

Empathy-based Tutoring with Generative AI for Personalized Support in EFL Speaking Classrooms

Maroua, ROGTI¹

Ecole Normale Supérieure de Laghouat, Algeria

m.rogiti@ens-lagh.dz

Received: 8/8/2025,

Accepted: 22/11/2025,

Published: 12/12/2025

Abstract: One of the hardest things for EFL students to do is learn how to speak. Speaking skills are very important for learning a language, but they are often not developed enough, which means that students cannot fully benefit from the language learning process. Because of this, teachers are always looking for new and better techniques to improve students' speaking skills. One of the most interesting things in the 21st century education is the use of AI in language teaching. This study examines an empathy-driven teaching methodology utilizing generative AI to improve speaking proficiency and provide tailored emotional support in EFL contexts. The proposed methodology incorporates affective computing to assess learners' emotional engagement and utilizes large language models (LLMs) for empathic conversational answers and personalized feedback. A quasi-experimental approach will be utilized with a sample of forty EFL undergraduate students, contrasting an experimental group utilizing the empathy-enabled AI tutor, ELSA, with a control group engaged in traditional AI-based speaking practice. Quantitative data will undergo statistical analysis. The results indicate that AI-driven affective tutoring models can provide valuable insights for enhancing speaking proficiency and fostering emotional engagement through sympathetic AI tutors. Implications are suggested to incorporate practices for integrating emotional social intelligence into AI-powered EFL pedagogy.

Keywords: empathetic support, AI tutoring systems, EFL students, speaking proficiency, personalized support

Résumé : L'une des choses les plus difficiles pour les étudiants en anglais langue étrangère est d'apprendre à parler. Les compétences orales sont très importantes pour apprendre une langue, mais elles ne sont souvent pas suffisamment développées, ce qui signifie que les étudiants ne peuvent pas pleinement bénéficier du processus d'apprentissage de la langue. À cause de cela, les enseignants cherchent toujours de nouvelles et meilleures techniques pour améliorer les compétences orales des élèves. L'une des choses les plus intéressantes dans l'éducation du XXI^e siècle est l'utilisation de l'IA dans l'enseignement des langues. Cette étude examine une méthodologie d'enseignement axée sur l'empathie utilisant l'IA générative pour améliorer la compétence orale et fournir un soutien émotionnel personnalisé dans les contextes d'anglais langue étrangère (EFL). La méthodologie proposée intègre l'informatique affective pour évaluer

l'engagement émotionnel des apprenants et utilise des modèles de langage de grande taille (LLMs) pour des réponses conversationnelles empathiques et des retours personnalisés. Une approche quasi-expérimentale sera utilisée avec un échantillon de quarante étudiants de premier cycle en anglais langue étrangère, contrastant un groupe expérimental utilisant le tuteur IA, ELSA, capable d'empathie, avec un groupe de contrôle engagé dans une pratique de conversation traditionnelle basée sur l'IA. Les données quantitatives seront soumises à une analyse statistique. Les résultats indiquent que les modèles de tutorat affectif pilotés par l'IA peuvent fournir des informations précieuses pour améliorer la compétence orale et favoriser l'engagement émotionnel grâce à des tuteurs IA empathiques. Des implications sont suggérées pour intégrer des pratiques visant à incorporer l'intelligence sociale émotionnelle dans la pédagogie de l'anglais langue étrangère (EFL) alimentée par l'IA.

Mots-clés : soutien empathique, systèmes de tutorat par IA, apprenants d'anglais langue étrangère, compétence orale, soutien personnalisé

Introduction

Speaking is an important skill for people who want to acquire English as a second language. It can be hard to get, but it is important for effective communication. It also demands confidence and the ability to talk to people in person, which many students may find hard to do (Guo & Wang 2024). Educational institutions are now using artificial intelligence, which has made it easier for students to learn a language in more ways. AI tutors are becoming more popular as a technique for students to practice speaking in ways that are more personal and interesting (Law, 2024). Students may not always have enough chances to practice when they study a language the old-fashioned manner. On the other side, generative AI enables people more personalized and flexible learning experiences that are tailored to their needs. This makes it easier for them to practice talking.

Generative Artificial Intelligence (GAI), notably Large Language Models (LLMs) like ChatGPT and chatbots, is growing quickly. This has transformed how students learn a second language. Now, GAI conversational bots in EFL classes give quick speaking practice, personalized feedback, and language scaffolding that changes based on the student's needs. AI-based speaking tutors have improved language correctness, fluency, and pronunciation (Zou et al., 2023); nevertheless, most systems prioritize linguistic performance above emotional support. EFL learners sometimes experience foreign language speaking anxiety and reduced confidence, especially during speaking tasks, which may hinder the development of oral communication abilities (Gao et al., 2022). This underscores the imperative for tutoring solutions that provide both technical feedback and emotional support for learners (Yang et al., 2022).

Adequate opportunities for students to converse with native speakers, crucial for developing fluency and confidence, are sometimes limited. The absence of personalized feedback results in students not receiving prompt corrections or customized assistance to enhance their pronunciation, fluency, or overall speaking proficiency. Consequently, students sometimes encounter difficulties in acquiring the requisite speaking ability for effective communication. Although GAI technologies for language acquisition are rapidly adopted, their application in enhancing EFL speaking competency mostly centers on providing linguistic feedback, including corrections for grammar, pronunciation, and fluency issues.

