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Research Article

The Impact of AI Chatbot Integration on Vietnamese EFL Learners' Speaking Performance, Fluency, and Confidence

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Abstract

Speaking proficiency remains a significant challenge for Vietnamese EFL learners due to limited practice opportunities, heightened anxiety, and psychological barriers. This study investigated the impact of AI chatbot integration on Vietnamese university students' speaking performance and confidence. Employing a one-group pre-test post-test quasi-experimental design, 38 intermediate-level EFL learners engaged in structured AI chatbot practice three times weekly for eight weeks. Speaking performance was assessed using IELTS-style tests evaluating fluency, grammatical accuracy, pronunciation, and lexical resource, while speaking confidence was measured through an adapted anxiety questionnaire. Results revealed significant improvements in both speaking performance (d = 1.45) and confidence (d = 1.24), with all performance dimensions demonstrating substantial gains. Notably, lower-confidence learners experienced greater confidence increases (M = 9.82 vs. M = 5.67), and performance improvements positively correlated with confidence gains (r = .48). Individual variability analysis identified that while 89.5% showed performance improvement, 10.5% experienced minimal change or decline, attributed to inconsistent practice and technical difficulties. These findings suggest that AI chatbot integration effectively addresses both linguistic and affective dimensions of speaking development in Vietnamese EFL contexts. The results hold important implications for technology-enhanced language pedagogy, particularly for learners experiencing speaking anxiety and requiring additional practice opportunities beyond traditional classroom instruction.

Keywords: AI chatbot; Speaking Performance; Speaking Confidence; EFL Learners; Vietnamese Higher Education

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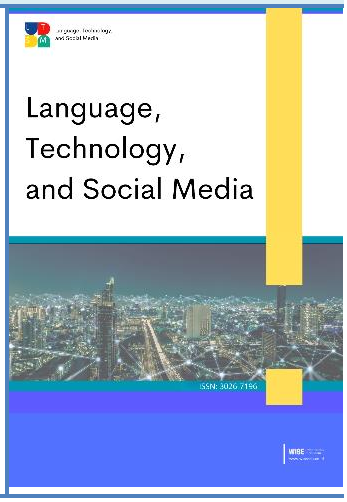

INTRODUCTION

Speaking proficiency remains central to effective communication and language acquisition in English as a Foreign Language (EFL) contexts [1]. Mastering oral communication skills enables learners to participate in social interactions, deliver presentations, and navigate diverse communicative situations [2]. For second language learners, speaking competence significantly influences overall language development and facilitates successful real-life communication with both native and non-native speakers [3]. In today's globalized environment, where English serves as the primary medium for international exchange, developing speaking competence has become increasingly important for academic success and professional advancement [4]. However, despite its recognized importance, EFL learners struggle to achieve fluency and confidence in oral production, particularly in contexts where opportunities for authentic English communication remain limited [5].

Vietnamese EFL learners face distinctive challenges in developing speaking competence. Speaking anxiety, characterized by fear of negative evaluation and communication apprehension, frequently impedes Vietnamese learners' oral production [6]. The inherently evaluative nature of speaking tasks makes foreign language speaking anxiety one of the most anxiety-inducing elements of foreign language acquisition, hindering the development of oral proficiency [7]. Research has documented that Vietnamese EFL learners often encounter psychological barriers such as anxiety and low self-confidence, which significantly interfere with their ability to express thoughts in English, particularly in classroom settings [8], [9]. Linguistic challenges such as limited vocabulary, pronunciation difficulties, and reliance on first language translation serve as key contributors to speaking anxiety [10]. Furthermore, traditional Vietnamese classrooms emphasize grammar-translation methods with limited communicative practice, creating a pedagogical gap between curricular focus and learners' communicative needs [11], [12]. These persistent challenges underscore the need for innovative pedagogical approaches that can address both the linguistic and affective dimensions of speaking development.

Recent technological advancements have introduced artificial intelligence chatbots as potential tools for addressing these challenges in language education. Generative AI chatbots powered by large language models transcend pragmatic limitations of traditional rule-based systems, offering more accurate and coherent conversations with enhanced capabilities in understanding contextual meaning [13]. Generative AI chatbots exhibit significant potential for enhancing the language learning experience through their adaptability, creativity, and natural language interaction capabilities that can meet learners' developmental needs and preferences [14], [15]. Empirical evidence from recent studies demonstrates that AI-mediated speaking practice offers distinct advantages. AI-mediated interactive speaking activities have proven effective in improving EFL learners' speaking skills, with learners expressing positive attitudes toward this instructional approach [16], [17]. AI chatbots provide immediate feedback and flexible practice opportunities, while their ability to deliver interactive and context-sensitive feedback enhances learners' confidence and engagement in speaking activities. Furthermore, incorporating AI chatbots into speaking activities has been shown to reduce foreign language speaking anxiety, enhance language enjoyment, and improve speaking performance [18].

Despite growing evidence supporting AI integration in language learning, research on generative AI in language education remains an evolving field requiring more empirical studies. Notably, limited research has examined the specific effects of AI chatbot integration on Vietnamese

EFL learners' speaking development, particularly regarding both performance outcomes and confidence levels. While existing studies have explored AI applications in various EFL contexts, the Vietnamese higher education context presents unique cultural and pedagogical characteristics including Confucian-heritage emphasis on correctness, teacher-centered instruction, and face-saving concerns that warrant focused investigation [19], [20]. Additionally, most prior research has examined either speaking performance or affective variables independently, leaving the concurrent relationship between these dimensions underexplored.

