JDSS | Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Integrating AI-Powered Tools for Pronunciation Improvement: A Study of ESL Learners' Perceptions and Learning Experiences

[1]Sadia Nazir, [2]Dr Fareeha Javed and [3]Dr Sana Baig

1. Lecturer, Department of English Language & Literature, Lahore College for Women University, Punjab, Pakistan
2. Associate Professor, Department of English Language & Literature, Govt. Graduate College for Women Gulberg, Lahore Punjab, Pakistan
3. Lecturer, Department of TESOL, Lahore College for Women University, Lahore, Punjab, Pakistan

| **Corresponding Author:** | fjaved71@gmail.com |

ABSTRACT

This qualitative study explored how AI-Powered pronunciation tools affect the fluency development of Pakistani ESL learners, particularly undergraduate students studying English Literature. Through semi-structured interviews with 15 students who actively used AI-Powered tools like Speechling, ChatGPT and Google Assistant etc., the research investigated learners' perceptions, experiences, and perceived changes in their English fluency due to the use of these tools. The findings revealed that Pakistani ESL learners gained increased confidence, noticed clearer speech production, and appreciated the immediate corrective feedback offered by AI-powered tools. However, limitations such as internet dependency, lack of contextual explanations, and unfamiliar accents in AI models were also highlighted. The study suggests integrating AI-powered tools into English language curricula to enhance autonomous pronunciation practice while maintaining teacher guidance for contextual learning of Pakistani ESL learners.

Introduction

English is a key academic and professional language in Pakistan. However, fluency in speaking remains a major challenge for many ESL learners (Alharbi & Khalil, 2023; Khan et al., 2024). Although, it is taught as a second language from pre-school classes onwards, still, most students face problems with English pronunciation throughout the educational period and even after the completion of degree in their professional/daily life (Ahmad et al., 2022) when they are expected to communicate fluently in English. Even at BS level, students face difficulty in speaking proficiently in English language (Khan & Krishnasamy, 2024, Pathan et al., 2025) which creates impediment to achieving higher scores. Baig (2014), Baig et al. (2019, 2020, 2021), and Sattar et al., (2019) also highlighted challenges faced by Pakistani students in developing and improving English language skills.

Multifarious issues like grammatical errors, mispronunciation of words, shyness, performance anxiety, reluctance, fear of failure and lack of motivation hinder Pakistani ESL learners' spoken English skills (Javed, 2020; Khan et al., 2025; Younas et al., 2025). According to Javed (2024a), the growth of AI in English language learning is not only technological, but also deeply pedagogical and moral. Hence the use of AI-powered tools is imperative in ESL teaching and learning.

While plenty of research has utilized quantitative and experimental designs, few studies have penetrated into ESL learners' voices and their individual perspectives regarding the impact of AI-powered tools, particularly in South Asian contexts where English is taught and learned as a second language. Therefore, this study investigates the experiences, insights and perceptions of Pakistani undergraduate students regarding the impact of AI-powered pronunciation tools on their English speaking fluency and confidence.

Literature Review

Traditional classroom contexts frequently lack sufficient time and tailored feedback to improve learners' pronunciation and fluency (Bibi & Shahzad, 2025; Fatima et al., 2024), resulting in English language instruction that fails to provide positive linguistic output (speaking). The introduction of AI-powered pronunciation tools such as ELSA Speak, Google Assistant, ChatGPT, and Speechling opens up new avenues for personalized and independent speaking practice (Abdel-Reheem, 2024; Choudhary et al., 2025), a beneficial linguistic input (Riaz & Kausar, 2024), and significantly improves learners' speaking proficiency.

Pakistani ESL learners often face hindrances in speaking fluently in English owing to traditional instructional methods offering limited time for individual pronunciation corrections (Khan et al., 2024). AI pronunciation tools and applications give freedom to learners to practice at their individual pace, repeat practice tasks and attain unbiased corrections through features like phoneme-level feedback, waveforms of English speech and continual listening and speaking practice (Celik et al., 2025; Rohmiyati, 2025). Despite their potential, AI pronunciation tools raise fundamental challenges about accessibility, bias, and the educational assumptions built into their algorithms. These tools should be part of a larger discussion about learner-centered design and responsible innovation (Javed, 2024a).

