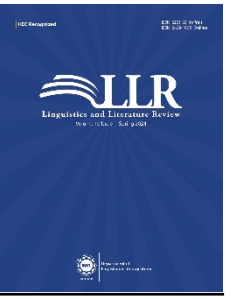
Linguistics and Literature Review (LLR)
Volume 12 Issue 1, Spring 2026
ISSN$_{(P)}$: 2221-6510, ISSN$_{(E)}$: 2409-109X
Homepage: http://journals.umt.edu.pk/llr/Home.aspx



Title:	**Investigating the Impact of Artificial Intelligence–Assisted Tools on English Language Acquisition among University-Level ESL Learners**
Author (s):	Syyed Sheraz Ali Sherazi, Muhammad Sheheryar, and Azha Farid
Affiliation (s):	Southwestern University of Finance and Economics, Chengdu, China
DOI:	https://doi.org/10.32350/llr.121.03
History:	Received: June 29, 2026, Revised: June 15, 2026, Accepted: June 10, 2026, Published: 30 June 2026
Citation:	Sherazi, S. S. A., Sheheryar, M., & Farid, A. (2026). Investigating the impact of artificial intelligence–assisted tools on English language acquisition among university-level ESL learners. *Linguistics and Literature Review*, *12*(1), 43-66. https://doi.org/10.32350/llr.121.03
Copyright:	© The Authors
Licensing:	This article is open access and is distributed under the terms of Creative Commons Attribution 4.0 International License
Conflict of Interest:	Author(s) declared no conflict of interest

A publication of
Department of English and Literary Studies, School of Liberal Arts,
University of Management and Technology Lahore, Pakistan

Investigating the Impact of Artificial Intelligence: Assisted Tools on English Language Acquisition among University-Level ESL Learners

Syyed Sheraz Ali Sherazi*, Muhammad Sheheryar, and Azha Farid

Faculty of International Studies, Southwestern University of Finance and Economics, Chengdu, China

Abstract

Artificial Intelligence (AI) is reshaping L2 teaching and learning. This study aims to explore the impact of ChatGPT and other AI-based tools on ELL (adult learners) whose first language is not English in Pakistan. A structured questionnaire was used to collect data from 300 students. The researchers used various statistical analyses to assess the impact of the AI tools on students' learning outcomes. The results show that ChatGPT and other AI tools had a positive impact on students' English writing skills and their motivation to learn. No gender differences were detected, however, in writing skills development. However, students' speaking skills did not significantly improve when they used AI tools. The results indicate that AI can be used as an effective complement to writing development and the motivation of learners, but activities should be designed to support speaking specifically. Moreover, over-dependence on AI tools should be avoided. Rather, the use of AI resources should be combined with speaking activities and other pedagogical approaches to achieve more well-rounded and effective English language learning outcomes.

***Keywords*:** artificial intelligence, ChatGPT, English language learning, ESL learners, writing skills.

Introduction

AI has changed how teaching and learning happens. New tools like Large Language Models (LLMs) and ChatGPT have changed how English language teaching (ELT) is comprehended, bringing opportunities for highly customized lessons, feedback, content generation, and active learning. AI has proven useful in building different skills, unlike traditional e-learning tools. Therefore, AI is intertwined with language learning technology, a key area for recent educational research (Huang et al., 2022; Ji et al., 2023). Nelson et al. (2025) and Wang (2025) shows that, AI-based instructional environments promote greater learner engagement and provide

*Corresponding Author: 223050211901@smail.swufe.edu.cn

adaptive, personalized language support that significantly transform the teaching of English for Academic Purposes in Higher Education.

Artificial Intelligence (AI) has been proven to have a number of advantages in language learning. AI tools can help students' writing by providing additional vocabulary, grammar checks, and overall positive attitudes towards learning a language. In particular, ChatGPT offers instant feedback on writing, which allows students to practice writing in a real way and obtain learning support outside of class (Escalante et al., 2023; Hwang & Chang, 2023; Jeon & Lee, 2023; Li, 2023; Widiati et al., 2023). The recent study on generative AI and higher education also shows that it can enhance second-language writing, facilitate self-directed learning, enhance the quality of formative assessment feedback and boost learners' motivation (Ibrahim & Kirkpatrick, 2024).

In spite of these pedagogical advantages, the inclusion of AI in language education has its own challenges. There has been documented reliance on AI, decreased critical thinking, declining academic integrity, and increased algorithmic biases, as well as concerns about the dependability of AI content (Kohnke et al., 2023; Mohamed, 2024; Liu & Ma, 2024; Su et al., 2023). In addition, educators are expected to utilize AI in a responsible manner, pedagogical, ethical and professional requirements in balance, and to facilitate interaction in language classrooms (Kuhail et al., 2023; Or & Chapman, 2022). Integration of AI in education needs institutional investment, the adoption of AI literacy, understanding of pedagogical practices tailored to specific contexts, and teacher support beyond the simple use of technology (Wang, 2025).

