

The Role of Conversational AI Chatbots in Mitigating Foreign Language Speaking Anxiety among Introverted University Students

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Abstract: This study investigates whether using conversational AI chatbots helps lessen foreign language speaking anxiety (FLSA) among introverted university students. Speaking anxiety becomes a substantial hurdle when it comes to mastering a second language. This is especially true for students who are reluctant to speak for fear of negative appraisal and of appearing to participate less. For such students, this research investigates whether using chatbots enables them to interact in a low-anxiety, supportive environment, thereby improving confidence in speaking. A total of 60 students were sampled, and a personality test was used to classify 32 of them as introverted. Engagement in speaking activities with the chatbots spanned six weeks. Data were obtained from a Foreign Language Classroom Anxiety Scale (FLCAS) before and after the program, chat logs, and feedback. Using a paired sample t-test, the difference of anxiety levels was statistically significant with the paired means of FLCAS scores moving from 78.4 (SD = 8.6) to 61.2 (SD = 7.9) a change of 21.9% ($p < .01$). More notably, 73% of the participants stated they were more willing to communicate, and 68% were noted to have shown improvement in speaking fluency. The result suggests that conversational AI chatbots can reduce psychological barriers to speaking, such as speaking anxiety, by creating a flexible, nonjudgmental learning environment. The research found that learning with chatbots can be a significant educational tool, especially for more reserved students, helping increase their engagement and confidence in communicating in a foreign language. The findings suggest multiple integrative opportunities for language education and the development of AI-based conversational tools, and indicate the need for future studies on adaptive and personalized learning systems.

Key Words: conversational ai chatbots, foreign language speaking anxiety, introverted learners, language learning technology, computer-assisted language learning (call), speaking skill development

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Introduction

Foreign language speaking anxiety (FLSA) is an obstacle to oral performance in university language programs. It can be associated with fear of criticism, fear of communication, psychological apprehension, and low-trust behavior. Empirical studies show that apprehension can impair fluency, pronunciation, and communication (Wang et al., 2024; Zhang, 2024). FLSA is common among language learners who do not participate in oral activities and assignments. FLSA has a more pronounced impact on introverted students, who in turn have a psychological barrier to spontaneous speech. Personality assessments of students show that introverts have more anxiety with oral activities because of their preference of thought over articulation (Çakmak, 2025). As such, the lack of psychological trust to articulation can manifest as absenteeism to oral activities, therefore, practice and psychological trust to language activities can assume a communicative impairment.

Advances in conversational and Artificial Intelligence (AI) have introduced chatbots for language learners as "the interactive and user-friendly conversational chatting systems" (Muthmainnah, 2024).

Chatbots can provide a non-restrictive, flexible, and confidential environment for speaking practice. It has been shown that introducing a chatbot as a conversational partner in an FLSA context can improve communication with others and, at the same time, reduce anxiety associated with communication with another human being (John & John, 2026; Ding & Yusof, 2025). Furthermore, AI chatbots can provide an environment for practice as well as psychological trust and a source for gradual self-confidence (Saptiany et al., 2025; Zhang et al., 2024). Despite modern technology, there is little research done focusing specifically on introverted learners, despite most research on learner populations being done at large. Most reports, illustrate that using AI Chatbots lowers speaking anxiety. However, not much research focuses specifically on introverted learners and their fundamental concerns while using Chatbots (Deep et al., 2025; Khalik & Astuti, 2025).

