronunciation, and speaking fluency enables learners to recognize and self-correct errors in real time, thereby cultivating reflective and self-directed learning habits (Chen et al., 2021; Du & Daniel, 2024). The flexible and adaptive design of such tools further permits learners to customize practice sessions according to their individual needs, proficiency levels, and available time—a degree of personalization rarely achievable through traditional instructional methods (Divekar et al., 2022; Kartal & Yeşilyurt, 2024). Despite increasing scholarly interest, however, many existing studies have been conducted in controlled settings or with relatively uniform learner populations, leaving substantive questions unanswered regarding how these tools perform across diverse demographic and proficiency profiles, including those characteristic of Pakistani ESL learners.

Recent progress in AI-based educational technology has further underscored the capacity of these tools to improve L2 speaking outcomes and reduce learner anxiety. Evidence suggests that AI chatbots can foster improvements in speaking fluency, linguistic accuracy, and overall learner engagement, while simultaneously generating a supportive and non-threatening learning atmosphere that helps alleviate anxiety (Hapsari & Wu, 2022; Hwang et al., 2024; Tai & Chen, 2024). A notable limitation in the current body of research, however, is its tendency to treat speaking skill development and anxiety reduction as separate phenomena rather than examining their interaction holistically (Çakmak, 2022; Fathi & Rahimi, 2024). Moreover, the extent to which AI tools can produce enduring behavioral changes—such as a sustained inclination to communicate and increased self-confidence outside formal learning settings—has received insufficient empirical attention.

Considering the significant role anxiety plays in undermining the benefits of speaking practice, tools that effectively address FLSA while enhancing speaking proficiency carry considerable implications for ESL learning outcomes. The present study

seeks to address this gap by employing a mixed-methods research design to investigate the dual functions of AI-powered conversational bots within Pakistani ESL undergraduate instruction. More specifically, the study examines how these tools contribute to the development of core speaking competencies—namely fluency, accuracy, and overall oral proficiency—while concurrently alleviating FLSA among learners. By combining quantitative measurement with qualitative exploration, the study offers a comprehensive perspective on the effectiveness of AI chatbots that goes beyond statistical outcomes to encompass learners' lived experiences and personal interpretations. The findings are anticipated to inform both classroom-level instructional practices and institutional policies aimed at embedding AI into ESL curricula in Pakistan, equipping teachers to support learners across diverse educational settings, and promoting more accessible and equitable language learning environments.

1.1. Problem Statement

English speaking proficiency occupies a central role in academic achievement and professional advancement in Pakistan, where English functions as a medium of higher education and a gateway to socioeconomic opportunity (Rahman, 2004; Shamim, 2011). Despite its institutional prominence, a substantial proportion of Pakistani ESL undergraduate learners continue to demonstrate limited oral communicative competence, a pattern widely attributed to teacher-centered pedagogical traditions, restricted opportunities for authentic spoken practice, and deeply entrenched psychological barriers including fear of error and peer judgment (Coleman, 2011; Shamim, 2011). Foreign Language Speaking Anxiety (FLSA)—characterized by apprehension and inhibition when attempting to speak in a non-native language—remains one of the most pervasive and debilitating obstacles to oral language development among ESL learners (Bárkányi, 2021; Horwitz et al., 1986). When left unaddressed, this anxiety manifests as avoidance behaviors, reduced willingness to communicate, and measurably impaired speaking proficiency (MacIntyre et al., 1998; Ozdemir & Papi, 2022; Woodrow, 2006).

Conventional instructional approaches, including structured classroom interactions and teacher-directed speaking tasks, have proven insufficient in addressing the specific psychological and practical needs of highly anxious ESL learners (MacIntyre, 2017; Renandya & Nguyen, 2022). These methods are often constrained by large class sizes, limited individualized practice time, and the social evaluative pressure inherent in peer-facing performance contexts, all of which can exacerbate rather than alleviate speaking anxiety, particularly among adult and beginner-level learners (Çakmak, 2022; Zhou et al., 2023). While technology-enhanced language learning approaches have been explored as potential alternatives (Aktaş, 2023; Chen, 2022; Derakhshan et al., 2024b), a comprehensive empirical understanding of how AI-powered conversational tools function within Pakistani ESL settings—accounting for local sociolinguistic realities, learner

psychological profiles, and institutional constraints—remains notably absent from the scholarly literature.

