Teaching English as a Second Language Quarterly (TESLQ)
(Formerly Journal of Teaching Language Skills)
45(1) 2026, pp. 109-134
https://doi.org/10.22099/tesl.2025.52912.3402
Online ISSN: 2981-1546
Research Paper

The Impact of AI-powered Character AI on EFL Learners' Speaking: The Moderating Role of Anxiety

Karim Shabani [*1]

Abstract

Although several studies have examined the effectiveness of Artificial Intelligence (AI) tools in enhancing L2 speaking, it remains unclear whether learners with low and high levels of anxiety benefit similarly from AI-based instruction. The present study examined the extent to which learners with varying levels of anxiety, specifically high and low, benefit from an AI-based speaking assistant, Character AI. This research involved 30 intermediate EFL learners from a language institute, who were identified and labeled as high-anxiety (HA) and low-anxiety (LA) groups based on their anxiety scores. Following a sequential explanatory mixed-methods design, the initial phase involved administering the Oxford Placement Test (OPT) to determine participants' language proficiency, followed by a pre-test that served as a benchmark of their speaking proficiency before exposure to the Character AI app. Over the course of the study, participants engaged with Character AI for speaking practice and feedback. The results showed that Character AI-based support was beneficial for promoting FL speaking by fostering enhanced interaction and oral communication. It was also observed that learners with lower initial anxiety levels demonstrated greater improvements in speaking, implying that anxiety may moderate the benefits of AI-driven educational technologies. The qualitative findings underscore the potential of AI technologies as robust tools in L2 speaking, facilitating personalized, interactive, and learner-centric learning experiences. The present outcomes provide substantial insights into the interactions between psychological factors, technological integration, and language acquisition within the English as a Foreign Language (EFL) framework.

Keywords: Artificial intelligence, Character AI, L2 speaking, Anxiety

Foreign language anxiety (FLA) has long been considered a barrier to L2 development among learners (Horwitz, 2010; MacIntyre, 2017). The FLA in EFL settings emanates from multiple factors, namely a lack of regular access to native speakers (Xin & Derakhshan, 2024), predominance of traditional methodologies (Nushi et al., 2019), shyness and intercultural factors (Gilakjani, 2012), unprepared teachers (Bozorgian & Shamsi, 2020), and large classroom sizes, which constrain individualized feedback (Gholamrezapour & Salandari Rabori, 2019). Following the pervasive use of technology in recent years, researchers have

[*] Review History:
Received: 23/04/2025 Revised: 29/06/2025 Accepted: 08/07/2025

1. Associate Professor of Applied Linguistics at Allameh Mohaddes Nouri University; PhD Holder of TEFL from the University of Tehran, Iran, shabanikarim@gmail.com

How to cite this article:
Shabani, K. (2026). The Impact of AI-powered Character AI on EFL Learners' Speaking: The Moderating Role of Anxiety. *Teaching English as a Second Language Quarterly*, *45*(1), 109-134. https://doi.org/10.22099/tesl.2025.52912.3402

proposed generative AI as a viable solution to these challenges and, consequently, as a means of lowering anxiety. AI-based instruction has been well embraced by practitioners for its potential to offer several benefits such as delivering real-time feedback and adjustments (Nguyen, 2023), simulating human-like interaction (Alizadeh et al., 2020), providing access to vast sources of information (Alrishan, 2023), supporting personalized and tailored instruction (Yu & Yao, 2024), fostering deeper engagement (Kaur et al., 2022), accessibility and convenience (Foroughi et al., 2024), and last but not least, emotional support (Peña-Acuña & Corga Fernandes Durão, 2024). In AI-supported education, learners are given the luxury of self-directed practice, independence from time and location constraints, interactivity, and non-judgmental tone (Hedayati & Marandi, 2014; Song & Song, 2023; Rezai et al., 2024).

Pennington (1999) notes that AI tools offer significant advantages for EFL learners by enabling them to assess and mitigate their foreign accent through targeted instruction and self-regulation. According to Kaur et al. (2022), this technology is especially vital in foreign-language learning contexts where opportunities to hear native accents are scarce. A significant advantage of generative AI is its ability to leverage AI-driven chatbots and avatars as instructional assistants. These assistants engage learners in dialogic exchanges and role-playing activities, providing immediate, contextually relevant, and personalized feedback on pronunciation, grammar, and vocabulary (Huang et al., 2020; Labadze et al., 2023; Stolvoort et al., 2024).

Despite abundant reports on the inherent functions of AI tools in language instruction (Mehrpour et al., 2016; Ngo et al., 2024), the jury is still out on the role of anxiety in learners' success (Saddiqa et al., 2024). Although many studies have reported the effectiveness of AI-assisted tools in reducing anxiety (Bozorgian & Shamsi, 2020; Nasri et al., 2022), others have claimed about elevated anxiety in AI-mediated education (Almaiah et al., 2022; Jeon, 2022; Wang et al., 2022), thus an exigent need for undertaking further exploration. Browsing the literature reveals that no research has compared the effects of AI-powered education on learners with different levels of anxiety. Moreover, limited research exists on the effectiveness of a newly introduced AI chatbot, Character AI, for teaching speaking. The reason for selecting this app for this study was its unique functionality, which allows users to converse with their favorite avatars. It is assumed that learners tend to connect more effectively with instructors who match their characters and preferences (Schunk & Zimmerman, 2008; Zhang et al., 2023). Thus, the current study aimed to unveil the effectiveness of Character AI-based feedback on Iranian EFL learners' speaking improvement. Additionally, it examined whether learners with varying levels of anxiety benefit differently from such instruction. To tackle these concerns, the following research questions were developed:

1. Does Character AI-assisted instruction have a significant effect on EFL learners' speaking skills?

2. Are there any significant differences between LA and HA learners in their speaking skills after using Character AI?

3. What are the LA and HA learners' attitudes toward using Character AI in practicing speaking skills?

Background and Literature Review

Foreign/second language anxiety and AI

Anxiety in language learning is conceptualized as a subjective psychological state marked by tension, apprehension, and nervousness, linked to autonomic nervous system activation (Horwitz, 2010). Specifically, Foreign Language Anxiety (FLA) pertains to the anxiety experienced in language learning contexts and can manifest across various language skills, with speaking anxiety being particularly impactful (Bashori et al., 2022; Horwitz et al., 1986). FLA is theorized to negatively influence learners' perceptions of their language abilities, often leading to fear of appearing unskilled or awkward during oral communication (Young, 1991). Test anxiety (TA), a related construct, involves fear of failure in evaluative situations and can detrimentally affect academic performance (Horwitz et al., 1986).

The role of anxiety in language learning is complex; it may both hinder and, in some cases, enhance learning outcomes. While excessive anxiety impairs performance by causing avoidance behaviors, reticence, and reduced cognitive processing efficiency (MacIntyre, 2017; MacIntyre & Gardner, 1994), moderate levels of FLA may motivate learners to engage more deeply with language challenges (Marcos-Llinás & Garau, 2009; Scovel, 1978). This dual nature underscores the importance of examining anxiety as a moderating variable in language performance. The integration of AI in language education introduces new dynamics in learners' affective experiences. AI-powered tools, such as conversational chatbots and intelligent personal assistants (IPAs), offer learners opportunities for low-pressure, personalized practice that can reduce anxiety by providing immediate, non-judgmental feedback and allowing autonomous pacing (El Shazly, 2020; Kaur et al., 2022; Lee et al., 2022).

