AI-Integrated Task-Based Language Teaching for Low-Proficiency EFL Learners: A Longitudinal Mixed-Methods Study

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Abstract

This longitudinal mixed-methods study investigated how AI-integrated Task-Based Language Teaching (TBLT) supported speaking development, affective change, and learner engagement among low-proficiency English as a Foreign Language (EFL) learners in a technology-enhanced learning environment. Fourteen adult learners (CEFR A1–A2) in a continuing education context participated in a two-semester intervention incorporating AI tools for speaking practice, feedback, pronunciation support, and task-based rehearsal. Given the small sample size and non-normal data distribution, non-parametric analyses were conducted. A Friedman test revealed a statistically significant difference in speaking performance across four time points, $\chi^2(3, N = 14) = 19.57$, $p < .001$, with a moderate-to-large effect size (Kendall's $W = .47$). Post-hoc Wilcoxon signed-rank tests indicated significant within-semester improvements in both Semester 1 ($Z = -2.51$, $p = .012$, $r = .67$) and Semester 2 ($Z = -2.64$, $p = .008$, $r = .71$). In Semester 1, speaking-related anxiety significantly decreased ($Z = -3.18$, $p = .001$, $r = .85$), while confidence increased significantly ($Z = -2.94$, $p = .003$, $r = .79$), both with large effect sizes. In contrast, motivation showed small-to-moderate positive changes in Semester 2, although these did not reach statistical significance. Qualitative reflections further suggested that AI-integrated rehearsal and iterative speaking practice reduced anxiety, enhanced learner confidence, and increased engagement in classroom activities. These findings suggest that AI-integrated TBLT can create technology-enhanced learning environments that support longitudinal speaking development, affective regulation, and sustained learner engagement among low-proficiency EFL learners.

Keywords: AI-integrated language learning, technology-enhanced learning, task-based language teaching (TBLT), longitudinal mixed-methods study, speaking development, learner engagement

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Introduction

Artificial intelligence (AI) and educational technology are increasingly being utilized to support language learning by providing opportunities for interaction, feedback, and self-paced practice (Huang et al., 2022; Qiao & Zhao, 2023; Zou et al., 2025). In EFL contexts, these technologies have attracted growing attention for supporting speaking development, particularly among lower-proficiency learners who benefit from guidance and repeated opportunities to communicate. However, speaking remains one of the most challenging language skills because learners must process and produce language in real time (Newton & Nation, 2020; Skehan, 2018). Many learners also experience speaking anxiety, fear of negative evaluation, and low confidence, which can reduce participation and willingness to communicate (Alageel & Altalhab, 2024; Horwitz et al., 1986; Khajavy et al., 2018; MacIntyre & Gardner, 1994; MacIntyre et al., 1998; Ozdemir & Papi, 2022; Woodrow, 2006). These difficulties may be especially noticeable among adult learners in continuing education, who often have limited study time and fewer opportunities to use English outside the classroom (Hwang et al., 2024; Laila et al., 2023; Qiao & Zhao, 2023; Robah & Anggrisia, 2023; Shen & Chiu, 2019; Usman & Mahmud, 2024; Yessenbekova, 2024; York et al., 2021).

Task-Based Language Teaching (TBLT) emphasizes meaningful communication through authentic speaking tasks and repeated task cycles (Ellis et al., 2019; Sharmin, 2023; Skehan, 2018). AI tools, including automatic speech recognition (ASR), text-generation systems, and multimodal learning platforms, can support these processes by providing opportunities for practice, feedback, and rehearsal (Chen et al., 2024; Fathi et al., 2024; Hwang et al., 2024; Zhou et al., 2025). Previous studies have reported improvements in fluency, pronunciation, confidence, and willingness to communicate in AI-supported environments (Zhang et al., 2024), although findings related to learners' emotional experiences remain mixed (El Shazly, 2021; Huang et al., 2022). In addition, much of the existing research focuses on short-term interventions, with limited attention to low-proficiency adult learners and long-term changes in speaking performance, anxiety, and motivation. To address these gaps, this study examined speaking development, affective change, and learner engagement among low-proficiency adult EFL learners across two consecutive semesters of AI-integrated TBLT.

Literature Review

Speaking Development in AI-Integrated Task-Based Language Teaching Contexts

Speaking development is the gradual improvement in learners' ability to use fluent, intelligible, and appropriate language in real-time interaction. In this case, to quickly process vocabulary, encode the syntax of words in a reading passage, organize discourse units, and exert phonological control (Newton & Nation, 2020; Skehan, 2018). Task-based language teaching (TBLT) involves cycles of pre-task preparation, task performance, and post-task reflection that provide opportunities for speaking development. These cycles provide repeated opportunities for meaningful language use and the gradual development of fluency and accuracy (Ellis, 2009; Ellis et al., 2019; Hsu, 2017; Long, 2015). Recent research suggests that AI-supported tasks can help learners practice, revise, and refine their spoken output. A recent meta-analysis reported a large overall effect of generative AI integration on speaking performance (Hedges' $g = 0.72$), indicating positive effects on learners' oral production (Li et al., 2026). Empirical studies have shown that AI-supported activities, including role-play tasks, interactive drills, automatic speech recognition (ASR) chatbots, and virtual conversational companions, can improve speaking performance and willingness to communicate while providing additional

opportunities for speaking practice (Chen et al., 2024; Fathi et al., 2024; Guan et al., 2024; Hwang et al., 2024; Jeon et al., 2023; Zhou et al., 2025). These environments often incorporate multimodal features, such as textual support, spoken audio, and AI-generated feedback, allowing learners to practice at their own pace and refine their spoken output as needed through repeated practice. This may be particularly beneficial for low-proficiency learners who require additional support and repeated practice to develop speaking skills (Guan et al., 2025).

