

EXPLORING THE PSYCHOLOGICAL IMPACTS OF GOOGLE ASSISTANT UTILIZATION FOR EFL STUDENTS: A CASE STUDY

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ABSTRACT

In digital era, technology has become increasingly integrated into the language learning process offering new approaches to address challenges in learning English among EFL students. A recent technological advancement involves the implementation of virtual assistants, such as Google Assistant, as interactive pronunciation coaches for learning speaking. So, this study tries to investigate the psychological impact of using Google Assistant concerning with student's autonomy, competence, and relatedness as a learning aid among EFL students within the framework of Self-Determination Theory (SDT). A mixed methods approach was used, involving a quantitative survey and qualitative interviews among Students. The questionnaire was adapted from established model of SDT. The results showed that Google Assistant as a learning aid has significantly influenced students' autonomy, competence, and relatedness in terms of students' pronunciation, confidence, motivation, and reducing anxiety. These findings implied that integrating voice-based AI aids can be beneficial for learning speaking such as pronunciation instruction, especially for learners with high anxiety or low confidence. To conclude, Google Assistant can serve as an effective interactive pronunciation coach in learning speaking.

Keywords: Google Assistant, AI-powered learning, Autonomy, Psychological needs.

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INTRODUCTION

In the field of English as a Foreign Language (EFL) learning, psychology plays a central role in understanding the mental, emotional, and behavioral processes that shape how students acquire and refine their language skills (Yin, 2021). Among the various psychological factors, motivation is widely recognized as one of the most influential, since it determines not only the level

of learners' engagement but also their persistence in overcoming the challenges of mastering a foreign language. A motivated learner is more likely to practice consistently, take risks in communication, and embrace opportunities for self-improvement. To foster this motivation in modern classrooms, the integration of technology has become increasingly essential. Artificial Intelligence (AI), as one of the most rapidly advancing technologies in education, provides unique opportunities to enhance language learning experiences. Google Assistant, for example, is an AI-powered virtual assistant capable of two-way communication that offers students a supportive and low-pressure environment in which to practice English. By reducing the fear of judgment often associated with face-to-face interaction, it encourages learners to engage more freely and independently, thereby strengthening their intrinsic motivation.

The adoption of AI for language learning, particularly in pronunciation training, directly addresses psychological needs that influence motivation and self-efficacy (Vistorte et al., 2024; Shen & Cui, 2024). Unlike traditional methods, AI-driven tools provide interactive and personalized experiences that align closely with Self-Determination Theory (SDT) developed by Deci and Ryan (1985). SDT emphasizes three essential psychological components—autonomy, competence, and relatedness—which serve as the foundation for motivation and personal growth in learning contexts. Within EFL settings, autonomy empowers students to take charge of their learning, competence ensures they feel capable of achieving progress through effective feedback and structured practice, and relatedness creates a sense of emotional connection and belonging, whether with peers, teachers, or even AI systems simulating social interactions. Together, these needs form the basis of sustained motivation and engagement, which are critical for mastering pronunciation, fluency, speech clarity, and the personalization of language use.

Recent studies demonstrate that integrating AI into EFL learning environments does not merely enhance linguistic outcomes such as pronunciation accuracy or fluency, but also positively influences learners' psychological well-being. For example, by supporting autonomy, AI tools allow students to practice anytime and anywhere, fostering independence and reducing reliance on teachers (Jianfeng et al., 2018; Alrabai, 2021). Through competence, learners benefit from instant feedback and tailored exercises that strengthen their self-confidence, reduce anxiety, and build persistence (Zhang, 2021; Yang & Duan, 2023). Relatedness, meanwhile, is enhanced by creating meaningful interactions—whether through peers, teachers, or AI—that reduce feelings of isolation and cultivate a sense of belonging (X. Zhang, 2021; M. Zhang, 2021; Qiao & Zhao, 2023). For shy or anxious learners in particular, practicing with AI-powered assistants like Google Assistant provides a private, judgment-free environment where they can experiment with speaking without the fear of embarrassment (Alharthi, 2024).