Although these features are beneficial, they frequently overlook the emotional aspects of language acquisition, particularly the speaking anxiety, diminished confidence, and decreased motivation typically encountered by EFL learners. Conventional AI-driven speaking tutors offer mechanical and task-focused interactions that enhance accuracy but lack the human-like empathy essential for fostering risk-taking and perseverance in communication. Research on empathy-based intelligent tutoring systems (ITS) underscores the significance of affective feedback and emotional support in augmenting learners' involvement in language learning.

Considering these limitations, AI tools may serve as a viable solution to improve speaking skills by providing tailored feedback and facilitating immersive practice opportunities (Guo et al., 2023). Nonetheless, the understanding of how AI tools specifically offer emotional support remains limited. Most studies on AI tutors in language learning emphasize accuracy and fluency feedback, while underexploring personalized emotional support in speaking tasks and rarely integrating generative AI with empathy-driven tutoring strategies (Davoodifard & Eskin, 2024; Yang et al., 2022; Gao et al., 2022; Wang et al., 2025). This research seeks to address this gap by examining the impact of an empathy-driven generative AI tutor on the speaking proficiency and emotional engagement of EFL learners. This study aims to assess the impact of empathetic responses on speaking outcomes and the provision of emotional support.

The current study is an attempt to answer the following questions :

1. How does empathy-based tutoring with Generative AI improve speaking proficiency of EFL students?
2. How does empathy-based generative AI tutoring influence students' emotional engagement ?

1. Review of Literature

1.1 Generative AI in language education

Generative AI can offer significant opportunities and challenges in language teaching and learning, particularly FL/SL context (Wang et al., 2025). Integrating GAI and its applications for EFL language education requires further investigation

within the Algerian context. It is essential to examine both theoretical and practical aspects of employing Generative AI in language education and assessment (Davoodifard & Eskin, 2024). In language learning, GAI can enhance students' speaking skills (Yang et al., 2022), provide personalized feedback (Gao et al., 2022), develop writing skills (Guo et al., 2022), enhance students' autonomy (Haristiani et al., 2022), academic engagement (Guo & Wang, 2024), emotional experiences (Xin & Derakhshan, 2025), and facilitate interaction and collaboration (Toboula & Martinien, 2023).

Generative artificial intelligence pertains to the utilization of AI for the production of novel content, including text, photos, audio, and videos. This procedure utilizes a machine learning model to examine patterns and correlations within a dataset of human-generated content (Guo et al., 2023). AI tools for teaching and learning languages can help students attain their language learning goals. But they also threaten the integrity of language instruction, the teaching profession, and the fundamental motives for learning foreign languages (Moorhouse & Wong, 2025).

Teaching language with AI-powered tutors can beneficially influence learners' emotions by providing a supportive and personalized atmosphere. Prior AI tutors possess a diverse array of digital capabilities, hence exerting a substantial influence on language acquisition (Chen et al., 2025). Certain GAI chatbots may exhibit deficiencies in emotional intelligence and empathy, resulting in an inability to acknowledge and address the emotional states of language learners. This shortcoming can induce dissatisfaction and insufficient support during challenging situations, particularly for less adept students (Xin & Derakhshan, 2025). Moreover, technical difficulties, such as erroneous responses, may heighten anxiety and diminish interest (Law, 2024).

Artificial Intelligence has revolutionized EFL learning, especially in enhancing speaking skills via chatbots, speech recognition technologies, and conversational agents. Research indicates that AI-driven systems enhance learners' fluency, pronunciation, and vocabulary richness through on-demand interactive practice (Wang et al., 2025; Weng & Fu, 2025). Generative AI, driven by extensive language models, facilitates real, context-sensitive dialogues that replicate genuine communication situations (Toboula & Martinien, 2023). The transition from rule-based to generative conversational agents facilitates dynamic, human-like interactions and tailored task design, demonstrating potential in enhancing learners' oral ability (Davoodifard & Eskin, 2024).

Large language models are complex artificial intelligence systems adept at learning from vast quantities of textual data. (Wang & Xue, 2024). Discriminative LLMs, such as Claude and GPT-4, have undergone substantial investigation about their effectiveness in classification-oriented question answering. The creative

potential of LLMs enables them to address diverse inquiries with enhanced flexibility and effectiveness, generating human-like responses (Lin et al., 2023). These models are capable of producing human-like text, translating languages, and delivering personalized instructional resources (Wang et al., 2018).

1.2 Generative AI- Powered Empathetic Feedback

Generative AI offers novel prospects for emotionally responsive conversational coaching. In contrast to pre-programmed chatbots, Generative AI may generate nuanced, human-like sympathetic responses, modifying conversational tone and complexity according to learner input (Jiang et al., 2024). Prior research indicates that sentiment-aware AI chatbots can alleviate learners' speaking fear and enhance their readiness to interact (Davoodifard & Eskin, 2024). However, most contemporary methods offer empathy in a restricted, predetermined manner, missing the nuanced flexibility necessary for individualized emotional involvement in speaking practice.