Although there is increasing evidence that generative AI can enhance L2 speaking performance within TBLT contexts (Chen et al., 2024; Fathi et al., 2024; Hwang et al., 2024; Li et al., 2026; Yang et al., 2022), several limitations persist. Most AI-TBLT studies emphasize short-term interventions, and relatively few examine longitudinal speaking development or learners' long-term progress (Li et al., 2026). Qualitative findings reveal that some learners discontinue autonomous AI speaking practice over time due to motivational or environmental constraints (Guan et al., 2025). Furthermore, adult learners in continuing education contexts are underrepresented in the literature (Li et al., 2026; Zhou et al., 2025), and AI interventions generally produce smaller effects for lower-proficiency learners compared to more advanced peers (Li et al., 2026). Therefore, additional longitudinal research is required to determine how AI-integrated instructional environments support sustained speaking development among low-proficiency adult learners. To address this gap, the present study investigated growth in speaking across two consecutive semesters of AI-integrated task-based learning.

Speaking Anxiety and Confidence in AI-Integrated Adult EFL Learning

Speaking anxiety is a critical affective factor influencing oral performance in EFL contexts. Horwitz et al. (1986) conceptualized foreign language anxiety as a situation-specific construct involving communication apprehension, test anxiety, and fear of negative evaluation, all of which are salient in speaking tasks. Building on this framework, this study adopted Park's (2014) FLCAS model, which operationalizes speaking-related anxiety as communication apprehension regarding understanding and confidence. Closely related constructs, including willingness to communicate and confidence, further explain speaking behavior, as learners' willingness to communicate is influenced by self-confidence, perceived competence, and anxiety (MacIntyre et al., 1998).

AI-integrated and technology-mediated environments have increasingly been examined as forms of affective scaffolding that may reduce psychological barriers to oral participation. Such environments can offer low-pressure, flexible, and individualized learning conditions that foster confidence, enable self-paced rehearsal, provide repeated speaking opportunities, and enhance willingness to participate (Bashori et al., 2024; Tania et al., 2025; York et al., 2021). These affordances are particularly relevant for adult EFL learners in continuing education, who often experience limited study time, work responsibilities, and heightened awareness of linguistic limitations. However, recent reviews indicate that adult learners and non-traditional teaching contexts remain underrepresented in the literature (Tania et al., 2025). Furthermore, most affective studies have employed short-term or cross-sectional designs, with limited attention to the progression of anxiety and confidence alongside speaking development over time (Gao, 2022; Toyama & Yamazaki, 2021). To address this gap, the present study adopts a longitudinal perspective to examine the co-development of speaking performance and affective change in an AI-integrated task-based learning context.

AI-Assisted Scaffolding, Repeated Practice, and Pronunciation Support

While previous research has emphasized AI's role in reducing affective barriers, less attention has been given to how AI functions as a structured pedagogical system for scaffolding, repeated practice, and iterative rehearsal. From a sociocultural perspective, scaffolding enables learners to perform beyond their current level through guided support within the Zone of Proximal Development (Mingyan et al., 2025; Vygotsky, 1978). In AI-integrated environments, such support can be operationalized through GenAI, teacher feedback, and iterative revision. Generative AI tools can assist learners in generating scripts, adjusting linguistic complexity, and refining language through multiple rounds of revision and adaptive speaking tasks (Kooti et al., 2025; Rahman & Brime, 2025). When combined with teacher guidance on content accuracy and pronunciation, this hybrid scaffolding system supports linguistic development and communicative appropriateness (Aliakbari et al., 2025; Khan et al., 2025), suggesting that AI effectiveness depends on pedagogically aligned integration rather than isolated use of the tool (Sutrah et al., 2025).

AI technologies also support repeated practice and pronunciation development, both of which are essential for speaking growth. Automatic speech recognition (ASR) systems allow learners to rehearse spoken output repeatedly and receive immediate feedback on segmental and suprasegmental features (Al-husban, 2025; Bashori et al., 2024; Chen et al., 2022; Dennis, 2024; Sormin et al., 2025; Sutrah et al., 2025), while systematic review evidence identifies pronunciation as the most consistently improved speaking sub-skill in AI-assisted environments (Sutrah et al., 2025). This is important because repeated practice supports automaticity and fluency in L2 speaking (Nation, 2007; Thornbury, 2005). Multimodal AI-integrated environments further enable learners to combine textual, visual, and auditory resources, making speaking a recursive process of drafting, practicing, revising, and re-performing spoken output (Li et al., 2026), which aligns with TBLT principles of authentic, goal-oriented communication (Ellis et al., 2019; Long, 2015; Makhlouf, 2021). However, limited research has examined AI as an integrated scaffolding system within longitudinal task-based instructional design; therefore, this study examined how AI-integrated scaffolding, pronunciation support, and iterative speaking practice contributed to longitudinal speaking development and affective change among low-proficiency adult EFL learners.

