

Self-efficacy as a Mediator Between AI-dialogic Scaffolding, Language Anxiety, and Speaking Confidence in Saudi EFL Context

Shadi Majed Alshraah¹, Amani BinJwair², Ahmad Subhi Salem Mufleh³ and Ashwaq A. Aldaghri⁴

¹English Department, Preparatory Year Deanship, Prince Sattam bin Abdulaziz University, Saudi Arabia

²Curriculum and Instruction, College of education, Prince Sattam Bin Abdulaziz University, Saudi Arabia

³Basic Science Department, Preparatory Year Deanship Prince Sattam bin Abdulaziz University, Saudi Arabia

⁴Department of English Language and Literature, College of Languages and Translation, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia

s.alshraah@psau.edu.sa

dr.aasj2007@gmail.com

a.mufleh@psau.edu.sa (corresponding author)

Aaaldaghri@imamu.edu.sa

<https://doi.org/10.34190/ejel.24.4.4675>

An open access article under [CC Attribution 4.0](#)

Abstract: Obstacles remain in the form of inconsistent outcomes of AI applications in English as a foreign language (EFL) speaking instruction, particularly in Saudi contexts, where language anxiety and a sense of insecurity prevent learners from becoming more empowered through technological exposure. In this study, a mediator variable, self-efficacy, was postulated in the interaction between AI dialogic scaffolding, language anxiety, and speaking confidence. The current research employed a quantitative cross-sectional design, with data analyzed using partial least squares structural equation modelling (PLS-SEM) among 243 Saudi students studying at EFL universities. The findings established that AI-dialogic scaffolding had positive effects on speaking confidence and self-efficacy, and negative effects on language anxiety were very high. These relationships were partially mediated by self-efficacy, which is a critical psychological mediator. The results present a new model that incorporates technological and affective factors, offering meaningful theoretical and practical implications for the creation of AI-based language-learning contexts that facilitate psychological stability and skills acquisition. The originality of this research lies in empirically verifying complex mediating pathways in the context of Saudi EFL and extending the models of direct effects that most other researchers have previously explored. This study offers a rational framework that combines technological, cognitive, and affective features, thus contributing to the theoretical knowledge of both applied linguistics and educational technology. It extends beyond the examination of immediate impacts and shapes models of how scaffolding procedures align with the wavy paths through which they exert their influence. The studies suggest using an evidence-based approach in the Saudi context, and researchers should focus on enhancing self-efficacy to break anxiety and lack of self-confidence. Finally, the study illuminates that the true potential of AI in ed-tech is not just its ability to copy an interaction; rather, its capacity to be organized in a way that instills psychological strength and confidence in the messages it delivers. Thus, the study provides a distinct path for the evolution of a better, more holistic, and learner-focused digital language-learning environment.

Keywords: AI dialogic scaffolding, Language anxiety, Speaking confidence, Self-efficacy, Saudi EFL learners

1. Introduction

The adoption of artificial intelligence (AI) in English as a foreign language (EFL) teaching has radically changed oral communication instruction (Ekizer, 2025). Saudi Arabian learning groups often face severe challenges in achieving proficiency in speaking, with significant challenges including large-scale language anxiety (Alshakhi, 2025) and communicative confidence. Typical classroom environments do not usually provide individuals with the non-judgmental and persistent feedback required to mitigate these affective challenges. This leaves students afraid of spontaneous communication, crippling their language development and empowerment. AI dialogic scaffolding (ADS) is a transformative solution that provides adaptive and interactive scaffolding by simulating a conversation with a human (Ma, 2025). In this study, AI dialogic scaffolding is operationally defined as a pedagogical process in which an AI tool (e.g., a conversational chatbot or adaptive dialogue system) provides structured, turn-by-turn support for oral practice. This support includes: (a) modelling target utterances, (b)

offering corrective feedback on pronunciation/grammar, (c) prompting learners to elaborate or reformulate responses, and (d) gradually reducing hints as competence increases. The specific AI tool used was a custom-built dialogue system integrated into the university's learning management system. Learners engaged in five 20-minute sessions over two weeks, with each session focusing on a different everyday topic (e.g., introducing oneself, making requests). Interaction logs showed that 92% of participants completed all sessions. This operationalization distinguishes ADS from generic chatbot use or non-dialogic automated feedback.

However, the use of AI tools cannot guarantee learner empowerment. This technology is closely connected to the learner's psychological state, specifically their self-efficacy (SE). Even though language production structural support is only assisted by ADS, language anxiety (LA) continues to affect the courage to talk (SC) perniciously. The problem is that AI integration does not yield results that are quite similar; some learners find it pleasant, whereas others experience stress. What is very important is that one should know the interaction between ADS and LA that alters SC, but more to the point, SE is a very important psychological bridge in that interaction. Without a clear view of such mediation processes, the future of AI-driven learner empowerment can be regarded as a mere theoretical construct, and Saudi EFL learners have little ground to resist the fear they experience when speaking online. This study addresses this pressing question and concerns the multidimensional relationship between technological support and mental stability. Existing studies have either (a) examined AI exposure without measuring psychological mediators (e.g., Ekizer, 2025), (b) studied self--Alshakhi, 2025), or (c) used qualitative designs that cannot quantify indirect effects (Zhang, 2025). No study has modelled self-efficacy as a simultaneous mediator between AI scaffolding and language anxiety on speaking confidence in a Saudi EFL sample using PLS-SEM. Thus, it remains unknown whether AI's benefits of AI operate through self-efficacy or only directly, and whether anxiety damages confidence partly by eroding self-belief. This study closes this gap by testing the specific indirect paths shown in Figure 1.

Although educational technology is currently gaining popularity, many research gaps remain in understanding the multifaceted interactions among AI dialogic scaffolding, language anxiety, and speaking confidence through the self-efficacy lens. The overall positive effects of applying AI to language learning have been widely reported in the existing literature (Ekizer, 2025); however, little empirical evidence is available on specific dialogic scaffolding processes in the context of Saudi EFL. Although Alshakhi (2025) emphasized the importance of anxiety among Saudi learners, they did not delve deeply into the role of AI-guided scaffolding procedures that are likely to reduce the burden. Also, even though recent studies indicate that AI tools have the potential to enhance speaking fluency as proposed by some studies (Wang and Wang 2025), the fact that self-efficacy has a mediating effect on the connection between these two is disregarded or is considered briefly (Yan et al., 2025). Earlier research has mostly focused on two extremes (Ebadi et al., 2025) and overlooked the subtle psychological mechanisms that guide translation to empower learners (Dai et al., 2025). In addition, the precise effects of interactive situations and personal feedback on self-evaluation remain unexplored (Cui, Yang and Xu, 2025). Most studies employ qualitative or simple correlational designs, creating a methodological gap and necessitating more rigorous structural modelling (Zhang, 2025).

This study aimed to examine the mediating effect of self-efficacy on the connection between AI dialogic scaffolding, language anxiety, and speaking confidence in Saudi EFL learners. This study examined the interactions among these variables to empower learners using a partial least squares structural equation modelling (PLS-SEM) approach. This study is of great value in two ways: it provides a critical theoretical and methodological contribution to the dynamics of Applied Linguistics. In principle, it is a further extension of Social Cognitive Theory, theorizing AI dialogic scaffolding as a contemporary environmental factor that restructures the self-efficacy of EFL learners (Ren, Stephens and Lee, 2026). It offers a new framework for the interaction between digital scaffolding and affective variables, such as language anxiety and communicative outcomes. Methodologically, the researchers used PLS-SEM, which provides strong statistical support for complex mediating mechanisms that are inaccessible to traditional regression modelling.