1.3 Empathy-Based Tutoring

Empathy-driven tutoring emphasizes recognizing and addressing learners' emotional conditions, offering tailored emotional assistance in conjunction with cognitive support. Research emphasized its influence on academic performance and educational results (Falk et al., 2020; Siyan et al., 2024). Conventional approaches to imparting empathy encompass role-playing, literary study, and introspective activities (Goldstein, 2016). The emergence of AI in education presents novel methodologies for empathy training, including AI-powered chatbots and virtual reality (VR) simulations that offer immersive experiences to deepen students' sympathetic understanding (Mastorodimos & Chatzichristofis, 2019). D'Mello and Graesser (2015) assert that intelligent tutoring systems incorporate affective computing technologies, such as sentiment analysis and emotion identification, to modify instructional strategies in real time.

AI tutors that use emotional computing and sentiment analysis may tell if someone is stressed, angry, or unsure by looking at their language and adjusting how they respond (Gao et al., 2022). For example, an AI tutor that understands how teachers feel can tell when a student is growing irritated and switch to a more encouraging tone or give them easier verbal cues before going back to harder tasks (Shih et al., 2022). Chen et al. (2025) contend that AI-driven virtual reality (VR) simulations and chatbots can offer pupils genuine scenarios that evaluate their emotional understanding and empathy skills in manners that traditional methods may inadequately achieve. These AI systems can replicate diverse social interactions and emotional contexts, offering customized and adaptable learning experiences that address the unique needs of each learner (Lin et al., 2023).

The present study is grounded in Vygotsky's Sociocultural Theory (1978), which emphasizes the significance of social interaction and scaffolding in

language acquisition. When generative AI instructors are more understanding, they become helpful partners who help students in their Zone of Proximal Development. The Affective Filter Hypothesis (Krashen, 1982) asserts that anxiety and negative emotions might hinder language acquisition. The AI tutor's purpose is to help students learn by employing empathy-based teaching methods to decrease their affective filters. This will provide a psychologically safe space that is beneficial for improving speaking skills. The method also incorporates Social Presence Theory (Short et al., 1976), which suggests that people are more likely to get involved in mediated situations when they feel socially linked. Empathic AI tutors give personalized, emotionally sensitive feedback, which makes students more interested in learning, this gives them a sense of social presence.

Grounded in these theoretical foundations, the conceptual framework of our study posits that learners' initial speaking proficiency levels and emotional states, including confidence, anxiety, and attitudes, interact with an empathy-driven generative AI tutor equipped with emotion detection, empathetic feedback, and tailored conversational tasks. This intervention aims to augment emotional engagement, social presence, and interaction quality, resulting in enhanced speaking competency, encompassing fluency, accuracy, and pronunciation, prior to utilizing the AI-based support. Figure 1 illustrates the conceptual framework design of the study on empathic AI support for EFL students' speaking proficiency and emotional involvement.

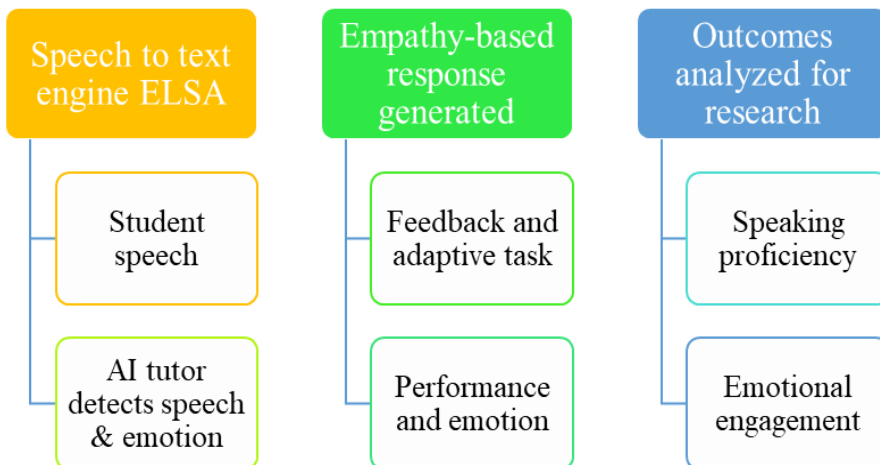


Figure 1. The Conceptual Framework of the study

Earlier studies on emotional intelligent tutoring systems have demonstrated that the incorporation of empathy enhances student engagement and educational achievements, especially in STEM and general education (Akhmetova et al., 2025; Ismail & Hastings, 2023; Chang et al., 2024). The research conducted by Jamaluddin and Mohtar (2025) underscores the utilization of AI to educate and cultivate empathy in learners through the integration of recent developments in AI applications. The results show that AI-based instructional tools can help people acquire empathy. The study addresses the problems and limitations, and suggests future avenues for research in this growing subject. Similarly, the research conducted by D'Angelo et al. (2022) indicated favorable results from the utilization of AI-driven chatbots for empathy training, encompassing heightened engagement and enhanced emotional reactions.

Consequently, the study by Jeon et al. (2024) sought to provide a progressive framework for computer vision instruction through the integration of neural network-based AI and symbolic AI at each stage. They did research to see how well AI-integrated training worked in four lessons. Their results showed that students were statistically more interested in using AI in a science topic, that their understanding of science improved significantly, that their use of AI in real life improved significantly, and that they understood how to combine AI and computer vision in scientific exploration.