Motivation and Engagement

In technology-enhanced language learning, particularly within AI-assisted environments, motivation and engagement are important for sustaining speaking development. AI tools can enhance engagement through interactive task design, adaptive learning pathways, and immediate personalized feedback, supporting self-paced and repeated practice (Nguyen, 2024; Qiao & Zhao, 2023; Zou et al., 2025). By increasing opportunities for participation, rehearsal, and learner autonomy, AI-integrated environments may strengthen learners' sense of control and sustained involvement in speaking activities. Such environments may also promote self-regulated learning by allowing learners to control the pace, frequency, and timing of speaking practice (Zimmerman, 2002).

Motivation should also be considered alongside speaking performance and anxiety because oral communication is cognitively demanding and anxiety-inducing (Hwang et al., 2024). Even in technology-enhanced environments, speaking anxiety, low motivation, and fear of failure may persist (Qiao & Zhao, 2023; Zhang et al., 2024). Sustained speaking development may therefore depend not only on linguistic improvement, but also on learners' ability to maintain

motivation, engagement, and confidence over time, particularly when they perceive autonomy, task value, and control over learning (Ryan & Deci, 2020). However, few longitudinal studies have examined how motivation, engagement, and speaking development co-evolve within AI-integrated instructional environments, highlighting the need for mixed-methods research that captures both performance outcomes and learners' socio-affective experiences over time.

Research Gap

Despite growing interest in AI-assisted language learning and task-based instruction, longitudinal research remains limited on how speaking performance, anxiety, and motivation co-develop within AI-integrated learning environments, particularly among low-proficiency adult EFL learners. To address this gap, this study investigated these changes across two semesters using a mixed-methods approach to examine how AI-integrated instructional design supported speaking development, affective regulation, and learner engagement over time. The following research questions guided the study:

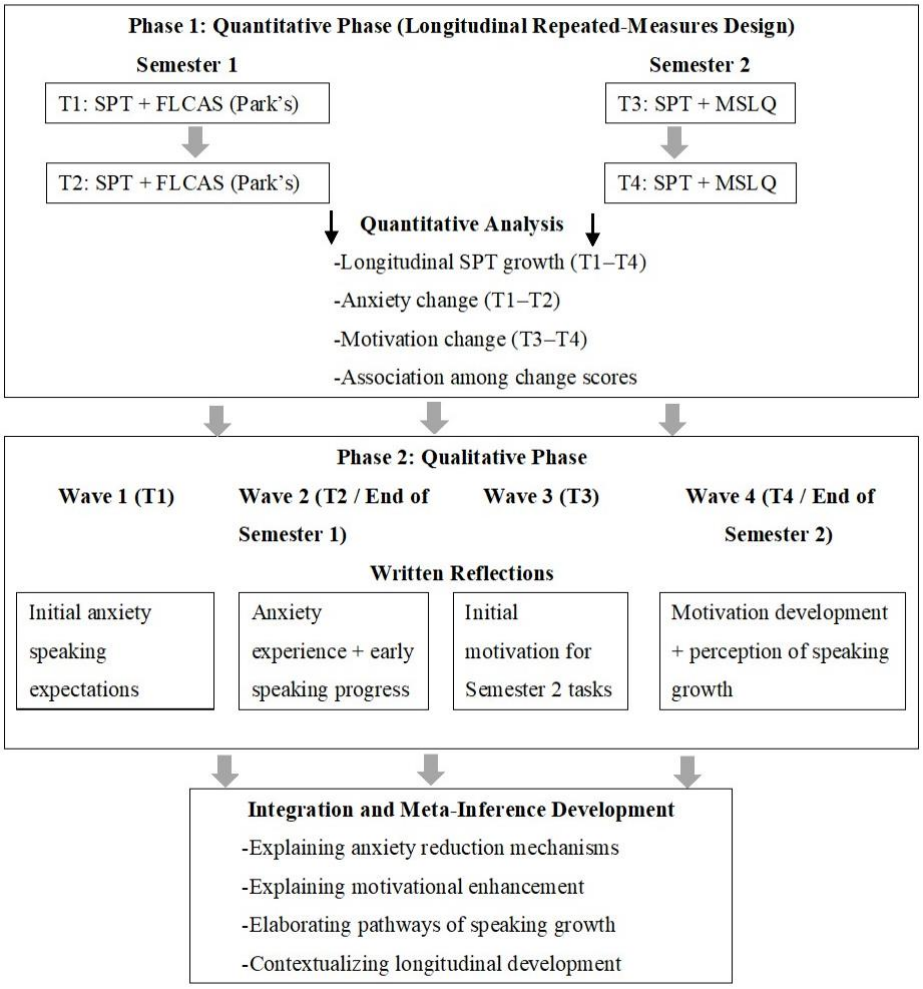
1. To what extent did low-proficiency adult EFL learners demonstrate longitudinal speaking development within an AI-integrated task-based learning environment?
2. To what extent did learners' speaking-related anxiety and confidence change during AI-integrated task-based learning in Semester 1?
3. To what extent did learners' motivation and engagement change during AI-integrated task-based learning in Semester 2?
4. How do learners' written reflections explain the longitudinal development of speaking performance, anxiety, motivation, and engagement across the two semesters?