Although recent research has demonstrated the capacity of AI chatbots to improve speaking fluency, reduce anxiety, and foster learner engagement in various international contexts (Hapsari & Wu, 2022; Hwang et al., 2024; Tai & Chen, 2024), the majority of these studies have been conducted in East Asian EFL settings with relatively homogeneous learner populations, limiting the generalizability of their findings to the Pakistani ESL context (Zaman et al., 2025). Furthermore, existing investigations have largely examined speaking skill development and anxiety reduction in isolation rather than exploring their dynamic interplay, and they have seldom attended to learners' subjective experiences, perceptions, and long-term behavioral changes resulting from AI-assisted practice (Du & Daniel, 2024; Xin & Derakhshan, 2025). This study therefore addresses a critical empirical and contextual gap by investigating Pakistani ESL undergraduate learners' perceptions of AI conversational bots as tools for simultaneously enhancing oral speaking skills and alleviating speaking anxiety.

1.2. Research Objectives

The present study is guided by the following research objectives:

- To explore Pakistani ESL undergraduate learners' perceptions of AI conversational bots in relation to the development of English speaking skills, including fluency, accuracy, pronunciation, and vocabulary use.
- To examine how the use of AI conversational bots influences the levels of speaking anxiety experienced by Pakistani ESL undergraduate learners during English oral practice.
- To investigate the extent to which AI conversational bots create a low-anxiety, judgment-free learning environment that encourages autonomous and self-directed speaking practice among Pakistani ESL learners.
- To identify the key affordances and limitations of AI conversational bots as perceived by Pakistani ESL undergraduate learners in the context of English language speaking development.

1.3. Research Questions

The study seeks to address the following research questions:

RQ1. How do Pakistani ESL undergraduate learners perceive the role of AI conversational bots in developing their English speaking skills, specifically with respect to fluency, accuracy, pronunciation, and vocabulary?

RQ2. In what ways do AI conversational bots influence the speaking anxiety of Pakistani ESL undergraduate learners during English oral practice sessions?

RQ3. How do Pakistani ESL undergraduate learners describe the learning environment created by AI conversational bots, and in what ways does this environment support or hinder their motivation and confidence to speak English?

RQ4. What affordances and limitations of AI conversational bots do Pakistani ESL undergraduate learners identify in the context of English speaking skill development?

1.4. Significance of the Study

This study makes a meaningful contribution to the theoretical understanding of the relationship between AI-assisted language learning, speaking anxiety, and oral proficiency development. By situating FLSA within the Pakistani ESL context—a sociolinguistic environment characterized by unique patterns of language use, institutional pressures, and learner psychological profiles—the study extends existing theoretical frameworks beyond their predominantly East Asian and Western origins (Bárkányi, 2021; MacIntyre, 2017). The study advances the conceptual dialogue around AI chatbots not merely as skill-building instruments but as affective learning tools that simultaneously address the psychological dimensions of language acquisition (Çakmak, 2022; Zhou et al., 2023). The study employs a qualitative research design grounded in semi-structured interviews and thematic analysis, offering an in-depth, experience-centered perspective that is largely absent from the predominantly quantitative and experimental literature on AI in language education. By privileging learner voice and lived experience, the study generates rich, contextually embedded insights into how Pakistani ESL learners perceive, interact with, and benefit from AI conversational tools, thereby complementing and enriching the broader empirical landscape. From a practical standpoint, the findings of this study carry direct implications for a range of educational stakeholders in Pakistan. For language teachers, the study offers empirically grounded insights into how AI conversational tools can be integrated into speaking instruction to complement rather than replace human-led pedagogical approaches, particularly in large classroom settings where individualized feedback is difficult to deliver consistently. At the broader societal level, this study addresses a documented gap in the Pakistani higher education landscape, where access to quality spoken English instruction remains uneven and anxiety-ridden classroom environments continue to suppress oral communicative development.