Nevertheless, limited research (Mastorodimos & Chatzichristofis, 2019; Shih et al., 2022; Gao et al., 2022) has investigated empathy-based tutoring explicitly in the context of EFL speaking skill enhancement, where emotional support and confidence cultivation are essential. Li et al. (2024) presented a challenge for detecting negative emotions through audio to identify chances for empathetic feedback in language acquisition. Subsequently, researchers developed the inaugural spoken English instructional chatbot featuring adaptive, compassionate feedback. This feedback is generated through automated prompt optimization of Chat-GPT and assessed with English learners. The results illustrate the efficacy of our solution via initial user research.

The research conducted by Wu et al. (2022) examines the impact on emotions through an affective tutoring system that features a virtual emotional agent capable of interacting with users and documenting emotional occurrences in a database. The research findings indicate that the proposed Affective Mobile Language Tutoring System interaction design markedly enhances learner engagement and performance. In the emotional feedback analysis and learning process, AMLTS facilitated students' comprehension of the material and promoted peer engagement while fostering pleasant feelings. The research by Ismail and Hastings (2023) developed an emotionally adaptive intelligent tutoring system that identifies foreign language fear and delivers suitable interventions as

required. The results shown are derived from the data presently available prior to contrasting the adaptive method with static feedback systems.

2. Method

Quantitative data about speaking proficiency and emotional engagement were collected using an experimental design and a self-report questionnaire on student engagement. The quantitative design included a 6-week intervention for undergraduate EFL students at ENS Laghouat. The experiment comprises a pre-test and a post-test. Participants (N=40) were chosen through convenience sampling and allocated into a control group (CG=20) and an experimental group (EG=20). We utilized this sample method to get data from easily accessible participants enrolled in the speaking classroom.

Participants in EG were exposed to three tasks based on AI-generated tutor, namely ELSA, during the pre-test to examine the effect on their speaking proficiency and emotional engagement while CG received teacher feedback and instructions. ELSA is an advanced AI-powered application that leverages modern technologies, such as Automatic Speech Recognition (ASR), machine learning, and natural language processing (NLP) to assess and enhance foreign language (EFL) pronunciation and speaking skill. It is designed to provide personalized feedback on pronunciation, fluency, and overall speech quality, in real time, and help users improve their English-speaking abilities.

The AI Tutor “*ELSA*” provided varied sympathetic feedback based on students' responses. For instance:

Student 1 Output : *“I... I wanted to study... um... at the... at the college next year”*

Empathy-Driven AI Feedback :

You are performing admirably, proceed at your own pace ; it is customary to hesitate when conversing in a foreign language. I observed that you employed 'next year' in conjunction with 'wanted to study.' To discuss future intentions, one can state : *'I aspire to enroll in college next year.'* Let us attempt it collaboratively: *'I aspire to enroll in the college next year.'* Excellent endeavor!

Your pronunciation of 'next year' is distinct !

Student 2 Output : *“I am uncertain... I find it Challenging”*

Empathy-Driven AI Feedback :

It appears you are experiencing some uncertainty; this is very OK ; many students experience that sentiment first. Your efforts are commendable. Let us formulate it into separate phases. Could you provide a singular, straightforward rationale for the difficulty experienced? Take your time ; I am available to assist you.

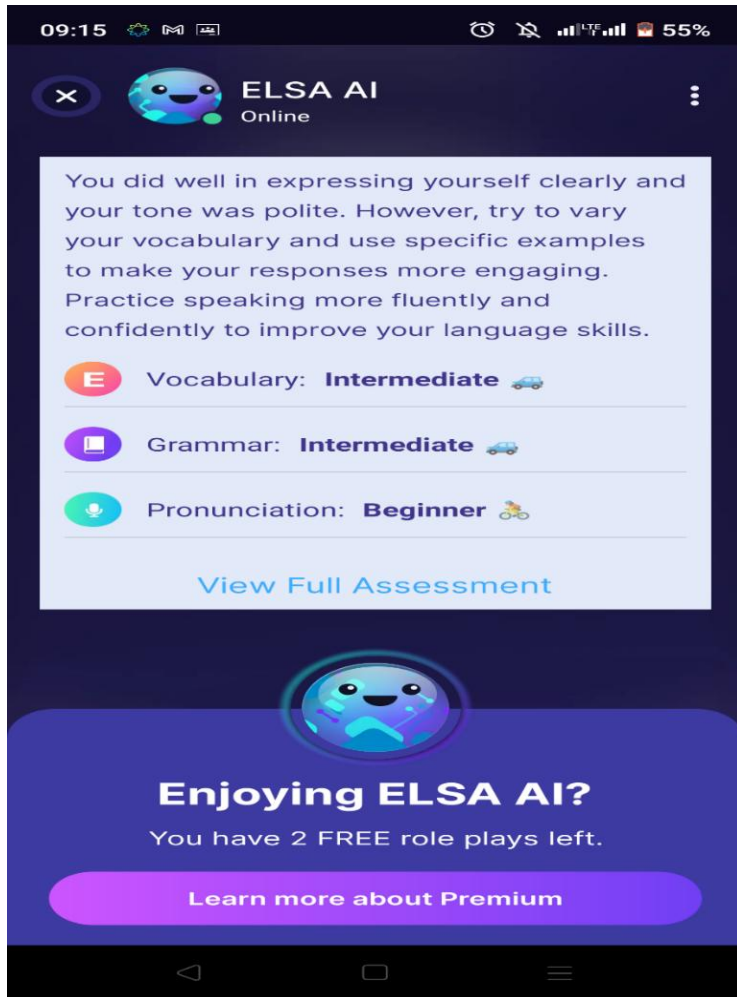


Figure 2. Empathy Feedback provided by the AI tutor

Prior to the intervention, all participants completed a speaking pre-test to assess their competence level and received a self-report questionnaire regarding their emotional engagement. Over the course of six weeks, participants interacted with structured speech cues and exercises facilitated by the researcher, while EG was introduced to the AI Tutor. Upon concluding these sessions, all groups administered a post-test and post-treatment questionnaire in week 6. The study procedure is illustrated in the above figure 2. The objective of this final assessment was to ascertain if exposure to AI-based activities had improved students' speaking proficiency and emotional engagement.