Method

A longitudinal explanatory sequential mixed-methods design was employed to investigate speaking development, affective change, and learner engagement within an AI-integrated task-based learning environment. Quantitative data were gathered over two semesters to monitor changes in speaking performance, anxiety, and motivation. On the other hand, qualitative data were collected through written reflections at four distinct time points to explain learners' developmental experiences. The design was QUAN-dominant, with qualitative data providing explanatory support, and findings were integrated during the interpretation phase to generate meta-inferences. Figure 1 demonstrates the overall research design.

Figure 1

Longitudinal Explanatory Sequential Mixed Methods Design of the Study



Participants and Context

The participants were 14 adult English as a Foreign Language (EFL) learners with low English proficiency who were enrolled in a continuing education English course at a university in southern Taiwan. Participants' proficiency levels ranged from CEFR A1 to A2. The course was conducted once a week for two 45-minute sessions. The AI-integrated environment provided flexible speaking practice, feedback, and task-based activities beyond the traditional classroom context. Most participants remained in the study for both semesters, allowing for data collection at multiple time points.

Instructional Design and Procedure

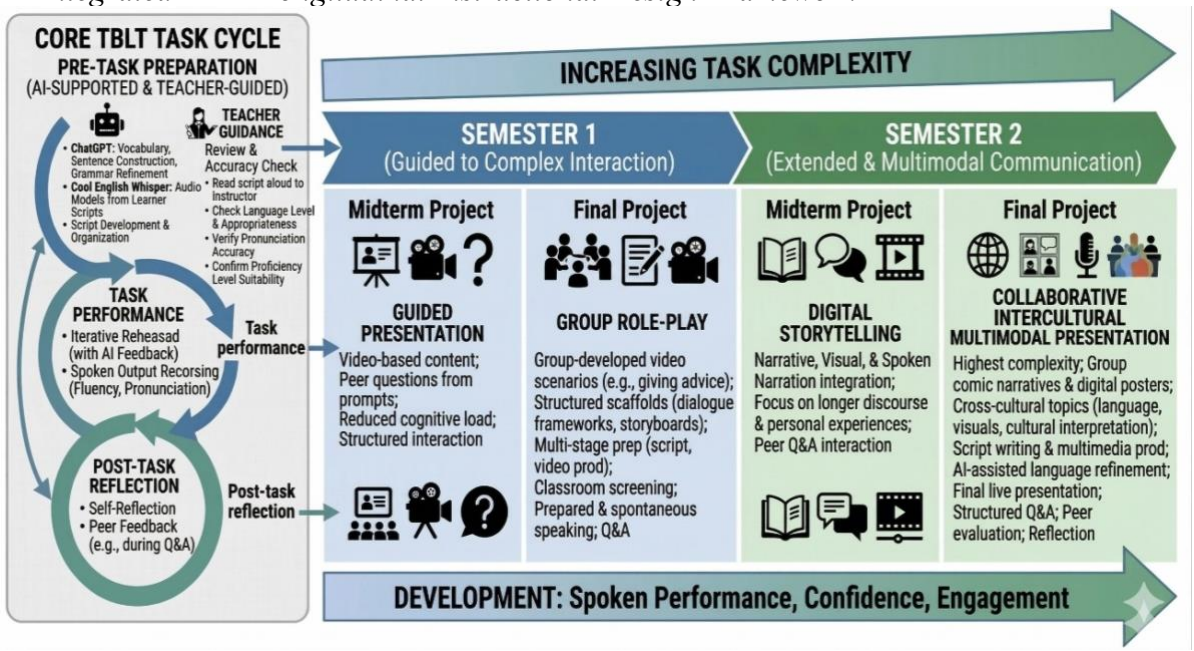
An AI-integrated Task-Based Language Teaching (TBLT) framework was implemented across two consecutive semesters to support longitudinal speaking development and affective change. The instructional design followed repeated task cycles consisting of pre-task preparation, task performance, and post-task reflection. During the pre-task phase, learners used ChatGPT for vocabulary development, sentence construction, grammatical refinement, and script organization. Teacher guidance was provided to ensure language appropriateness and pronunciation accuracy. Pronunciation support was further provided through the Cool English

platform developed by the Ministry of Education in Taiwan, which integrates Whisper-based automatic speech recognition to analyze learners' spoken input and provide pronunciation feedback. During task performance, learners produced spoken output through presentations, role-plays, storytelling, and multimodal projects. In the post-task phase, learners revised and rehearsed their spoken output through AI-supported feedback, recordings, and self-reflection.