From a sociocultural perspective (Vygotsky, 1978), AI-mediated interactions can be viewed as culturally and socially mediated tools that scaffold learner engagement and language development, potentially mitigating anxiety through supportive, interactive environments (El Shazly, 2020). However, AI may also introduce new forms of anxiety, such as technophobia or fear of failure in AI-driven settings, which can negatively impact motivation and participation (Wang et al., 2022; Almaiah et al., 2022). The impersonal nature of AI interactions and limited emotional responsiveness may fail to meet some learners' affective needs, sometimes exacerbating anxiety (Pérez et al., 2020; Wen et al., 2024). Speaking anxiety, a critical facet of FLA, directly affects oral performance and willingness to communicate. AI-powered character AI, by simulating human-like conversational partners, provides learners with a non-threatening platform to practice speaking skills, potentially reducing speaking anxiety and enhancing fluency, accuracy, vocabulary, and pronunciation (Dizon, 2020; Lee et al., 2022; Vančová, 2023).

Empirical studies

Multiple studies demonstrate that AI-powered tools can significantly enhance L2 learners' speaking skills, including fluency, pronunciation, vocabulary retention, and overall oral proficiency. For instance, Peña-Acuña and Crismán-Pérez (2024) found that an AI app with voice recognition and pronunciation coaching improved oral skills and vocabulary retention among EFL learners. Similarly, Tzu-Yu and Chen (2022) reported that intelligent personal assistants, such as the Google Assistant, increased adolescent learners' speaking proficiency by providing engaging, authentic, and flexible speaking practice with immediate feedback. Azizimajd (2023) also found that AI chatbots, such as Replika, led to greater oral fluency gains than traditional instruction. These findings align with broader research indicating AI's potential to support learner autonomy and self-regulation, which are critical for speaking development (Qiao & Zhao, 2023; Wei, 2023). However, the extent of improvement may vary depending on learners' proficiency levels and the nature of AI interaction, as Kang (2022) noted that lower-proficiency learners benefited more from AI-supported speaking practice than higher-proficiency learners.

The literature reveals contradictory findings regarding AI's role in alleviating or exacerbating foreign language speaking anxiety (FLSA). Bashori et al. (2022) and Azizimajd (2023) found that AI-based Automatic Speech Recognition (ASR) platforms and chatbots helped reduce speaking anxiety by providing a less threatening environment than peer interactions. Qualitative data suggested that AI systems offer a safe space for practice, thereby mitigating anxiety. Conversely, El Shazly (2020) reported that AI interactions did not reduce anxiety and even slightly increased it, attributing this to the formal academic setting and cultural factors such as mixed-gender classrooms in a male-dominated context. This suggests that contextual and sociocultural variables critically mediate AI's impact on anxiety, highlighting the need for more nuanced investigations that consider learner backgrounds and learning environments.

Beyond speaking skills and anxiety, AI-assisted learning has been linked to improvements in motivation, self-confidence, critical thinking, and self-regulation. Studies by Burston (2014), Teimouri et al. (2019), and Hsu et al. (2023) indicate that AI tools can foster learner motivation and self-regulatory behaviors. However, some findings show these effects may not always reach statistical significance (e.g., no significant anxiety reduction in Hsu et al., 2023). These affective and cognitive dimensions are crucial because they mediate language learning outcomes. The interplay between motivation, anxiety, and self-regulation in AI-mediated environments warrants deeper exploration, especially considering the complex role anxiety may play as a moderating variable rather than a simple outcome.

While existing studies provide valuable insights into the facilitative effects of AI on speaking skills and affective factors, there are notable gaps. Firstly, few studies critically examine anxiety as a moderating variable influencing the relationship between AI use and speaking performance, leaving open questions about how anxiety interacts with AI-based

learning processes. There is also limited qualitative data comparing the experiences of learners with varying anxiety levels, which could illuminate the differential impacts of AI tools. Moreover, sociocultural and contextual factors that influence AI's effectiveness, such as classroom dynamics and cultural norms, warrant further investigation. Finally, emerging AI tools, such as Character AI, remain underexplored, offering opportunities to assess their unique contributions to speaking development and anxiety mitigation.

Methodology

Design

This study adopted a sequential explanatory mixed-methods design. It adhered to the tenets of a quasi-experimental design during the quantitative phase and, in the qualitative phase, employed content analysis following Dörnyei and Ryan's (2015) framework. The participants were not randomly allocated to groups; instead, they were categorized based on their pre-existing anxiety levels and subsequently assigned to two distinct experimental cohorts. This design facilitated a meaningful comparison between high and low anxiety groups, with the grouping determined by participants' pre-test anxiety scores.

Participants

The initial participants in this study were 53 EFL learners with a mean age of 35, selected via convenience sampling because they were drawn from a language institute in Iran where access was readily available. This approach was chosen for practical reasons, such as time constraints and the availability of a homogeneous group of EFL learners sharing a common L1 (Persian). The rationale for this sampling method was to ensure a relatively uniform participant pool in terms of language background and educational context, thereby helping control for extraneous variables and focusing on the study's primary objectives. Based on the results of an Oxford Placement Test (OPT), 30 intermediate learners were recruited to form a homogeneous group in terms of language proficiency. The rest were excluded because their OPT scores fell outside the inclusion criterion, which required scores to be within 1 standard deviation of the mean. After taking the Foreign Language Speaking Anxiety Questionnaire, the participants were categorized into High anxiety (N=14) and Low anxiety (N=16) groups. The participants with anxiety scores above the median score were classified as the High Anxiety group. In contrast, those with scores below this cutoff point were classified as the Low Anxiety group. The researcher acted as the instructor of both groups.

Instruments and Materials

The current study used a range of instruments, including the Oxford Placement Test (OPT), the Foreign Language Speaking Anxiety (FLSA) Questionnaire, the Pre-test, the Post-test, and the Character AI app.

OPT. The Oxford Placement Test (OPT) is a widely used, free assessment tool in research contexts. It comprises two progressively challenging sections, each designed to evaluate language proficiency. The initial section consists of 40 items that require test-takers to select the most appropriate word to complete a given sentence. Upon successful completion of the first part, participants advance to the second section, which comprises 20 items, including cloze tests and multiple-choice grammar exercises. The duration of the first and second sections ranges from 15-20 minutes and 15-25 minutes, respectively. Participants scoring 30-47 on the placement instrument were operationally defined as exhibiting intermediate proficiency. The placement test's internal consistency reliability, as assessed by the Kuder-Richardson Formula 21 (KR-21), was .78 for this sample, indicating acceptable reliability for group-level comparisons within this study.

Foreign Language Speaking Anxiety Questionnaire. To assess learners' speaking anxiety within the context of foreign language acquisition, the Foreign Language Speaking Anxiety (FLSA) questionnaire, adapted from the Foreign Language Classroom (Speaking) Anxiety scale (Horwitz et al., 1986) by Öztürk and Gürbüz (2014), was employed. Comprising 18 items rated on a five-point Likert scale, the questionnaire requires participants to provide a single response per item. The response options range from 'strongly agree' (5 points), 'agree' (4 points), 'not sure' (3 points), 'disagree' (2 points), to 'strongly disagree' (1 point). Selecting 'strongly agree' indicates a high level of FLSA across all items. The reliability of the anxiety questionnaire was examined through Cronbach's α. The value of Cronbach's α equaled .99, which is higher than .70 and, therefore, is shown to be acceptable.

Pre-test and Post-test. The speaking test conducted during the pre-test phase aimed to evaluate various essential speaking skills of EFL learners, utilizing criteria based on the IELTS scoring framework. The test involved a personal narrative task that encouraged learners to reflect on their experiences, allowing them to demonstrate their ability to narrate a story while showcasing their speaking skills, such as fluency, coherence, and vocabulary. Participants were requested to discuss various aspects of their lives, starting their narratives with the prompt sentence provided in the instruction sheet as in the following:

Q: Describe a time when you overcame a difficult situation. You should say:

- What the situation was
- When and where it happened
- How you dealt with it
- Explain what you learned from the experience.