2. Literature Review

2.1 Theoretical Foundation

The theoretical base draws on sociocultural, social cognitive, and affective perspectives to explain how students' conditions and psychology influence oratory confidence in AI-facilitated EFL settings. The conceptualization of speaking confidence in Figure 1 proposes that AI dialogic scaffolding and language anxiety will alter the proximal communicative outcome of speaking confidence, and that the central mediation between the two will be self-efficacy as a belief system. The application of AI dialogic scaffolding is justified by sociocultural theory, which conceptualizes learning as a mediated activity in which interaction, feedback, and regulation facilitate the

internalization of communicative competence, whether mediated by humans or technology (Vygotsky, 1978; Lantolf et al., 2014). From this perspective, AI-free dialogic scaffolding entails a teaching instruction system that emphasizes meaning-making, learner agency, and gradual advancement of oral skills. The explanatory logic for attributing evidence of speaking confidence from these instructional experiences to social cognitive theory is that it underlies self-efficacy as an agentic judgment that controls effort, persistence, and communicative risk-taking (Bandura, 2018). In this regard, scaffolded interaction can indirectly improve speaking confidence by enhancing learners' perceived communicative ability. This explanation is supplemented by the affective perspective, which explains the restraining effect of language anxiety, which disrupts attentional control and leads to negative self-assessment in an interactive situation (Gegersen & MacIntyre, 2020). Thus, it is hypothesized that anxiety has a direct and indirect impact on speaking confidence by undermining self-efficacy beliefs. Figure 1 combines all these theoretical perspectives into a consistent causal framework in which self-efficacy, in interaction with instructional support and emotional constraints, results in variability in speaking confidence. This framework is reflected in current theoretical developments and will provide a rigorous foundation for testing the hypotheses suggested in technology-based language-learning settings. While the present study emphasizes recent work from 2024 to 2026, the role of self-efficacy in language learning was established decades earlier (Woodrow, 2011). The current model extends these foundational studies by substituting human scaffolding with AI-dialogic scaffolding. Consequently, the contribution is not the discovery of new psychological mechanisms but rather the application of well-established theory to an emerging technological context. Sociocultural theory explains how AI scaffolds learning (mediation). Social cognitive theory explains why self-efficacy changes (mastery experiences and vicarious observation). Affective perspective explains when anxiety overrides both (attentional control, negative self-talk). The novel integration in Figure 1 is that self-efficacy is positioned as the common pathway: AI operates through it (sociocultural → cognitive), and anxiety operates through it (affective → cognitive). This synthesis predicts that any intervention (AI or anxiety reduction) will have a limited effect on speaking confidence unless it first changes self-efficacy. Figure 1 is derived from Bandura's (2018) triadic reciprocal determinism (person – environment – behaviour). AI dialogic scaffolding represents the environmental factor; self-efficacy is the *personal* belief; speaking confidence and language anxiety are behavioural/affective outcomes. The specific arrows are based on: (a) Vygotsky's (1978) mediation principle (AI → self-efficacy), (b) Gegersen and MacIntyre's (2020) affective filter model (anxiety → speaking confidence), and (c) previous meta-analyses (Ren, Stephens and Lee, 2026) showing self-efficacy as a mediator. No prior study has tested this exact configuration in Saudi EFL with AI scaffolding.

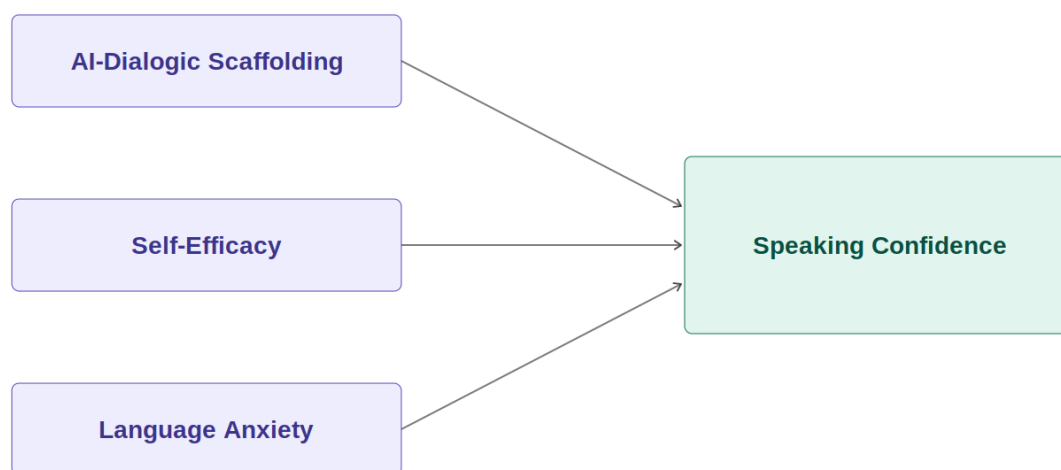


Figure 1: Research Framework

2.2 Previous Studies and Hypotheses Development

Effect of AI-Dialogic Scaffolding on Speaking Confidence

Recent literature suggests the growing importance of the AI dialogic scaffold in helping English as a Foreign Language (EFL) students feel more confident in speaking their language, often in the context of social cognitive theory. This theoretical approach assumes that learning occurs as a social process involving dynamic reciprocal interactions among the person, environment, and behavior. Interactive and personalized feedback from AI

dialogic scaffolding helps develop an environment in which observational learning and mastery experiences are inviting and can contribute to the formation of self-efficacy as the central construct of social cognitive theory, thereby directly affecting speaking confidence. For example, Cui, Yang and Xu (2025) found that AI can significantly improve EFL learners' speaking, provided that a system is used as a communicative scaffold and co-constructs with scenario-specific interactions. Similarly, Ma and Chen (2025) observed that language games involving AI did not demotivate or decrease the interest of Chinese EFL learners, which indirectly resulted in the acquisition of English and consequently increased confidence in speaking. Wang and Wang (2025) narrowed the study to the use of individually interactive scaffolding using AI and its impact on the performance of secondary school students in speaking, setting goals, and self-critical reflection, which are the main components of confidence in speaking. Ebadi et al. (2025) also noted the benefits of AI-enhanced scaffolding procedures in increasing confidence during the speaking process, Tian et al. (2026) investigated the effects of a GenAI-assisted dialogic model of peer feedback on self-efficacy among EFL writers, with the implication that it propagates to speaking confidence. Finally, Grab (2025) demonstrated that ESL undergraduates learned more through AI chatbots with built-in practice to improve speaking. These studies lead to the conclusion that AI dialogic scaffolding is a beneficial, interactive learning environment that enhances EFL learners' speaking confidence, skill acquisition, and self-belief development. Although we use causal language ("influences," "affects") for consistency with social cognitive theory, all hypotheses refer to statistical associations from cross-. Based on these findings, we formulated our first hypothesis as follows:

H1: AI-Dialogic scaffolding positively influences Speaking Confidence in Saudi EFL learners.

Effect of Language Anxiety on Speaking Confidence

Language anxiety significantly influences the development of speaking confidence among EFL learners, a phenomenon frequently attributed to sociocultural theory, which emphasizes social interaction and cultural context in the learning process. Too much anxiety may construct a filter of emotions, making learners unable to take part in communicative practices and speaking, thereby negatively affecting their confidence. For example, Lin et al. (2025) validated the negative predictive role of foreign language anxiety on learners' willingness to communicate, which is a direct antecedent of speaking confidence. Septiawan et al. (2025) outlined the extent, attitudes, and perceptions of speaking anxiety among university students, indicating its ubiquity. Alharbi, (2025) established a strong negative correlation between EFL anxiety and academic performance in speaking. Cancino and Cabello (2024) investigated the links between language learning strategies and self-efficacy and implicitly related the negative effects of anxiety on strategy use and future confidence. The triarchic nature of the relationship between L2 learners' cognition, emotion, and language performance was also explored by Ma (2022). A crucial point in these studies is how the concept of anxiety (emotion) interferes with performance (i.e., speaking). Radjuni, Sahraeny and Latief (2025) analyzed the correlation between English-speaking self-efficacy and students' English-speaking, in which anxiety was identified as an inhibitor of self-efficacy. As these studies have consistently shown, language anxiety is a significant barrier that lowers the speaking confidence of EFL learners and hinders their participation and performance. Drawing on the negative role of anxiety, we formulated hypothesis two as follows:

H2: Language Anxiety negatively influences Speaking Confidence in Saudi EFL learners.