Each semester included midterm and final project-based speaking tasks with increasing complexity. In Semester 1, learners completed a guided video-based presentation with a simulated Q&A session, followed by a group role-play project supported by dialogue frameworks, storyboards, script development, rehearsal, and classroom screening. In Semester 2, learners completed a digital storytelling task using StoryJumper, combining narrative structure, visual design, text, images, and recorded audio. The final project required a collaborative intercultural multimodal presentation using tools such as Pixton to create comic-based narratives and digital posters on cross-cultural topics. Across the two semesters, the tasks progressed from guided speaking to independent, multimodal, and intercultural communication, supporting development in speaking performance, confidence, and engagement. Figure 2 illustrates the AI-integrated TBLT instructional design, including task cycles, AI-integrated processes, and the progression of project-based tasks.

Figure 2

AI-Integrated TBLT Longitudinal Instructional Design Framework



Instruments

Speech Performance Test (SPT)

Speaking performance was assessed using the Speech Performance Test (SPT), which is embedded in the MyET system. The SPT is an AI-based automated speech evaluation tool that analyzes oral production through speech recognition and acoustic features, generating scores for pronunciation accuracy, fluency, and overall speech quality. The test produces raw item scores from 0 to 100, which are converted into a four-point rating scale based on performance bands and then summed to produce an overall speaking score aligned with CEFR proficiency levels. Scores were collected at four time points: T1, T2, T3, and T4. In addition to formal

assessment, the SPT was used during the first 10 minutes of each class as a regular practice activity, providing learners with ongoing opportunities for feedback, monitoring, and speaking practice.

Foreign Language Classroom Anxiety Scale (FLCAS)

Speaking-related anxiety was measured using the Foreign Language Classroom Anxiety Scale (FLCAS; Horwitz et al., 1986). The scale was operationalized based on Park's (2014) two-factor structure, and the adapted version comprised 23 items representing communication-related anxiety. The instrument was administered at two time points (T1 and T2) to examine changes in speaking-related anxiety. Minor wording adjustments were made to align the items with the speaking-focused context. The scale demonstrated high internal consistency at both time points (Pre: Cronbach's $\alpha = .92$; Post: Cronbach's $\alpha = .90$).

Motivated Strategies for Learning Questionnaire (MSLQ)

Learner motivation was measured during Semester 2 using selected subscales from the MSLQ (Pintrich et al., 1991). Four motivation components were included: intrinsic goal orientation, task value, control of learning beliefs, and self-efficacy for learning and performance. These subscales were selected because they capture learners' interest, perceived task value, beliefs about effort-based learning, and confidence in their learning abilities, which are particularly relevant in task-based speaking instruction contexts. The MSLQ was administered at two time points (T3 and T4) to examine changes in learner motivation during Semester 2.

The selected subscales demonstrated excellent internal consistency at both time points (Pre: Cronbach's $\alpha = .99$; Post: Cronbach's $\alpha = .98$). Subscale reliabilities ranged from .93 to .98 at T3 and from .84 to .95 at T4, indicating strong internal consistency across constructs, although some subscales showed very high values that may suggest overlap among items.

Written Open-Ended Reflections

Given that the participants were adult learners enrolled in a continuing education program, instructional time was limited to two 45-minute sessions per week. As a result, it was not feasible to conduct additional qualitative data collection methods, such as interviews, outside of regular class time. To address this constraint, written reflections were employed as the primary qualitative data source. Reflection prompts were administered at four key points throughout the study: the midterm and final examinations of Semester 1, and the midterm and final examinations of Semester 2. These reflections were designed to capture learners' perceptions of classroom activities, as well as their experiences related to speaking performance, anxiety, and motivation over time.

Data Collection and Analysis

For the quantitative phase, analyses were conducted using SPSS (Version 27). Given the small sample size ($n = 14$) and potential non-normality, non-parametric tests were employed. Longitudinal speaking development (T1–T4) was examined using the Friedman test, followed by Wilcoxon signed-rank tests for pairwise comparisons. Changes in speaking-related anxiety (T1–T2) and motivation (T3–T4) were also analyzed using Wilcoxon tests. Effect sizes (r) were calculated, and associations among change scores were examined to explore relationships between speaking development and affective variables.

For the qualitative phase, data were collected through four waves of written reflections at the midterm and final of each semester. The data were analyzed using thematic analysis (Braun & Clarke, 2006) with an inductive approach to identify patterns related to confidence, anxiety, engagement, and perceived improvement. The themes were then integrated with quantitative findings for explanatory purposes.

Results

Longitudinal Speaking Development

Descriptive statistics for SPT scores across four time points are presented in Table 1. Mean SPT scores increased from 67.64 (SD = 29.29) at the beginning of Semester 1 (T1) to 91.00 (SD = 39.74) at the end of Semester 1 (T2). Scores continued to rise at the beginning of Semester 2 (T3; M = 101.86, SD = 49.30) and reached 117.79 (SD = 44.70) by the end of Semester 2 (T4). Overall, learners demonstrated an approximate 50-point increase in mean SPT scores from T1 to T4.