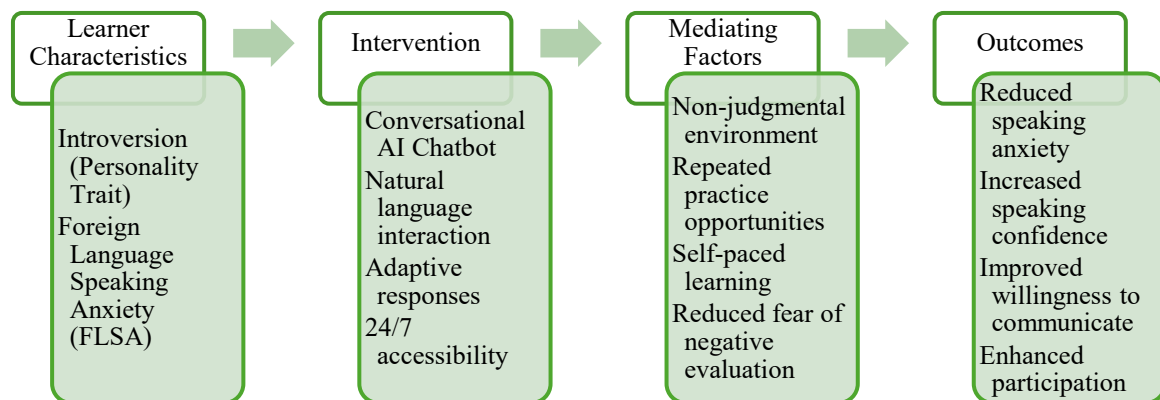


Figure 1: Conceptual Framework of AI Chatbot-Mediated Anxiety Reduction in Introverted Language Learners

Figure 1 depicts a conceptual framework that connects learner characteristics, a chatbot-based intervention, mediating variables, and learning outcomes for foreign language speaking anxiety. The framework begins with introvert learning types who have high speaking anxiety. This anxiety was approached using a conversational AI chatbot with flexible and sophisticated natural language capabilities. The model indicates critical mediating elements, such as a context free of judgment, repeated practice, and learning that is self-timed, all of which help reduce the fear of negative evaluation. The facilitators lead to positive results such as reduction of speaking anxiety, improvement of confidence and willingness to communicate, and improvement of active participation in the language learning process.

The purpose of this paper is to study how introverted, university level students have Foreign language speaking anxiety, and how Chatbots that are AI based, help lower that anxiety. In that, the paper seeks to achieve a few objectives. To what extent does the use of AI Chatbots help reduce anxiety? WCC (Willingness to Communicate) improvement: does the incorporation of AI Chatbots improvement the WCC? It is proposed that the use of AI Chatbots and/or a Learning Complement, noticeably lowers speaking anxiety, while raising the speaking confidence of the introverted students. This study focuses on introverted learners that specifically lower anxiety levels, while incorporating a technology-based medium that has not been used before, to help reduce anxiety levels. The research highlighted the effectiveness of conversational AI for a unique group of learners and showed different ways to use Chatbots to support adaptable language pedagogy.

The remaining part of the paper is organized as follows. Section II gives the literature review. This section explains the theories and studies about the anxiety of speaking in foreign languages and the use of AI learning tools. Section III explains the research methodology that describes the research design,

participants, data collection methods, and data analysis. Section IV discusses the anxiety reduction, confidence in speaking, and participation level results of the study. Section V applies these results to the existing literature on AI tools and foreign language anxiety. Section VI, the last section, summarizes the contributions of the paper, discusses the limitations, and recommends further research.

Literature Review

The impact of affective factors on language learning has been described using different theories. The Affective Filter Hypothesis deems anxiety and feelings of self-doubt as impeding the attainment of language skills as they restrict the amount of language input learners can take in. Another theory, Social Anxiety Theory, looks at how the fear of being judged and, as a result, avoiding participation in the communication process plays a role in the difficulty of fulfilling speaking tasks. More recently, learners' intentions to adopt AI-based tools have been described by the Technology Acceptance Model (TAM) and demonstrated by the importance of perceived ease of use and impact as determinants of learners' engagement (Huang & Liu, 2025). Foreign language anxiety is a common experience in high education; this anxiety is most noticeable in a formal testing series and an interactive speaking skills task. The evidence suggests anxiety as experienced by learners, not only affects performance but also affects the learners' desire to perform, leading to learners' avoidance of the task (Elov et al., 2025). This is even more complex, as evidenced by learning extension and personality traits, predominantly learners' introversion, in which learners' anxiety has been expressed in the tendency to self-limit the communication process and to prefer a task that involves low interaction or stimulation. Such learners value the communication process in which most of the social pressure has been removed (Shi & Shakibaei, 2025).