In contrast to traditional face-to-face methods, which are limited by time and often generate pressure due to immediate teacher feedback, AI-powered systems allow students to learn flexibly, adaptively, and comfortably. Tools such as Google Assistant not only correct mispronunciations in real time but also

simulate authentic conversations, exposing learners to natural language use and improving listening comprehension (Chen et al., 2020). This makes AI a highly relevant tool, especially in regions like Indonesia where Android devices dominate, making Google Assistant widely accessible. Studies further indicate that such AI technologies improve willingness to communicate (WTC), increase learners' confidence, and lower speaking anxiety by creating playful, interactive, and non-threatening contexts for practice (Tai & Chen, 2020; Zou et al., 2023). Although research has highlighted the linguistic benefits of AI integration, the psychological dimensions—particularly how tools like Google Assistant support autonomy, competence, and relatedness—remain less explored, yet they are critical to understanding how motivation is shaped in EFL contexts.

Against this background, English learning is understood as a holistic process encompassing listening, speaking, reading, and writing skills, all of which require consistent motivation and practice. Listening develops comprehension of spoken input, speaking builds communicative confidence, reading expands vocabulary and understanding, and writing sharpens accuracy and expression. AI tools support these areas in complementary ways but have shown particular promise in enhancing speaking, where anxiety, fear of mistakes, and lack of confidence often serve as barriers. By enabling learners to practice freely, receive instant feedback, and experience less threatening interactional settings, Google Assistant helps them develop the psychological resilience and motivation necessary to progress. Consequently, the integration of AI technologies not only facilitates language acquisition but also fosters the fulfillment of key psychological needs. This makes it possible to cultivate learners who are autonomous, competent, and socially connected, ensuring that they are more motivated, engaged, and capable of achieving proficiency. Therefore, this study seeks to address a critical question: *How does the use of Google Assistant influence EFL students' psychological needs in learning English?*

METHOD

For data collection, we used quantitative and qualitative approaches that were researcher-made. In the first, this research collects quantitative data approaches by evaluating the questionnaires. The second, conducted the qualitative data approaches by interviews to explain unclear or uncommon questionnaire findings. This research uses an explanatory sequential mixed methods design that combines quantitative and qualitative data approaches to explore the participants' perspectives (Creswell, 2018). This study obtained data from respondents who had already used Google Assistant and learned English in Jakarta, Indonesia. The total number of respondents was around 105 respondents involving 91 females and 14 male. 42 respondents aged between 14-20 years, 63 respondents aged over 21 years. The instruments used are Open-Ended and Closed-Ended questions. The questionnaire was distributed from April until May, 2025 by using Google Form. To analyse the data, the research used the likert scale like Nguyen & Dinh (2019) as the survey instruments. For the data analysis used mean and standard deviation to describe quantitative data, and thematic analysis to condense, presents to describe qualitative data (Angeles & Delhi, 2008). The five respondents

were selected to complement the survey data on their experiences and impressions of using Google Assistant as an independent learning.

FINDING AND DISCUSSION

This research uses a 1-5 Likert scale through Google Form, starting from Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), Strongly Agree (SA). Of the 59% participants answered that they had been learning English for more than 10 years and 96.2% answered that they had used Google Assistant. Then 77.1% answered that they had used Google Assistant as a tool to practice Speaking, Listening, Writing for English learning. From 50.5% participants chose to use Google Assistant several times a week to learn English.

Table 1. Students' perspective on their Autonomy, Competence, Relatedness

No.	Statements	SD	D	N	A	SA	Mean	STD
1	I feel motivated to use Google Assistant as part of learning English.	0	6.8	23.2	48.5	21.4	3.89	0.85
2	Google Assistant increases my motivation to learn English.	0	8.7	21.4	43.7	26.2	3.92	0.91
3	When I use Google Assistant, it helps a lot to improve my English skills.	0	2.9	16.5	44.7	35.9	4.17	0.79
4	I think Google Assistant is an effective tool for developing my English skills.	0	7.8	11.7	41.7	38.8	4.15	0.9
5	I feel comfortable using Google Assistant as an English learning tool.	1	5.8	15.5	45.6	32	4.06	0.9
6	I would rather practice English pronunciation with Google Assistant than practicing with friends or teachers.	5	25.2	13.6	27.2	29.1	3.56	1.29
7	I feel Google Assistant is relevant to my English learning needs/goals.	1	3.9	19.4	40.8	35	4.08	0.89
8	Google Assistant makes learning English more fun and motivating.	0	7.8	16.5	47.6	28.2	4	0.88
9	Google Assistant helps me feel more relaxed when practicing speaking in English.	1.9	3.9	12.6	54.4	27.2	4.05	0.86
10	I feel more confident when practicing English with Google Assistant compared to other methods.	0	11.7	22.3	39.8	26.2	3.85	0.97
11	Using Google Assistant reduces	1	5.8	16.5	40.8	35.9	4.08	0.92