Table 1

Descriptive Statistics for SPT Scores Across Four Time Points (N = 14)

Time Point	M	SD	Min	Max
T1	67.64	29.29	16	130
T2	91.00	39.74	24	158
T3	101.86	49.30	18	173
T4	117.79	44.70	39	190

Note. T1 = Beginning of Semester 1; T2 = End of Semester 1; T3 = Beginning of Semester 2; T4 = End of Semester 2. SPT = Speaking Proficiency Test

A Friedman test revealed a statistically significant difference in speaking performance across the four time points, $\chi^2(3, N = 14) = 19.57$, $p < .001$, with a moderate-to-large effect size (Kendall's W = .47). Post-hoc Wilcoxon signed-rank tests further showed significant within-semester improvements from T1 to T2 ($Z = -2.51$, $p = .012$, $r = .67$) and from T3 to T4 ($Z = -2.64$, $p = .008$, $r = .71$), both indicating large effect sizes. Mean SPT scores increased progressively across all four time points, with learners demonstrating an approximate 50-point increase from T1 to T4. These findings indicate sustained speaking development across the two-semester instructional period.

Changes in Speaking Anxiety and Confidence (Semester 1)

Descriptive statistics for the two FLCAS factors are presented in Table 2. For Communication Apprehension (Factor 1), mean scores decreased from 42.71 (SD = 13.34) at pretest to 31.50 (SD = 8.65) at posttest. In contrast, for the confidence-related dimension (Factor 2), mean scores increased from 36.57 (SD = 6.95) to 44.00 (SD = 2.39), indicating an improvement in learners' perceived speaking confidence.

Table 2

Descriptive Statistics for FLCAS Factor Scores at Pretest and Posttest (N = 14)

Factor	Pretest		Posttest	
	M	SD	M	SD
F1 (Communication Apprehension)	42.71	13.34	31.50	8.65
F2 (Communication Apprehension and Confidence)	36.57	6.95	44.00	2.39

Note. FLCAS = Foreign Language Classroom Anxiety Scale; F1 = Communication Apprehension; F2 = Confidence-related dimension. Higher scores on F1 indicate higher levels of speaking anxiety, whereas higher scores on F2 indicate greater speaking confidence.

A Wilcoxon signed-rank test revealed a statistically significant reduction in Communication Apprehension from pretest to posttest, $Z = -3.18$, $p = .001$, with a large effect size ($r = .85$). Similarly, a significant increase was observed for the confidence dimension, $Z = -2.94$, $p = .003$, with a large effect size ($r = .79$). Overall, these findings indicate a substantial reduction in speaking-related anxiety accompanied by increased speaking confidence during Semester 1. A summary of inferential statistics across speaking performance, anxiety, and confidence is presented in Table 3.

Table 3

Summary of Inferential Statistics for Changes in Speaking Performance and Speaking-Related Anxiety (N = 14)

Measure	Comparison	Statistic	*p*	Effect Size
SPT	T1–T4	$\chi^2(3) = 19.57$	$< .001$	$W = .47$
SPT	T1–T2	$Z = -2.51$	.012	$r = .67$
SPT	T3–T4	$Z = -2.64$	.008	$r = .71$
FLCAS F1	Pre–Post	$Z = -3.18$	.001	$r = .85$
FLCAS F2	Pre–Post	$Z = -2.94$	.003	$r = .79$

Note. SPT = Speaking Proficiency Test; FLCAS = Foreign Language Classroom Anxiety Scale; F1 = Communication Apprehension; F2 = Confidence-related dimension; *W* = Kendall's coefficient of concordance; *r* = effect size for Wilcoxon signed-rank tests.

Learning Motivation and Engagement (Semester 2)

Descriptive statistics for the four motivational constructs are presented in Table 4. As shown, all four constructs demonstrated slight increases from T3 to T4. Intrinsic goal orientation increased from 20.00 (SD = 5.79) to 21.00 (SD = 7.17), while task value rose from 31.21 (SD = 9.07) to 32.36 (SD = 10.90). Control of learning beliefs increased modestly from 22.14 (SD = 4.99) to 22.50 (SD = 5.76), and self-efficacy improved from 38.21 (SD = 11.76) to 40.21 (SD = 10.05). Overall, these results indicate a consistent upward trend in learners' motivational orientation during Semester 2.

Table 4
Descriptive Statistics for Learning Motivation at T3 and T4 (n = 14)

Motivation Construct	T3		T4	
	M	*SD*	*M*	*SD*
Intrinsic Goal Orientation	20.00	5.79	21.00	7.17
Task Value	31.21	9.07	32.36	10.90
Control of Learning Beliefs	22.14	4.99	22.50	5.76
Self-Efficacy	38.21	11.76	40.21	10.05

Note. T3 = beginning of Semester 2; T4 = end of Semester 2. Scores represent summed subscale values from the Motivated Strategies for Learning Questionnaire (MSLQ).