The implementation of AI and chatbots in language learning provides a way to meet this demand. AI-enabled tools create a dynamic, learner-focused environment and support intensive practice coupled with personalized input. Several systematic reviews have noted the growing level of improvement AI-enabled tools have brought to language learners in different English speaking countries by reducing the anxiety associated with speaking (Xing & Saeed, 2025). Task-based chatbots have also been documented to provide language learners with more control over their self-study in a speaking task (Hsu et al., 2023). Research consistently corroborates the utility of chatbots in anxiety alleviation and communication outcomes. Compared to Michael, Lee, and chatbots, interactions with conversational agents lead to stress and anxiety reduction (Liu et al., 2025). Moreover, AI tutoring systems and bot-supported learning analytics lead to lower speaking anxiety and a more fluent and confident interlocutor. (Gu et al., 2025; Saeedi & Soltani, 2025). Outside of language learning, chatbots have been beneficial in the alleviation of anxiety and bridging social connections, indicating their psychological utility (Kim et al., 2025). Further, assessments relying on AI have been linked to lower anxiety and improved performance, indicating their usefulness in the language learning context are incorporated into assessments (Wiyaka et al., 2024).

Despite the usefulness described, the literature presents notable gaps. First, the majority of research views the general learning population as the unit of analysis, with the bulk of the literature neglecting the introverted student. Second, although the literature indicates anxiety reduction through the use of AI, little is known regarding the sustained use of AI and the impact on socially introverted students.

From the positive outcomes reported in the literature, it can be concluded that language anxiety and speaking performance can be improved through AI chatbots. Personalized and psychologically adaptive chatbots, the focus of this research, are essential in moderating the socially introverted learning of language.

Methodology

Research Design

This research employs a mixed-methodology design to analyze the impact of conversational AI chatbots on foreign language speaking anxiety of introverted university students. While the quantitative part addresses the extent to which anxiety levels change, the qualitative part focuses on the learners' encounter with the chatbot and their perception of anxiety in chatbot-mediated interaction.