	my anxiety when learning English.							
12	Google Assistant allows me to learn English without feeling overseen or judged.	1.9	6.8	4.9	46.6	39.8	4.19	0.93
13	I feel that Google Assistant provides a learning experience that makes me feel like I am interacting with a tutor or friend.	1.9	8.7	16.5	44.7	28.2	3.93	0.99

The mean ranges from 3.56 to 4.19 which means that respondents generally ‘tend to agree’ with the statement about using Google Assistant in English language learning. Most of the standard deviations are <1 which indicates that respondents’ answers are relatively consistent. Then, the findings based on standard deviation (STD) are mostly small at <0.99 which indicates that respondents have relatively uniform and stable perceptions.

Statement point 6 ‘I prefer practicing English pronunciation with Google Assistant rather than practicing with friends or teachers’ has a mean value of 3.56 and the highest standard deviation of 1.29 compared to other items. The mean value indicates that respondents generally tend to agree with this statement. However, the high standard deviation indicates that there is considerable diversity of opinion among respondents.

Some students feel more comfortable practicing independently using technology, while others prefer direct interaction with humans such as friends or teachers. This shows that EFL students’ learning preferences towards using Google Assistant for pronunciation vary widely.

This can be related to the perception that despite the rapid development of AI-based technologies such as Google Assistant, there is still a social preference for human interaction in the learning process. Moreover, this disapproval could also reflect a concern or resistance to the dominance of AI in various aspects of life, including education, amidst the common narrative of AI replacing humans in various job sectors. In conclusion, point 6 contributes to distinguishing students’ views and inclinations and can serve as a reference for a better and more flexible approach to English language learning.

Table 2. Students’ perspective on their Autonomy

No.	Statements	SD	D	N	A	SA	Mean	STD
1	I feel motivated to use Google Assistant as part of learning English.	0	6.8	23.2	48.5	21.4	3.89	0.85
6	I would rather practice English pronunciation with Google Assistant than practicing with friends or teachers.	5	25.2	13.6	27.2	29.1	3.56	1.29

12	Google Assistant allows me to learn English without feeling overseen or judged.	1.9	6.8	4.9	46.6	39.8	4.19	0.93
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Point 1 about increasing motivation to learn English using Google Assistant shows a mean of 3.89 which means 'tend to agree' and a standard deviation of 0.85 which is in the low dispersion category which means respondents' responses are 'relatively consistent.' Many students are motivated to use Google Assistant as part of their learning. This supports 'Autonomy' in that students feel they have control over how they learn. Respondent G stated “Yes, it helps. I usually use it at night, so I often dialogue about my daily life that day.” because they unconsciously learn to speak with Google Assistant. Then respondent C “I use Google Assistant to learn new vocabulary. For example, I can ask for word definitions or example sentences, which enriches my understanding of the use of words in context.” Respondents expressed that using Google Assistant motivated them to practice English regularly. They demonstrated autonomy by initiating learning activities such as practicing speaking, learning new vocabulary, and integrating English use into daily routines. This self-directed engagement highlights their control over the learning process, aligning with the concept of learner autonomy. Supporting Hong & Guo's (2025) findings that the theoretical potential of AI-enhanced environments to improve EFL learning outcomes and underscore the practical importance of integrating AI interventions in language education to enhance motivation, manage cognitive load, and foster learner autonomy.

On the other hand, in point 6 the preference for practicing pronunciation with Google Assistant rather than a friend or teacher shows a mean of 3.56 which is 'neutral to agree' with a standard deviation of 1.29 which is 'high dispersion'. Respondents were divided as some were more comfortable with AI, but others still preferred practicing directly with humans. This suggests that while technology provides the option of 'autonomy' for learning this doesn't mean students are directly replacing social practice. However, this difference in view could be influenced by individuals' comfort with technology and confidence communicating directly with humans. Supported by respondent A “Yes, I am more courageous to ask questions. However, when it comes to confidence in dialoguing with English, I feel more comfortable talking directly with friends than AI.” Then, respondent F stated, “I feel more helped in terms of grammar when dialoguing with Google Assistant because I feel the grammar given is more correct than my friends who are both still learning.” The responses reflect mixed preferences regarding using Google Assistant vs practicing with humans. Some students appreciated the Assistant for its accuracy and lack of judgment that made them feel at ease. Others felt more comfortable and confident when practicing with peers. This indicates that while Google Assistant offers an autonomous tool for learning, it doesn't fully replace the value of social interaction in language practice. Supporting the research by Sari & Kurniawan (2025) explored students' perceptions of AI speech recognition in pronunciation practice. The study found that while AI tools like Google Read