The relationship based on social cognitive theory is that of English as a Foreign Language (EFL) learners. This model assumes that mastery experiences and verbal persuasion foster self-efficacy through a triadic interplay. Empirical observations of recent times suggest that scaffolds based on AI offer a framework for such experiences, a low-stakes, low-distraction environment in which they thrive. For example, Almusharraf et al. (2025) showed that generative AI chatbots help learners develop a sense of competence through immediate, non-judgmental feedback that builds on an understanding of communicative power. Similarly, Apriani et al. (2024) found that self-efficacy, a key indicator of the development of interactive support for AI, increased substantially after artificial task-based support was provided. This was also quantified by Ren, Stephens and Lee, (2026), who reported that academic self-belief in AI-mediated learning environments was significantly positive. Moreover, Xiao et al. (2025b) argue that AI-guided systems promote cognition, thereby reducing cognitive overload and increasing self-efficacy when performing challenging tasks. According to Zhang (2026), AI dialogue provides a safe environment for mastering verbal communication. In contrast, Wang and Wang (2025) stated that AI interactive scaffolding directly facilitates the establishment of goals and self-assessment, which are key components of effective behavior. Considering the central role of self-efficacy in social cognitive theory, we formulated hypothesis three as follows:

H3: AI-Dialogic Scaffolding positively influences Self-Efficacy in Saudi EFL learners. These results highlight the empowering nature of technology.

Effect of Language Anxiety on Self-Efficacy

The effects of language anxiety on the self-efficacy of EFL students are also severe, and they are well explained with reference to the social cognitive theory, which focuses on the mutual interaction among personal, behavioral, and environmental factors. Extreme anxiety causes a person to lose trust in their abilities, especially in performance-related activities, such as speaking a foreign language. This loss of self-efficacy may lead to avoidance tendencies, which, in turn, limits opportunities to develop skills and build confidence in their abilities. In this manner, for example, the study by Heydarnejad (2025) on the roles of academic mindfulness and teacher support in educational self-efficacy implicitly implied that anxiety, as an emotional constraint, would harm all of them. Similarly, Pan and Li (2025) observed that acceptance of generative AI was associated with EFL learners' well-being and self efficacy. Therefore, negative emotional states, such as anxiety, have the opposite effect. The research published by Li et al. (2024) on increasing learners' confidence in English learning emphasized that highly effective learners are more motivated, which, in turn, would decrease anxiety and motivation through lowered self-efficacy. Wang (2024) developed and confirmed scale measures of speaking self-efficacy, and it is important to note that perceived capability plays an important role in language production and is directly affected by anxiety. Moreover, the connection between English-speaking self-efficacy and performance perception indicates that factors such as anxiety can reduce self-efficacy (Radjuni, Sahraeny and Latief, 2025). Finally, the systematic review by Wang and Wang (2025) on anxiety and self-efficacy among English language learners further solidifies that anxiety is a major hindrance to the development of powerful self-efficacy. Altogether, these studies show that language anxiety plays a crucial role in reducing EFL learners' self-efficacy, as it creates self-doubt and prevents them from engaging in language learning. Given the inverse relationship between anxiety and perceived competence, we formulated hypothesis four as follows:

H4: Language Anxiety negatively influences Self-Efficacy in Saudi EFL learners.

Effect of Self-Efficacy on Speaking Confidence

Self-efficacy is a fundamental construct of social cognitive theory that determines EFL speaking confidence. This theory assumes that the beliefs individuals hold about their ability to plan and implement the courses of action needed to achieve their goals provide the basis for their motivation, behavior, and emotional states. Increased self-efficacy in speaking results in greater effort, persistence, and resilience in the face of challenges, thereby directly increasing confidence. Wang (2024) formulated and tested scales of speaking self-efficacy, explaining that it is directly connected to perceived speaking ability and confidence. Li et al. (2024) found that positive EFL students are more motivated, and their motivation is closely intertwined with their confidence in their ability to speak. According to Chang, Zhou and Zhang (2024), EFL learners' participation in speaking activities is positively affected by their task-specific self-efficacy. When learners have greater confidence in their speaking skills, they tend to engage more actively, which enhances their speaking confidence. A direct test of the relationship between English-speaking students' self-efficacy and English-speaking performance was conducted by Radjuni, Sahraeny and Latief (2025), who found a positive direct correlation between these two variables. This notion is also supported by Wang and Wang (2025) on anxiety and self-efficacy among English language learners, as self-efficacy levels are inversely related to anxiety and confidence in speaking. Furthermore, the article by Ma and Chen (2025) on the contribution of human touch to AI-optimized language learning and self-efficacy implicitly suggests that self-efficacy is a major factor in explaining general language skills and confidence, based on research on the role of human touch in language learning. This study has consistently reaffirmed that a strong sense of self-efficacy is the highly desired element that can assist EFL students in building their speaking confidence, leading them to become more active and consistent in speaking. Considering the central role of self-efficacy in social cognitive theory, we formulated hypothesis five as follows:

H5: Self-efficacy positively influences Speaking Confidence in Saudi EFL learners.

Self-Efficacy as a mediator

The relationship between the AI dialogue scaffold, language anxiety, and speaking confidence was mediated by self-efficacy, as best explained by social cognitive theory. The theory stresses that people's perceptions of their abilities are influential factors that shape their motivation, behavior, and emotional reactions. When applied to EFL learning, AI dialogic scaffolding could enhance speaking confidence, both directly and indirectly, by supporting learners' self-efficacy. For example, Pan and Li (2025) proposed that acceptance of generative AI is correlated with the well-being and self-efficacy of EFL learners, suggesting that a positive attitude toward AI

tools could boost self-belief. According to Cui, Yang and Xu (2025), AI, as a communicative scaffold, enhances speaking skills, and the subsequent improvement in speaking skills leads to a stronger sense of self-efficacy, which, in turn, boosts confidence. Moreover, self-efficacy tends to mediate the negative effects on speaking confidence in language anxiety. When language anxiety is high, it takes away the self-efficacy of the learners, such that they feel incompetent to speak effectively, and hence this reduces their speaking confidence. Alharbi (2025) indicated good negative relationships between EFL anxiety and digital self-efficacy, which means that anxiety directly diminishes self-belief. Heydarnejad (2025) investigated whether academic mindfulness and teacher support can affect educational self-efficacy, suggesting that educational self-efficacy would be positively influenced by factors that reduce anxiety. The role of anxiety and self-efficacy among English language learners aligns with the findings of Wang and Wang (2025) who revealed that higher self-efficacy is associated with lower anxiety and confidence. These studies indicate that self-efficacy is an influential psychological process and that AI-dialogic scaffolding and language anxiety can mediate the effect of EFL learners' speaking confidence. Integrating the previous paths, we formulated hypothesis six on mediation as follows:

H6: Self-efficacy mediates the relationship between AI-Dialogic scaffolding, language anxiety, and speaking confidence in Saudi EFL learners.

3. Research Methodology

3.1 Participants and Setting

This study used a quantitative design and a cross-sectional survey to examine the correlations among ADS, LA, SE, and SC among Saudi EFL learners. The study population consisted of students studying English as a Foreign Language at the university level in Saudi Arabia, an industry that enrolled approximately 2.2 million students in 2024 (Alanazi, 2024). To determine the sample size, a table based on Krejcie and Morgan's (1970) method was used, and a sample of 384 participants was selected to ensure statistical representativeness of the sample. A convenience (accessible) sampling method was used, meaning that the researchers invited all EFL students in the six cooperating universities who were present during the data-collection period. The target of 384 was based on Krejcie and Morgan's table for a population of 2.2 million, but this table assumes a simple random sampling. Because our sample was non-probability, the sample achieved ($N = 243$) was not statistically representative of all Saudi EFL students in the strict sense. We report a 63.3% response rate, but the target was 384 (Krejcie & Morgan for 2.2 million), and we obtained 243 valid responses (63.3% of the target). A total of 243 valid responses were obtained out of 384 questionnaires sent, with a response rate of 63.28%. Table 1 shows the Saudi EFL participants in this study.