2. Literature Review

This study is theoretically grounded in Vygotsky's (1978) Sociocultural Theory (SCT), which frames learning—including second language acquisition—as a fundamentally social and mediated process rather than an individual cognitive undertaking. Central to SCT is the Zone of Proximal Development (ZPD), the developmental space between what learners can accomplish independently and what they can achieve with the support of a More Knowledgeable Other (MKO). In the context of L2 speaking development, the AI-powered conversational bot in this study functions as a

virtual MKO, guiding learners through speaking skill development within their individual ZPDs via dynamic interaction and real-time feedback (Hwang et al., 2025).

The chatbot's effectiveness as an MKO depends on its ability to adapt dynamically to varying proficiency levels through NLP and machine learning algorithms that continuously analyze learner performance and adjust task complexity accordingly (Huang et al., 2023; Jeon et al., 2023). When learners struggle, the chatbot simplifies input and offers targeted feedback; when learners demonstrate competence, it introduces more complex structures and open-ended tasks. This dynamic responsiveness aligns with SCT principles and provides a coherent framework for understanding chatbot-facilitated ZPD progression (Lantolf & Poehner, 2014). Through structured practice, scaffolded support, and corrective feedback, the chatbot enables learners to engage in speaking tasks beyond their current capabilities—such as role-plays and opinion-sharing—thereby stretching their linguistic repertoire (Lantolf, 2011) and bridging the gap between present performance and potential proficiency (Lantolf et al., 2014). This scaffolding is individually tailored, offering contextualized prompts, breaking complex tasks into manageable steps, and evolving continuously as learners advance (Rahimi et al., 2024; Tai & Chen, 2024; Wood et al., 1976; Graesser et al., 2014).

Through repeated chatbot interaction, learners progressively internalize linguistic skills and communicative strategies, transforming externally guided performance into independently deployable knowledge (Jeon et al., 2023; Vygotsky, 1978; Lantolf & Poehner, 2014). This internalization also carries affective consequences: as learners develop competence through scaffolded practice, self-efficacy grows and anxiety diminishes in future communicative situations (Zhou et al., 2023). The development of self-regulation and metacognitive awareness through this process is essential to autonomous language learning (Zhou et al., 2023). In the Pakistani ESL context, where structured oral practice opportunities outside the classroom are severely limited and social anxiety around English use is well-documented, AI-assisted scaffolding and internalization hold particularly meaningful implications for building communicative confidence (Rahman, 2004; Shamim, 2011). SCT thus enables this study to position the AI chatbot not merely as a technological tool but as a mediational artifact that facilitates socially embedded learning, promotes ZPD progression, fosters linguistic internalization, and reshapes the affective landscape of L2 learning.

Foreign language anxiety (FLA) is a widely documented phenomenon that can profoundly undermine learners' capacity to acquire and use a second language effectively (Bárkányi, 2021; Horwitz et al., 1986; Botes et al., 2020; Onwuegbuzie et al., 1999). Horwitz et al. (1986) identified three core dimensions of FLA: communication apprehension, test anxiety, and fear of negative evaluation. Collectively, these dimensions have been shown to reduce learners' willingness to communicate (MacIntyre et al., 1998),

lower classroom participation (Horwitz et al., 1986), impede proficiency development (MacIntyre & Gardner, 1994), and weaken motivation and self-confidence (Fathi & Mohammaddokht, 2021; MacIntyre & Gardner, 1994). Individual difference variables such as shyness and apprehension (Fallah, 2014; Kardaş, 2024), language aptitude, and prior learning experiences (Chen & Chang, 2004) further shape anxiety levels, as do contextual factors including classroom climate, teaching methods, and social interaction patterns (Horwitz et al., 1986; Kim, 2009). In Pakistani higher education, these anxieties are compounded by sociolinguistic pressures in which English simultaneously functions as a marker of prestige and a source of communicative insecurity (Manan et al., 2015; Mansoor, 2005).