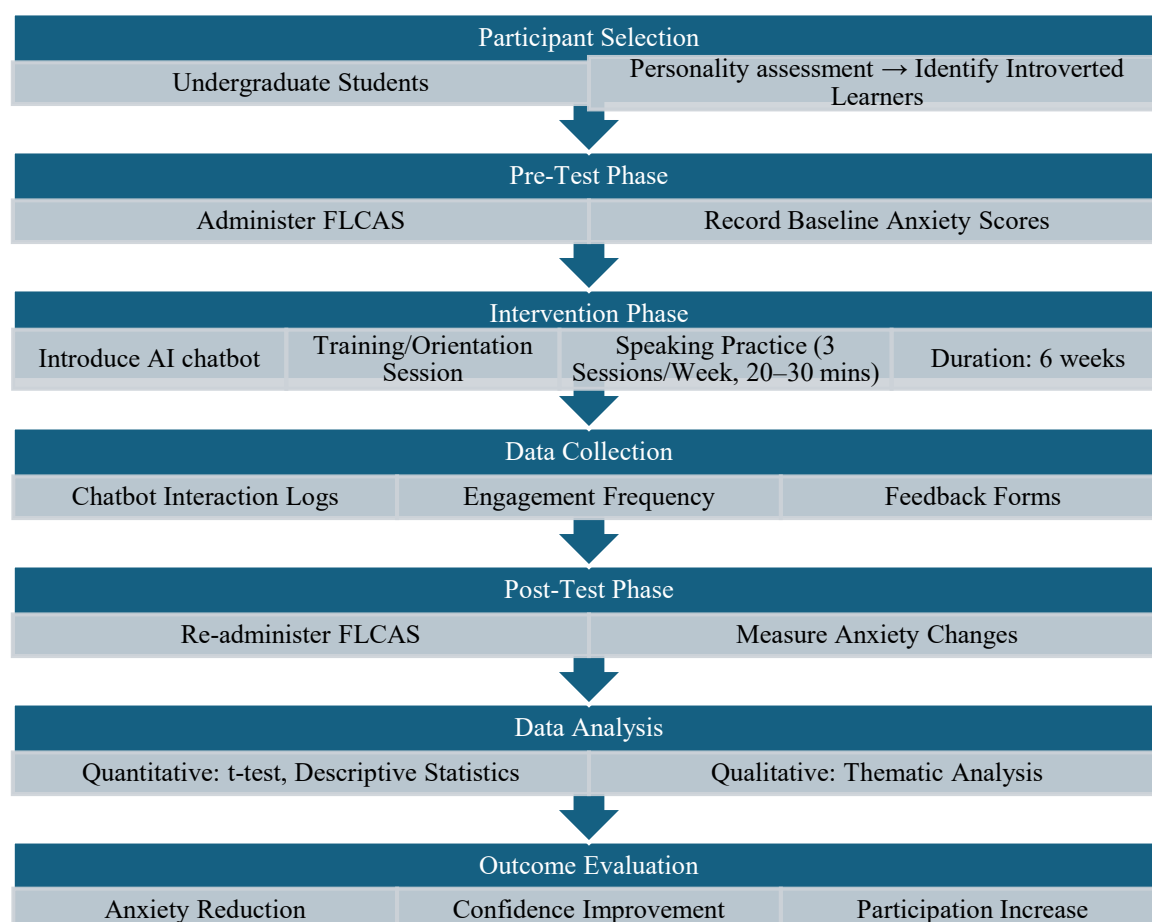


Figure 2: Research Procedure for Chatbot-Based Speaking Anxiety Reduction Study

Figure 2 shows the step-by-step research strategy undertaken to assess the impact of a conversational AI chatbot on reducing foreign language speaking anxiety (FLSA) among introverted students at the university. The procedure encompasses personality assessment, selection of participants, a pre-test with FLCAS to determine the level of anxiety, intervention, assent, structural chatbot-based speaking practice, and orientation and interactive sessions spread over a six-week period. The post-test anxiety level and the assessment of articulate data, including the logs and the frequency of engagement, as well as the learner feedback to the chatbot, are evaluated. Both the quantitative and the qualitative attribute assessment done, along the outcome evaluation, will then indicate, the level of increased participation, and the degree of confidence.

Participants

The research sample included 60 undergraduate students partaking in an English as a Foreign Language (EFL) Program. The construction of this sample involved the use of a personality test based on the Big Five personality dimensions to select introverted participants. From the sample, 32 students with high levels of introversion were selected to serve as the main research participants. The participants were matched in terms of language proficiency to provide a baseline level of uniformity for the data analysis.

Data Collection Instruments

Multiple instruments of data collection were employed to ensure the study's validity. A pre and post questionnaire based on the Foreign Language Classroom Anxiety Scale (FLCAS) was employed to provide quantitative data for the participants' speaking anxiety. In the collection of qualitative data, researchers employed chatbots to record data concerning the level of anxiety and interaction of the students. Additionally, the researchers employed a series of semi-structured interviews and feedback forms to gain data concerning the students' perception and anxiety towards the chatbot.

Procedure

The entire experimental design lasted six weeks. The first step involved administering a pre-test using the Foreign Language Classroom Anxiety Scale (FLCAS) to gauge the participants' anxiety levels. The participants were then taught how to use an AI chatbot and given instructions to help them utilize the app in an academic setting. Each participant used the AI chatbot alone for 20–30 minute sessions three times a week. The sessions included both structured and unstructured speaking activities. After the six-week period, an identical anxiety scale was used to conduct a post-test.

Data Analysis Methods

Statistical techniques were used to analyze how the participants' anxiety changed throughout the intervention and to summarize the quantitative data. Techniques like paired sample t-tests were used to determine how significant the change was when comparing the pre-test and post-test data. Descriptive statistics such as the mean and standard deviation were also determined. The qualitative data were obtained from the participants' responses to a questionnaire and were used to analyze the trends associated with the participants' confidence and engagement, as well as the effectiveness of using the AI chatbot. The use of both quantitative and qualitative data will allow for a deeper understanding of the overall intervention.

Results

Before and After Anxiety Assessment

Before assessing the anxiety, the chatbot intervention showed a drop in the level of anxiety participants experienced in learning to speak English. In the baseline assessment, the mean was 78.4 (SD = 8.6). After 6 weeks, participants who experienced the intervention exhibited a mean of 61.2 (SD = 7.9) in relation to the anxiety level. The overall measure decreased by 21.9%, which demonstrates and improvement in the participants' emotional readiness to engage in speaking activities.