Table 1: Demographic Profile of the Respondents ($N = 243$)

Variable	Category	Frequency	Percentage (%)
Gender	Male	108	44.4
	Female	135	55.6
Age Group	18–20 years	99	40.7
	21–23 years	132	54.3
	24 years and above	12	4.9
Year of Study	Foundation Year	40	16.5
	Year 1	48	19.8
	Year 2	55	22.6

Variable	Category	Frequency	Percentage (%)
	Year 3	52	21.4
	Year 4	48	19.8
Institution Type	Public University	168	69.1
	Private University	75	30.9
Field of Study / Major	English Language / Applied Linguistics	84	34.6
	Education (EFL/TESOL)	53	21.8
	Other Disciplines	106	43.6
English Proficiency Level	Beginner	40	16.5
	Intermediate	101	41.6
	Upper-Intermediate	47	19.3
	Advanced	55	22.6
Experience with AI Tools	No prior experience	60	24.7
	Limited experience	91	37.4
	Moderate experience	60	24.7
	Extensive experience	32	13.2
Experience with Dialogic Scaffolding Activities	None	52	21.4
	Occasional	98	40.3
	Frequent	93	38.3
Confidence in Speaking Activities (Self-Rated)	Low	50	20.6
	Moderate	122	50.2

Variable	Category	Frequency	Percentage (%)
	High	71	29.2

The demographics of the 243 Saudi EFL participants in this study are presented in Table 1, which reflects the study's results. It was mainly a women's sample (55.6%), with the majority (54.3%) in the 21-23 age group, which is typical of university enrolment (Alanazi, 2024). The respondents were spread across all academic years, with the highest percentage (22.6) in Year 2, and most were from public universities (69.1). Interestingly, although 56.4% of the participants were English majors, a significant number (43.6%) were from other majors, and most of them showed a general interest in EFL. Regarding proficiency, most participants rated themselves as intermediate (41.6) or advanced (22.6). The general experience with AI tools and dialogic scaffolding was also ambivalent; 37.4% had little experience with AI, and 40.3% had a low frequency of scaffolding. Overall, there was a moderate (50.2 percent) and high (29.2 percent) proportion of 70.8 percent speaking with confidence, 20.6 percent speaking with low confidence, and progressing to affective in the Saudi environment (Alshakhi, 2025). This variety of students demonstrates that this research is applicable to students from diverse backgrounds and experiences.

3.2 Data Collection

The study items were a structured questionnaire containing adjusted field questions from current scales. The ADS was assessed using six items based on Tuan (2025), focusing on AI-based pedagogical support. LA was measured using the 5-item Foreign Language Classroom Anxiety Scale (Horwitz, Horwitz and Cop, 1986). SE was measured using five items modified from the Speaking Skills Self-Efficacy Beliefs questionnaire (Wang and Sun, 2024), and SC was assessed using seven adapted Griffiee (1997) items. A pretest with 5 participants (different from the main sample) was used only to check for obvious wording errors and survey flow. This was followed by a pilot study with 30 participants (10% of the target sample), who completed the same survey and then were interviewed for 5 minutes about item clarity. Based on pilot feedback, two items (LA4 and SC6) were reworded slightly (e.g., "I feel anxious" → "I feel nervous"). The pilot data were not included in the main analysis. Construct validity was further assessed via confirmatory factor analysis (all loadings > 0.77; Table 3). No items were deleted. The original scales were in English. They were translated into Arabic by two bilingual applied linguists, then back-translated by two independent translators. Discrepancies (3 out of 23 items) were resolved by a third expert. For the Saudi context, we replaced culturally specific references (e.g., "speaking in front of the whole class" became "speaking in front of a group of 5–6 Saudi peers"). No items were deleted; all were retained to maintain comparability with the original validation studies. A pilot investigation involving 30 learners revealed that Cronbach's alphas for all constructs exceeded 0.70, thereby validating the internal reliability and ruling out the need for further adjustments. After conducting the pilot study, most statements underwent a review and refinement process to more accurately align with the academic environment of Saudi EFL learners, guaranteeing that the items were both linguistically suitable and culturally pertinent for the intended audience.

3.2.1 Procedure and ethical approval

Data were collected over 2 months, consecutive days (14th January-16th March 2026) using the university's licensed Qualtrics platform. Participants accessed the survey via a unique anonymous link distributed through course LMS announcements and WhatsApp groups of six English departments. Inclusion criteria were: (a) enrolled in a mandatory EFL speaking course, (b) had not previously used an AI dialogue system for speaking practice, (c) age ≥18 years, and (d) provided informed consent. Exclusion criteria: (a) incomplete responses (>10% missing), (b) straight-lining (identical answers for >80% of items), and (c) completion time <3 minutes (determined by pilot testing). The survey remained open until 243 valid responses were obtained after cleaning, a process that took 2 months. (a) Our model includes both direct and indirect paths (mediation), which PLS-SEM handles without distributional assumptions. (b) We prioritize prediction ($Q^2 = 0.622-0.700$) over covariance-based fit indices because our goal is to identify which variables predict speaking confidence for intervention design. (c) Preliminary Shapiro-Wilk tests indicated that 7 of 23 items violated normality assumptions ($p < 0.05$), rendering maximum likelihood estimation inappropriate. (d) The sample size ($N = 243$) exceeds the 10-times rule for the most complex regression (max 3 predictors → minimum 30 cases). Thus, PLS-SEM is methodologically justified, not merely convenient. The researchers received ethical approval from the Institutional Review Board at Prince Sattam bin Abdulaziz University (Approval No. SCBR-399/2026; January 2026). This research adhered to the Helsinki Declaration of 1964; it supported informed consent and did not violate confidentiality. All

participants were informed of their right to withdraw, and their data was handled securely to ensure privacy throughout the research.

3.3 Data Analysis

Data collection was conducted electronically using the university's licensed Qualtrics platform to ensure the participants' anonymity. This platform was chosen because it automatically anonymizes IP addresses and prevents the collection of identifying metadata, thereby reducing social desirability bias and encouraging honest responses regarding language anxiety, which is a sensitive topic in Saudi EFL contexts. Data analysis was performed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS 4. PLS-SEM was selected for three reasons: (a) the research prioritizes the prediction of speaking confidence ($Q^2 = 0.700$) over covariance-based fit indices; (b) preliminary normality tests revealed that seven out of 23 items violated univariate normality (Shapiro-Wilk $p < 0.05$), making maximum likelihood estimation inappropriate; and (c) the model includes both direct and indirect mediation paths, which PLS-SEM estimates without distributional assumptions (Hair et al., 2022). This approach is methodologically appropriate for complex mediation in applied-linguistics research.

4. Results of the Study

Table 2 presents the results of the exploratory factor analysis for common method biases. The first accounts for 48.831 percent of the overall variation, with an initial eigenvalue of 14.161, which falls short of the standard 50 percent criterion (Hair et al., 2022). This implies that, although we do find common method variance, as in the case of simple single-source and self-report survey data, it is not high enough to seriously affect the findings. The fact that three further significant elements (eigenvalues greater than one) accounted for 67.111 percent of the variance also shows that the constructs were latent and not the product of a single methodological variable. Thus, despite its presence, common method bias was not considered a serious issue in this study.

Table 2: Common Method Bias

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.161	48.831	48.831	14.161	48.831	48.831	8.546	29.470	29.470
2	2.924	10.083	58.913	2.924	10.083	58.913	5.081	17.522	46.992
3	1.292	4.456	63.370	1.292	4.456	63.370	3.281	11.314	58.306
4	1.085	3.741	67.111	1.085	3.741	67.111	2.554	8.805	67.111

The findings from the model measurement are presented in Table 3, which indicates high reliability and convergent validity for all constructs. All item loadings were beyond the acceptable limit of 0.70 (Hair et al., 2022), ranging from 0.770 to 0.889. Internal consistency was good, with Cronbach's alpha values exceeding 0.80 (AI-Dialogic scaffolding $\alpha=0.802$, Language Anxiety $\alpha=0.856$, Speaking Confidence $\alpha=0.817$, self-efficacy $\alpha=0.822$). The reliability of the scales was further supported by composite reliability (rho_c) scores ranging from 0.825 to 0.841. The criteria used to statistically define convergent validity were an Average Variance Extracted (AVE) for each construct higher than 0.50, with an average of 0.668 to 0.762 (Hair et al., 2019). These findings suggest that the scaled tools, including ADS (Tuan, 2025), LA (Horwitz, Horwitz and Cop, 1986), SE (Wang and Sun, 2024), and SC (Griffiee, 1997), worked well in the Saudi EFL context and offered psychometrically adequate tools for testing the structural model. The six ADS items (e.g., "The AI dialogue system gave me step-by-step hints when I struggled") directly reflected the operationalization above. No other AI tool (e.g., a generative chatbot without scaffolding or an automated grammar checker) was used. This distinguishes ADS from generic "AI-assisted interaction".