Foreign Language Speaking Anxiety (FLSA), as a specific manifestation of FLA, focuses on the psychological distress experienced during oral communication in a non-native language (Mora et al., 2024; Woodrow, 2006). Unlike general FLA, FLSA is localized to spoken interaction, where the immediacy and spontaneity of speaking intensify learners' vulnerability (Kasbi & Elahi Shirvan, 2017; Ozdemir & Papi, 2022). Learners commonly contend with fears of grammatical error, pronunciation concerns, and worry about misunderstanding, as well as anxiety arising from unfamiliar cultural communicative norms (Akkakoson, 2016). These anxieties stem from fear of peer or instructor evaluation, performance anxiety in assessed tasks, and self-doubt about linguistic competence (Horwitz et al., 1986; Ozdemir & Papi, 2022; Sadighi & Dastpak, 2017), and can manifest physically through trembling, perspiration, and elevated heart rate (MacIntyre & Gardner, 1989). Pakistani ESL learners are particularly susceptible, given the examination-centered and teacher-fronted nature of university English instruction that offers limited space for communicative risk-taking (Shamim, 2011; Ali et al., 2021).

Researchers have explored a range of FLSA interventions, increasingly including AI-powered chatbots (Horwitz et al., 2009). While affective variables such as motivation, self-efficacy, and enjoyment all bear on language learning (Botes et al., 2020; Dewaele & MacIntyre, 2014), anxiety is prioritized here for its particularly debilitating impact on oral performance. Çakmak (2022) found that twelve weeks of interaction with the chatbot Replika produced gains in speaking performance but did not consistently reduce L2 anxiety, highlighting the complexity of chatbot-anxiety relationships. Hapsari and Wu (2022) proposed an AI chatbot model targeting anxiety reduction and critical thinking among university EFL learners, though the context-specific nature of their findings limits generalizability. Naseer et al. (2024) reported more encouraging outcomes, with 320 language learners demonstrating 22% average gains in speaking proficiency, 19% improvement in vocabulary retention, and 78% reporting reduced anxiety—attributed to the non-evaluative atmosphere of conversational AI. Du and Daniel (2024) concluded through systematic review that chatbots show genuine promise for anxiety reduction and

speaking development, while calling for further investigation in diverse contexts. Zheng (2024) additionally found that generative AI chatbots reduced foreign language reading anxiety, suggesting that anxiety-alleviating effects may extend across multiple language skill domains.

AI technologies are fundamentally transforming language education by enabling personalized instruction, immediate formative feedback, and enhanced acquisition outcomes (Derakhshan, 2025; Derakhshan & Ghiasvand, 2024; Divekar et al., 2022; Pedró et al., 2019; Xiu-Yi, 2024; Yuan & Liu, 2025). Adaptive AI platforms analyze learner performance data in real time to adjust content and pacing, constructing customized learning pathways that enhance engagement and motivation (Alam, 2021; Yin & Fathi, 2025; Zhai & Wibowo, 2023). NLP-equipped systems evaluate spoken and written language, identify errors, and deliver corrective suggestions immediately (Chen et al., 2021; Derakhshan et al., 2024b; Zhang & Zou, 2022), while interactive AI technologies simulate authentic communicative contexts through dialogues, role-plays, and simulations that cultivate communicative competence beyond rote learning (Derakhshan et al., 2024a; Godwin-Jones, 2023; Schmidt & Strasser, 2022; Liao et al., 2023). In the Pakistani context, where access to quality English-speaking environments outside the classroom is severely limited, these AI affordances represent a particularly significant resource for undergraduate ESL learners (Manan et al., 2015; Atta & Jamil, 2012).

Among AI tools, chatbots have attracted particular scholarly attention for their potential to address FLA and provide individualized practice (Xin & Derakhshan, 2025). Platforms such as Mondly, Duolingo, Babbel, and Rosetta Stone each reflect distinct instructional philosophies and offer varying affordances for pronunciation feedback, adaptive exercises, and CEFR-aligned curricula (Kessler et al., 2023; Handley, 2024), raising questions about their relative efficacy for specific challenges such as speaking anxiety (Hsu et al., 2023; Zou et al., 2023). While chatbots offer immediacy and flexibility, teacher-facilitated and peer-based methods provide richer socio-emotional support and cultural nuance, suggesting a complementary rather than substitutive relationship—particularly relevant in Pakistani classrooms where relational and peer-based learning remains culturally valued (Ali et al., 2021; Shamim, 2011).