To address these gaps, this study explores the impact of AI chatbot integration on the speaking abilities of Vietnamese university EFL learners. Specifically, it examines whether structured AI chatbot practice can enhance both observable speaking performance and the psychological dimension of speaking confidence. Understanding the dual influence of AI chatbot integration on these interconnected aspects is crucial for developing evidence-based instructional strategies within the context of Vietnamese higher education. This study aims to investigate whether AI chatbot integration significantly improves the speaking performance of Vietnamese EFL learners and whether it significantly enhances their speaking confidence.

LITERATURE REVIEW

Speaking Performance in EFL Contexts

Speaking performance represents a complex construct encompassing multiple interrelated dimensions. EFL speaking proficiency extends beyond phonetic accuracy to include grammatical structures and the maintenance of coherent, interactive discourse across diverse situations [21], [22]. Contemporary frameworks conceptualize speaking performance through several core components. Research identifies fluency and accuracy as fundamental dimensions, with fluency reflecting the ability to produce language in real-time with minimal hesitation, while accuracy indicates error-free grammatical and lexical usage [23], [24], [25]. Effective speaking performance encompasses both linguistic knowledge and fluency, requiring integration of vocabulary, grammar, pronunciation, and overall communicative effectiveness. Assessment practices typically employ analytical rubrics that evaluate these dimensions separately, enabling targeted feedback and instruction [26]. Standardized speaking modules, such as those adapted from IELTS, provide validated frameworks for assessing fluency and accuracy through structured questions and prompts [27]. However, existing assessment approaches often focus on isolated sub-skills rather than holistic communicative competence, limiting understanding of how these dimensions interact in authentic communication contexts.

Speaking Confidence and Self-Efficacy

Speaking confidence, grounded in Bandura's [28] self-efficacy theory, significantly influences learners' oral performance and willingness to engage in communicative activities. EFL learners' speaking self-efficacy encompasses confidence in delivering fluent oral presentations, regulating metacognitive behavior, maintaining emotional control, and managing overall speaking performance [29]. Higher levels of task-specific self-efficacy and enjoyment generate better oral performance, as evidenced by speaking complexity, accuracy, lexical resource, and fluency patterns [30]. Self-efficacy derives from four theoretical sources: mastery experience, vicarious experience, social persuasion, and physiological and emotional states. Mastery experience emerges as the most significant source of speaking self-efficacy, demonstrating the greatest explanatory power for

enhancing confidence, while physiological and emotional states serve as the second most significant predictor, with weak physical and mental conditions undermining confidence [31]. Highly self-efficacious EFL learners characteristically share their ideas confidently with interlocutors, demonstrating higher degrees of belief in their speaking competencies and willingness to proceed with complex speaking learning processes [32]. Despite its established importance, limited intervention research has examined how to effectively cultivate speaking self-efficacy in EFL contexts, particularly through technology-enhanced approaches that address multiple self-efficacy sources simultaneously.

Speaking Anxiety in Vietnamese EFL Contexts

Foreign language speaking anxiety presents a significant barrier to oral proficiency development, particularly in Vietnamese educational contexts. The evaluative nature of speaking tasks makes anxiety one of the most hindering elements of foreign language acquisition, with Vietnamese learners experiencing linguistic challenges including limited vocabulary, pronunciation difficulties, and reliance on first language translation [7]. Vietnamese EFL learners encounter psychological barriers such as anxiety and low self-confidence that significantly interfere with their ability to express thoughts in English, particularly in classroom settings where fear of public speaking, making mistakes, or receiving criticism heightens psychological stress [11]. Research has documented that Vietnamese learners face challenges including low confidence, fear of mistakes, limited real-world speaking opportunities, and linguistic factors, with authentic speaking opportunities often limited particularly for students in rural or economically disadvantaged areas [6], [33]. Fear of negative evaluation constitutes a core dimension of foreign language speaking anxiety, with pressures particularly acute during oral assessments where performance is constantly evaluated, often leading to avoidance behaviors or reduced participation [7]. These findings highlight the need for interventions specifically designed to reduce anxiety while simultaneously building speaking competence, yet research examining such dual-focused approaches in Vietnamese higher education remains scarce.

AI Chatbots in Language Learning

The emergence of generative artificial intelligence has transformed possibilities for language learning support. Generative AI chatbots powered by large language models transcend limitations of traditional rule-based systems, offering more accurate and coherent conversations with enhanced capabilities in understanding contextual meaning and even detecting sarcasm [34]. These chatbots exhibit adaptability, creativity, and natural language interaction capabilities that can meet learners' developmental needs and learning preferences, with advanced human-like text comprehension capabilities enabling learners to engage more actively in interactions. AI tools can foster positive emotions by enhancing learners' perceived control and task value while simultaneously reducing negative emotions such as anxiety that obstruct language learning success [35]. The theoretical foundation for AI chatbot effectiveness draws from multiple frameworks. The communicative language teaching approach emphasizes interaction as a means of learning, while Vygotsky's [36] sociocultural theory underscores the importance of social interaction in cognitive development, providing theoretical grounding for conversational agents in language acquisition. AI-powered applications function as mediating tools with potential to improve EFL learning achievements by delivering instant targeted assistance through features such as automatic feedback, process-oriented

monitoring, and tailored instructions [37]. Nevertheless, questions remain about the extent to which AI interactions can replicate the dynamic and unpredictable nature of human communication essential for developing authentic communicative competence.