Table 3: Measurement Model

Constructs	Factor Loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AI-Dialogic Scaffolding		0.802	0.813	0.825	0.672
ADS1	0.833				
ADS2	0.821				
ADS3	0.777				
ADS4	0.811				
ADS5	0.836				
ADS6	0.837				
Language Anxiety		0.856	0.803	0.827	0.718
LA1	0.826				
LA2	0.819				
LA3	0.845				
LA4	0.881				
LA5	0.865				
Speaking Confidence		0.817	0.819	0.834	0.668
SC1	0.847				
SC2	0.779				
SC3	0.845				
SC4	0.797				
SC5	0.770				
SC6	0.877				
SC7	0.801				
Self-Efficacy		0.822	0.823	0.841	0.762
SE1	0.860				
SE2	0.889				
SE3	0.863				
SE4	0.881				
SE5	0.871				

Table 4 shows the discriminant validity measurement based on the heterotrait-monotrait (HTMT) ratio and predictive model performance. Discriminant validity is supported by HTMT values for all constructs, which are all below the conservative threshold of 0.85 (Hair et al., 2022). Namely, the most significant correlation was between LA and SC at 0.798, indicating a strong but neither close nor weak relationship. The model is quite explanatory, as SE and SC have R-squared values of 0.630 and 0.711, respectively, indicating that the predictors explain a significant percentage of the variance in these endogenous variables and that the model satisfies the theoretical assumptions of Social Cognitive Theory (Bandura, 2018). Moreover, the Q-squares (0.622 for SE and 0.700 for SC) are also greater than 0, indicating that the model has predictive relevance (Hair et al., 2019). The overall findings support the uniqueness of the measured constructs and the model's ability to test hypotheses.

Table 4: Hetetrait-monotrait Discriminant Validity

Constructs	R-square	Q-square	ADS	LA	SC	SE
ADS						
LA			0.456			
SC	0.711	0.700	0.558	0.798		
SE	0.630	0.622	0.546	0.641	0.777	

As shown in Table 4a, all items loaded higher on their intended construct than on any other construct, with a minimum difference of 0.10 or more. For instance, ADS1 loaded at 0.833 on ADS but cross-loaded at only 0.368 on LA, 0.433 on SE, and 0.417 on SC. Similarly, LA3 loaded at 0.845 on LA, with cross-loadings on SC (0.488), SE (0.661), and ADS (0.306), which were all substantially lower. The highest cross-loading across all 23 items was 0.714 (LA4 on SE), which was well below the conventional threshold of 0.70 (Hair et al., 2022). No item exhibited a cross-loading that exceeded its primary load. This pattern confirms that each construct is empirically distinct from the others, supporting discriminant validity at the item level. The complete cross-loading matrix is shown in Table 4a.

Table 4a: Cross Loadings

Items	ADS	LA	SC	SE
ADS1	0.833	-0.368	0.417	0.433
ADS2	0.821	-0.335	0.438	0.412
ADS3	0.777	-0.378	0.435	0.457
ADS4	0.811	-0.287	0.397	0.363
ADS5	0.836	-0.341	0.400	0.398
ADS6	0.837	-0.309	0.408	0.384
LA1	-0.363	0.826	-0.566	-0.636
LA2	-0.367	0.819	-0.473	-0.617
LA3	-0.306	0.845	-0.488	-0.661
LA4	-0.355	0.881	-0.445	-0.689
LA5	-0.359	0.865	-0.691	-0.646
SC1	0.444	-0.503	0.847	0.620
SC2	0.400	-0.448	0.779	0.560
SC3	0.455	-0.475	0.845	0.596
SC4	0.420	-0.446	0.797	0.570
SC5	0.392	-0.425	0.770	0.529
SC6	0.419	-0.343	0.877	0.547
SC7	0.379	-0.331	0.801	0.568
SE1	0.399	-0.659	0.597	0.860
SE2	0.446	-0.676	0.649	0.889
SE3	0.445	-0.659	0.606	0.863
SE4	0.441	-0.714	0.672	0.881
SE5	0.451	-0.639	0.599	0.871

Table 5 presents the Variance Inflation Factors (VIFs) to assess multicollinearity among the predictor constructs in the structural model. None of the VIF values exceeded the generally established level of 5, and it was even stricter at 3 (Hair et al., 2019). In the case of SC prediction, the VIFs were 1.337, 2.442, and 2.703 for ADS, LA, and SE, respectively, indicating no multicollinearity. For the prediction of Self-Efficacy, the VIFs were 1.205 for ADS and 1.205 for LA. These low values suggest the absence of harmful multicollinearity, indicating that the

constructs of the predictors are well dispersed and that the individual effects of these predictors on the dependent variables (SC and SE) can be estimated consistently and without bias due to high intercorrelations.

Table 5: Variance Inflation Factor (VIF)

Constructs	SC	SE
ADS	1.337	1.205
LA	2.442	1.205
SE	2.703	

The results of the path analysis for the test of direct relationships in the hypothesized model are presented in Table 6 and Figure 2. The first hypothesis (H1) posits that ADS is positively associated with SC. This hypothesis is supported by a significant positive path ($\beta = 0.176$, $p < 0.001$). Sociocultural theory is consistent with this observation, as it assumes that tools and social interaction mediate learning (Lantolf et al., 2014). The AI tool served as a mediating artifact, providing organized, interactive assistance that could internalize communicative competence and, therefore, directly increase confidence, as demonstrated in comparable situations by Wang and Wang (2025). Although $\beta = 0.176$ for $ADS \rightarrow SC$ is small ($f^2 = 0.081$, below Cohen's 0.15 for medium), it is meaningful because (a) it operates alongside a very large anxiety effect ($\beta = -0.640$) and (b) the indirect effect (0.030) represents an additional 17% of the direct effect. In educational terms, Hypothesis H2, which states that LA has a negative impact on SC, is strongly supported by a significant negative path ($\beta = -0.640$, $p = 0.001$). Such a large contribution can be explained through the affective perspective of sociocultural and cognitive paradigms, with anxiety serving as a filter that disrupts performance and self-assessment (Gregersen and MacIntyre, 2020), a claim confirmed by other researchers in Saudi settings (Alharbi, 2025). The direct effect of AI on confidence ($\beta = 0.176$) was weaker than expected, given that prior meta-scaffolding procedures could yield stronger effects. Alternatively, the strong anxiety effect ($\beta = -0.640$) may suppress the AI- In H3, the impact of ADS on SE was positive ($\beta = 0.221$, $*p = .001$). This is because the social cognitive theory acknowledges mastery experiences and supportive feedback as sources of self-efficacy (Bandura, 2018). The AI scaffold facilitated such experiences, increasing learners' belief in their capabilities, as observed by Ren, Stephens and Lee (2026). The negative effect of LA on SE (H4) is also strongly supported (H4: $\beta = -0.677$, $p < 0.001$). This is explicated by social cognitive theory, which holds that anxiety weakens cognitive processing and the motivational beliefs required for strong self-efficacy (a point Heydarnejad (2025) observes). Lastly, H5, which suggests that SE has a positive effect on SC, is supported ($\beta = 0.137$, $*p = 0.024$). This direct relationship is key to social cognitive theory, in which efficacy beliefs determine effort and perseverance in activities such as speaking (Bandura, 2018), and was confirmed in EFL learning by Wang, Zhao and Li, (2024).