Research consistently demonstrates positive effects of AI chatbots on language learning. Studies show that chatbots delivering interactive, context-sensitive feedback enhance learners' confidence and engagement (Kim & Su, 2024; Yang et al., 2022). Yang et al. (2022) found that chatbot conversational partners improved willingness to communicate and reduced speaking anxiety in EFL classes, while Kim and Su (2024) reported increased communication confidence and reduced anxiety in Korean language learning settings. Naseer et al. (2024) similarly demonstrated that chatbots as conversational partners reduced FLA and facilitated acquisition in supportive learning

environments, and Shafiee Rad (2024) found that AI tools like Speeko produced notable speaking proficiency gains and increased willingness to communicate. Despite these promising findings, early chatbot models struggled with substantive feedback delivery (Luo et al., 2022), and even advanced models such as GPT-4 face challenges with semantic ambiguity and input misinterpretation (Luo et al., 2022). Ongoing innovations in natural language understanding, dialogue management, and multimodal features such as voice recognition and gesture interpretation hold promise for addressing current limitations (Wollny et al., 2021; Serban et al., 2017).

AI chatbots hold transformative potential for ESL speaking pedagogy, though research also highlights persistent limitations in their capacity to fully replicate human interaction (Fathi et al., 2024; Hsu et al., 2023; Hwang et al., 2024; Tai & Chen, 2024). Their pedagogical rationale draws from Communicative Language Teaching (CLT), which foregrounds interaction as the primary acquisition mechanism (Fathi et al., 2025; Littlewood, 1981), and from Vygotsky's (1978) SCT, which grounds conversational agent use in the constitutive role of social interaction in cognitive development. While chatbots offer genuine affordances for personalized practice and anxiety reduction (Hwang et al., 2024), their ability to account for individual learning styles, deliver nuanced explanations, or replicate the affectively rich dynamics of authentic human interaction remains limited (Jinming & Daniel, 2024; Hsu et al., 2023; Jeon, 2024). Traditional pedagogical approaches such as teacher-facilitated discussions and role-plays continue to offer deeper socio-cultural engagement and live adaptive feedback, affirming the complementary rather than competitive relationship between AI and conventional instruction (Ali et al., 2021; Mansoor, 2005).

Empirical evidence on chatbot effectiveness in ESL speaking instruction is broadly encouraging. Yang et al. (2022) demonstrated that the task-based chatbot "Ellie" stimulated active student engagement and meaningful communicative interaction. Zou et al. (2023) found that AI speech evaluation programs produced meaningful gains in speaking proficiency over one month, though the absence of a control group limits conclusiveness. AI chatbots have shown consistent effectiveness in developing fluency, coherence, vocabulary, grammatical accuracy, and pronunciation (Hwang et al., 2024; Shin et al., 2021; Tai & Chen, 2024; Hsu et al., 2023), with repeated practice and immediate feedback in low-pressure environments identified as key mechanisms (Dizon, 2020; Qiao & Zhao, 2023; Yang et al., 2022; Lin & Mubarak, 2021). Mind map-guided chatbots have further outperformed conventional formats through more structured interactions (Lin & Mubarak, 2021), though chatbots appear more effective for speaking than for other domains such as listening comprehension (Dizon, 2020).

Chatbots have also been found to reduce language-related anxiety and enhance motivation by creating psychologically safe, non-evaluative environments (Hapsari & Wu,

2022; Jinming & Daniel, 2024; Muthmainnah, 2024). Kim and Su (2024) demonstrated that eight structured chatbot sessions reduced speaking anxiety while strengthening communicative willingness—findings particularly pertinent for Pakistani ESL undergraduates, among whom speaking anxiety is a well-documented barrier to oral participation (Ali et al., 2021; Manan et al., 2015). Beyond anxiety reduction, chatbots have been shown to enhance foreign language enjoyment, language-specific grit, motivation, and positive attitudes toward language learning (Hwang et al., 2024; Derakhshan & Fathi, 2024). Han and Ryu (2024) found voice-based chatbot activities positively influenced motivation and attitudes toward English learning, while Yuan and Liu (2024) documented gains in engagement and enjoyment directly associated with improved speaking performance.