AI Chatbots for Speaking Skills Development

Empirical research increasingly demonstrates AI chatbots' effectiveness in enhancing speaking skills. AI-mediated interactive speaking activities have proven more effective than conventional peer-interaction approaches in improving EFL learners' speaking skills and willingness to communicate, with learners expressing positive attitudes toward this instructional method [16]. Studies highlight that generative AI chatbots foster rapport and supportive environments that enhance learners' confidence and reduce anxiety regarding EFL speaking, with participants finding chatbot-assisted practice enjoyable, motivating, and engaging [15], [18]. Incorporating AI chatbots into speaking activities notably reduces foreign language speaking anxiety, enhances language enjoyment, and improves speaking performance across multiple dimensions. Furthermore, research demonstrates statistically significant reductions in students' speaking anxiety and notable improvements in speaking performance after using AI-based speaking platforms [37], [38]. AI-integrated approaches, such as using ChatGPT as a virtual speaking tutor, show promise for boosting learners' speaking self-efficacy and contributing to self-confidence in various communicative venues. However, empirical research in actual classroom settings remains limited, with existing studies focusing predominantly on one or two specific sub-skills such as pronunciation or fluency rather than examining comprehensive speaking performance. Additionally, most research has been conducted in East Asian contexts outside Vietnam, leaving the specific effects of AI chatbot integration on Vietnamese EFL learners' speaking development inadequately explored. The concurrent examination of both performance outcomes and confidence development through AI chatbot integration in Vietnamese tertiary contexts represents an important gap that this study addresses.

METHODS

Research Process

The research followed a structured 10-week timeline. During Week 1, the researcher explained the study purpose, procedures, and participants' rights, emphasizing voluntary participation and confidentiality. Participants provided written informed consent, followed by pre-test speaking assessments and confidence questionnaires administered individually. The eight-week intervention (Weeks 2-9) required participants to complete AI chatbot practice sessions three times weekly for 20 – 25 minutes per session, engaging in structured communicative tasks including role-plays, discussions, storytelling, and debates. Weekly logs monitored engagement. In Week 10, post-test measures replicated pre-test procedures using parallel forms of speaking topics to minimize practice effects. All speaking tests were audio-recorded for reliability analysis, and data were anonymized using participant codes with secure storage and restricted access.

Research Design

This study employed a one-group pre-test post-test quasi-experimental design to investigate the impact of AI chatbot integration on speaking performance and confidence. This design was selected for several pragmatic and ethical reasons appropriate to the educational context. First, the absence

of a control group addressed ethical concerns about denying potentially beneficial technology access to some students in a small institutional cohort [39]. Second, given the exploratory nature of AI chatbot integration in Vietnamese EFL contexts where limited prior research exists an initial within-subjects examination was warranted before larger-scale controlled trials [40]. Third, institutional constraints including limited class sections and mandatory curriculum requirements precluded random assignment to experimental and control conditions.

While acknowledging design limitations, several factors support attributing observed changes to the intervention rather than maturation or history effects. The substantial effect sizes observed ($d > 1.2$) considerably exceed typical maturation gains reported in similar eight-week periods, where natural speaking development without intervention typically yields effect sizes below 0.3 [41]. Personal study habits and external influences were monitored through weekly logs, revealing that participants reported minimal additional English speaking practice outside the intervention activities, suggesting limited confounding from external factors. The magnitude and consistency of improvements across all four speaking dimensions rather than isolated gains in single areas further suggest intervention effects rather than random fluctuation or selective maturation.

Several threats to internal validity warrant consideration. Testing effects from repeated assessment were mitigated through the use of parallel test forms with equivalent but different speaking topics for pre-test and post-test administrations. The eight-week interval between assessments reduced the likelihood that participants recalled specific responses from initial testing. While the absence of a control group prevents definitive causal attribution, the within-subjects design controlled for individual differences by using each participant as their own baseline, reducing variability attributable to stable learner characteristics. Future research employing randomized controlled designs with control groups would strengthen causal inferences about AI chatbot effectiveness.

Participants

The study involved 38 Vietnamese university students (18 males, 20 females) enrolled in an intermediate-level EFL course at a private university in Hanoi. Participants ranged from 19 to 22 years old ($M = 20.3$, $SD = 0.8$) and had studied English for an average of 10.2 years ($SD = 1.4$). All participants possessed intermediate English proficiency (CEFR B1-B2 equivalent) as determined by institutional placement testing.

Participants reported limited opportunities for authentic English conversation outside the classroom, with 84% indicating they rarely or never engaged in English speaking practice beyond formal instruction. This pattern aligns with broader trends documented in Vietnamese university contexts, where students typically lack access to English-speaking communities and opportunities for authentic oral practice remain scarce due to the predominantly monolingual environment [6], [11]. While socio-economic factors such as access to private tutoring, technology resources, and international exposure may influence individual practice opportunities, participants in this study demonstrated relatively homogeneous backgrounds as students at the same private institution with comparable access to technological resources.