Several studies have indicated favorable results of AI-powered tools for learning English pronunciation. For example, Shao (2025) conducted an experimental study on university learners and concluded that effective utilization of AI tools optimizes language learning, boosts students' motivation and lessens anxiety within EFL settings. Zainuddin et al. (2024) also concluded from their research that ESL teachers have a positive attitude towards the implementation of AI tools in ESL settings. Building on this, Javed (2024b) investigated how teaching techniques have been redesigned in higher education due to digital revolution, particularly in contexts with limited resources and linguistic diversity. AI-powered pronunciation platforms contribute to this change by allowing for individualized training, multimodal engagement, and learner autonomy (Javed 2024b).

Another experimental study carried out by Mohammadkarimi (2024) on elementary and pre-intermediate levels came up with the findings gained from pre and post-test pronunciation scores and questionnaire responses that AI driven tools have the potential to enhance students' English pronunciation skills, and to boost their speaking confidence and to promote their engagement in language learning process. Nevertheless, various obstacles concerning to the interpretation of feedback and the grabbing of subtle differences in pronunciation were also pointed out by the researcher (Mohammdkarimi, 2024). A mixed methods study by Sadia et al. (2025) in Pakistani context highlights AI's immediacy but also criticizes its lack of explanatory depth and emotional disconnection with students.

Materia and Methods

A qualitative research design was employed to gain an in-depth understanding of ESL students' perspectives and subjective experiences with the incorporation of AI-powered tools in ESL courses. This study used a purposive sampling strategy. This non-probability sampling strategy includes choosing participants based on their relevance and skill in the research field (Campbell et al., 2020). The study sample comprised of 15 students enrolled in the BS English Literature Program (Semester IV) at a Pakistani public institution. Their selection was based on the fact that they had all used at least one AI pronunciation tool to improve their English-speaking ability.

This study used a semi-structured interview as its data gathering instrument. Semi-structured interviews were conducted with each participant individually to learn about their experiences, thoughts, and comments on the usage of AI tools by them. The interview

method allowed the researchers to dive into the study participants' distinct viewpoints while also allowing for flexibility in exploring unexpected revelations (Ruslin et al., 2022). Each interview lasted 30 to 45 minutes. The primary focus was on issues such as instant and objective feedback from AI technologies, improvements in learners' fluency and speaking confidence, and the urgent need to incorporate these tools alongside instructor facilitation in ESL courses.

Interviews were transcribed by the researchers and analyzed thematically as propagated by Braun and Clarke (2006), in order to have quite flexible and transparent analysis of qualitative data. Codes were generated inductively and a total of four emergent themes were identified across the interview data.

The qualitative insights gathered from ESL learners presented a multifaceted view of AI's potential role in bringing positive changes in the English language pronunciation of Pakistani ESL learners. Although the majority of them considered AI tools being prolific, efficient, constructive and interactive, they also scrutinized the situation by promoting the presence of ESL teachers' human interactions in classrooms to comprehend various cultural contexts. Each learner was asked 12 questions and their responses are mentioned by using the identification numbers as P1, P2, P3… P15. The findings are presented under the four emergent themes.

Results and Discussion

The majority of ESL learners in this study appreciated the instant and non-judgmental feedback they receive from AI-powered tools. They felt that receiving feedback at the phoneme level with visual representations indicating mouth positions seems highly helpful for improving correct pronunciation of words. Participant P2 told: *AI tool tells me exactly how I should pronounce a word and pinpoints my mistake if I pronounce something wrong. No teacher ever gave me such detailed correction*. Similarly, P5 expressed: *In the process of language learning, prompt correction is crucial which is provided by AI tools very easily*.

Participant P9 expressed emphatically: *I find AI tools very helpful as I can practice speech activity anytime, anywhere. It helps me to fix my pronunciation mistakes instantly through its quick feedback.* Another participant, P11 intimated that: …*Due to its prompt feedback I am able enough to make preparations, while sitting at home, for my classroom presentation task very easily and conveniently without having the need to go anywhere.* Participant P14 endorsed the same idea by saying: *AI pronunciation tools are always at your disposal. Whenever one feels the need, one can utilize their services within few seconds by having access to Wi-Fi signals*. Participant P15 was of the view: *AI even points out minor language mistakes that I overlook otherwise and guides me about how to correct those mistakes immediately.* The findings reveal that the participants believed that real time and instant feedback from AI tools enables them to improve their pronunciation skills in the best possible way.