Along offer beneficial pronunciation practice, some students still prefer human interaction for more personalized feedback.

Learning without feeling overseen or judged point 12 with a mean of 4.19 means agree strongly and a standard deviation of 0.93 which is consistent. Supported by the conversation during the interview mentioned by respondent A “Google Assistant is quite helpful for me to learn grammar and speaking. I like to chat using English, as well as practicing sentence structure. It's also good for pronunciation, because if he doesn't understand, it means I have to improve the way I speak. Even though it's not as detailed as the teacher, chatting with the Assistant makes me more courageous in speaking English.” Respondent D stated “I practiced my speaking using Google Assistant. It was as if I was calling Google Assistant. It was fun because I could speak English fluently even though there was confusion about choosing vocabs. However, Assistant can still understand what I mean so I don't have to be shy when speaking English. This way, slowly but surely, my speaking will improve.” Respondents indicated that using Google Assistant made them feel more confident and less anxious when practicing English. The freedom of judgment allowed them to speak more freely and take risks without fear of making mistakes. This supportive environment encouraged gradual improvement in speaking skills and helped reduce feelings of shyness or lack of confidence. Tai & Chen's (2020) examined EFL learners involved in Google Assistant language learning and found that the use of AI tools like Google Assistant can reduce speech anxiety and enhance user engagement in second language learning for teenagers.

Overall, the aspect of “autonomy” is sufficiently fulfilled used Google Assistant. The mean value of the three points is close to or above 4 which indicates positive. Google Assistant provides a sense of security and control in learning which strengthens the autonomous learning environment.

Table 3. Students' perspective on their Competence

No.	Statements	SD	D	N	A	SA	Mean	STD
3	When I use Google Assistant, it helps a lot to improve my English skills.	0	2.9	16.5	44.7	35.9	4.17	0.79
4	I think Google Assistant is an effective tool for developing my English skills.	0	7.8	11.7	41.7	38.8	4.15	0.9
7	I feel Google Assistant is relevant to my English learning needs/goals.	1	3.9	19.4	40.8	35	4.08	0.89
9	Google Assistant helps me feel more relaxed when practicing speaking in English.	1.9	3.9	12.6	54.4	27.2	4.05	0.86
10	I feel more confident when practicing English with Google Assistant compared to other	0	11.7	22.3	39.8	26.2	3.85	0.97

methods.

Perceptions of the general improvement of English language skills in point 3 with mean 4.17 means high, which indicates that many participants feel helped by Google Assistant. The low standard deviation is 0.79 indicating a relatively similar perception. Google Assistant is considered effective in improving English language skills and students' confidence in their competency progress is quite significant. Respondent D "Using Google Assistant helps improve some of my English skills, especially in speaking and vocabulary. Because I often talk to GA, I'm more accustomed to saying English words and more confident in speaking. Then, because sometimes I have to find simpler words or sentences that it understands, I automatically increase my vocabulary too. Grammar is also sharpened a little bit, because I learn to put together the right sentences so it can understand what I mean. So, without realizing that, I'm practicing all three at once: speaking, vocab, and grammar." So the effectiveness GA is relevant with the study of Fathi et al. (2025) that effective techniques for integrating IPAs (Intelligent Personal Assistant) into EFL speaking courses to enhance IELTS speaking test marks, fluency, and comprehensibility in EFL learners.