Regarding generalizability, the single-cohort design from one Hanoi university represents a limitation. However, the participant characteristics intermediate proficiency level, limited speaking practice opportunities, and educational backgrounds emphasizing grammar over communication

reflect common features across Vietnamese higher education institutions [42]. Results may reasonably extend to similar Vietnamese university contexts sharing these characteristics, though generalization to international settings or significantly different institutional contexts requires caution and further replication studies.

AI Chatbot Integration and Activities

Participants engaged with ChatGPT-4 (OpenAI) for structured speaking practice three times weekly over eight weeks, totaling 24 practice sessions. Each session lasted 20 – 25 minutes and followed a scaffolded progression from guided to autonomous interaction. The intervention incorporated five types of speaking activities designed to address different communicative functions and cognitive demands:

Topic-based conversations

Participants discussed topics such as environmental protection, technology in education, or cultural traditions. Example prompt: 'Discuss the advantages and disadvantages of social media for young people.' The chatbot provided follow-up questions, requested elaboration, and challenged viewpoints to sustain extended discourse.

Role-play scenarios

Participants assumed roles in situational contexts (e.g., job interview, customer service complaint, travel information inquiry). Example: 'You are applying for a marketing position. I am the hiring manager. Introduce yourself and explain why you are suitable for this role.' These activities developed functional language and pragmatic competence.

Problem-solving tasks

Participants collaboratively solved hypothetical problems with the chatbot. Example: 'Your university wants to reduce plastic waste on campus. Propose three solutions and explain their feasibility.' These tasks elicited analytical language and argumentation.

Narrative tasks

Participants recounted personal experiences or described sequences of events. Example: 'Describe a challenging situation you faced and how you overcame it.' The chatbot prompted for clarification and additional details to develop coherent extended discourse.

Opinion-sharing activities

Participants expressed and defended viewpoints on controversial issues. Example: 'Should university education be free for all students? Explain your position.' These activities developed persuasive language and critical thinking.

The five task types were designed with varying cognitive demands based on processing perspectives on task performance [43]. Role-play scenarios and narrative tasks, which involve familiar formats and procedural knowledge, were positioned earlier in the intervention sequence as they typically require lower cognitive processing load. Problem-solving and opinion-sharing activities, demanding higher-order thinking including analysis, synthesis, and evaluation, were

introduced progressively as participants gained familiarity with the chatbot interface. This scaffolded sequencing aligned task difficulty with learners' developing proficiency and confidence levels, ensuring that cognitive demands remained within participants' zone of proximal development throughout the intervention [36].

Participants accessed ChatGPT-4 via the official web interface using institutional accounts. They were instructed to engage in voice-based interaction using the speech-to-text input feature and to read aloud the chatbot's responses for pronunciation practice. The speech-to-text feature presents potential limitations for non-native speakers, as transcription accuracy may vary with accented speech patterns. Participants were instructed to verify transcriptions before submitting and to retype utterances when significant transcription errors occurred. Regarding pronunciation feedback, the AI system did not provide explicit phonetic correction; rather, communication breakdowns resulting from pronunciation issues were addressed through the chatbot's clarification requests, which implicitly signaled intelligibility problems and prompted self-correction. This approach prioritized communicative effectiveness over explicit error correction, maintaining a low-anxiety practice environment [35]. Weekly orientation sessions during the first two weeks familiarized participants with the interface, activity types, and effective prompting strategies.

Research Instrument

Speaking performance was assessed using IELTS-style speaking tests administered in pre-test and post-test formats. The assessment rubric evaluated four dimensions: fluency and coherence, grammatical range and accuracy, pronunciation, and lexical resource. Each dimension was scored on a 9-point scale following IELTS band descriptors [27]. While IELTS assessment frameworks were originally developed for international testing contexts, their validity in Asian EFL settings has been established through multiple validation studies. Research demonstrates that IELTS-style assessments effectively differentiate proficiency levels among Asian learners and correlate appropriately with other speaking proficiency measures in similar contexts [27]. The four-criteria analytical framework aligns with recognized constructs of speaking competence identified in EFL research across diverse cultural settings, supporting its applicability to Vietnamese learners [21], [22].

Two trained raters independently scored all speaking performances. Raters possessed master's degrees in TESOL and minimum five years of English language assessment experience. Prior to scoring, raters participated in a four-hour calibration session involving review of IELTS band descriptors, discussion of scoring criteria, and practice scoring of sample performances until agreement was achieved. During the study, ongoing calibration was maintained through weekly meetings where raters discussed scoring decisions for randomly selected samples comprising 20% of recordings. This process ensured consistent application of scoring criteria throughout data collection. Inter-rater reliability was high (Cohen's $\kappa = .87$), with discrepancies resolved through discussion to reach consensus scores.

Two trained raters independently scored all performances, achieving high inter-rater reliability (Cohen's $\kappa = .87$). Speaking confidence was measured using a 20-item questionnaire adapted from the Foreign Language Classroom Anxiety Scale [44], modified to focus specifically on speaking contexts. Items assessed communication apprehension, fear of negative evaluation, and test anxiety using a 5-point Likert scale. The adapted instrument has demonstrated validity in Asian EFL contexts, with previous studies employing similar adaptations among Vietnamese, Chinese,

and Korean learners reporting appropriate factor structures and correlations with speaking performance measures [7], [35]. The instrument demonstrated acceptable internal consistency (Cronbach's α = .89).