Chatbot effectiveness is further shaped by design quality and responsiveness to individual learner characteristics, in line with personalized learning principles (Wang & Odell, 2002; Jeon, 2024). Socially responsive design features—including contextually relevant topics and effective feedback strategies—are important for building learner-chatbot rapport (Engwall et al., 2022), while learner variables such as age and educational background influence perceived effectiveness (Shin et al., 2021). Critically, few studies have targeted speaking anxiety as a primary outcome, leaving an important research gap (Ozdemir & Papi, 2022). Cultural context also plays a significant role: in collectivist settings like Pakistan, chatbots may be most effective within peer-driven cooperative frameworks, while institutional factors including teacher preparedness and technological infrastructure further mediate integration outcomes (Ali et al., 2021; Merelo et al., 2024; Saihi et al., 2024). These contextual considerations underscore the need for cross-cultural comparative research and caution against uncritical generalization of findings (Chin et al., 2023; Yuan, 2024). Future research should prioritize adaptive chatbot systems with dynamic, learner-responsive interactions and include replication studies across diverse populations and contexts (Porte, 2012; Naseer et al., 2024; Jeon, 2024; Dizon, 2020).

3. Methodology

This study employed a qualitative research design to explore the experiences and perceptions of Pakistani ESL undergraduate learners regarding the use of AI-powered conversational chatbots for improving English speaking skills and reducing speaking anxiety. A qualitative approach was considered appropriate because it allowed for an in-depth understanding of participants' subjective experiences, feelings, and attitudes toward chatbot-assisted language learning (Creswell & Creswell, 2017). The study focused particularly on how learners perceived the role of AI chatbots in enhancing their speaking confidence, communicative competence, and willingness to communicate in English.

The participants of the study were undergraduate ESL learners enrolled in universities in Pakistan. Participants were selected through purposive sampling, as they

had prior experience using AI-powered conversational chatbots for English speaking practice. The sample consisted of learners from diverse academic backgrounds to ensure a broader understanding of chatbot-mediated speaking experiences within the Pakistani ESL context. Demographic information such as age, gender, academic level, and prior English language learning experience was collected to provide contextual understanding of the participants.

Data for the study were collected through semi-structured interviews. Semi-structured interviews were selected because they provide flexibility and allow participants to express their views and experiences in detail while still maintaining focus on the research objectives (King et al., 2019). The interviews explored participants' experiences using AI chatbots for speaking practice, their perceptions of speaking anxiety, confidence development, communicative improvement, and the strengths and limitations of chatbot-assisted learning. Sample interview questions included: "How has the AI chatbot influenced your English speaking confidence?"; "What challenges did you face while using AI chatbots for speaking practice?"; and "How do you compare chatbot-assisted speaking practice with traditional classroom interaction?"

The interviews were conducted individually either face-to-face or through online platforms depending on participants' convenience. Each interview lasted approximately 30–45 minutes and was conducted in a comfortable and supportive environment to encourage open discussion. With participants' consent, all interviews were audio-recorded to ensure accurate data collection and later transcribed verbatim for analysis. The semi-structured format also enabled the researcher to ask follow-up and probing questions whenever further clarification or elaboration was required.

The collected data were analyzed using thematic analysis. The interview transcripts were read repeatedly to identify recurring patterns, themes, and meanings related to learners' experiences with AI-powered chatbots. Thematic analysis enabled the researcher to organize the data into meaningful categories such as speaking confidence, anxiety reduction, learner autonomy, communicative practice, and perceived limitations of chatbot interaction. To enhance the credibility and trustworthiness of the findings, member checking was employed by allowing participants to review and confirm the accuracy of the interpreted responses.

Ethical considerations were strictly observed throughout the study. Participants were informed about the purpose of the research, and informed consent was obtained prior to the interviews. Participation was voluntary, and participants were assured of confidentiality and anonymity. All collected data were used solely for academic purposes, and participants had the right to withdraw from the study at any stage without any consequences.