Point 4 is the effectiveness of Google Assistant as a learning tool with mean 4.15 and standard deviation 0.9. Students perceived Google Assistant as not just a technology feature, but as a tool that significantly supports language skills. This enhances the perceived competence of students during the learning process. Respondent E "While using Google Assistant, my English skills have improved the most, especially vocabulary and speaking. I often ask questions in English, so I automatically add new vocabulary. My speaking is also more fluent because I often practice speaking directly. Grammar is also helped a bit, although it's not as accurate as learning from books" shows that supports their language development and boosts their sense of competence. Respondent E shared that their vocabulary and speaking skills improved through frequent practice, and grammar also benefited, though less than other areas. Tai & Chen's (2020) participants enjoyed interacting with Google Assistant, which helped them feel less anxious and more motivated to use English for real and meaningful communication.

In point 7, the suitability of Google Assistant with students' learning needs with mean 4.08 indicates a positive perception and a stable standard deviation of 0.89. Students feel that the learning experience with Google Assistant is relevant to their learning goals. This also supports the perception that this technology is not just a tool but also suits individual needs. Supported by Respondent A's perception "google assistant helped me a lot in knowing how to pronounce words in English that I didn't know, from there I improved my way of speaking a lot." Additionally, research by Chen et al. (2020) investigated college EFL learners' perceptions toward the use of Google Assistant for foreign language learning. The study found that learners appreciated the interactive features of Google Assistant, which supported their language learning process.

Google Assistant helps me feel more relaxed when practicing speaking in English on statement 9 mean 4.05 and standard deviation 0.86 shows that Google Assistant helps reduce tension during speaking practice, supporting a more supportive and less intimidating learning environment. In relation to increasing self-efficacy in practicing speaking. Respondent C “Google Assistant really helps me speak English. Every time I practice, I feel more confident when speaking with my friends.”

Furthermore, more confidence than other methods in point 10 with a mean of 3.85 and standard deviation of 0.97 means that the majority still feel confident but there is a variety of experiences. This shows that confidence with Google Assistant can depend on the student's learning style or previous habits. Respondent B “Google assistant helps me to feel more confident when speaking English.” These findings align with Chen et al. (2020) that learners found Google Assistant useful in improving their speaking and listening skills, with its pronunciation perceived as natural and its utterances easily comprehensible. This suggests that Google Assistant can serve as a supportive tool, fostering learners' confidence in using English.

In conclusion, on average, all items showed positive responses with all means above 3.8 and most above 4.1. In general, students feel that Google Assistant helps them feel more competent in learning English. In terms of the aspects of convenience, effectiveness, and relevance to learning needs, all were rated highly. However, the item on confidence compared to other methods showed little variation in the learning experience. These results show that Google Assistant not only helps technically but also emotionally and psychologically which is in line with the concept of perceived competence in SDT.

Table 4. Students' perspective on their Relatedness

No.	Statements	SD	D	N	A	SA	Mean	STD
2	Google Assistant increases my motivation to learn English.	0	8.7	21.4	43.7	26.2	3.92	0.91
4	I think Google Assistant is an effective tool for developing my English skills.	0	7.8	11.7	41.7	38.8	4.15	0.9
8	Google Assistant makes learning English more fun and motivating.	0	7.8	16.5	47.6	28.2	4	0.88
11	Using Google Assistant reduces my anxiety when learning English.	1	5.8	16.5	40.8	35.9	4.08	0.92
13	I feel that Google Assistant provides a learning experience that makes me feel like I am interacting with a	1.9	8.7	16.5	44.7	28.2	3.93	0.99

tutor or friend.

Increased motivation to learn English in point 2 with mean 3.92 and standard deviation 0.91. Most students feel motivated to learn English through interaction with Google Assistant. This shows that Google Assistant was not only the technology but also contributed emotionally in building the learning connection that was meaningful. Respondent F “Usually to say English sentences in front of many people is very afraid of feeling wrong. But after using google assistant, I can be more confident, even though it is incorrect in pronouncing it.” Next, the effectiveness of Google Assistant in assisting English skill development in point 4 with a mean of 4.15 and standard deviation 0.90. This effectiveness is felt in terms of learning outcomes, and in the context of user connectedness to the learning process. Then, feeling emotionally supported can increase the sense of belonging in the learning experience. Respondent D “Before practicing with Google Assistant, I always felt nervous about speaking English in front of people who are more expert. But after practicing English with Google Assistant, I feel relaxed.” Zhang (2024) highlighted that the interactive features and accessibility of Google Assistant fostered a more engaging and supportive learning experience, contributing to increased motivation and a sense of belonging in the learning process.