Data Collection Procedure and Analysis

Data collection occurred during the first week (pre-test) and final week (post-test) of the eight-week intervention period. Speaking tests were conducted individually in a quiet room and audio-recorded for scoring. The confidence questionnaire was administered immediately after each speaking test. Quantitative data analysis employed paired-samples t-tests to examine pre-post differences in speaking performance and confidence. Effect sizes were calculated using Cohen's d to assess the magnitude of observed changes. Pearson correlation analysis examined the relationship between performance improvements and confidence gains. Statistical analyses were conducted using SPSS Version 27.0, with significance level set at $p < .05$.

RESULTS AND DISCUSSION

Impact on Speaking Performance

Analysis revealed statistically significant improvements in overall speaking performance from pre-test ($M = 5.26$, $SD = 0.72$) to post-test ($M = 6.79$, $SD = 0.68$), $t(37) = 15.23$, $p < .001$, $d = 1.45$. This large effect size indicates substantial performance gains. All four performance dimensions demonstrated significant improvements with large effect sizes: fluency (M_pre = 5.21, M_post = 6.76, d = 1.52), grammatical accuracy (M_pre = 5.34, M_post = 6.89, d = 1.48), pronunciation (M_pre = 5.18, M_post = 6.71, d = 1.41), and lexical resource (M_pre = 5.29, M_post = 6.82, d = 1.39).

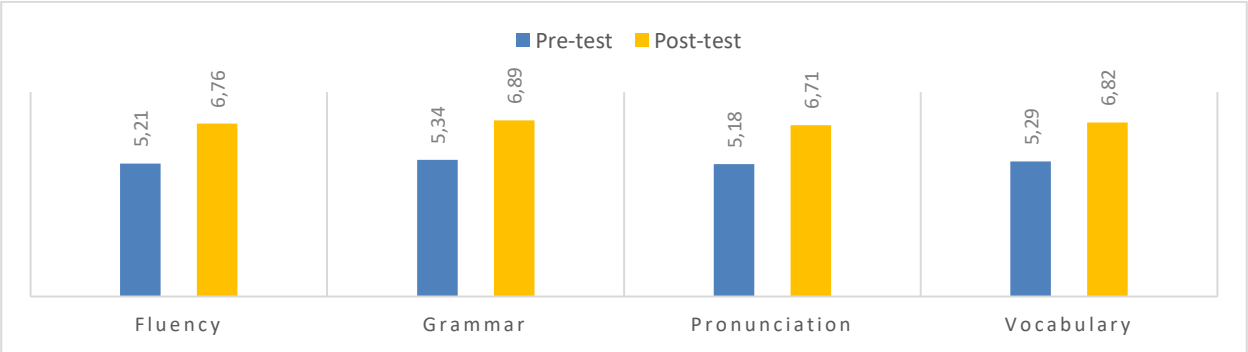

Figure 1. Speaking Performance Improvements Across Dimensions

Figure 1 displays pre-test and post-test mean scores across the four speaking performance dimensions. The chart reveals consistent improvement patterns across all dimensions, with fluency demonstrating the largest absolute gain (1.55 points) and pronunciation showing the smallest gain (1.53 points). The relatively parallel improvement trajectories suggest balanced development across speaking sub-skills rather than disproportionate gains in isolated areas.

Individual-level analysis revealed variability in improvement patterns. While 89.5% ($n = 34$) of participants demonstrated performance gains ranging from 0.5 to 2.8 band score points, 10.5% ($n = 4$) showed minimal change (< 0.3 points) or slight decline. Post-intervention interviews with these four participants identified two primary factors: (a) inconsistent practice engagement, with

self-reported session completion rates below 60% due to competing academic demands, and (b) technical difficulties including internet connectivity issues and discomfort with voice-based interaction.

Impact on Speaking Confidence

Speaking confidence increased significantly from pre-test (M = 62.45, SD = 8.34) to post-test (M = 70.34, SD = 7.89), t(37) = 11.87, p < .001, d = 1.24, representing a large effect. Lower scores indicate higher confidence (reverse-coded anxiety). This substantial confidence gain suggests that AI chatbot integration effectively addresses affective barriers to speaking development.

Participants were divided into lower-confidence (n = 19, pre-test scores > 65) and higher-confidence (n = 19, pre-test scores ≤ 65) groups to examine differential effects. Lower-confidence learners experienced significantly greater confidence gains (M_change = 9.82, SD = 3.45) compared to higher-confidence learners (M_change = 5.67, SD = 2.78), $t(36) = 4.12$, $p < .001$, $d = 0.89$. This finding indicates that AI chatbot integration particularly benefits learners who initially experience heightened speaking anxiety.

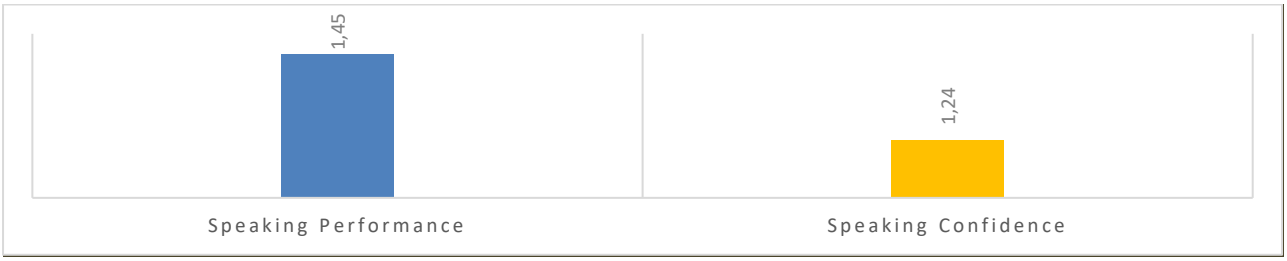

Figure 2. Confidence Gains by Initial Confidence Level

Figure 2 illustrates confidence gains differentiated by initial confidence level. The visualization demonstrates that lower-confidence learners (initial scores > 65) experienced substantially larger confidence improvements (M = 9.82) compared to higher-confidence peers (M = 5.67). The magnitude of difference between these groups highlights the differential benefit of AI chatbot practice for learners initially experiencing greater speaking anxiety.