The speaking performances were rated using the IELTS scoring criteria, which include four main components: fluency and coherence, pronunciation, lexical resource, and grammatical range and accuracy. To ensure the reliability of the speaking assessments, interrater reliability was established by having two trained raters independently evaluate the pre-test and post-test recordings. The raters were provided with detailed guidelines and training on consistently using the rating scale. A Pearson correlation coefficient was computed to assess agreement between raters, yielding a high level of interrater reliability ($r = 0.85$), indicating consistent ratings across evaluators.

Touchstone 2. The teaching material used in this study was *Touchstone 2*, an integrated skills-based book series designed to enhance learners' communicative competence in English. This resource provided structured lessons and activities focused on speaking practice, vocabulary development, and grammar reinforcement. The use of *Touchstone 2* ensured that participants received instruction and classroom practice on a wide variety of contexts throughout the course, aligning with the goals of improving their speaking skills. The integration of Character AI with Touchstone 2 enabled a blended learning experience (Liu & Yuan, 2024). Students could reinforce what they learned in class through additional speaking practice at home, or practice the next session's topics in advance via the app in a flipped-learning style (Shabani & Jabbari, 2023).

Character AI app. Character AI is a web-based, open-access application that uses AI to develop chatbot characters capable of generating text and voice responses using neutral language models. Users can create personalized characters and engage in conversations with a range of figures, such as fictional, historical, and celebrity figures, or find their favorite characters online and start chatting. Unlike conventional AI chatbots like ChatGPT, Character AI offers responses that mimic human interaction more closely and allows users to converse with multiple bots simultaneously, providing varied perspectives during discussions. Beyond simple interactions with celebrities or fictional personas, Character AI can also assist users by suggesting improvements in vocabulary, grammar, coherence, and generating new ideas. The app is convenient for learning anytime, anywhere, on both Android and iOS platforms, offering a low-pressure environment free of traditional learning stress.

To start chatting quickly, users can create a character using Quick Mode. This feature allows them to input basic information such as name, age, and background, as well as upload an avatar and design an AI-powered character. For those seeking to explore more specific traits, the Advanced Mode enables users to craft a custom dialogue with their preferred character for a more tailored conversation experience. The feedback provided is immediate, adapting to each user's preferences, speaking style, and proficiency level. Here are some key features of the app:

a) Customizable Characters: Users can design and personalize virtual characters with distinct personalities, backgrounds, and conversational styles. These characters can be inspired by real individuals, fictional personas, or completely original concepts.

b) Multimodal Communication: Users have the option to communicate via text in the chat box or orally through voice calls.

c) Human-Like Conversations: Character AI produces text responses that closely resemble human interaction, enabling users to engage in contextual and realistic dialogues with their characters and even ask follow-up questions.

Semi-structured interview. In addition to the quantitative assessment, a semi-structured interview protocol was used to investigate participants' perceptions of the AI application. A subsample of eight participants, randomly selected from each group, was interviewed. The interview guide comprised items designed to elicit participants' perspectives on their experiences with the AI application, specifically addressing perceived affordances and limitations (See Appendix 1). The content validity of the instrument was established through expert review by two doctoral-level specialists in ELT. Both reviewers hold PhDs in ELT and have extensive experience in language assessment and curriculum development. One expert is a university faculty member specializing in language testing and teacher education, while the other has published widely on EFL pedagogy and has served as a consultant for several educational projects. Interviews were administered individually via Google Meet, with each session lasting 15 to 20 minutes.

Procedure

Initially, 52 intermediate EFL learners from a language institute in Iran were recruited for this study. Participants first undertook the 45-minute OPT to assess their language proficiency. Those identified as being at the intermediate level were selected to complete an anxiety questionnaire. The participants were stratified into two distinct cohorts—high-anxiety and low-anxiety—based on the quantitative data derived from the questionnaire responses. Prior to the commencement of the instructional program, all participants received an orientation tutorial outlining the program's objectives and providing detailed information about the app's features and functionalities. Additionally, they completed consent forms to confirm their voluntary and informed participation in the research formally. Participants were apprised that their participation in the course would likely yield substantial improvements in oral proficiency and that the data collected would be utilized exclusively for research purposes, with assurances of confidentiality regarding their identities.

In the first session, a speaking pre-test was administered to establish the baseline oral proficiency of the two groups using the IELTS rating scale. A WhatsApp group was created to address any questions learners had about the app or the assigned tasks. From sessions 2 through 15, participants engaged in the intervention, which included classroom-based instruction and app interaction at their convenience to prepare for class activities. Interaction with the app proceeded communicatively in dialogues rather than isolated sentences, with feedback provided within seconds after users entered prompts in the chatbox or used voice chat. Importantly, all exchanges between learners and the app during voice chats were recorded in the chatbox,

enabling learners to review all outputs. Classroom activities followed a communicative approach, structured around a pre-task (warm-up), task cycle, and language focus sequence. Each session lasted 90 minutes, and the entire course spanned approximately six weeks.

In session 14, both groups participated in a post-test of speaking, administered in the same format as the pre-test, to assess any changes in their oral proficiency. Additionally, the FLA questionnaire was distributed to both groups to evaluate any changes in their anxiety levels. Finally, 8 learners from each group were randomly selected to participate in interviews, during which they shared their feelings and perspectives on the overall program's effectiveness and the materials used.

Data analysis involved both quantitative and qualitative methods specifically designed to address each research question. To address the first and second research questions, paired-samples t-tests and independent-samples t-tests were employed, respectively. The third research question was qualitative and focused on learners' perspectives on the intervention sessions. It was examined using qualitative content analysis, following Dörnyei and Ryan's (2015) framework, which entails organizing data according to themes that emerge from the interview transcripts. More precisely, the researcher conducted the content analysis, systematically examining the interview transcripts to identify recurring themes and patterns in learners' perceptions of the AI application. To enhance reliability, a second independent coder reviewed a subset of the transcripts, and discrepancies were discussed and resolved through consensus. The analysis focused on exploring the learners' attitudes toward using Character AI to improve their speaking skills. Interview transcripts from a subsample of participants (8 from each anxiety group) were transcribed verbatim and prepared for analysis. An initial coding scheme was developed inductively by reading the transcripts multiple times to identify meaningful units of text related to perceived benefits and challenges. Codes were grouped into broader categories (themes), such as "Improving speaking skills," "Personalized feedback," and "Digital stress". The coding scheme was pilot-tested on a sample transcript to ensure clarity and consistency. Definitions and categories were adjusted as needed. The transcripts were coded manually, with each meaningful segment assigned to one or more thematic categories. The frequency and salience of themes were examined to identify patterns and differences between the low-anxiety and high-anxiety groups.

Results

Analysis for The First Research Question

Before conducting statistical analyses on the collected data, it was essential to ensure that the data met the assumptions of normality. Given the relatively small sample size of the study ($n<50$), the Shapiro-Wilk goodness-of-fit test was employed to assess the normality of the data distribution. This test is particularly suitable for small sample sizes and provides a reliable measure of whether the data follow a normal distribution.

After confirming the data's normality, various statistical tests were performed to address the research questions and test the hypotheses. A paired-samples t-test was used to statistically compare intra-group differences in performance between the pre- and post-intervention assessments. This test allowed evaluation of changes in speaking proficiency within the same group of learners before and after the intervention with AI-powered speaking feedback. Tables 1 and 2 tabulate results for question one.