Wilcoxon signed-rank tests were conducted to examine whether the observed differences were statistically significant. As shown in Table 5, none of the motivational constructs demonstrated statistically significant changes. Specifically, intrinsic goal orientation did not show a significant difference ($Z = -1.46$, $p = .146$), nor did task value ($Z = -1.29$, $p = .197$). Similarly, changes in control of learning beliefs ($Z = -0.71$, $p = .478$) and self-efficacy ($Z = -1.18$, $p = .239$) were not statistically significant.

Table 5
Wilcoxon Signed-Rank Test Results for Changes in Learning Motivation

Construct	*Z*	*p*	Effect Size (*r*)
Intrinsic Goal Orientation	-1.455	.146	.39
Task Value	-1.290	.197	.34
Control of Learning Beliefs	-0.709	.478	.19
Self-Efficacy	-1.178	.239	.31

Note. T3 = beginning of Semester 2; T4 = end of Semester 2; *r* = effect size for Wilcoxon signed-rank tests.

Despite the lack of statistical significance, effect size estimates indicated small to moderate practical changes across the motivational constructs (r = .19–.39). These findings indicate that, although changes in motivation were not statistically significant, learners demonstrated a consistent pattern of gradual improvement in motivational orientation during Semester 2.

Qualitative Reflections on Speaking Development and Affective Change

To address RQ4, learners' written reflections collected at four time points were analyzed using thematic analysis (Braun & Clarke, 2006). The prompts focused on learners' perceptions of classroom activities, speaking performance, challenges, confidence, and learning experiences. Five themes emerged: increased speaking confidence, reduced anxiety through repeated practice, repetition as a key learning process, AI-integrated learning, and increased engagement. These themes helped explain and contextualize the quantitative findings for RQ1–RQ3.

Theme 1: Increased Speaking Confidence

Across the four reflection points, learners reported increased confidence in speaking English. Students described becoming more willing to speak and more comfortable expressing their ideas over time. For example, one learner stated: "I have become more confident in speaking English, and I hope there will be more opportunities like this in the future" (Interviewee No. 11). Another learner reflected: "I try to be braver, and I actually enjoy this kind of challenge" (Interviewee No. 7). In later reflections, learners also reported improvements in fluency: "I

think I am now quite fluent, and I can understand the content much better" (Interviewee No. 7).

Theme 2: Reduction of Anxiety Through Repeated Practice

Learners frequently described feelings of nervousness and anxiety at the beginning of the course, particularly when required to speak English for the first time. However, many reflections indicated that this anxiety decreased over time. For instance, one learner reported: "It was very stressful to use only English for the first time" (Interviewee No. 6). Another learner described: "Taiwanese students are often afraid to speak English because they are afraid of being corrected, and I am one of them" (Interviewee No. 9). In later reflections, learners reported reduced anxiety: "I feel that it is interesting and I am less anxious now" (Interviewee No. 2).

Theme 3: Repetition and Practice as Key Learning Processes

A recurring theme across all reflection points was the importance of repetition and practice. Learners emphasized that improvement in speaking ability was closely associated with repeated practice. For example, one learner noted: "Through repeated practice and rehearsal again and again, I gradually improved" (Interviewee No. 1). Another learner stated: "Repeating the practice over and over is the most effective way for me" (Interviewee No. 9). Similarly, another learner reported: "By practicing continuously, I can get closer to my ideal performance" (Interviewee No. 6).

Theme 4: AI-Integrated Learning

Another prominent theme was the use of AI tools to support learning. Learners reported using tools such as ChatGPT and pronunciation platforms to assist with vocabulary, translation, and pronunciation. For example, one learner noted: "I used ChatGPT to help translate my Chinese story into English" (Interviewee No. 5). Another learner stated: "I used GPT to support my learning" (Interviewee No. 13). Additionally, learners highlighted the use of pronunciation tools: "I uploaded my script to Cool English to practice pronunciation, and it was very helpful" (Interviewee No. 12).

Theme 5: Increased Engagement and Interest in Learning Activities

Learners frequently described the course activities as interesting, interactive, and different from traditional English classes. Many reflections emphasized enjoyment in classroom tasks. For example, one learner stated: "This class is lively and interesting, and it has increased my interest in learning English" (Interviewee No. 4). Another learner reported: "I found it very interesting, and I was happy when others enjoyed my video" (Interviewee No. 11). Similarly, another learner noted: "This course motivates me more to learn English" (Interviewee No. 4).

Collectively, these themes showed that learners' speaking development, anxiety reduction, and motivation were closely connected. Repeated practice in a supportive environment appeared to increase confidence and reduce anxiety, while AI tools supported rehearsal and language use. Greater engagement in classroom activities also helped sustain participation, suggesting that cognitive and affective development occurred together within the AI-integrated TBLT context.

Discussion

The findings suggested that AI-integrated TBLT may support the speaking development and affective regulation of low-proficiency adult EFL learners through scaffolding, iterative speaking practice, and sustained participation, rather than isolated use of technology.