Learning becomes more fun and motivating which is found in point 8. Mean 4.00 in the agree category and standard deviation 0.88 is low but shows consistency in answers. Google Assistant is considered capable of creating a positive and fun learning atmosphere. This aspect strongly supports the relatedness section, as positive experiences often arise from emotional attachment and enjoyable interactions. Respondent A stated “Yes, Google Assistant makes me more confident practicing English. Because the interaction is relaxed, non-judgmental, and I can practice anytime without fear of being wrong, I feel more relaxed and braver enough to speak.” Respondent B “Speaking ability, because it allows me to practice with a tool that is non-judgmental and not a real person, so it is not as nervous as practicing with a real person in general.” This result is relevant with Tai & Chen (2020) that Google Assistant significantly promoted learners' WTC, enhanced communicative confidence, and reduced speaking anxiety. Participants reported enjoying interactions with Google Assistant, which contributed to a more engaging and less threatening learning environment.

In point 11, the use of Google Assistant regarding reducing anxiety while studying with a mean of 4.08 and a standard deviation of 0.92. Students feel calmer and less anxious when studying, indicating an increase in the perception of skills without being pressured. Respondent C “Before using Google Assistant I was always afraid of pronouncing English wrong in front of my friends. After practicing English with Google Assistant, I feel more relaxed because I feel that no one will criticize my mispronunciation.”

Last, learning experiences such as with tutors or friends point 13 with a mean of 3.93, which is close to agrees and a standard deviation of 0.99, which is a relatively wide distribution of responses indicating differences in experience between students. Most students feel a social or interpersonal connection when using Google Assistant. Although not all respondents felt like they were interacting with a human, a fair amount perceived it as a social rather than a mechanical experience. Respondent I “Yes, Google Assistant makes me more confident to practice speaking English. Because, conversing with him there is no fear of being judged, so I can practice without being shy. I can also repeat until I pronounce it correctly without having to be afraid of people judging me. That's what makes me more relaxed, because it feels like I'm talking to a friend that really patient in listening to me to learn. In addition, if he can immediately understand what I'm saying, it feels good and makes me even more excited to keep practicing.” Respondent J “Yes, because I can practice without fear of being judged. Google Assistant also gives a 'safe' vibe because it doesn't judge or correct directly, so I feel more relaxed when practicing.” Respondent K “Yes, Google Assistant is enough to make me more confident in practicing English. I can practice without fear of being judged or embarrassed if I make mistakes. There's no pressure from other people, so I'm more relaxed to speak and repeat until I'm fluent. The automatic response from Google Assistant also helps me feel like I'm really chatting, so it's more comfortable to improve my speaking time by time.”

The respondents' answers consistently highlight that using Google Assistant reduces their anxiety and fear of making mistakes when speaking English. They feel more comfortable and confident practicing with a non-judgmental AI tool compared to practicing in front of others. Specifically, the respondents emphasize that Google Assistant helps them feel relaxed, reduces nervousness, and boosts their confidence, especially regarding pronunciation and speaking in public.

Overall, the relatedness aspect showed a positive response with the overall mean above 3.9. Participants felt that Google Assistant supported emotional relatedness in the learning process, whether through increased motivation, a relaxed learning atmosphere, or a learning experience that was similar to interpersonal interactions. This finding supports the relatedness aspect of SDT, that the need for individuals to feel emotionally connected to their learning environment.

CONCLUSION

This study aims to explore the psychological impact of using Google Assistant as an interactive pronunciation coach for EFL students through the lens of Self-Determination Theory (SDT), with a particular focus on the three aspects of autonomy, competence, and relatedness. As stated in the Introduction chapter, the expectation of incorporating Google Assistant into pronunciation practice can increase students' psychological engagement and confidence, especially for those who often feel anxious or hesitant in a traditional classroom setting.

The findings presented in the Results and Discussion confirm that this expectation has been achieved. Students reported a stronger sense of autonomy, as Google Assistant allowed them to practice independently at their own pace without fear of judgment. The sense of competence also increased in that students felt more capable and accurate in their pronunciation after repeated interactions and immediate feedback provided by Google Assistant. Interestingly, despite being a technology, Google Assistant also contributed to relatedness. Since, students expressed feeling more connected to the learning process and sharing their experiences with peers, creating an enabler for AI-based learning.