Table 1

Descriptive statistics for the speaking ability of the participants as a whole group

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	59.5333	30	5.62466	1.02692
Post-test	75.4000	30	5.75715	1.05111

Table 1 shows a large increase from the pre-test (M= 59.53, SD= 5.62) to the post-test (M= 75.40, SD= 5.75) in the participants' scores, suggesting that AI (Praktika.ai)-powered speaking feedback might have positively affected their speaking ability. A paired-samples t-test was conducted to assess the statistical difference in participants' performance from pre-test to post-test.

Table 2

Paired-samples t-test for the speaking ability of the participants as a whole group

	Paired Differences							
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pre-test - Post-test	-15.86667	6.79621	1.24081	-18.40441	-13.32892	-12.787	29	.000

Table 2 shows a statistically significant difference between the pre-test and post-test scores of the participants (p = .000, t = -12.78, df = 29). The mean difference equaled -15.86. The 95% confidence interval ranged from -18.40 to -13.32. The Eta squared value was .84, indicating a very large difference (Given, 2008), suggesting that the Iranian EFL learners' speaking ability improved significantly as a result of Character AI-supported feedback.

Analysis for The Second Research Question

Pre-test Results. An independent-samples t-test was conducted to determine whether the participants in the two groups, i.e., low-anxiety and high-anxiety, were similar in terms of their speaking ability at the beginning of the study, that is, prior to any intervention provided by the researcher.

Table 3

Descriptive statistics for the speaking ability of low- vs. high-anxiety groups on the pre-test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	low-anxiety	16	60.9375	7.18766	1.79692
	high-anxiety	14	57.9286	2.40078	.64163

Table 3.3 indicates a difference in terms of the mean scores between the two groups with high and low levels of anxiety on the pre-test. In other words, it can be seen that the low-anxiety group (M= 60.93, SD= 7.18) had a higher mean score than the high-anxiety group (M= 57.92, SD= 2.40).

Table 4

Independent-samples t-test for the speaking ability of low- vs. high-anxiety groups on the pre-test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	32.028	.000	1.492	28	.147	3.00893	2.01620	-1.12106	7.13892
Equal variances not assumed			1.577	18.718	.132	3.00893	1.90804	-.98872	7.00657

The Levene's test yielded a statistically significant p-value (p = .000), indicating a violation of the homogeneity of variance assumption. Consequently, the results from the second line of the independent-samples t-test table, which accounts for unequal variances, were examined and reported. The independent-samples t-test revealed a statistically non-significant difference between the two cohorts (p = .132, t = 1.57, df = 18.71). The effect size was characterized by a mean difference of 3.00, with a 95% confidence interval spanning from -0.98 to 7.00. This finding confirmed that the low-anxiety and high-anxiety groups were statistically similar in terms of their speaking proficiency at the outset of the study, prior to any intervention implemented by the researcher (see Table 4).

High-Anxiety group

First, a paired-samples t-test was conducted to examine the speaking ability of the high-anxiety group from the pre-test to the post-test.

Table 5

Descriptive statistics for the speaking ability of high-anxiety group

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	57.9286	14	2.40078	.64163
Post-test	69.9286	14	2.58589	.69111

Table 5 shows a large increase from the pre-test (M= 57.92, SD= 2.40) to the post-test (M= 69.92, SD= 2.58) in participants' mean scores. Figure 1 also illustrates this increase. A paired-samples t-test was run to assess the statistical difference in their performance from the pre-test to the post-test.

Table 6

Paired-samples t-test for the speaking ability of the high-anxiety group

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pre-test - Post-test	-12.00000	.55470	.14825	-12.32027	-11.67973	-80.944	13	.000

The paired-samples t-test results, as presented in Table 6, indicate a statistically significant difference between the pre-intervention and post-intervention scores for participants in the high-anxiety group (p = .000, t = -80.94, df = 13). The mean difference equaled -12.00. The 95% confidence interval ranged from -12.32 to -11.67. The Eta squared value was .99, indicating a very large effect and confirming that the treatment had a significant impact on the speaking ability of participants with high levels of anxiety.

Low-Anxiety group

A paired-samples t-test was performed to assess intra-group differences in speaking proficiency within the low-anxiety group, comparing performance on the pre-intervention and post-intervention assessments.

Table 7

Descriptive statistics for the speaking ability of low-anxiety group

	Mean	N	Std. Deviation	Std. Error Mean
Pre-test	60.9375	16	7.18766	1.79692
Post-test	80.1875	16	2.42813	.60703

Table 7 shows a large increase from the pre-test (M= 60.93, SD= 7.18) to the post-test (M= 80.18, SD= 2.42) in the mean scores of participants, raising the possibility that the intervention might have improved the speaking ability of participants with low levels of anxiety.

Table 8

Paired-samples t-test for the speaking ability of low-anxiety group

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pre-test - Post-test	-19.25000	7.92885	1.98221	-23.47499	-15.02501	-9.711	15	.000

The results of the paired-samples t-test, as detailed in Table 8, reveal a statistically significant difference between the pre-intervention and post-intervention scores for participants in the low-anxiety group (p = .000, t = -9.71, df = 15). The mean difference equaled -19.25. The 95% confidence interval ranged from -23.47 to -15.02. The Eta squared value was .86, indicating a very large effect and confirming that the treatment had a significant impact on the speaking ability of participants with low levels of anxiety.

High-Anxiety vs. Low-Anxiety groups

Given that the intervention was beneficial for both groups with high and low anxiety levels, an independent-samples t-test was conducted to determine whether there were statistically significant differences in speaking proficiency between the low- and high-anxiety groups at the conclusion of the study.

Table 9

Descriptive statistics for the speaking ability of low- vs. high-anxiety groups on the post-test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Post-test	low-anxiety	16	80.1875	2.42813	.60703
	high-anxiety	14	69.9286	2.58589	.69111

The descriptive statistics table (Table 9) indicates a difference in mean scores between the two groups with high and low levels of anxiety on the post-test. In other words, the low-anxiety group (M= 80.18, SD= 2.42) had a higher mean score than the high-anxiety group (M= 69.92, SD= 2.58).

Table 10

Independent-samples t-test for the speaking ability of low- vs. high-anxiety groups on the post-test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.057	.813	11.201	28	.000	10.25893	.91586	8.38287	12.13499
Equal variances not assumed			11.153	26.913	.000	10.25893	.91985	8.37127	12.14658

The Levene's test yielded a non-significant p-value (p = .813), indicating that the assumption of homogeneity of variance was met. Consequently, the results from the first line of the independent-samples t-test table were examined and reported. The independent-samples t-test revealed a statistically significant difference between the low-anxiety and high-anxiety groups (p = .000, t = 11.20, df = 28). The mean difference was 10.25, with a 95% confidence interval spanning from 8.38 to 12.13. The effect size was substantial, as indicated by an eta-squared value of .81, confirming that the two groups were statistically distinct in speaking proficiency, with the LA group outstripping the HA group at the conclusion of the study following the intervention (see Table 10).

Analysis for the Third Research Question

A semi-structured interview was employed to address this inquiry. In doing so, a subsample of 8 learners from each group was randomly selected. Thematic analysis of the interview data identified salient themes related to students' views on the benefits and challenges of integrating Character AI into their L2 speaking course. The low-anxiety participants' attitudes toward Character AI-assisted instruction are summarized in Table 11.