Improvement in Pronunciation and Speaking Confidence

The majority ESL Learners in this study expressed their satisfaction with the use of AI-powered tools owing to their role in enhancing their self confidence in pronouncing English words/sentences correctly. Participant P6 indicated: *Before using Speechling, I used to hesitate a lot. Now, I feel more confident while speaking, especially in class presentations.* Participant P7 shared the view that: *Practice makes a man perfect. So, I do a lot of practice with Google Assistant which has boosted my confidence and made me a better English speaker.*

P11 said also showed his satisfaction with AI-powered tools by saying: *AI has improved my oral communication skill to such an extent that I don't feel reluctant to have*

group discussions in English in class now. The participants reported that practicing in private environments reduced their anxiety and fear of embarrassment they had to face due to language mistakes in the past when they did not use AI-powered tools. Participant P14 told emphatically: *I always felt hesitant and shy to speak in English in front of my class. But when I started practicing alone with AI tool, I felt relaxed*. Such betterment actually leads towards higher oral participation in ESL classrooms.

The learners showed positive perceptions about the usage of AI tools and appreciated the instant feedback they got about their mistakes which helped them to maintain their interest in language learning process and ultimately improved their pronunciation skills.

AI Pronunciation Tools as Complement, Not Replacement

Despite great appreciation, ESL learners saw AI pronunciation tools as supplements, not replacements for English teachers. They drew attention to the human presence in understanding contextual meanings of words which points towards the importance of a human teacher and limitation of the AI tools which cannot replace human beings. P1 expressed: *Although I use AI for correcting my accent but I still need English teacher to explain meanings and usage of words… AI is good for pronunciation, but not for everything*.

Participant P10 communicated that: *AI assists me in pronouncing correct words, but not how to use them in real-life conversation, for this I need the guidelines of my teacher*. In a similar vein, Participant P13 argued, "…*I think it's essential to balance technology with human interaction*". Moreover, Participant P13 argued: *Although AI chatbots provide powerful speaking practice but I don't feel that they can replace a human instructor. Infact, English instructors impart cultural sensitivity and emotional intelligence to students along with the personalized feedback*. Participant P12 stressed that while using machinery for language learning: *… the lack of human touch makes me uncomfortable sometimes*. Though the participants' pronunciation got improved through the use of AI speaking tools but they expressed their concerns regarding the absence of contextual usage of words which was only possible in the presence of a human teacher.

Accessibility and Technological Hurdles

An important and recurring concern pointed out by the participants was the existence of accessibility and technological challenges like poor internet, non-availability of internet sources at institutional level, lack of advanced smartphones and accent mismatch etc., which often interfered with their language learning process. Participant P4 expressed: *Sometimes the AI tool didn't understand my accent… I had to repeat many times*. The issue of aligning learners' local accents with the tools' feedback system constitutes a big challenge and such technical glitches pose a huge hurdle in the way of language learning and improving process. Participant P6 highlighted: *Since a large great number of students share Wi-Fi in my hostel, so the apps work quite slowly and make practice boring for me*.

Despite appreciating the productivity of AI-powered tools, many participants perceived that accessibility problems restricted their pronunciation progress in Pakistani context. Participant P9 argued: *Internet is not available all the time so it becomes difficult for me to learn the required thing at the right time*. Participant 13 also indicated: *Sometimes the app doesn't even open because of the weak internet signals, so I am unable to practice pronunciation tasks regularly*. Such issues restrict consistent practice causing frustration and slow progress for Pakistani ESL learners.

The findings reveal that while AI-powered tools have strong potential to improve their pronunciation and fluency, infrastructural and technological limitations encountered remain consequential obstacles for many Pakistani ESL learners.

Discussion

The findings of this study stipulate that AI pronunciation tools positively influence pronunciation of ESL learners by giving access to consistent targeted practice and feedback. AI techniques improved learners' self-awareness and autonomy when speaking English. However, Pakistani ESL learners expressed concern about technical limitations and a lack of contextual awareness. The findings resonate with the findings of a qualitative research done by Hidayah et al. (2025). The participants of their study reported considerable betterment in their ability to pronounce challenging sounds and patterns in English after using AI-powered tools. However, the participants considered the tools to be more effective if harmonized with traditional teacher-led instructions. These insights highlight the need for a more nuanced view of AI pronunciation tools, not as stand-alone treatments but rather as a component of a larger restructuring of education. According to Javed (2024a, 2024b), the implementation of AI-powered tools needs to be driven by institutional preparedness, ethical considerations, and a dedication to inclusive, data-informed pedagogy.

Vančová (2024) conducted action research regarding the impact of AI tools on English pronunciation of first year students. The study concluded that less skilled participants acknowledged more the conversation with a Chabot as it permitted them to practice conversation in various scenarios. Whereas, more proficient individuals preferred tools imparting guided feedback. The current study participants' perceptions in the present study align with studies carried out by Abdelhalim and Alsehibany (2025) and Celik et al. (2025), who found that AI tutors increased ESL learners' self-efficacy and English oral communication skill to a greater level. However, in Pakistani context, digital literacy, accent variation, and infrastructure need to be addressed for wider adoption.