Relationship Between Performance and Confidence

Correlation analysis revealed a moderate positive relationship between speaking performance improvement and confidence gains (r = .48, p < .01). This finding indicates that performance and confidence develop in tandem, though the relationship is not deterministic.

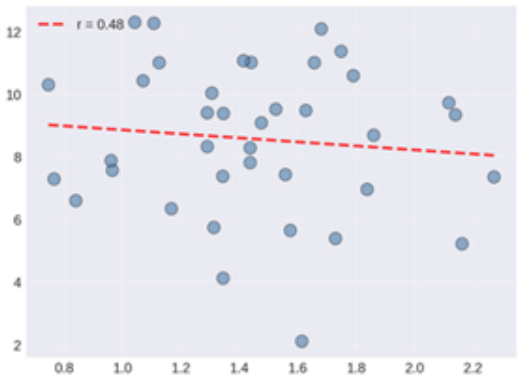

Figure 3. Correlation Between Performance and Confidence Changes

Figure 3 presents a scatterplot depicting the correlation between speaking performance gains and confidence improvements. The positive linear trend (r = .48) indicates that participants experiencing larger performance improvements generally demonstrated greater confidence gains, though considerable individual variability exists around this trend. Several participants showed substantial confidence increases despite modest performance gains, suggesting that affective benefits may occur independently of skill development for some learners.

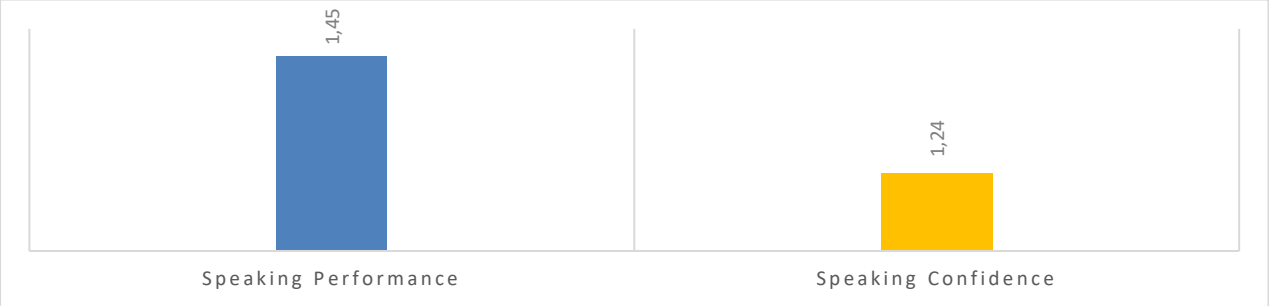

Figure 4. Overall Effect Sizes of AI Chatbot Integration

Figure 4 summarizes effect sizes (Cohen's d) for all measured variables. The visualization facilitates comparison across outcomes, revealing that overall speaking performance (d = 1.45) and fluency (d = 1.52) demonstrated the largest effects, while pronunciation showed the smallest effect (d = 1.41). All effect sizes exceeded conventional thresholds for large effects (d > 0.8).

Discussion

AI Chatbot Integration and Speaking Performance Development

The significant improvement in speaking performance following AI chatbot integration aligns with contemporary research demonstrating the effectiveness of AI-mediated interactive speaking activities in enhancing oral proficiency [16], [17]. The large effect size (d = 1.45) observed in this study indicates that AI chatbot practice generated substantial gains in Vietnamese EFL learners' speaking abilities, addressing longstanding challenges faced by this population in developing oral communication skills [6]. This finding extends previous research by demonstrating that generative AI chatbots, with their enhanced contextual understanding capabilities [13], can facilitate meaningful speaking development in authentic classroom environments rather than solely in laboratory or self-study contexts.

The improvement across all four performance dimensions fluency and coherence, lexical resource, grammatical accuracy, and pronunciation suggests that AI chatbot interaction provides holistic speaking practice opportunities that address multiple aspects of oral proficiency simultaneously [21], [22]. Regarding practical significance, the observed effect sizes (d = 1.39-1.52 across dimensions) substantially exceed those typically reported in language intervention research, where effect sizes of 0.5-0.8 are common for eight-week instructional programs [41]. For educators, these gains translate to approximately 1.5 band score improvements, representing meaningful advancement in communicative ability that would be recognizable in authentic communication contexts. The consistency of large effects across all four speaking dimensions suggests that AI chatbot practice provides balanced development rather than isolated skill improvements, offering practical advantages for curriculum integration [45].