Table 6: Path Analysis

Hypotheses	Path Analysis	Beta	STDEV	T statistics	C.I. Bias			f-square	P values
					Bias	2.5%	97.5%		
H1	ADS -> SC	0.176	0.039	4.519	0.001	0.093	0.248	0.081	0.000
H2	LA -> SC	-0.640	0.054	11.953	-0.002	-0.736	-0.529	0.582	0.000
H3	ADS -> SE	0.221	0.045	4.934	-0.000	0.139	0.313	0.110	0.000
H4	LA -> SE	-0.677	0.035	19.425	-0.001	-0.736	-0.596	0.726	0.000
H5	SE -> SC	0.137	0.061	2.261	-0.002	0.019	0.263	0.024	0.024

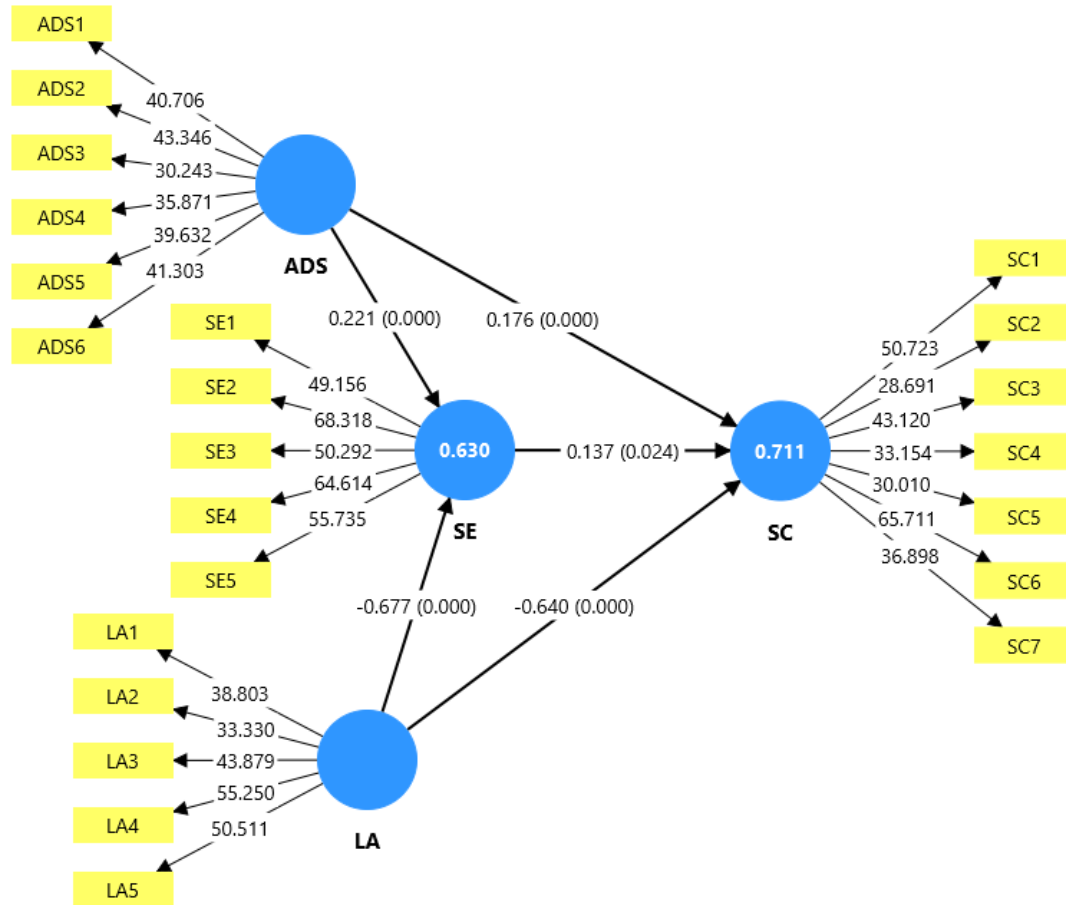


Figure 2: Graphical Results of Path Coefficient

The indirect effect results are shown in Table 7, which tests H6 for the mediating effect of SE. The mediating effect path between ADS and SC via SE was also significant ($\beta = 0.030$, $*p^* = 0.049$), confirming the mediation hypothesis. This result aligns with the social cognitive theory, which holds that environmental assistance, such as AI scaffolding, increases efficacy beliefs, which subsequently breeds confidence in performance (Bandura, 2018). This mediation aligns with Pan's (2025) observation that positive AI experiences increase self-belief. Equally, the indirect route between LA and SC via SE is also significant ($\beta = -0.093$, $*p^* = 0.027$), validating mediation. This is evident in social cognitive theory, which states that anxiety undermines the self-efficacy needed to engage in conversations with confidence, a claim supported by Wang and Wang, (2025) review. Thus, SE serves as a complementary mediator with statistical significance, albeit with a minor impact. The indirect influence of ADS through SE ($\beta = 0.030$) constitutes only 14.6% of ADS's overall effect on SC (total effect = 0.206; direct effect = 0.176). This VAF percentage (14.6%) was derived by dividing the indirect effect by the total effect ($0.030 \div 0.206 \times 100$). For the LA $\rightarrow$ SE $\rightarrow$ SC pathway, the VAF was 12.7% ($0.093 \div 0.733 \times 100$), indicating a statistically significant complementary mediation. Consequently, the majority of AI's impact on confidence is direct, rather than mediated by self-efficacy.

Table 7: Using Mediation Results, Indirect Method

Hypotheses	Path Analysis	Beta	STDEV	T statistics	C.I. Bias			P values
					Bias	2.5%	97.5%	
H6a	ADS $\rightarrow$ SE $\rightarrow$ SC	0.030	0.015	1.967	-0.000	0.005	0.068	0.049
H6b	LA $\rightarrow$ SE $\rightarrow$ SC	-0.093	0.042	2.222	0.001	-0.187	-0.014	0.027

5. Discussion of the Study

This study aimed to test whether self-efficacy mediates the relationship between AI dialogic scaffolding, language anxiety, and speaking confidence among Saudi EFL learners. This study discusses each hypothesis. The

direct effects emphasize the strong and autonomous roles of the instructional environment and the learner's affective condition. The direct relationship between language anxiety and speaking confidence was the most significant negative relationship, which proves the argument that anxiety is a primary and debilitating filter. This is consistent with the affective perspective, which emphasizes that anxiety consumes mental resources and activates negative self-assessments, which in turn directly impairs performance, irrespective of other supports (Gregersen and MacIntyre, 2020). This conclusion supports the results of the Saudi context, where anxiety permeates even during digital transformations (Alharbi, 2025). In contrast, the medium-sized but positive direct impact of AI dialogic scaffolding on confidence indicates that the technology itself is a tangible and beneficial structural advantage. In sociocultural terms, AI is an intermediary device that controls the learning process to facilitate the regular, non-judgmental exchange of speaking skills that is essential for building a sense of agency, as proposed by (Cui, Yang and Xu, 2025). Nevertheless, the absolute novelty of the proposed study's framework lies in the previously tested medium contacts via self-efficacy, which clarifies how and why these external agents shape confidence. The mediation analysis demonstrated that self-efficacy is not an outcome but a process essential to psychology. The assurance that AI dialogic scaffolding extends to is not just about skill development; fundamentally, it drives learners to exercise the skills they develop, which is an underlying tenet of social cognitive theory (Bandura, 2018). Unlike the effective modification of self-efficacy beliefs, simple exposure to technology does not always produce the intended effect on individuals, as the power of technology is not fully manifested, as meta-analytic research on the psychological impact of AI highlights (Ren, Stephens and Lee, 2026). More importantly, the mediation analysis provides an understanding of how anxiety has a deleterious impact. It not only paralyzes performance with anxiety, but the latter actually swallows up the innate faith in abilities. This loss of self-efficacy, as per the social cognitive theory, leads to a secondary passover channel that further suppresses confidence, thereby creating a vicious cycle of avoidance and doubt. This duo-pathway, immediate, and efficacy-mediated impact of anxiety provides a more precise view of its omnipresent impacts, which reinforces the results of the reviews indicating a connection between anxiety and depleted self-belief (Wang and Wen, 2025). Similar patterns are observed in other Asian and Middle Eastern contexts where speaking anxiety is prevalent. For instance, Kantar, Kok and Bakir (2026) found that English-speaking anxiety negatively predicts flourishing among Turkish EFL learners, while Flett, Nepon and Hewitt (2023) reported associations between anxiety and perfectionistic self-presentation. These cross-cultural parallels suggest that self-efficacy mediation may be generalizable beyond Saudi Arabia. In the Saudi EFL context, speaking is often a public face-threatening act. Even with AI, the anticipation of real-world evaluation (e.g., by teachers, peers) may prime anxiety. The strong effect suggests that AI's non-judgmental nature does not automatically override ingrained affective patterns. ADS likely increases self-efficacy not by reducing anxiety directly but by providing repeated successful trials. However, the small indirect effect ($\beta = 0.030$, $p = 0.049$) implies that for AI to work, learners must first notice their own success – a metacognitive step that may be weak in anxious learners. AI systems should explicitly prompt learners to attribute success to effort/ability (e.g., "You improved because you repeated the phrase correctly"). Without this attributional support, the mastery experience may not translate into self-efficacy. This way, the findings eloquently imply that self-efficacy is the critical factor in transforming AI-assisted training into learner empowerment. One should not be satisfied with technological or anxiety-reducing capabilities. Regarding the implications of the results, one may say that to make the process of AI integration effective regularly, especially in the context of a high level of anxiety, as was the case of Saudi EFL, the instructional design should be designed carefully to produce the most advantageous experiences of mastery and persuasive feedback, which has an immediate impact on self-efficacy. This can include adaptive levels of challenge, reflective questions, and feedback that is not based on pointing out errors but on ability. This study thus shifts the paradigm in the technology aspect under discussion, providing instant certainty that it is only a scaffolding for the psychological precondition of self-efficacy in the possibility of guaranteed communication. This mix, coupled with validation of the structural paths, will provide a more comprehensive plan for how one can develop AI technology to address the overall needs of the language learner and bridge the gap between the opportunities of Facebook and the actual psychological empowerment.