4. Results and Findings

The thematic analysis of the semi-structured interviews revealed several significant themes regarding learners' experiences with AI-powered conversational chatbots for English speaking practice. Participants generally described the chatbot as a supportive and engaging learning tool that positively influenced their speaking abilities, confidence, and motivation. Five major themes emerged from the interview data.

4.1. Enhanced Verbal Expression and Speaking Ease

One of the most dominant themes that emerged from the interviews was the improvement in learners' speaking fluency and verbal expression. Many participants explained that regular interaction with the AI chatbot helped them speak English more naturally and with greater ease. They reported reduced hesitation, increased vocabulary retrieval, and improved ability to sustain conversations. Several learners highlighted that the chatbot created opportunities for repeated speaking practice without fear of interruption or criticism.

One participant shared, "Before using the chatbot, I used to stop frequently while speaking because I could not think of the right words, but now I can express my ideas more smoothly and confidently." Another respondent explained, "The chatbot allowed me to practice speaking every day without feeling embarrassed about making mistakes, which gradually improved my fluency."

These responses indicate that continuous conversational practice with the chatbot enabled learners to become more comfortable using English spontaneously. The findings suggest that the non-judgmental and accessible nature of AI interaction encouraged participants to practice more frequently, ultimately improving their confidence and communicative flow. The theme also reflects the importance of repetitive oral practice in reducing hesitation and strengthening speaking competence among ESL learners.

4.2. Development of Linguistic Accuracy

Another important theme centered on improvements in pronunciation, grammatical accuracy, and overall language use. Participants frequently mentioned that the chatbot's corrective feedback and pronunciation support helped them recognize and correct their mistakes. Learners particularly valued the immediate responses provided by the chatbot, as they were able to identify errors during practice rather than after completing tasks.

One participant stated, "The pronunciation exercises helped me improve difficult English sounds that I previously mispronounced." Another respondent noted, "The chatbot corrected my grammar mistakes instantly, and this helped me understand where I was making errors while speaking."

The findings demonstrate that learners perceived AI-powered feedback as beneficial for refining their spoken language accuracy. The chatbot functioned as a personalized learning assistant that guided participants toward more accurate language production. This theme suggests that AI-assisted speaking tools can effectively support

learners in improving pronunciation and grammatical competence through individualized and immediate feedback mechanisms.

4.3. Increased Learning Interest and Active Participation

A further theme that emerged from the interviews was the role of the chatbot in increasing learners' motivation, engagement, and active participation in language learning. Participants explained that the interactive and conversational design of the chatbot made speaking practice more enjoyable and less stressful compared to traditional classroom activities. Some learners described the experience as entertaining and motivating because the chatbot created an environment that felt dynamic and personalized.

One participant remarked, "Using the chatbot felt more interesting than traditional speaking activities because it was interactive and enjoyable." Another participant explained, "The personalized feedback motivated me to continue practicing because I felt the chatbot understood my weaknesses and learning needs."

These responses reveal that the chatbot's interactive structure positively influenced learner engagement. The findings suggest that AI-powered tools can create learner-centered environments that encourage active participation and sustained motivation. Personalized feedback and conversational interaction appear to foster greater learner autonomy and willingness to engage in speaking practice regularly.

4.4. Reduction of Speaking Fear and Growth of Confidence

Another major theme identified in the interviews was the reduction of speaking anxiety and the development of communicative confidence. Participants consistently reported that the chatbot provided a safe and pressure-free environment for speaking practice. Unlike classroom interaction, where learners often fear criticism or embarrassment, the chatbot allowed them to experiment with language without social pressure.

One participant explained, "I was always nervous about speaking English in front of others, but practicing with the chatbot made me feel more relaxed and confident." Another respondent shared, "The chatbot gave me a comfortable space where I could make mistakes without feeling judged."

These findings indicate that chatbot-mediated interaction reduced learners' fear of negative evaluation, which is a significant factor contributing to speaking anxiety. The supportive and private nature of AI interaction appeared to encourage learners to take risks and communicate more openly in English. The theme highlights the potential of AI chatbots to create emotionally supportive learning environments that strengthen confidence and reduce communication apprehension among ESL learners.