The Foreign Language Engagement Scale was adapted from (Guo & Wang, 2024). It was disseminated to both groups prior to and subsequent to the therapy.

Empathy-based Tutoring with Generative AI for Personalized Support in EFL Speaking Classrooms

The major purpose was to assess students' emotional regulation throughout the experimental sessions prior to and following the utilization of the AI-based empathy tutor. The questionnaire comprised 15 statements, with a scoring scale from strongly agree (5) to strongly disagree (1).

3. Results

3.1 Speaking performance

An independent t-test was conducted on three speaking tasks to assess the speaking proficiency of CG and EG students before and after the test. Table 1 shows that there were no big variations in speaking performance ($t = -0.904$; $p = 0.368$) between the groups. This means that both groups had the same level of speaking proficiency before the treatment.

Table 1. Results of independent t-test on Speaking score for students

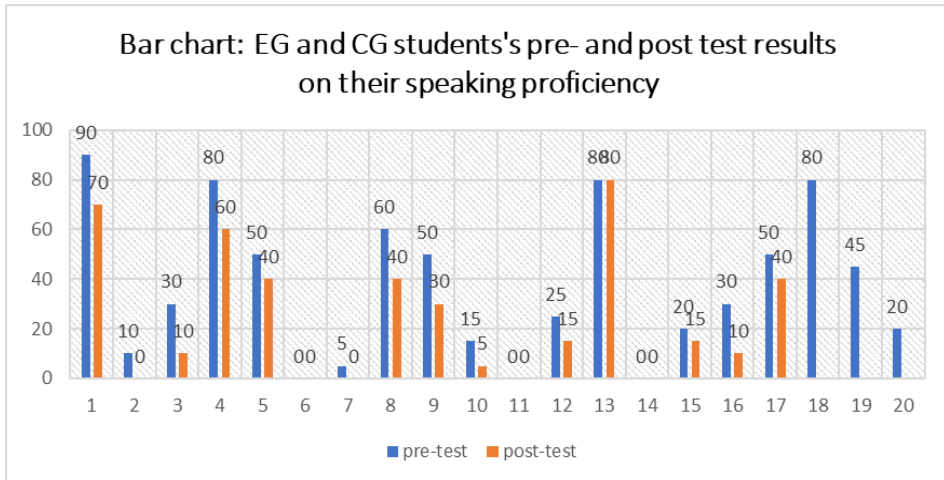
Pretest	Levene's test for equality of variances		t-test for equality of Means				
	F	Sig	T	Df	Sig (2 tailed)	Mean differen ce	Std.error difference
Equal variance assumed	0.083	.368	- .904	38	.368	-	2.30559
Equal variances not assumed			- .904	37.5	.368	- 2.08333	2.30559

Furthermore, subsequent to the use of the AI tutor, a paired sample t-test was conducted to assess the speaking scores inside the group following the treatment. Table 2 illustrates that the CG (speaking proficiency: $t(39) = 5.802$; $p < .005$; $r = 0.943$) and EG (speaking proficiency: $t(39) = -29.636$; $p < .005$; $r = 0.025$) exhibited a significant change in speaking performance from the pre-test to the post-test for the EG, along with varying effect sizes. This outcome demonstrates that AI-driven empathy feedback significantly influenced speaking performance.

Table 2. Results of Paired Sample t-test for students speaking proficiency

	M	Std	Correlation	T	Df	Sig
CG pretest- posttest	-1.83	4.21	0.943	5.802	39	0.001
EG pretest- posttest	-55.76	14.57	0.025	-29.636	39	0.000

The Bar chart below represents the results of the pre-test and post-test, which show the percentage of students' mother tongue use, fluency, and pronunciation. According to these findings, it is noted that there is a considerable difference between the two highlighted results.



Bar chart 1. Pre- and post-test Results on Speaking Proficiency

3.2 Students Emotional Engagement

The post-test questionnaire was conducted to assess whether participants in both groups significantly improved their emotional support following the empathy offered by both the teacher and the AI tool, thereby addressing the second study question. Cronbach's Alpha was utilized to assess the internal consistency of the questionnaire items, resulting in $\alpha = .852$, indicative of excellent internal consistency. The descriptive data for students' emotional engagement in the pre-test and post-test are presented as follows. The mean score for the CG is $M = 14.36$ with $Std = 7.36$, whereas for the EG, the mean is $M = 16.28$ and $Std = 5.33$ for the pre-test. The post-test scores yielded a mean of $M = 15.53$ and $Std = 6.35$ for the CG, whereas the EG exhibited a mean score of $M = 23.88$ and $Std = 4.23$.