6. Research Implications

The current research relies on Social Cognitive Theory because it effectively positions AI dialogic scaffolding as a strong determinant of the environment, playing a proactive role in shaping self-efficacy beliefs, thereby excluding the use of human sources of efficacy information. It also mediates social, cultural, and affective perceptions and forms a compound that explains how digital tools and moods interact in a fundamental psychological process that influences the outcomes of communication. The PLS-SEM methodological approach offers a valid framework for studying technological improvements in learning by accounting for intricate

mediating mechanisms. This may provide a prototype for investigating oblique psychological pathways that cannot be examined using other methods. The central implication for practitioners and instructional designers is that AI tools must be designed purposefully to train learners' skills, foster mastery, and provide efficacy-building feedback. This recommendation aligns with Bandura's (2018) sources of self-efficacy, which entail a shift from generic interactions to scaffolded sequences that gradually build learners' confidence. Empirically, the need to include AI in dealing with the affective department is clear, and teachers and schools should not overlook this option in situations with comparatively high rates of anxiety in Saudi Arabia. One of the strategies aimed at boosting traditional teaching is presented here. Another societal contribution of this study to the field's goals of digital-era education equity and student empowerment is made. It provides them with a way out of language distortions that can decrease their self-confidence and participation in the world's academic and professional communities, where English is the medium of entry.

6.1 Limitations and Future Studies

Although this study is highly insightful, some of its limitations suggest future research directions. Because the design is cross, it does not establish temporal precedence or rule out reverse causality (e.g., confident learners may seek out more AI practice). Future experimental or longitudinal designs are required to test the causal direction. Although Harman's single-behavioral data (e.g., AI interaction logs, observer ratings of speaking confidence) or use a time-lagged design (e.g., measure AI use at T1, self-efficacy at T2, speaking confidence at T3) to reduce same-source bias. The cross-sectional design will be effective in capturing relationships at the current time; however, it will not allow for causal inference or consideration of changes in dynamics in longitudinal relationships between AI and the use of such tools. In addition, the data gathered through self-report, despite its normalcy and validation, can be complemented by behavioral indicators of real speaking behavior or system logs when interacting with an AI, which adds a multi-method perspective. The sample, grounded in Saudi university students, offers contextual relevance. However, its generalizability to other levels of education and cultural contexts with different patterns of technological adoption and affective profiles is also restricted. Future analyses can rely on longitudinal or experimental designs to establish causality and the development of self-efficacy and confidence over time. To validate the model, it can be tested by extending the study to younger students, vocational settings, or other cultures. It would be interesting to include multimodal data, such as the interpretations of the speech output, checking the measurements of the physiological symptoms of anxiety, or eye-tracking during the interaction with AI, which would give a clearer and more comprehensive picture of the learning process and even erase the gap between perceived and actual competence. We acknowledge that our model did not include potentially relevant control variables such as gender, English proficiency level, prior AI experience, year of study, or institution type. While we collected these demographic data (reported in Table 2), we chose not to include them as predictors to preserve parsimony and avoid overfitting, given our sample size ($N = 243$) and the complexity of the mediation model (five direct paths plus two indirect paths). However, this omission means we cannot rule out the possibility that one or more demographic factors explain part of the variance in speaking confidence. Future research with larger samples should test whether the mediation paths remain significant after controlling for these variables. We did not test alternative model specifications (e.g., reversing the mediation: confidence $\rightarrow$ self-efficacy $\rightarrow$ anxiety), multi-group analyses (e.g., by gender or proficiency), or non-linear effects (e.g., quadratic effects of anxiety). These should be addressed in future studies. The reported results assume linearity and correct model specification, which may not hold.

6.2 Conclusion of the Study

This study has covered a crucial issue of unequal performance of learners in AI-based language acquisition by examining the mediating psychological processes. This study acknowledges that self-efficacy is an established mediator between instructional support and oral performance in non-AI contexts. The modest novelty of this study lies in (a) testing the *specific* ADS operationalization defined above, (b) quantifying the *relative* indirect effect of ADS vs. anxiety through self-efficacy in the same model, and (c) providing the first PLS-SEM evidence from Saudi EFL university students. However, the general pattern (scaffolding $\rightarrow$ self-efficacy $\rightarrow$ confidence; anxiety $\rightarrow$ self-efficacy $\rightarrow$ confidence) replicates prior theoretical expectations. Therefore, the contribution is confirmatory and context-specific, not transformative. It revealed that the relationship between technological devices and learners' empowerment was not direct; rather, it ran through learners' belief systems, which were the major mediating variable. The findings confirm the claim that AI-dialogic scaffolding is a vital intervention in the environment, with its direct and indirect positive impact on speaking confidence among Saudi EFL learners, achieved by directly affecting self-efficacy. Meanwhile, language anxiety proved to be a potent adverse factor, having a massive direct impact on a sense of confidence and a considerable indirect impact, as it weakened

learners' self-efficacy beliefs. As a mediator, self-efficacy is a fundamental explanatory variable, and the emphasis shifts from exposure to technology to a psychological variable that results in factual empowerment. The research offers a rational framework that combines technological, cognitive, and affective features, thus contributing to the theoretical knowledge of both applied linguistics and educational technology. It extends beyond the examination of immediate impacts and shapes models of how digital interventions align with the wavy paths through which they exert influence. The studies suggest using an evidence-based approach in the Saudi case, and the researchers should focus on enhancing self-efficacy to break that anxiety and lack of self-confidence. Finally, the study illuminates that the true potential of AI in ed-Tech is not just its ability to copy an interaction; rather, it is its capacity to be organized in a way that instills psychological strength and confidence in the messages it delivers. Thus, the study provides a distinct path for the evolution of a better, more holistic, and learner-focused digital language learning environment.

Declaration of the use of AI: The authors used Grammarly for the proofreading, spelling and checking of the current work. The authors reviewed and edited the content as required, and they take full responsibility for the publication. Authors declared no AI- tools were used to write or generatet text.

Ethical Approval: Ethical approval for this study was obtained from the Institutional Review Board Committee at Prince Sattam bin Abdulaziz University (Approval No. SCBR-642/2026; Date of approval: 31 January, 2026). The study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Competing interests: There is no conflict of interest.

Authors' contributions: All have authors have equivalent roles.

Funding: The authors extend their appreciation to Prince Sattam bin Abdulaziz University for Funding this research work through the project number (PSAU/2025/02/37654)

Conflicts of interests: The authors declare that they have no conflicts of interest to report regarding the present study.

Data Availability: Data will be available upon reasonable request from thecorrespondent author.

Consent to Participate: Before collecting data, all participants were informed and provided consent confirmation for participation. They were informed that they could withdraw from the study anytime without any consequences.