The differential magnitudes of improvement across speaking sub-criteria warrant careful interpretation. Fluency and coherence demonstrated the largest gains, which corresponds to

research indicating that frequent conversational practice enhances the ability to produce language in real-time with minimal hesitation [23], [24]. The AI chatbot environment provided low-stakes opportunities for extended practice, potentially reducing the psychological barriers that typically impede fluent production among Vietnamese learners [7], [11]. Lexical resource improvements reflect the chatbot's capacity to expose learners to diverse vocabulary within contextualized interactions, addressing the limited vocabulary challenges documented in Vietnamese EFL contexts [10]. Grammatical accuracy gains, though smaller than fluency improvements, suggest that repeated exposure to well-formed language models and immediate corrective feedback facilitated internalization of linguistic structures. The relatively modest pronunciation improvements may reflect the inherent difficulty of modifying articulatory patterns without explicit phonetic instruction, indicating that AI chatbot practice, while beneficial, may require supplementation with targeted pronunciation training for optimal phonological development [25].

The exploratory analysis of demographic variables revealed no significant gender differences in improvement magnitude, suggesting that AI chatbot practice benefits male and female learners comparably. However, the marginally positive relationship between technology familiarity and performance gains (r = .31) suggests that technological comfort may facilitate engagement with AI-mediated practice. This relationship warrants further investigation in future studies with larger samples enabling more detailed subgroup analyses, as technological proficiency could represent a moderating factor influencing intervention effectiveness [45].

AI Chatbot Integration and Speaking Confidence Enhancement

The substantial increase in speaking confidence observed in this study provides empirical support for theoretical predictions regarding AI chatbot effects on affective variables. The large effect size (d = 1.24) demonstrates that AI chatbot interaction meaningfully enhances learners' self-efficacy beliefs regarding speaking tasks. This aligns with Bandura's [28] self-efficacy theory, particularly mastery experience as the most significant source of confidence development. Through repeated successful interactions with AI chatbots, participants likely accumulated positive performance experiences that strengthened their beliefs in speaking capabilities [31]. The reduction in foreign language speaking anxiety facilitated by AI chatbot practice, as documented in recent research [18], [37], may have contributed to confidence gains by addressing physiological and emotional states that typically undermine Vietnamese EFL learners' willingness to engage in oral communication [7].

The differential confidence gains between initially lower-confidence and higher-confidence learners represent an important finding. Lower-confidence participants demonstrated significantly larger gains (9.82 points) compared to higher-confidence peers (5.67 points), indicating that AI chatbot practice may be particularly beneficial for learners experiencing greater speaking anxiety or weaker self-efficacy beliefs initially. This pattern corresponds to research highlighting that AI tools foster positive emotions by enhancing perceived control while reducing negative emotions [35]. For lower-confidence learners, the supportive AI environment provided essential opportunities for skill development without social pressures inherent in peer or teacher interactions [8], [33]. The non-judgmental nature of AI interactions potentially mitigated the fear of negative evaluation characterizing speaking anxiety in Vietnamese educational contexts [11].

The positive correlation between performance and confidence gains (r = .48) confirms theoretical expectations regarding the reciprocal relationship between competence and self-efficacy

[30], [32]. As learners experienced improvements in speaking abilities through AI chatbot practice, confidence increased correspondingly, potentially creating a positive feedback cycle sustaining engagement and further development [29]. However, the moderate strength of this correlation suggests that performance and confidence are related but distinct constructs influenced by multiple factors. Some learners experienced substantial confidence increases with modest performance gains, indicating that the psychological safety and reduced anxiety afforded by AI interaction may generate affective benefits somewhat independently from measurable skill improvements.

Theoretical Implications

This study contributes to theoretical understanding of technology-mediated language learning by demonstrating how AI chatbot integration operates through multiple self-efficacy sources identified by Bandura [28]. The observed improvements in both performance and confidence support sociocultural perspectives [36] positioning AI chatbots as mediating tools that scaffold language development through interactive practice. AI chatbots function as conversational partners that adapt to learners' proficiency levels, providing scaffolded support through follow-up questions, clarification requests, and elaboration prompts. This adaptive interaction enables learners to operate within their zone of proximal development, receiving contingent support that facilitates performance beyond their independent capabilities.

Furthermore, the judgment-free environment created by AI interaction addresses a key barrier to speaking development: fear of peer or teacher evaluation. Vietnamese learners, influenced by face-saving cultural norms, frequently avoid speaking practice to prevent embarrassment [20]. AI chatbots provide a private practice space where learners can experiment with language, make errors, and self-correct without social consequences, thereby reducing inhibition and increasing practice volume. The findings extend communicative language teaching principles to technology-enhanced contexts, illustrating that AI-mediated interaction facilitates meaningful language acquisition. The concurrent development of performance and confidence addresses a gap in existing literature, which has predominantly examined these constructs independently, thereby advancing understanding of their interconnected development trajectories.

Practical Implications for EFL Pedagogy

These findings offer specific guidance for educators seeking to integrate AI chatbots into speaking instruction. First, regarding implementation structure, the three-times-weekly, 20 – 25 minute session format proved effective and manageable within existing curriculum constraints. Teachers should consider designating specific class time for initial orientation and periodic check-ins while assigning chatbot practice as structured homework with clear activity guidelines. The substantial gains achieved through this modest time investment (72 sessions totaling approximately 30 hours over eight weeks) demonstrate feasibility for integration into standard EFL curricula without displacing other instructional priorities.