An independent t-test indicated no significant differences between the EG and the CG ($t = -12.05$, $df = 38$, $p = 0.26$), implying that both groups demonstrated similar levels of emotional engagement. Additionally, following the implementation of AI-based empathy feedback, a paired sample t-test was performed to evaluate emotional engagement within the group after treatment. The findings indicate that the EG demonstrated a significant change in emotional engagement ($t(19) = 34.25$; $p < .001$; $r = 0.512$), while the CG also exhibited a

notable change ($t(19) = 29.13$; $p < .001$; $r = 0.63$) from pre-test to post-test, with the EG showing a substantial effect size of $r > 0.5$. The findings presented in Table 3 indicates that AI-driven empathy feedback had a significant impact on emotional engagement.

Table 3. Results of Paired Sample t-test for Students' Emotional Engagement

	M	Std	Correlation	T	df	Sig
CG pretest-posttest	-1.52	3.23	0.512	34.25	19	0.000
EG pretest-posttest	-15.57	6.37	0.631	29.13	19	0.000

4. Discussion

Based on the results above, it can be said that some students had very low grades, some had low average scores, and only a few had high grades before they started using AI tutors. The bar chart in the results section shows that majority of the students utilize their mother tongue a lot. For example, student No. 01 (90%), student No. 04 (80%), and student No. 13 (50%). But the changes are clear in the post-test scores of most of the students. For example, student number 3 went from 10% to 0%, student number 8 went from 60% to 40%, and student No. 20 went from 50% to 10%. However, student number 19 showed no progress, with 80% on both the pre-test and post-test.

There could be a lot of reasons for this, such as the fact that he/she doesn't know many words or speak very well, which means they need more practice time to see any kind of progress. In addition to not being afraid to talk to the AI instructor in English, he or she swiftly switched to his/her native language when he/she couldn't find the correct words in English. This finding aligns with the studies conducted by Chen et al. (2019), Akhmetova et al. (2025), and Jeon et al. (2022), which confirm that regular interaction with the AI-generated tool leads to a decrease in the usage of the mother tongue and adds to the enhancement of students' speaking proficiency.

On the other hand, the self-report sought to assess the emotional support obtained by students prior to their exposure to the AI tutor. The findings indicate that AI tools facilitated student participation in classroom interactions, tailored feedback, and enhancements in academic achievement and emotional involvement. The results show that the AI-generated exercises helped students improve their speaking abilities and emotional involvement. A lot of students got really high marks after doing the tasks, which shows that they became better.

Some students had only moderate progress, which may have been because the program was brief and didn't give them enough time to really develop, while others exhibited clear advances. Usually, the students who became better the most were the ones who followed the directions closely and used the cues that were given to them.

The results show that not all individuals made the same amount of progress. For example, student N°. 9 only progressed a little better. The researcher observed that this student appeared less motivated to acquire a new language and primarily participated in activities to maintain social alignment with peers. He/she also used his/her first language, Arabic, a lot. He/she did, however, demonstrate a small improvement in grammar, which could be because they paid attention to how the AI tutor employed prepositions and verb forms. The students who tried to speak English, even when they had trouble with vocabulary, and those who didn't use their first language showed the biggest development. Students who previously had a good speaking level but weren't extremely active or interested, like student No. 7, also made a lot of progress after talking to an AI tutor. A lot of them learned to talk with more confidence. These findings are consistent with the research conducted by Wu et al. (2022) and Ismail and Hastings (2023), indicating that AI tutors may provide a less stressful alternative to conventional speaking classes and a more conducive environment for practice. Furthermore, the potential of AI-driven activities to facilitate and enrich language acquisition in significant ways is evident.

The findings also align with those of D'Angelo et al. (2022) and Shih et al. (2022), demonstrating that the incorporation of AI tutors in speaking sessions positively influence speaking proficiency and emotional engagement. They propose that the utilization of AI tools facilitated an increase in students' confidence, by alleviating shyness and anxiety. Furthermore, these AI tools may replicate various social interactions and emotional states, providing personalized and adaptive learning experiences that correspond to the specific needs of learners. Further, empathetic AI teachers replicate social presence by providing tailored, emotionally immediate feedback, enhancing student engagement. These findings correspond with those of Jamalluddin and Mohtar (2025) and Gao et al. (2024), as well as Chang et al. (2024), suggesting that empathetic AI interactions are engineered to enhance learners' interest and motivation, thereby positively influencing speaking proficiency, including fluency and pronunciation, as well as emotional states through engagement with an empathy-driven generative AI tutor that recognizes emotions and provides empathetic feedback.

Conclusion

This study yielded empirical data regarding the utilization of AI tutor empathy feedback to enhance speaking proficiency and emotional engagement

among EFL students. We have shown that most EFL students have positive experiences using AI tutor feedback and prefer it to just corrective feedback when speaking. The AI tutor offered assistance by employing an emotive tone and assessing emotional readiness. We offer a number of implications to improve the current practice. This research showed that employing AI tutor empathy for feedback is an effective strategy that improves students' speaking abilities and emotional involvement. A series of significant consequences can be articulated for both the Algerian setting and global situations. It is crucial to examine how EFL teachers integrate teacher empathy with AI tutor empathy to enhance students' self-confidence, emotional responses, and alleviate speaking anxiety through a comparative empirical study. They ought to provide students with additional assessment and feedback possibilities, such as employing sentiment analysis to facilitate individualized feedback. Future research may investigate the influence of AI-driven instructors on reducing students' cognitive burden in transdisciplinary contexts.