These results not only showed the alignment between the research aims and the results, but also highlighted the practical implications of integrating voice AI technology in EFL learning environments. Future research could explore broader applications such as incorporating Google Assistant or similar AI tools into curriculum-based pronunciation modules or extending this model to students with special learning needs or psychological disabilities. In addition, future research could also further examine the long-term effects on learner motivation and performance, as well as compare the effectiveness of different virtual assistants.

In summary, the psychological impact confirmed in this study lays a meaningful foundation for teaching innovation and technology integration in language education.

REFERENCES

- Alaskar, H. (2023). The Role Of Online Learning In Enhancing The Performance Of Introverted Female Saudi Students In Translation. *Saudi Journal Of Language Studies*, 3(3). <https://doi.org/10.1108/Sjls-12-2022-0092>
- Alharthi, S. M. (2024). Siri As An Interactive Pronunciation Coach: Its Impact On Efl Learners. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186x.2024.2304245>
- Alrabai, F. (2021). The Influence Of Autonomy-Supportive Teaching On Efl Students' Classroom Autonomy: An Experimental Intervention. *Frontiers In Psychology*, 12(September). <https://doi.org/10.3389/fpsyg.2021.728657>
- Angeles, S. P. L., & Delhi, N. (2008). Saldana. *Encyclopedia Of Public Health*, 28(4), 1274–1274. https://doi.org/10.1007/978-1-4020-5614-7_3085
- Chen, H. H. J., Yang, C. T. Y., & Lai, K. K. W. (2020). Investigating College Efl Learners' Perceptions Toward The Use Of Google Assistant For Foreign Language Learning. *Interactive Learning Environments*, 31(3). <https://doi.org/10.1080/10494820.2020.1833043>
- Creswell, J. W. (2007). *Qualitative Inquiry And Research Design: Choosing Among Five Approaches* (J. W. Creswell, Ed.). Sage Publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, And Mixed Methods Approaches*. Sage Publications.
- Darwin, Rusdin, D., Mukminatien, N., Suryati, N., Laksmi, E. D., & Marzuki. (2023). Critical Thinking In The Ai Era: An Exploration Of Efl Students'

- Perceptions, Benefits, And Limitations. *Cogent Education*, 11. <https://doi.org/10.1080/2331186x.2023.2290342>
- Fathi, J., Rahimi, M., & Teo, T. (2025). Applying Intelligent Personal Assistants To Develop Fluency And Comprehensibility, And Reduce Accentedness In Efl Learners: An Empirical Study Of Google Assistant. *Language Teaching Research*. <https://doi.org/10.1177/13621688251317786>
- Hong, X., & Guo, L. (2025). Effects Of Ai-Enhanced Multi-Display Language Teaching Systems On Learning Motivation, Cognitive Load Management, And Learner Autonomy. *Education And Information Technologies*. <https://doi.org/10.1007/s10639-025-13472-1>
- Jianfeng, C., Raj, G., & Ai, J. (2018). The Correlations Among Learning Motivation, Autonomy And Language Proficiency In Chinese Efl Context. *Learn Journal: Language Education And Acquisition Research Network Journal*, 11(1), 1–14.
- Kannan, J., & Munday, P. (2018). New Trends In Second Language Learning And Teaching Through The Lens Of Ict, Networked Learning, And Artificial Intelligence. *Circulo De Linguistica Aplicada A La Comunicacion*, 76, 13–30. <https://doi.org/10.5209/Clac.62495>
- Learn What Your Google Assistant Is Capable Of. (N.D.). (N.D.). Google Assistant. Retrieved December 27, 2024, From <https://assistant.google.com/learn/>
- Natale, S., & Cooke, H. (2021). Browsing With Alexa: Interrogating The Impact Of Voice Assistants As Web Interfaces. *Media, Culture And Society*, 43(6), 1000–1016. <https://doi.org/10.1177/0163443720983295>
- Nguyen, G. T. K., & Dinh, H. T. (2019). Students' Evaluation Of Using Google Classroom In Project-Based Learning In Faculty Of English, Hanoi National University Of Education. *Vietnam Journal Of Education*, 3(2), 40–44. <https://doi.org/10.52296/Vje.2019.41>
- Nguyen, T. D. T., & Tran, T. Q. (2023). Unpacking Psychological Factors Affecting Efl Students' Online Language Learning Engagement. *Learn Journal: Language Education And Acquisition Research Network*, 16(2).
- 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(November). <https://doi.org/10.3389/fpsyg.2023.1255594>
- Ryan, R. M., & Deci, E. L. (2017). *Self-Determination Theory: Basic Psychological Needs In Motivation, Development, And Wellness*. Guilford Publications.
- Ryan, R. M., & Deci, E. L. (2017). *Self-Determination Theory: Basic Psychological Needs In Motivation, Development, And Wellness*. Guilford Publications.
- Sari, F. K. (2025). Efl Students ' Perceptions Of Ai Speech Recognition In Pronunciation Practice : The Case Of Google Read Along. 13(1), 205–214.
- Sarpourian, F., Samad-Soltani, T., Moulaei, K., & Bahaadinbeigy, K. (2022). The Effect Of Virtual Reality Therapy And Counseling On Students' Public Speaking Anxiety. *Health Science Report*, 5(5). <https://doi.org/10.1002/Hsr2.816>