Longitudinal Speaking Development

The results indicated sustained improvement in learners' speaking performance over the two-semester instructional period. These findings are consistent with previous research that highlights the importance of repeated speaking opportunities, meaningful task engagement, and task-based language teaching (TBLT) cycles of performance and reflection (Ellis et al., 2019; Long, 2015; Nation, 2007; Thornbury, 2005). The findings further corroborate studies suggesting that AI-mediated tasks can facilitate speaking development by offering adaptive support and increased opportunities for communicative practice (Hwang et al., 2024; Zhou et al., 2025). In contrast to many short-term intervention studies, the present research provided longitudinal evidence that AI-integrated TBLT can support speaking development through a structured scaffolding and rehearsal system, which includes AI-assisted script generation, teacher-guided refinement, and automatic speech recognition (ASR)-based pronunciation practice.

Reduction of Speaking Anxiety and Increased Confidence

The findings showed reduced speaking-related anxiety and increased confidence during Semester 1, supporting conceptual perspectives that correlate anxiety, confidence, and willingness to communicate (Horwitz et al., 1986; MacIntyre et al., 1998). This affective change appeared to be related to repeated, low-pressure speaking practice, which allowed learners to rehearse before performing, reduce fear of negative evaluation, and acquire greater control over speaking tasks. This is in line with research suggesting that technology-enhanced environments can lessen affective barriers and promote participation (Duan et al., 2021; York et al., 2021). Rather than resulting solely from AI use, the reduction in anxiety appeared to stem from the pedagogically integrated use of AI within a supportive, task-based environment that emphasized scaffolding, iterative rehearsal, and sustained communicative participation. Over time, these processes may have resulted in increased confidence and greater willingness to communicate among low-proficiency adult EFL learners.

Motivation and Engagement

Although motivational changes were modest and did not reach statistical significance, key findings indicate that AI-integrated TBLT appears to help sustain learner engagement and perceived task value. Increases in task value and self-efficacy reflect growing learner confidence and recognition of the relevance of speaking tasks. Research supports the idea that AI-assisted learning environments motivate learners through interactive, adaptive, and personalized experiences (Qiao & Zhao, 2023; Zou et al., 2025). Qualitative evidence demonstrated increased interest and willingness to participate when the environment was supportive and manageable. AI tools provided self-paced, iterative speaking practice, fostering control and autonomy. Task-based activities boosted the perceived relevance of learning. Collectively, these findings suggest that motivation within AI-integrated TBLT contexts may develop through structured task design, technology-supported rehearsal, and reduced affective

barriers. Such environments may support sustained motivational development among low-proficiency adult EFL learners.

Integrated Findings and Meta-Inferences

The integration of quantitative and qualitative findings demonstrates that speaking development, affective regulation, and learner engagement advanced simultaneously within the AI-integrated TBLT environment. Qualitative data connected improvements in speaking performance and confidence to iterative speaking practice, AI-supported learning, and increased willingness to participate. Furthermore, participants reported elevated interest, greater perceived task value, and sustained participation, despite the absence of significant motivational changes. These results indicate that speaking development was influenced by the interaction of cognitive, affective, and motivational factors.

Meta-inferences indicate that AI-integrated instructional design can serve as a scaffolding and rehearsal system to support sustained oral language development. Low-pressure speaking practice, AI-assisted rehearsal, and teacher-guided refinement contributed to improvements in speaking ability, reduced anxiety, and increased learner confidence. Overall, speaking development in AI-integrated TBLT environments resulted from both technology-based affordances and pedagogically structured opportunities for interaction, rehearsal, and affective support.

Limitations and Future Research

This study has several limitations. The small sample size and focus on low-proficiency adult learners in a continuing education context may limit the generalizability of the findings. Although the study adopted a longitudinal design, it was limited to two semesters, and the longer-term sustainability of speaking development, affective change, and motivational engagement remains unclear. In addition, the study conceptualized AI as part of an integrated instructional environment but did not isolate the effects of individual AI tools or instructional components. Future research should include larger, more diverse samples, extend the duration of the investigation, compare different AI-integrated instructional designs, and examine learner-related variables such as autonomy, digital literacy, and technology acceptance.

Conclusion

The present study examined longitudinal changes in speaking performance, anxiety, and motivation among low-proficiency adult EFL learners in an AI-integrated TBLT context. The findings showed improved speaking performance, reduced speaking anxiety, and modest positive motivational trends, suggesting that AI-integrated TBLT may support both linguistic development and affective regulation. Speaking development appeared to emerge through the interaction of pedagogical scaffolding, technology-supported rehearsal, and sustained learner participation. Rather than functioning as a standalone tool, AI operated as part of an integrated instructional system that supported learners in planning, practicing, revising, and performing speaking tasks.

The findings further suggest that AI is most effective when integrated within a structured TBLT framework rather than used in isolation. AI can support script development, pronunciation practice, and iterative speaking rehearsal, while teachers continue to provide guidance on content, pronunciation, and communicative appropriateness. By combining technological

support with teacher scaffolding, AI-integrated learning environments may extend speaking practice beyond the classroom and create low-pressure opportunities that promote confidence, participation, and willingness to communicate among low-proficiency adult EFL learners.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

Generative AI tools (e.g., ChatGPT and Gemini) were used to assist with language refinement and the visual design of Figure 2. All content was reviewed and verified by the author, who takes full responsibility for the manuscript.

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