This study had various limitations that hindered the attainment of optimal outcomes. The time limitations encountered by the researcher during the execution of experimental activities curtailed students' abilities to thoroughly engage with AI tools in speaking classes. Moreover, a significant drawback was the researcher's lack of access to a varied array of research resources, attributable to the novelty of incorporating AI tools in speaking sessions. Implementing the study in an EFL classroom environment posed difficulties in guaranteeing that all students possessed a mobile phone or internet access, resulting in numerous issues that adversely impacted the study's results. Furthermore, numerous students exhibited an excessive dependence on their native language.

References

- Akhmetova, A. I., Sovetkanova, D. M., Komekbayeva, L. K., Abdrakhmanov, A. E., Yessenuly, D., & Serikova, O. S. (2025). A systematic review of artificial intelligence in high school STEM education research. *Eurasia Journal of Mathematics, Science and Technology Education*, 21(4), em2623. <https://doi.org/10.29333/ejmste/16222>
- Chang, C. Y., Wang, P. L., Li, C. J., & Hwang, G. J. (2024). From empathy to quality long-term care: a generative AI-based art therapy approach based on the self-directed learning model. *Interactive Learning Environments*, 33(5), 3333–3353. <https://doi.org/10.1080/10494820.2024.2443072>
- Chen, Z., Wei, W., & Zou, D. (2025). Generative AI technology and language learning: global language learners' responses to ChatGPT videos in social media. *Interactive Learning Environments*, 1–14. <https://doi.org/10.1080/10494820.2025.2511248>

- D'Angelo, S., McMahan, R., & Van Buren, H. (2022). Chatbots in education: Exploring the role of AI in enhancing student learning and empathy. *Journal of Educational Technology Systems*, 51(2), 226-245. <https://doi.org/10.1177/00472395221108430>
- Davoodifard, M., & Eskin, D. (2024). Exploring the Role of Generative AI in Second Language Education: Insights for Instruction, Learning, and Assessment. *Studies in Applied Linguistics and TESOL*. 24 (1), 21-23. <https://doi.org/10.52214/salt.v24i1.12863>
- D'Mello, S. K., & Graesser, A. C. (2015). Feeling, thinking, and computing with affect-aware learning technologies. In R. A. Calvo, S. K. D'Mello, J. Gratch, & A. Kappas (Eds.), *The Oxford handbook of affective computing* (pp. 419–434). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780199942237.013.032>
- Falk, H., Kretschmar, R., & Timmers, M. (2020). Virtual reality for empathy training: A meta-analysis of recent advances. *Virtual Reality*, 24(3), 347-359. <https://doi.org/10.1007/s10055-020-004231>
- Gao, X., Wu, H., & Lin, L. (2022). Personalized learning with AI: How adaptive systems are transforming education. *Educational Technology & Society*, 25(1), 52-65. <https://doi.org/10.2307/45252930>
- Gao, L., López-Pérez, M., Melero-Polo, I., & Andreea Trifu. (2024). Ask ChatGPT first! Transforming learning experiences in the age of artificial intelligence. *Studies in Higher Education*, 1–25. <http://doi.org/10.1080/03075079.2024.2323571>
- Goldstein, T. (2016). Role-playing and empathy in education: A practical guide. *Teaching and Learning Journal*, 11(4), 142-155.
- Guo, H., Sun, Y., Wang, X., et al. (2022). Spatial Distribution Characteristics and Source Analysis of Heavy Metals in County Urban Soil. *Journal of Environmental Science*, 42, 287-297
- Guo, K., Zhong, Y., Li, D., & Chu, S. (2023). Effects of chatbot-assisted in-class debates on students' argumentation skills and task motivation. *Comput Educ*, 203, 104862. <https://doi.org/10.1016/j.compedu.2023.104862>.
- Guo, Y., & Wang, Y. (2024). Exploring the Effects of Artificial Intelligence Application on EFL Students' Academic Engagement and Emotional Experiences: A Mixed-Methods Study. *European Journal of Education Research, Development and Policy*, 60 (1), e12812. <https://doi.org/10.1111/ejed.12812>
- Ismail, D., & Hastings, P. (2023). Emotionally Adaptive Intelligent Tutoring System to Reduce Foreign Language Anxiety. In: Wang, N., Rebolledo-Mendez, G., Dimitrova, V., Matsuda, N., Santos, O.C. (eds) *Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky*. AIED