- Shen, Y., & Cui, W. (2024). Perceived Support And Ai Literacy: The Mediating Role Of Psychological Needs Satisfaction. *Frontiers In Psychology*, 15(June), 1–11. <https://doi.org/10.3389/fpsyg.2024.1415248>
- Tai, T. Y., & Chen, H. H. J. (2020). The Impact Of Google Assistant On Adolescent Efl Learners' Willingness To Communicate. *Interactive Learning Environments*, 31(3), 1485–1502. <https://doi.org/10.1080/10494820.2020.1841801>
- Tai, T. Y. (2024). Comparing The Effects Of Intelligent Personal Assistant-Human And Human-Human Interactions On Efl Learners' Willingness To Communicate Beyond The Classroom. *Computers & Education*, 210. <https://doi.org/10.1016/j.compedu.2023.104965>
- Vistorte, A. O. R., Deroncele-Acosta, A., Ayala, J. L. M., Barrasa, A., López-Granero, C., & Martí-González, M. (2024). Integrating Artificial Intelligence To Assess Emotions In Learning Environments: A Systematic Literature Review. *Frontiers In Psychology*, 15(June). <https://doi.org/10.3389/fpsyg.2024.1387089>
- Yang, L., & Duan, M. (2023). The Role Of Emotional Intelligence In Efl Learners' Academic Literacy Development. *Heliyon*, 9(1), E13110. <https://doi.org/10.1016/j.heliyon.2023.E13110>
- Yin, X. (2021). The Interplay Of Efl Students' Enjoyment, Hope, Pride And Self-Regulation. *Frontiers In Psychology*, 12(December), 1–7. <https://doi.org/10.3389/fpsyg.2021.803476>
- Yuan, L., & Liu, X. (2025). The Effect Of Artificial Intelligence Tools On Efl Learners' Engagement, Enjoyment, And Motivation. *Computers In Human Behavior*, 162. <https://doi.org/10.1016/j.chb.2024.108474>
- Zhang, M. (2021). Efl/Esl Teacher's Resilience, Academic Buoyancy, Care, And Their Impact On Students' Engagement: A Theoretical Review. *Frontiers In Psychology*, 12(August). <https://doi.org/10.3389/fpsyg.2021.731859>
- Zhang, M. (2024). Enhancing Self-Regulation And Learner Engagement In L2 Speaking: Exploring The Potential Of Intelligent Personal Assistants Within A Learning-Oriented Feedback Framework. *Bmc Psychology*, 12(1). <https://doi.org/10.1186/s40359-024-01917-0>
- Zhang, X. (2021). The Impact Of Efl Students' Emotioncy Level On Their Motivation And Academic Achievement: A Theoretical Conceptual Analysis. *Frontiers In Psychology*, 12(December). <https://doi.org/10.3389/fpsyg.2021.798564>
- Zhang, X., & Ardasheva, Y. (2019). Sources Of College Efl Learners' Self-Efficacy In The English Public Speaking Domain. *English For Specific Purposes*, 53, 47–59. <https://doi.org/10.1016/j.esp.2018.09.004>
- Zou, B., Du, Y., Wang, Z., Chen, J., & Zhang, W. (2023). An Investigation Into Artificial Intelligence Speech Evaluation Programs With Automatic Feedback For Developing Efl Learners' Speaking Skills. *Sage Open*, 13(3). <https://doi.org/10.1177/21582440231193818>