Table 11

LA learners' attitudes toward Character AI-assisted instruction

Themes	Sample Quotations	No
	Benefits	
1. Improving speaking skills (e.g. Accuracy, fluency, vocabulary)	LA5: It was fun to try out new words and phrases and receive feedback from the app. LA2: My AI celebrity helped me get prepared for different topics. Her suggestions helped me improve my vocabulary, grammar and fluency.	8
2. Personalized feedback	LA6: The app was always there to give me feedback on my shared topics. I felt like it knew everything about my topics.	8

Themes	Sample Quotations	No
	Benefits	
	LA4: My character corrected my wrong pronunciations and I learned how a change in the stress pattern of some words can change the entire meaning.	
3. Motivation and enthusiasm	LA7: I liked its ability to respond to my questions. In many cases, the app asked for my views on the raised topic. This encouraged me to engage more.	6
	LA6: Talking with my favorite character made me feel motivated and entertained.	
4. Accessibility	LA1: The avatars offered round-the-clock support, providing answers to my questions regardless of the hour, including during the late evening.	6
	LA3: The avatars were always available to answer my questions, providing assistance whenever needed.	
5. Immediate feedback	LA8: What I really loved about the app was how fast it responded. I didn't have to go searching through dictionaries or anything to get help. I'd just ask a question, and it would give me suggestions instantly, which saved me an ocean of time.	3
	Challenges	
1. Robotic/mechanical interaction	LA4: I prefer talking to a real person. I couldn't really connect with the AI, and it was hard to tell if it understood what I was trying to say.	5
	LA6: It has problems sometimes understanding what I said.	
2. Intercultural incompetence	- Sometimes, I raised questions about my country but it had no idea about my sociocultural context.	4

As shown in the Table, the LA learners highlighted seven benefits of Character AI for enhancing their speaking, listed in order of frequency as follows: improving speaking skills, personalized feedback, motivation and enthusiasm, accessibility, and immediate feedback. However, they also mentioned the robotic/mechanical interaction and intercultural incompetence as two main drawbacks of the Character AI-driven instruction. The next table summarizes the HA group's views about the AI-based program:

Table 12

HA learners' attitudes toward Character AI-assisted instruction

Themes	Sample Quotations	No
	Benefits	
1. Improving speaking skills (e.g., Accuracy, fluency, vocabulary)	HA2: The feedback I received from the app helped me learn new vocabulary and use them in my speech.	8
	HA5: Talking with the avatar helped me speak much faster.	
2. Non-judgmental tone	HA6: The app created a non-judgmental atmosphere that made me feel comfortable practicing my speaking skills.	7
	HA8: I enjoyed speaking with my character because I had no fear of making errors and losing marks.	
3. Emotional support	HA7: The avatar helped me cope with my shyness. His suggestions were very helpful.	7
	HA1: Sometimes, I asked her about my frustration and she offered me good advice.	
4. Motivation and enthusiasm	HA3: Talking with my favorite actor encouraged me to converse with the app. This was very enjoyable.	6

Themes	Sample Quotations	No
	Benefits	
	HA4: At first it was stressful to interact with the app but over time I got used to it and I felt less stressful.	
5. Personalized feedback	HA7: The avatar was able to give me details about anything I asked and he was ready to help. HA3: Whenever I didn't understand a word or expression, the avatar repeated it patiently and was never annoyed by my questions.	5
6. Immediate feedback	HA5: The suggestions I received from the app were within seconds.	3
7. Accessibility	HA6: I could share my questions anytime and anywhere even at the party.	2
Challenges		
1. Digital stress	HA4: My stress increased when I wanted to talk with the chatbot. HA2: Personally, I have bad feelings about technology. I get agitated when working with mobile apps.	3
2. Intercultural incompetence	HA8: The app was not able to give me information about the local foods and lifestyle of my country.	3

The table demonstrates that HA learners identified the same benefits as the LA group, while also mentioning the 'non-judgmental tone', and 'emotional support', but ranked them differently in terms of frequency as follows: improving speaking skills, non-judgmental tone, emotional support, motivation and enthusiasm, personalized feedback, immediate feedback, accessibility. However, they mentioned digital stress and intercultural incompetence as their challenges.

By way of comparison, both LA and HA learners recognized the value of Character AI in improving speaking skills. However, their priorities differed significantly. LA learners appreciated the personalized, immediate feedback from the AI, as well as its accessibility and motivational aspects. HA learners, on the other hand, highly valued the AI's non-judgmental atmosphere and emotional support, suggesting a greater focus on affective factors in their learning. While both groups experienced challenges related to intercultural incompetence, LA learners expressed concerns about the robotic nature of the interaction, while HA learners struggled with digital stress.

Discussion

The current study aimed to examine the impacts of Character AI-assisted intervention on the speaking abilities of Iranian LA and HA learners. The study provides evidence supporting Character AI-powered instruction in enhancing L2 speaking. As regards the first research question, the findings align with the growing body of literature supporting the positive impact of AI on language learning outcomes (Alizadeh et al., 2020; Foroughi et al., 2024; Klimova & Chen, 2024). The rejection of the null hypotheses suggests that AI-powered feedback is an effective tool for improving speaking abilities among Iranian EFL learners. This finding corroborates previous research that underscores the efficient role of technology in English language instruction. In line with earlier studies (Yu & Yao, 2024), the results emphasize the inherent capabilities of AI technologies to provide personalized and adaptive learning.

Specifically, the study demonstrates that AI-powered feedback through Character AI significantly improves the speaking abilities of Iranian EFL learners.

As for the second research question, the study's results reveal a significant difference in the speaking ability of high-anxiety and low-anxiety learners after receiving AI-powered feedback, with low-anxiety learners benefiting more from the intervention. This finding has two messages. Firstly, both groups showed substantial changes from the pre-test to the post-test, indicating that the AI-based feedback was conducive to both groups' improvement in speaking, regardless of their anxiety levels. This observation is commensurate with that of Huang et al. (2020), El Shazly (2020), Nasri et al. (2022), and Kaur et al. (2022). The learners' improvement could be attributed to Character AI's inherent features, which provide instant, personalized, and joyful feedback that outweigh its disadvantages. Secondly, the lower performance of the HA group compared to their LA counterparts provides evidence for the mitigating role of anxiety in L2 learning. The literature is replete with studies testifying that anxiety can disrupt language learning, particularly speaking (Awan et al., 2010; Bai, 2023; MacIntyre, 2017; Teimouri et al., 2019). Studies concur that language anxiety often leads to reduced participation, increased self-consciousness, and a higher likelihood of errors, collectively stifling progress. For example, Foote et al. (2012) demonstrated that corrective feedback is more effective in low-anxiety contexts, as high-anxiety learners may struggle to process and apply feedback effectively. These learners might be more preoccupied with their anxiety, which can reduce their cognitive resources available for learning and integrating new information. Moreover, this finding suggests that while technology can boost learning outcomes, it is incumbent to consider individual characteristics. Learners with low anxiety levels are more inclined to engage with and derive benefits from the instantaneous feedback offered by AI tools. These learners can use feedback constructively, applying corrections and practicing without the added burden of anxiety, leading to more significant improvements in their speaking.