2023. *Communications in Computer and Information Science*, vol 1831. Springer, Cham. https://doi.org/10.1007/978-3-031-36336-8_55
- Jamaluddin, N. S., & Mokhtar, M. (2025). Teaching Empathy: How AI Can Support the Development of Soft Skills in Education. *International Journal of Academic Research in Business and Social Sciences*, 15(3), 704–713. <http://dx.doi.org/10.6007/IJARBSS/v15-i3/24469>
- Jeon, I., Kang, S. J., & Kang, S. (2024). A staged framework for computer vision education: Integrating AI, data science, and computational thinking. *Applied Sciences*, 14(21), 9792. <https://doi.org/10.3390/app14219792>
- Jiang, M., Zhao, Q., Li, J. Q., Wang, F., et al. (2024). *A Generic Review of Integrating Artificial Intelligence in Cognitive Behavioral Therapy*.
- Krashen, S. (1982). *Principles and practice in second language acquisition*. Prentice-Hall International.
- Law, L. (2024). Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review, *Computers and Education Open*, 6, 100174, <https://doi.org/10.1016/j.caeo.2024.100174>
- Lin, W., Zhang, D., Tao, Q., Shi, D., Haffari, G., Wu, Q., He, M., & Ge, Z. (2023). Medical visual question answering: A survey, *Artificial Intelligence in Medicine*, 143, 102611, <https://doi.org/10.1016/j.artmed.2023.102611>
- Mastorodimos, D., & Chatzichristofis, S. A. (2019). Studying affective tutoring Systems for Mathematical Concepts. *J. Educ. Technol. Syst.* 48, 14–50. <https://doi.org/10.1177/0047239519859857>
- Moorhouse, B. L., & Wong, K. M. (2025). *Generative Artificial Intelligence and Language Teaching*. Cambridge: Cambridge University Press.
- Shi, H., Chai, C.H. Zhou, S., & Aubrey, S., (2025). Comparing the effects of ChatGPT and automated writing evaluation on students' writing and ideal L2 writing self, *Computer Assisted Language Learning*, <https://doi.org/10.1080/09588221.2025.2454541>
- Siyan, L., Teresa, S., Yu, Z., & Hirschberg, J. (2024). Using Adaptive Empathetic Responses for Teaching English. *Proceedings of the 19th Workshop on Innovative Use of NLP for Building Educational Applications*, 34–53. <https://doi.org/10.48550/arXiv.2404.13764>
- Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Wiley.
- Toboula, Z., & Martinien, C. (2023). Exploring the impact of AI-Powered collaborative and interactive NLP apps on EFL teaching in the post-Covid-19 era. https://papersssrn.com/sol3/papers.cfm?abstract_id=4398817
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, MA: Harvard University Press. <https://doi.org/10.2307/j.ctvjf9vz4>

- Wang, C.-H., & Lin, H.-C. K. (2018). Constructing an affective tutoring system for designing course learning and evaluation. *J. Educ. Comput. Res.* 55, 1111–1128. <https://doi.org/10.1177/0735633117699955>
- Wang, Y., & Xue, L. (2024). Using AI-Driven Chatbots to Foster Chinese EFL Students' Academic Engagement: An Intervention Study. *Computers in Human Behavior*, 159, 108353. <https://doi.org/10.1016/j.chb.2024.108353>
- Wang, Y., Zhang, T., Yao, L., & Seedhouse, P. (2025). A scoping review of empirical studies on generative artificial intelligence in language education. *Innovation in Language Learning and Teaching*, 1–28. <https://doi.org/10.1080/17501229.2025.2509759>
- Weng, Z. & Fu, Y. (2025). Generative AI in language education: Bridging divide and fostering inclusivity. *International Journal of Technology in Education (IJTE)*, 8(2), 395-420. <https://doi.org/10.46328/ijte.1056>
- Wu, C.H., Lin, H.K., Wang, T., Huang, T., & Huang, W. (2022). Affective mobile language tutoring system for supporting language learning. *Frontiers in Psychology*, 13, 833327. <https://doi.org/10.3389/fpsyg.2022.833327>
- Xin, Z., & Derakhshan, A. (2025). From excitement to anxiety: Exploring English as a foreign language learners' emotional experience in the artificial intelligence-powered classrooms. *European Journal of Education*, 60(1), e12845. <https://doi.org/10.1111/ejed.12845>
- Yang, L., Holtz, D., Jaffe, S. *et al.* The effects of remote work on collaboration among information workers. *Nat Hum Behav* 6, 43–54 (2022). <https://doi.org/10.1038/s41562-021-01196-4>
- Zou B., Reinders H., Thomas., M., & Barr., D (2023). Editorial: Using artificial intelligence technology for language learning. *Front. Psychol.* 14, 1287667. <https://doi.org/10.3389/fpsyg.2023.1287667>

Appendix A

Pre and Post-Test Speaking Task

Task one:

A. What do you observe in the Picture:

This assignment was very good at testing how well students could explain visual information. Students demonstrated their proficiency in vocabulary and grammatical structures by describing an image with words such as "There is/are," "In the picture, I can see," and "At the top/bottom of the picture."

B. Read the Text:

The researcher could check how well learners could pronounce vowels, consonants, and words by having them read a passage out loud. This also tested their ability to link words, handle pauses, and keep a steady pace.

1. A Day at the Beach



I can't wait to spend a day at the beach, especially when it's nice and bright. I prefer to bring a towel, some sunscreen, and maybe some food and a drink with me. When I get to the beach, I locate a decent place to put my towel down and enjoy the warm sand on my feet. I really like the sound of the waves breaking on the beach. It makes me feel relaxed. I like to swim in the ocean sometimes because it feels good and cool. Sometimes, I just sit back and relax, read a book, or watch folks play games in the sand. Being near the sea makes me feel calm and cheerful at the end of the day.



2. My Favorite Meal

Pizza is my favorite food, and I could eat it virtually every day! The melted cheese and acidic tomato sauce make a great combo that I enjoy. I like to put my favorite toppings on my pizza, such mushrooms, olives, and sometimes a little

pepperoni. Pizza is a food that everyone likes, therefore it's always nice to eat with family or friends.