References

- Alanazi, A. H. 2024. Achieving global recognition: higher education rankings and the commitment to quality in Saudi Arabia's 2030 Strategic Vision (Doctoral dissertation, University of Glasgow).
- Alharbi, M. S. 2025. Digital transformation and EFL anxiety: A mixed-methods study on the impact of online learning on the language acquisition psychology of Saudi Arabian students. *Social Sciences & Humanities Open*, 12, 101721.
- Almusharraf, A., Bailey, D., Almusharraf, N., & Alotaibi, T. 2025. Students' perceptions of generative AI in EFL writing: Strategies, self-efficacy, satisfaction, and behavioural intention. *Australasian Journal of Educational Technology*, 41(5), 18-36.
- Alshakhi, A. 2025. Speaking test anxiety among adult Saudi EFL learners: Causes, factors, and suggested solutions. *International Journal of Language Testing*, 15(2), 166-180.
- Apriani, E., Cardoso, L., Obaid, A. J., Muthmainnah, M., Wijayanti, E., Esmianti, F., & Supardan, D. (2024). Impact of AI-powered chatbots on EFL students' writing skills, self-efficacy, and self-regulation: a mixed-methods study. *Global Educational Research Review*, 1(2), 57-72.
- Bandura, A. 2018. Toward a psychology of human agency. *Perspectives on Psychological Science*, 13(2), 130-136. <https://doi.org/10.1177/1745691617699284>
- Cancino, M., and Cabello, G. 2024. Foreign Language Speaking Anxiety and Computer Self-Efficacy in an Online Emergency Remote Teaching Environment: Perceptions from EFL Learners. *Mextesol Journal*, 48(4), n4.
- Chang, P., Zhou, L., and Zhang, L. J. 2024. The roles of task-specific self-efficacy and enjoyment in EFL learners' development of speaking CALF: A longitudinal study. *System*, 127, 103539.
- Cui, Z., Yang, H., and Xu, H. 2025. The Effects of Interaction Scenarios on EFL Learners' Technology Acceptance and Willingness to Communicate with AI. *Behavioral Sciences*, 15(10), 1391.
- Dai, X., Wang, Y., Yu, J., Qiu, B., Wang, R., and Na, M. 2025. Motivation and engagement as pathways: how AI-augmented online assessment shapes English-speaking competency in vocational EFL classrooms. *Frontiers in Psychology*, 16, 1730953.
- Flett, G. L., Nepon, T., & Hewitt, P. L. (2023). The Perfectionistic Self-Presentation Failure Scale: Psychometric Properties and Associations with Depression and Social Anxiety. *Journal of Concurrent Disorders*, 12-32.

- Ebadi, S., Velayati, S., Ramezanzadeh, A., and Salman, A. R. 2025. Exploring the impact of AI-powered speaking tasks on EFL learners' speaking performance and anxiety: An activity theory study. *Acta Psychologica*, 259, 105391.
- Ekizer, F. N. 2025. Exploring the impact of artificial intelligence on English language teaching: A meta-analysis. *Acta Psychologica*, 260, 105649.
- Grab, M. Ö. 2025. Integrated AI chatbot practice: A pathway to improved ESL speaking skills. *Social Sciences & Humanities Open*, 12, 101933.
- Gregersen, T., and MacIntyre, P. D. 2020. Acting locally to integrate positive psychology and peace: practical applications for language teaching and learning.
- Griffiee, D. T. 1997. Validating a questionnaire on confidence in speaking English as a foreign language. *JALT Journal*, 19(2), 177-197.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Lux, G., and Troiville, J. 2022. *Modèles d'équations structurelles Partial Least Squares (PLS-SEM)* (No. hal-03782748).
- Hair, J. F., Risher, J. J., Sarstedt, M., and Ringle, C. M. 2019. When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24.
- Heydarnejad, T. 2025. Disclosing motivation and educational self-efficacy in AI-enhanced EFL learning via a lens into reflective thinking, academic mindfulness, and teacher support. *Discover Psychology*, 5(1), 145.
- Horwitz, E. K., Horwitz, M. B., and Cope, J. 1986. Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125-132.
- Kantar, A., Kök, M., and Bakir, A. (2026). Conformity to Masculine Norms and Academic Entitlement: Alexithymia and Empathy as Serial Mediators. *Gender Issues*, 43(1), 21.
- Krejcie, R. V., and Morgan, D. W. 1970. Table for determining sample size from a given population. *Educational and Psychological Measurement*, 30(3), 607-610.
- Lantolf, J. P., Thorne, S. L., and Poehner, M. E. 2014. Sociocultural theory and second language development. In *Theories in second language acquisition* (pp. 221-240). Routledge.
- Li, J., Wang, C., Zhao, Y., and Li, Y. 2024. Boosting Learners' Confidence in Learning English: Can Self-Efficacy-Based Intervention Make a Difference?. *TESOL Quarterly*, 58(4), 1518-1547.
- Lin, Y., Wang, B., Zhang, G., and Su, Y. 2025. The relations among foreign language anxiety, academic buoyancy, and willingness to communicate in EFL classroom. *Frontiers in Psychology*, 16, 1634054.
- Ma, Y. (2022). The triarchy of L2 learners' emotion, cognition, and language performance: Anxiety, self-efficacy, and speaking skill in lights of the emerging theories in SLA—*Frontiers in psychology*, 13, 1002492.
- Ma, Y., and Chen, M. 2025. The Human Touch in AI: Optimizing Language Learning through Self-Determination. *Frontiers in Psychology*, 16, 1568239.
- Pan, Y., and Li, G. 2025. The effects of perceived teacher support and growth language mindset on learner well-being in AI-integrated environment: the mediating role of generative AI attitude. *Frontiers in Psychology*, 16, 1660462.
- Radjuni, M., Sahraeny, S., and Latief, M. R. A. 2025. The Relationship between Self-Efficacy and EFL Students' Speaking Performance: A Case Study of English Department Students. *SHIELD: Journal of Studies on Human Interaction, Education, and Language Development*, 1(1).
- Ren, L., Stephens, J. M., and Lee, K. 2026. The Impact of AI on Learners' Self-Efficacy: A Meta-Analysis. *Behavioral Sciences*, 16(1), 158.
- Septiawan, H., Setiyadi, B., Mahpul, M., Sukirlan, M., and Nisa, K. 2025. The anxiety in English for foreign language speaking class: the case of university students in Lampung context. *Journal of Education and Learning (EduLearn)*, 19(1), 362-370.
- Tian, F., Li, H., Gao, Y., and Li, J. 2026. A GenAI-supported dialogic model to enhance the functions of peer feedback in EFL writing: a mixed-method interventional study: *system*, 136, 103895.
- Tuan, N. D. 2025. Boosting Fluency, Reducing Fear: Utilizing Generative AI as a Scaffolding Tool in EFL Speaking Classes.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wang, L., and Wang, L. 2025. Exploring enjoyment, motivation, self-efficacy, and engagement in AI-assisted English learning: A self-determination theory approach. *Learning and Motivation*, 92, 102197.-
- Wang, Y., and Sun, P. P. 2024. Development and validation of scales for speaking self-efficacy: Constructs, sources, and relations. *Plos one*, 19(1), e0297517.
- Woodrow, L. (2011). College English writing affect: Self-efficacy and anxiety. *System*, 39(4), 510-522.
- Xiao, F., Zou, E. W., Lin, J., Li, Z., and Yang, D. 2025. Parent-led vs. AI-guided dialogic reading: Evidence from a randomized controlled trial in children's e-book context. *British Journal of Educational Technology*, 56(5), 1784-1813.
- Yan, J., Wu, C., Tan, X., and Dai, M. 2025. The influence of AI-driven personalized foreign language learning on college students' mental health: a dynamic interaction among pleasure, anxiety, and self-efficacy. *Frontiers in Public Health*, 13, 1642608.
- Zhang, W. 2026. The impact of AI chatbots on EFL learners' oral proficiency and willingness to communicate. *System*, 136, 103919.
- Zhang, X. 2025. Enhancing oral English learning through AI: a case study on the impact of AI-driven speaking applications among Chinese university students. *Frontiers in Psychology*, 16, 1595818.