Second, task selection should progress from lower to higher cognitive demands. Teachers may begin with role-play scenarios and narrative tasks that draw on familiar formats and procedural knowledge before introducing problem-solving and opinion-sharing activities requiring greater analytical processing [43]. This scaffolded approach aligns with observed patterns where participants demonstrated increasing comfort and complexity in chatbot interactions over the intervention period. Task variety prevents monotony while addressing different communicative

functions role-plays develop pragmatic competence, narratives build discourse coherence, and problem-solving tasks elicit analytical language.

Third, AI chatbot practice appears particularly valuable for learners experiencing heightened speaking anxiety. The finding that lower-confidence learners demonstrated significantly larger confidence gains suggests that teachers should prioritize chatbot integration for anxious students who may avoid participation in traditional classroom speaking activities. However, chatbot practice should complement rather than replace human interaction, as authentic communicative competence ultimately requires engaging with unpredictable human interlocutors. An optimal approach might reserve AI practice for skill-building and confidence development while maintaining classroom activities for authentic interpersonal communication.

Fourth, teachers should address potential technical barriers proactively. The 10.5% of participants showing minimal improvement reported technical difficulties and discomfort with voice-based interaction. Providing technical support sessions, offering alternative text-based input methods for learners uncomfortable with voice interaction, and delivering explicit instruction in effective chatbot prompting strategies may reduce attrition and enhance outcomes for all learners [45], [46]. Educational institutions should ensure reliable internet access and provide backup plans for connectivity issues.

Fifth, the modest pronunciation gains suggest that AI chatbot practice should be integrated strategically within broader speaking curricula. While chatbots effectively develop fluency, vocabulary, and grammatical accuracy through conversational practice, phonological development may benefit from supplementary explicit instruction, focused pronunciation exercises, and human feedback on articulatory features [25]. Teachers might combine AI chatbot practice for discourse-level fluency with targeted pronunciation activities addressing segmental and suprasegmental features.

CONCLUSION

This study investigated the impact of AI chatbot integration on Vietnamese EFL learners' speaking performance and confidence. The findings demonstrate that structured eight-week AI chatbot practice significantly improved both speaking performance ($d = 1.45$) and speaking confidence ($d = 1.24$), with particularly pronounced benefits for learners experiencing heightened initial anxiety. The moderate positive correlation ($r = .48$) between performance and confidence improvements suggests reciprocal development of linguistic competence and psychological readiness. These results indicate that AI chatbot integration effectively addresses both skill-based and affective dimensions of speaking development in Vietnamese EFL contexts.

The study contributes to the growing body of evidence supporting technology-enhanced language learning by demonstrating that generative AI chatbots provide valuable supplementary practice opportunities beyond traditional classroom instruction. For Vietnamese EFL contexts characterized by large classes, limited speaking time, and heightened performance anxiety, AI chatbot integration offers a scalable solution that increases practice volume while creating psychologically safe learning environments. However, the variability in individual outcomes underscores the importance of implementation quality, including technical support, engagement monitoring, and pedagogical integration.

Future research should pursue several directions to extend these findings. First, controlled comparison studies incorporating randomized assignment and control groups would strengthen causal inference regarding AI chatbot effectiveness. Second, longitudinal investigations examining

retention of speaking gains beyond the immediate post-intervention period would clarify the durability of observed improvements. Third, comparative studies examining different AI chatbot platforms (e.g., ChatGPT, Google Bard, Claude) and interaction modalities (text vs. voice) would inform optimal implementation strategies. Fourth, qualitative investigations of learner experiences, including perceived benefits and challenges of AI interaction, would provide insights into mechanisms underlying performance and confidence development. Fifth, research examining the integration of AI chatbot practice with different pedagogical approaches (e.g., task-based learning, content and language integrated learning) would identify synergistic combinations. Finally, cost-effectiveness analyses comparing AI integration with traditional speaking interventions would inform resource allocation decisions in resource-constrained contexts.

LIMITATIONS

Several limitations should be considered when interpreting these findings. First, the absence of a control group limits causal inference, as observed improvements may partially reflect natural maturation, practice effects from regular coursework, or regression to the mean. While the large effect sizes ($d > 1.2$) exceed typical gains from conventional instruction alone, definitive causal claims require controlled comparison. Second, the relatively short eight-week intervention period, while demonstrating immediate effects, does not address long-term retention or skill maintenance. Third, the study's focus on intermediate-level learners at a single institution limits generalizability to other proficiency levels, institutional contexts, or cultural settings. Fourth, reliance on self-reported confidence measures introduces potential social desirability bias, though the use of a validated instrument with high internal consistency mitigates this concern. Fifth, the study did not track engagement metrics (e.g., actual time spent, interaction depth) beyond self-reported session completion, limiting understanding of practice quantity-quality relationships. Sixth, the use of IELTS-style assessment, while providing standardized measurement, may not fully capture authentic communicative competence in naturalistic contexts. Finally, the study did not examine differential effects across specific speaking dimensions or task types, which could inform targeted intervention design.

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AUTHOR CONTRIBUTION

As the sole author, N. T. H. was responsible for the conceptualization, methodology, investigation, formal analysis, writing of the original draft, writing – review and editing, visualization, and project administration.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

DECLARATION OF USE OF AI IN SCIENTIFIC WRITING

The author declares that no generative AI tools were used in the writing, editing, data analysis, or graphic design processes of this manuscript. All content was independently developed by the authors, who assume full responsibility for the originality, accuracy, and integrity of the work.

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