The findings suggest that AI tools lack contextual usage, such as collocations, idiomatic expressions, or tone adjustments in formal as well as informal settings. These barriers are a sign of larger disparities in infrastructure that exist in Pakistani educational systems. In order to maximize the use of AI-powered language tools, this gap thus emphasizes the necessity of integrated education and real-life communication activities.

Conclusion

An in-depth analysis of the qualitative data reveals that AI-powered pronunciation tools have the potential to support fluency development among Pakistani ESL learners at the undergraduate level. These tools are interesting and user-friendly, aiding language learning by increasing pronunciation abilities and transforming learners into proficient communicators. However, the majority of the learners in this study believe that a mixed strategy that combines the benefits of AI-powered tools with the expertise, competence, and guidance of an English teacher is preferable for achieving more productive results in language learning. The interview participants believed that, when combined with instructor facilitation, the usage of such technologies could help produce more confident and proficient speakers in Pakistani universities.

Recommendations

The findings have several practical consequences for both the ESL instructors and learners. AI-powered applications can deliver real-time, rapid, and consistent feedback, encouraging independent learning outside the classroom. Users must be conscious of the limitations of AI-powered technologies and use them in conjunction with tailored teacher instruction. As is evident from the findings, learners support the usage of AI-powered technologies in ESL settings, but they advocate for their integration with human engagement. Furthermore, these findings are consistent with the sociocultural theory of language learning, emphasizing the importance of both individual contact with AI-powered tools and directed social interaction with English teachers for efficient English language

learning. Since a teacher's presence in an English classroom improves learners' critical thinking and problem-solving abilities while also developing language skills, it is critical to implement AI-powered tools thoughtfully in ESL classrooms, ensuring that they truly complement traditional teaching and confirm an inclusive environment for all ESL learners.

References

Abdelhalim, S. M., & Alsehibany, R. A. (2025). Integrating AI-powered tools in EFL pronunciation instruction: effects on accuracy and L2 motivation. *Computer Assisted Language Learning*, 1-25.

Abdel-Reheem Amin, E. (2024). EFL students' perception of using AI text-to-speech apps in learning pronunciation. *Migration Letters, 21*(3), 887-903.

Ahmad, K., Azam, T., Syedm, A. F., & Qayyum, H. (2022). Problems in Pronunciation: A Case Study of ESL Learners at Leads Group of Colleges Gujranwala, Pakistan. *Harf-o-Sukhan, 6*(1), 341-347.

Alharbi, K., & Khalil, L. (2023). Artificial intelligence (AI) in ESL vocabulary learning: An exploratory study on students and teachers' perspectives. *Migration Letters, 20*(S12), 1030-1045.

Baig, S., Javed, F., & Altaf, F. (2021). Investigating Integration of Writing Skills in Grade VIII English PTBB Textbook. *Global Language Review, 6*(2), 1-14.

Baig, S., Siddiquah, A., & Javed, F. (2020). An analysis of the competency 'reading and thinking skills' in Grade VIII English textbook. *Global Social Sciences Review, 5*(1), 231-240.

Baig, S., Javed, F., & Altaf, F. (2020). Unveiling Aural/Oral Skills in Grade VIII English Textbook. *Global Regional Review, V* (II), 155-168.

Baig, S. (2014, January). *Multimediality as a gadget in Language Teaching or Teaching Paradigm Shift*. In International Conference on Education and e-Learning (EeL). Proceedings (p. 138). Global Science and Technology Forum.

Bibi, S., & Shahzad, A. K. (2025). Impact of Artificial Intelligence on English Language Teaching at University Level: A Study of EFL Teachers' Perspectives in Pakistan. *ASSAJ, 4*(01), 200-234.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101.

Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S., ... & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of research in Nursing, 25*(8), 652-661.

Celik, B., Yildiz, Y., & Kara, S. (2025). Using ChatGPT as a virtual speaking tutor to boost EFL learners' speaking self-efficacy. *Australian Journal of Applied Linguistics, 8*(1), 102418-102418.

Choudhary, M. W., Ashraf, M., Fatima, S. M., & Zahid, M. (2025). Impact of AI-Assisted Flipped Classroom on Speaking Skills of Pakistani ESL Learners. *ACADEMIA International Journal for Social Sciences, 4*(2), 593-601.

Fatima, N., Zahid, F., & Ullah, I. (2024). Role of Discussion teaching technique in improving English language speaking skills of ESL learners. *Jahan-e-Tahqeeq, 7*(1), 648-666.