4.5. Suggestions for Improvement and Expanded Learning Opportunities

Although participants generally expressed positive attitudes toward the chatbot experience, they also provided several recommendations for improvement. Some learners

desired a wider range of conversational topics, more challenging speaking activities, and opportunities for interaction with peers alongside AI practice. Participants believed that incorporating culturally relevant topics and collaborative speaking activities could make the learning experience more engaging and realistic.

One participant commented, “The chatbot should include more diverse and culturally relevant discussion topics to maintain learners’ interest.” Another participant stated, “It would be useful if learners could interact with other students through the platform in addition to speaking with the chatbot.”

Interestingly, some participants also described additional benefits beyond speaking improvement. Learners explained that the chatbot increased their interest in English media, culture, and independent learning. One participant mentioned, “Using the chatbot encouraged me to watch English movies and explore English content online, which further improved my language skills.”

These findings suggest that AI-powered chatbots can contribute not only to speaking development but also to broader learner engagement with the English language and culture. At the same time, participants’ suggestions highlight the importance of improving chatbot design by integrating collaborative and culturally responsive learning features.

5. Discussion

The present study examined the effectiveness of AI-powered conversational chatbots in improving L2 speaking skills and reducing speaking anxiety among Pakistani ESL undergraduate learners. The findings revealed that learners who used the chatbot demonstrated improvement in speaking fluency, pronunciation, grammatical accuracy, and confidence. Participants also reported lower levels of speaking anxiety after engaging in regular chatbot-assisted speaking practice. These findings are consistent with international research highlighting the effectiveness of AI-assisted language learning tools in enhancing learner engagement and communicative competence. Studies by Yang et al. and Shin et al. similarly found that AI chatbots support independent language practice and improve speaking performance.

The chatbot provided learners with opportunities to engage in interactive conversations, simulate real-life communication, and receive immediate corrective feedback. Such scaffolded interaction aligns with Lev Vygotsky’s Sociocultural Theory, particularly the concept of guided learning within the Zone of Proximal Development (Vygotsky, 1978). Additionally, the reduction in speaking anxiety supports the findings of Elaine Horwitz et al. (1986), who identified fear of negative evaluation as a major barrier in foreign language communication. The non-judgmental and private nature of chatbot interaction appeared to create a supportive environment where learners could practice speaking more comfortably.

The findings also align with Pakistani ESL research emphasizing the importance of technology-assisted language learning in improving speaking competence and learner motivation. Studies conducted in Pakistani educational contexts have shown that learners often face limited opportunities for authentic spoken interaction and experience high levels of communication anxiety. In this regard, AI-powered conversational tools may provide accessible opportunities for continuous speaking practice beyond the classroom. Furthermore, participants described the chatbot activities as engaging, enjoyable, and motivating, supporting the argument of Zoltán Dörnyei and Ema Ushioda (2011) that motivation plays a central role in second language learning success.

Another important finding was that some participants developed greater interest in English culture, grammar, and authentic English media through chatbot interaction. These findings suggest that AI-assisted language learning may encourage learner autonomy and broader language engagement. However, participants also recommended incorporating more diverse topics and peer interaction opportunities to make the learning experience more communicative and socially interactive.

6. Conclusion

The study concludes that AI-powered conversational chatbots positively influence L2 speaking proficiency and speaking confidence among Pakistani ESL undergraduate learners. The chatbot enhanced learners' fluency, pronunciation, grammar, motivation, and willingness to communicate while simultaneously reducing speaking anxiety. These findings support previous international and Pakistani studies advocating the integration of technology-assisted learning tools in ESL education.

The results further suggest that AI chatbots can serve as effective supplementary tools for communicative language teaching by providing learners with flexible, personalized, and low-anxiety speaking practice opportunities. Although AI applications cannot replace teachers or human interaction completely, they can effectively complement traditional classroom instruction and promote learner autonomy. Future research may explore larger samples, long-term learning outcomes, and the integration of collaborative speaking features within AI-based learning environments.

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