As for the third research question, the qualitative analysis brought to the surface both affordances and challenges of the Character AI-powered classroom. The scrutiny divulged that both LA and HA learners identified improved speaking skills as a key benefit of Character AI, though their appraisals of other affordances differed significantly. LA learners emphasized the utility of AI-driven personalized and immediate feedback, accessibility, and motivational features. This observation supports the claims and findings of other studies, such as Nguyen (2023), Alizadeh et al. (2020), Yu and Yao (2024), Foroughi et al. (2024), and Peña-Acuña and Corga Fernandes Durão (2024). HA learners, however, placed greater value on the AI's capacity to provide a non-threatening and emotionally supportive learning context, indicative of a stronger preference for affectively oriented learning designs (Hedayati & Marandi, 2014; Song & Song, 2023; Rezai et al., 2024). The significant change in the HA group could be attributed to their relative anonymity with their invented character or chatbots, which could reduce the fear of judgment or embarrassment, a source of anxiety for learners in face-to-face situations (Xin & Derakhshan, 2024). These findings give credence to the emotional basis of AI-assisted

platforms, which pave the way for a stress-free environment to hone speaking skills (Wen et al., 2024; Zou et al., 2023). The qualitative data provided empirical evidence of the positive impact of AI on anxiety reduction. However, this finding diverges from the results reported by El Shazly (2020) and Çakmak (2022), who documented a negative effect of AI on foreign language anxiety, as well as from Hsu et al. (2023), who observed no significant difference in anxiety scores between the pre-intervention and post-intervention assessments.

Aside from the affordances, the LA and HA groups pointed to several challenges. Intercultural incompetence emerged as a shared limitation, while concerns about the lack of human-like interaction were more pronounced among LA learners, and digital stress was a primary challenge for HA learners. A notable challenge identified by both LA and HA learners was Character AI's intercultural incompetence. As one HA learner expressed, "Sometimes, I raised questions about my country, but it had no idea about my sociocultural context" (HA8). This limitation corroborates concerns raised in recent studies (Klimova & Chen, 2024; Sarwari, 2024) about AI tools' inability to fully grasp local cultural nuances, which may hinder authentic language use and learner engagement. As for the lack of human-like interaction, our finding coincides with existing concerns about AI's inability to fully substitute for human interaction (Dakakni & Safa, 2023) and reports of learners' preference for a human teacher over teacher bots (Jeon & Lee, 2024). Finally, the digital stress reported by some learners indicated that technostress, as a mental block, can hinder their learning experiences (Sayfutdinovna Abdullaeva et al., 2024).

Conclusion

The present study probed the impact of AI-powered speaking classrooms on the speaking ability of Iranian EFL learners, with specific attention to the moderating effect of learner anxiety. The study provided support for the facilitative role of Character AI-powered instruction in learners' speaking abilities, with the low-anxiety group outperforming the high-anxiety group. Using the Character AI app, learners benefited from instant, personalized feedback at their convenience, interacting with their favorite chatbots and receiving on-the-spot feedback. The quantitative findings revealed that while both groups experienced significant improvement in speaking, the LA group benefited more from AI feedback than the HA group, suggesting that FL anxiety may attenuate the positive effects of AI on learners' speaking abilities. Qualitative results further highlighted both the advantages and limitations of Character AI as perceived by learners in both groups. Overall, the findings suggest that despite certain drawbacks, the positive features of Character AI outweigh its limitations, affirming its efficacy in improving speaking proficiency for both LA and HA learners.

These findings have several implications for language teaching and technology integration. Educators are suggested to incorporate AI tools into their curricula to enhance L2 speaking and to create supportive learning environments that mitigate anxiety. Developers of language-learning technologies should consider features that support learners' emotional well-being,

making AI tools more effective and engaging. The differential benefits observed between high-anxiety and low-anxiety learners highlight the need for personalized learning approaches. Syllabus designers can incorporate AI-assisted speaking activities into curricula, ensuring that tasks balance technological interaction with human support. Materials developers can create resources that guide learners on maximizing AI tools, including tutorials on managing digital stress and cultural limitations. Educators should tailor their teaching methods to address learners' idiosyncratic needs, taking into account anxiety levels and other individual characteristics. Teachers can integrate Character AI tools into their speaking practice sessions, allowing learners to receive instant, personalized feedback outside class hours and supplementing limited face-to-face time. Teacher educators can train instructors to effectively combine AI feedback with traditional teaching methods, emphasizing strategies that support learners with varying levels of anxiety. For high-anxiety learners, additional support mechanisms, such as one-on-one tutoring, personalized feedback sessions, and stress-reduction strategies, may be necessary. Low-anxiety learners, on the other hand, may benefit more from group activities and peer feedback. By adopting a flexible, individualized approach, educators can ensure that all learners, regardless of anxiety level, receive the support they need to enhance their speaking skills. Learners can be encouraged to use AI applications independently to practice speaking in a low-pressure environment, particularly benefiting high-anxiety students by reducing the fear of judgment.

The study demonstrates that AI-powered tools can complement traditional language teaching methods rather than replace them. AI technology should be viewed as a valuable supplementary resource that enhances the overall quality of language instruction. Traditional methods, such as face-to-face interactions and human feedback, provide essential social and emotional support that AI cannot yet replicate. However, AI tools can fill gaps by offering targeted and timely feedback that might not be feasible in a typical classroom setting. This blended approach, combining the strengths of both human and AI feedback, can lead to more comprehensive and effective pronunciation training.

One key limitation of the study was its relatively small sample size, as all participants were recruited from a single language institute. Recruiting subjects from various educational settings and using random sampling could enhance the generalizability of the findings. Moreover, the study's reliance on self-reported anxiety measures and the categorization into high- and low-anxiety groups may overlook the complexity and variability of anxiety experiences among learners. Furthermore, the absence of a control group without AI intervention limits the ability to isolate the specific effects of Character AI-powered instruction. While this study focused on speaking, future research could examine the impact of Character AI-powered feedback on other linguistic skills, such as grammar, vocabulary, and listening comprehension. Further research should examine how different learner demographics, such as gender, age, educational background, and prior language experience, affect the effectiveness of AI-powered pronunciation feedback. Understanding these variables can help tailor AI tools to meet the

needs of diverse learner populations better and ensure equitable access to language learning resources. Future studies could explore the best practices for integrating AI-powered feedback with traditional human instruction.

Acknowledgments

We would like to thank the editorial team of TESL Quarterly for granting us the opportunity to submit and publish the current synthesis. We would also like to express our appreciation to the anonymous reviewers for their careful, detailed reading of our manuscript and their many insightful comments and suggestions. We also acknowledge all the participants who took part in this study.

Declaration of conflicting interests

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for this article's research, authorship, and/or publication.

References

Alizadeh, M., Mehrpour, S., & Ghaemi, H. (2020). AI-driven pronunciation feedback vs. human teacher feedback: A comparative study. *ReCALL*, *32*(4), 423-439. https://doi.org/10.1017/S0958344020000123

Almaiah, M. A., Alfaisal, R., Salloum, S. A., Hajjej, F., Thabit, S., El-Qirem, F. A., Lutfi, A., Alrawad, M., Al Mulhem, A., Alkhdour, T., Awad, A. B., & Al-Maroof, R. S. (2022). Examining the impact of artificial intelligence and social and computer anxiety in E-learning settings: Students' perceptions at the university level. *Electronics*, *11*(22), 3662. http://doi.org/10.3390/electronics11223662

Alrishan, A. M. H. (2023). Determinants of intention to use ChatGPT for professional development among Omani EFL pre-service teachers. *International Journal of Learning, Teaching and Educational Research*, *22*(12), 187-209. https://doi.org/10.26803/ijlter.22.12.10

Awan, R., Anwar, M., & Naz, A. (2010). An investigation of foreign language classroom anxiety and its relationship with students' achievement. *Journal of College Teaching & Learning*, *7*(11), 33-40. https://doi.org/10.19030/tlc.v7i11.249

Azizimajd, H. (2023). Investigating the impacts of voice-based student-chatbot interactions in the classroom on EFL learners' oral fluency and foreign language speaking anxiety. *Technology Assisted Language Education*, *1*(2), 61-83. https://doi.org/10.22126/tale.2023.2732