Hidayah, A. N., Riyanti, D., Gres, E., & Yuliana, Y. G. S. (2025). Ai-Powered Pronunciation Tools: Supporting English Learners In Multilingual Classrooms Who Dislike English In Pontianak. *Wiralodra English Journal (WEJ), 9*(1), 13-26.

Javed, F. (2024a). The Evolution of Artificial Intelligence in Teaching and Learning of English Language in Higher Education: Challenges, Risks, and Ethical Considerations. In The *Evolution of Artificial Intelligence in Higher Education: Challenges, Risks, and Ethical Considerations* (pp. 249-276). Emerald Publishing Limited.

Javed, F. (2024b). Digital Transformation in Teaching and Learning of English in Higher Education. In *Digital Transformation in Higher Education, Part B: Cases, Examples and Good Practices* (pp. 103-125). Emerald Publishing Limited.

Javed, F. (2020). Adaptation challenges faced by Pakistani university entrants. *Student Success, 11*(2), 41-51.

Khan, U., Javaid, S., Khan, T., Rehman, A., & Ara, A. (2025). Identifying Barriers to Spoken English Proficiency: A Case Study of NUML Pakistan. *ACADEMIA International Journal for Social Sciences, 4*(3), 371-388.

Khan, A., Fareed, M., Hussain, A., & Hussain, I. (2024). Challenges of teaching english language speaking skills at the secondary school level in Pakistan: English language teachers' perspective. *Pakistan Journal of Social Sciences, 44*(4), 705-716.

Khan, A. U. R., & Krishnasamy, H. N. (2024). The Importance of Vocabulary Learning to Improve Speaking Skills among English Language Undergraduates in a Public University in Pakistan. *Pakistan Journal of Life & Social Sciences, 22*(2), 23381-23391.

Mohammadkarimi, E. (2024). Exploring the use of artificial intelligence in promoting English language pronunciation skills. *LLT Journal: A Journal on Language and Language Teaching, 27*(1), 98-115.

Pathan, E., Soomro, A., Parveen, Z., & Mangrio, U. (2025). Pronunciation Challenges Among Pakistani English Language Learners (ESL) At The University Level: A Survey And Pedagogical Implications. *Journal for Current Sign, 3*(1), 548-565.

Riaz, Y., & Kausar, G. (2024). Improving Pakistani College Students' Speaking Skills Using AI-Driven Linguistic Input: An Experimental Study. *Journal of Asian Development Studies, 13*(4), 853-870.

Rohmiyati, Y. (2025). Enhancing English language learning through artificial intelligence: opportunities, challenges and the future. *DIAJAR: Jurnal Pendidikan dan Pembelajaran, 4*(1), 8-16.

Ruslin, R., Mashuri, S., Rasak, M. S. A., Alhabsyi, F., & Syam, H. (2022). Semi-structured Interview: A methodological reflection on the development of a qualitative research instrument in educational studies. *IOSR Journal of Research & Method in Education (IOSR-JRME), 12*(1), 22-29.

Sadia, S., Ahmad, K., & Ali, Z. (2025). The Role Of Ai Tools In Enhancing English Language Proficiency: A Case Study Of Pakistani Undergraduate Students. *Journal of Applied Linguistics and TESOL (JALT), 8*(2), 40-46.

Sattar, A., Javed, F., & Baig, S. (2019). A Study of English Language Syntactical Errors Committed by Pakistani Higher Secondary Science Students. *Global Regional Review*, *IV*(II), 521-535.

Shao, S. (2025). The role of AI tools on EFL students' motivation, self-efficacy, and anxiety: Through the lens of control-value theory. *Learning and Motivation, 91*, 102154.

Vančová, H. (2024). AI-powered tools in English pronunciation classroom: An action research report. In Y. Choubsaz, P. Díez-Arcón, A. Gimeno-Sanz, J. Hriňák, X. Liashuk, S. Pokrivčáková & H. Vančová (Eds.), *CALL for Humanity - EUROCALL 2024 Short Papers,* 33-40.

Younas, M., El-Dakhs, D., & Anwar, B. (2025, September). Motivational role of teachers in developing English speaking skills of Pakistani university students. *Frontiers in Education, 10*, 1-11.

Zainuddin, N. M., Bukhari, N. A., & Mohamad, M. (2024). Implementation of Artificial Intelligence (AI) As A Pedagogical Tool in Tertiary ESL Classroom: Teachers' Perspectives. *Language Teaching and Technology Journal, 14*(8), 907-921.