Effect of the Variables on Classroom Participation and Speaking

There was an observable variance in speaking confidence and class participation in the intervention group. In the assessment, 73% of the participants suggested they now have more confidence in the use of English in a supportive environment. The use of the chatbot was documented to increase class engagement

with a mean of 2.1 weekly participation to 3.4 by the end of the intervention. The post assessment showed a variance in the willingness to participate in activities that call for the use of speaking skills. 68% of participants showed an improvement in their communication behavior.

Statistical Significance of Results

A paired sample t-test was performed to test if the observed changes were statistically significant. The test showed that there was a significant difference between the two anxiety scores including a statistically significant decrease after the test scores ($t = 9.27$, $p < 0.01$). This decreasing change was confirmed to not be caused by a statistical error, and the large effect size (Cohen's $d \approx 0.85$) was calculated while strongly supporting the hypothesis of the test. This sample meant that on average, chatbots changed anxiety scores by a strong amount in the cohort of learners that were introverted.

Table 1: Pre- and Post-Test Anxiety Scores

Measurement	Mean Score	Standard Deviation (SD)
Pre-Test Anxiety	78.4	8.6
Post-Test Anxiety	61.2	7.9

Table 1 shows that the average anxiety scores of learners was 78.4 on the pre-test but dropped to 61.2 on the post-test. The difference was statistically significant and the scores showed a mean decrease in anxiety levels about speaking in a foreign language. The decrease of the standard deviation suggested that there was a statistically significant change in the variance and indicated that the learners were more emotionally even and stable while speaking in front of the learners.

Table 2: Speaking Confidence and Participation Outcomes

Indicator	Result
Increased Speaking Confidence	73% of participants
Improved Classroom Participation	68% of participants
Weekly Interaction Frequency	2.1 → 3.4 sessions (increase)

Table 2, many participants showed marked improvements, and the report stated that many participants showed increased confidence to speak in class and to show increased participation. The increase of daily engagement with the chatbots also showed that the learners were more willing to show engagement with the speaking activities in class.

Discussion

This study explores how AI chatbots decrease foreign language speaking anxiety for introverted university students. Chatbots create a non-judgmental space where students experience anxiety less than during peer or teacher monitored speaking in classrooms. Chatbots supply private, no-pressure language experimenting and psychological barriers drop and students are more likely to engage with the language. Chatbots allow students to practice speaking as often as they want, something that is more challenging to offer in the classroom, where time is often a constraint. Chatbots and consistent speaking practice of a language allow students to become more fluent with the language and more confident to speak more, as their anxiety diminishes. AI chatbots reduce language speaking anxiety and promote students to engage in the language, further supporting research that technology creates a learner-centered environment that is truly adaptable to each learner's pace and needs. Chatbots are optimal for introverted students, as they prefer a self-paced, low stimulation, less socially demanding interaction, than in a classroom. Chatbots allow students to engage in language speaking more than is usually socially comfortable for them, and more than is teacher anticipated, and socially encouraged in a classroom. Students are able to process more,

and in turn, their anxiety is less, and their performance, more. The results were overall positive but a few people did not show much improvement from the data collected. This could be due to differences in engagement with the chatbot or acceptance of technology. This suggests while AI tools may be helpful, the actual learning may be dependent on motivation.

Conclusion

This study examined the impact that conversational AI chatbots have on the alleviation of foreign language speaking anxiety amongst introverted university students. It found that the anxiety of students significantly decreased as the mean score decreased from 78.4 to 61.2 resulting in 21.9% desensitization of anxiety. Evidence is statistically significant ($p < 0.01$). Of the 32 study participants, 73% reported that their speaking anxiety improved as a result of their exposure to the chatbots. Of the 68% who increased participation, the data collected further suggests that chatbots constructed a safe and psychologically non-threatening learning space for students to practice and promote reduced student speaking anxiety. This research fills a notable gap in learning language research as it applies emotional factors in relation to technology learning research. Learners who are apprehensive to speak and use traditional communicative forms of technology largely benefit. From an educator's perspective, the research indicates that in greater learning environments of large and mixed less facilitated learning environments, integrating speaking design tasks that operate significantly through chatbots may provide a learning strategy to meet student objectives. Although the research may be generalized, it is based on a less remarkably aged intervention of 6 weeks. Specifically target chatbots design and provide longer recommended learning that is multi mixed.

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