Bai, S. (2023). The predictive effects of foreign language anxiety and boredom on willingness to communicate among Chinese struggling EFL learners. *Heliyon*, *9*(9), 1-11. https://doi.org/10.1016/j.heliyon.2023.e19610

Bashori, M., van Hout, R., Strik, H., & Cucchiarini, C. (2022). Web-based language learning and speaking anxiety. *Computer Assisted Language Learning*, *35*(5-6), 1058-1089. https://doi.org/10.1080/09588221.2020.1770293

Bozorgian, H., & Shamsi, E. (2020). Computer-assisted pronunciation training on Iranian EFL learners' use of suprasegmental features: A case study. *Computer-Assisted Language Learning Electronic Journal*, *21*(1), 93-113. https://doi.org/10.29140/callej.v21n1.299

Burston, J. (2014). MALL: The pedagogical challenges. *Computer Assisted Language Learning*, *27*(4), 344-357. https://doi.org/10.1080/09588221.2014.914539

Çakmak, F. (2022). Chatbot-human interaction and its effects on EFL students' L2 speaking performance and anxiety. *Novitas-ROYAL (Research on Youth and Language)*, *16*(2), 113-131. https://doi.org/10.24193/novitas-royal.16.2.07

Dakakni, D., & Safa, N. (2023). Artificial intelligence in the L2 classroom: Implications and challenges on ethics and equity in higher education: A 21st-century Pandora's box. *Computers and Education: Artificial Intelligence*, *5*, 100179. https://doi.org/10.1016/j.caeai.2023.100179

Dizon, G. (2020). Evaluating the effectiveness of AI-driven chatbots in language learning. *International Journal of Artificial Intelligence in Education*, *30*(3), 351-367. https://doi.org/10.1007/s40593-019-00190-3

Dörnyei, Z., & Ryan, S. (2015). The psychology of the language learner revisited. *Routledge*, 201-203.

El Shazly, R. (2020). Effects of artificial intelligence on English speaking anxiety and speaking performance: A case study. *Expert Systems*, *38*(3), 1-15. https://doi.org/10.1111/exsy.12667

Foote, J., Trofimovich, P., Collins, L., & Urzúa, E. (2012). Pronunciation teaching practices in communicative second language classrooms. *The Language Learning Journal*, *44*(2), 181-196. https://doi.org/10.1080/09571736.2013.784345

Foroughi, B., Senali, M. G., Iranmanesh, M., Khanfar, A., Ghobakhloo, M., Annamalai, N., & Naghmeh-Abbaspour, B. (2024). Determinants of intention to use ChatGPT for educational purposes: Findings from PLS-SEM and fsQCA. *International Journal of Human–Computer Interaction*, *40*(17), 4501-4520. https://doi.org/10.1080/10447318.2023.2226495

Gholamrezapour, E., & Salandari Rabori, M. A. (2019). Empathy as a predictor of pronunciation mastery: The case of female Iranian EFL learners' pronunciation errors. *Journal of Teaching Language Skills*, *38*(2), 107-129. https://doi.org/10.22099/jtls.2020.35609.2756

Gilakjani, A. P. (2012). A study of factors affecting EFL learners' English pronunciation learning and the strategies for instruction. *International Journal of Humanities and Social Science*, *2*(3), 119-128.

Given, L. M. (Ed.). (2008). *The Sage encyclopedia of qualitative research methods (Vol 1 & 2)*. SAGE Publications. https://doi.org/10.4135/9781412961288.n133

Hedayati, H., & Marandi, S. (2014). Iranian EFL teachers' perceptions of the difficulties of implementing CALL. *ReCALL*, *26*(3), 298-314. https://doi.org/10.1017/S0958344014000172

Horwitz, E. K. (2010). Foreign and second language anxiety. *Language Teaching*, *43*(2), 154-167. https://doi.org/10.1017/S026144480999036X

Horwitz, E., Horwitz, M., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, *70*(2), 125-132. https://doi.org/10.1111/j.1540-4781.1986.tb05256.x

Hsu, T. C., Chang, C., & Jen, T. H. (2023). Artificial intelligence image recognition using self-regulation learning strategies: effects on vocabulary acquisition, learning anxiety, and learning behaviours of English language learners. *Interactive Learning Environment*, *32*, 1–19. https://doi.org/10.1080/10494820.2023.2165508

Huang, Y., Lin, W., & Yu, Y. (2020). The effects of a mobile-assisted language learning (MALL) app on EFL learners' English pronunciation. *ReCALL*, *32*(1), 1-20. https://doi.org/10.1017/S0958344019000196

Jeon, J. (2022). Exploring AI chatbot affordances in the EFL classroom: Young learners' experiences and perspectives. *Computer Assisted Language Learning*, *37*(3), 1-26. http://doi.org/10.1080/09588221.2021.2021241

Jeon, J., & Lee, S. (2024). Can learners benefit from chatbots instead of humans? A systematic review of human-chatbot comparison research in language education. *Education and Information Technologies*, 1-32. https://doi.org/10.1007/s10639-023-11635-0

Kang, H. (2022). Effects of artificial intelligence and native speaker interlocutors on ESL learners' speaking ability and affective aspects. *Multimedia-Assisted Language Learning*, *25*, 9–43. http://doi.org/10.15702/mall.2022.25.2.09

Kaur, R., Singh, A., & Kaur, J. (2022). The effect of AI-based language learning tools on foreign language anxiety. *Journal of Language and Education*, *8*(2), 195-210. https://doi.org/10.17323/jle.2022.2.12

Klimova, B., & Chen, J. H. (2024). The impact of AI on enhancing students' intercultural communication competence at the university level: A review study. *Language Teaching Research Quarterly*, *43*, 102-120. https://doi.org/10.32038/ltrq.2024.43.06

Lee, D., Kim, H., & Sung, S. (2022). Development research on an AI English learning support system to facilitate learner-generated context-based learning. *Educational Technology Research and Development*, *71*(2), 629-666. https://doi.org/10.1007/s11423-022-10172-2

Liu, B., & Yuan, D. (2024). Research on personalized teaching strategies based on learner profiles in a blended learning environment. *International Journal of Information and Communication Technology Education (IJICTE)*, *20*(1), 1-23. https://doi.org/10.4018/IJICTE.346823

MacIntyre, P. D. (2017). An overview of language anxiety research and trends in its development. In C. Gkonou, M. Daubney, & J.-M. Dewaele (Eds.), *New insights into language anxiety: Theory, research and educational implications. Multilingual Matters*, 11–30. https://doi.org/10.21832/9781783097722-003

MacIntyre, P. D., & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. *Language Learning*, *44*(2), 283-305. https://doi.org/10.1111/j.1467-1770.1994.tb01103.x

Marcos-Llinás, M., & Garau, M. (2009). Effects of language anxiety on three proficiency-level courses of Spanish as a foreign language. *Foreign Language Annals*, *42*(1), 94-111. https://doi.org/10.1111/j.1944-9720.2009.01010.x

Mehrpour, S., Shoushtari, S. A., & Shirazi, P. H. N. (2016). Computer-assisted pronunciation training: The effect of integrating accent reduction software on Iranian EFL learners' pronunciation. *Computer-Assisted Language Learning Electronic Journal*, *17*(1), 97-112.

Nasri, M., Shafiee, S., & Sepehri, M. (2022). An account of Iranian EFL learners' speaking complexity, accuracy, and fluency and foreign language speaking anxiety in a computer-assisted language learning environment. *Computer-Assisted Language Learning Electronic Journal*, *23*(2), 299-321. https://doi.org/10.19173/callej.23.2.408

Ngo, T. T.-N., Chen, H. H.-J. & Lai, K. K.-W. (2024). The effectiveness of automatic speech recognition in ESL/EFL pronunciation: A meta-analysis. *ReCALL*, *36*(1), 4–21. https://doi.org/10.1017/S0958344023000113

Nguyen, T. T. H. (2023). EFL teachers' perspectives toward the use of ChatGPT in writing classes: A case study at Van Lang University. *International Journal of Language Instruction*, *2*(3), 1–47. https://doi.org/10.54855/ijli.23231

Nushi, M., Jafari, R., & Golesorkhi, Z. (2019). Iranian EFL learners' beliefs towards teaching and learning of pronunciation. *Journal of English Language Teaching and Learning*, *11*(23), 221-251.

Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: systematic literature review. *International Journal of Educational Technology in Higher Education*, *20*(56), 1-17. https://doi.org/10.1186/s41239-023-00426-1

Öztürk, G., & Gürbüz, N. (2014). Speaking anxiety among Turkish EFL learners: The case at a state university. *Journal of Language and Linguistic Studies*, *10*(1), 1-17.

Peña-Acuña, B., & Corga Fernandes Durão, R. (2024). Learning English as a second language with artificial intelligence for prospective teachers: a systematic review. *Frontiers in Education*, *9*, 1-7.

Pennington, M. C. (1999). Computer-aided pronunciation pedagogy: Promise, limitations, directions. *Computer Assisted Language Learning*, *12*(5), 427-440. https://doi.org/10.1177/0033688220977406

Pérez, J. Q., Daradoumis, T., & Puig, J. M. M. (2020). Rediscovering the use of chatbots in education: A systematic literature review. *Computer Applications in Engineering Education*, *28*(6), 1549-1565. https://doi.org/10.1002/cae.22326

Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: illuminating the impact on speaking skills and self-regulation in Chinese EFL context. *Frontiers in Psychology*, *14*, 1-15.

Rezai, A., Namaziandost, E., & Hwang, G. J. (2024). How can ChatGPT open promising avenues for L2 development? A phenomenological study involving EFL university students in Iran. *Computers in Human Behavior Reports*, *16*, 1-17. https://doi.org/10.1016/j.chbr.2024.100510

Saddiqa, D. A., Masood, D. S., Amjad, D. I., & Asif, A. (2024). Second language anxiety: Examining its role as a barrier or facilitator in second language acquisition. *Internatonal Journal of Contemporary Issues in Social Sciences*, *3*(2), 378-388. Retrieved from https://ijciss.org/index.php/ijciss/article/view/646

Sarwari, A. Q., Javed, M. N., Adnan, H. M., & Wahab, M. N. A. (2024). Assessment of the impacts of artificial intelligence (AI) on intercultural communication among postgraduate students in a multicultural university environment. *Scientific Reports*, *14*, 13849. https://doi.org/10.1038/s41598-024-63276-5

Sayfutdinovna Abdullaeva, B., Abdullaev, D., & Djuraeva, L. (2024). Decoding the significance of digital literacies among EFL learners: A probe into the consequences on technostress, foreign language anxiety, academic enjoyment, and language achievement. *Applied Research on English Language*, *13*(4), 101-128. https://doi.org/10.22108/are.2024.141205.2274

Schunk, D. H., & Zimmerman, B. (2008). *Motivation and self-regulated learning: Theory, research, and applications.* Routledge.

Scovel, T. (1978). The effect of affect on foreign language learning: A review of the anxiety research. *Language Learning*, *28*(1), 129-142. https://doi.org/10.1111/j.1467-1770.1978.tb00309.x

Shabani, K., & Jabbari, A. (2023). Differential effects of interaction-embedded vs interaction-reduced modes of fully online flipped instruction on EFL learners' speaking. *Computer Assisted Language Learning*, 1-27. doi.org/10.1080/09588221.2023.2219280

Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. *Frontiers in Psychology*, *14*, 1260843. https://doi.org/10.3389/fpsyg.2023.1260843

Stolvoort, J., Mackaaij, M., & Tribushinina, E. (2024). Age of onset, motivation, and anxiety as predictors of grammar and vocabulary outcomes in English as a foreign language learners with developmental language disorder. *Journal of Communication Disorders*, *108*, 106407. https://doi.org/10.1016/j.jcomdis.2024.106407

Teimouri, Y., Goetze, J., & Plonsky, L. (2019). Second language anxiety and achievement: A meta-analysis. *Studies in Second Language Acquisition*, *41*(2), 363-387. https://doi.org/10.1017/S0272263118000311

Tzu-Yu, T., & Chen, H. (2022). The impact of intelligent personal assistants on adolescent EFL learners' speaking proficiency. *Computer Assisted Language Learning*, *37*, 1-28. https://doi:10.1080/09588221.2022.2070219

Vančová, H. (2023). AI and AI-powered tools for pronunciation training. *Journal of Language and Cultural Education*, *11*(3). https://doi.org/10.2478/jolace-2023-0022

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wang, Y., Wei, C., Lin, H., Wang, S., & Wang, Y. (2022). What drives students' AI learning behavior: A perspective of AI anxiety. *Interactive Learning Environments*, 1-17. http://doi.org/10.1080/10494820.2022.2153147

Wei, L. (2023). Artificial intelligence in language instruction: impact on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in Psychology*, *14*, 1261955. https://doi.org/10.3389/fpsyg.2023.1261955

Wen, F., Li, Y., Zhou, Y., An, X., & Zou, Q. (2024). A study on the relationship between AI anxiety and AI behavioral intention of secondary school students learning English as a foreign language. *Journal of Educational Technology Development and Exchange (JETDE)*, *17*(1), 130-154. https://doi.org/10.18785/jetde.1701.07

Xin, Z., & Derakhshan, A. (2024). From excitement to anxiety: Exploring English as a foreign language learners' emotional experiences in the artificial intelligence-powered classrooms. *European Journal of Education*, *60*(1), e12845. https://doi.org/10.1111/ejed.12845

Young, D. J. (1991). Creating a low-anxiety classroom environment: What does language anxiety research suggest? *The Modern Language Journal*, *75*(4), 426-439. https://doi.org/10.1111/j.1540-4781.1991.tb05378.x

Yu, C., & Yao, G. (2024). Enhancing student engagement with AI-driven personalized learning systems. *International Transactions on Education Technology* (ITEE), *3*(1), 1-8. https://doi.org/10.33050/itee.v3i1.662

Zhang, S., Shan, C., Lee, J. S. Y., Che, S., & Kim, J. H. (2023). Effect of chatbot-assisted language learning: A meta-analysis. *Education and Information Technologies*, *28*(11), 15223-15243. https://doi.org/10.1007/s10639-023-11805-6

Zou, B., Guan, X., Shao, Y., & Chen, P. (2023). Supporting speaking practice by social network-based interaction in artificial intelligence (AI)-assisted language learning. *Sustainability*, *15*, 2872. https://doi.org/10.3390/su15042872

Appendix 1

1. Can you describe your overall experience using the Character AI application for improving your speaking skills?
2. What specific features of the AI application did you find most helpful for your language learning?
3. How did the feedback provided by the AI affect your speaking performance?
4. Did you feel motivated or encouraged while interacting with the AI? Please explain.
5. Were there any aspects of the AI application that you found frustrating or challenging?
6. How did the AI application compare to traditional speaking practice methods you have used before?
7. Did you experience any emotional or psychological effects (e.g., anxiety, confidence) while using the AI? If so, please describe them.
8. How accessible and convenient was the AI application for your learning needs?
9. Did you notice any cultural or contextual limitations in the AI's responses or interactions?
10. What suggestions do you have for improving the AI application to better support your speaking development?