While the positive relationship between AI-assisted tools and writing improvement is well-established in the literature, these findings come predominantly from technologically advanced educational contexts. This study contributes by examining whether similar patterns hold in a developing ESL context (Pakistan), and further extends the literature by investigating the relationship between usage frequency and perceived outcomes, gender differences, and the limitations of AI for speaking skills—areas that remain underexplored. To address this gap, the current study focuses on whether AI-enabled tools influence the English language learning of university ESL students in Pakistan. More specifically, this study examines the impact of AI on Pakistani ESL learners' writing skills, vocabulary development, speaking confidence, and motivation, as well as

the challenges they face in using AI-assisted tools. By presenting empirical data from developing ESL context, the current study contributes in expanding area of scholarship in AI-Language Learning, and, as a result, its findings have positive implications for the use of generative AI within the framework of higher education for developing ESL contexts.

Literature Review

The explosion of AI tools, particularly ChatGPT, has initiated research into language learning and teaching in AI-facilitated environments, while also stirring academic debate. While AI tools have generated interest in how this technology impacts learning in second language acquisition, researchers have noted potential concerns regarding their pedagogical effectiveness, learner omission, and the instructor's role. Therefore, this research aims to identify specific components of this nascent literature by integrating the social and practical elements of this phenomenon.

Reframing Language Learning: Theoretical Perspectives

To comprehend AI's application in ELT, some core SLA theories should be considered. In ELT, Krashen's (1985) Input Hypothesis helps to better understand AI activities. In SLA, language acquisition refers to the input a learner is exposed to that is slightly beyond their current level of competence. AI fills this gap by providing input that is tailored to the learner's level. On the other hand, a lack of socio-cultural considerations may limit the impact of AI input and, as a result, may undermine language learning (Wei, 2023).

Swain's (1985) Output Hypothesis is another good example of this type of criticism. According to this framework, AI and ELT offer the possibility of eliciting language in a relatively safe environment, where the learner can, to a degree, build confidence and fluency in speaking and writing. In her, Vygotsky's (1978) Zone of Proximal Development (ZPD) is also used in a language-learning context. Within the ZPD, learners bridge their learning gaps by engaging with appropriately challenging tasks. In speech learning, the challenges learners may encounter include a lack of feedback or an unclear speech goal, both of which can be provided by AI.

Artificial Intelligence might be able to provide something similar to ZPD, but real human interaction may never be fully replicated by AI. To a learner who is culturally engaged in social interactions and the many tones and variability of human emotions, AI may be an imperfect tool. AI is useful

as an assistive device in learning, as it structures input to a learner's slightly intelligible zone of proximal development; however, it should not be assumed that AI can replace a language partner.

From CALL to AI: Continuity and Transformation

ELT and AI follow from earlier CALL and MALL frameworks. Chapelle (2001, 2003) noted that early CALL focused on technology's potential to enable interaction and promote learner autonomy. More recent studies (Beatty, 2013; Hubbard, 2009) shifted their focus to the combination of technology and pedagogy. Burston (2015) argued that MALL enhanced retention, while Stockwell (2010) argued that MALL increased flexibility. We now have AI tools that can engage in real-time dialogue and enable learners to personalize learning pathways.

The transition from Computer-Assisted Language Learning (CALL) to AI-supported language learning represents a significant technological development. Earlier CALL systems primarily focused on providing computer-mediated language practice and interaction, whereas contemporary AI-based tools offer more dynamic and personalized learning opportunities. AI technologies can provide individualized feedback, generate learning materials, and support interactive and adaptive language learning. However, the educational impact of AI does not depend solely on its technological novelty. Rather, meaningful integration occurs when technological capabilities are effectively aligned with sound pedagogical principles and learners' needs.

AI-Assisted Learning: Opportunities and Limitations

In recent years, researchers have focused on AI-based applications in ELT and their pedagogical utility. According to Huang et al. (2022) and Ji et al. (2023), their systematic literature review shows that AI-based chatbots stimulate learner engagement, autonomy, and personalization of learning. Additionally, by promoting learner autonomy, the apps assist learners in improving the language skills of their choice to extend learning beyond the classroom.

Several studies examined the effects of AI technologies on learners' writing skill development. Widiati et al. (2023) and Escalante et al. (2023) describe the positive impacts of AI-based writing tools, including immediate, detailed, and personalized feedback. According to these authors, AIbased writing tools extend the capabilities of the prior automated writing

assessment tools described by Warschauer and Ware (2006) and Koltovskaia (2020). However, while AI feedback may enhance grammar and language correctness, AI is limited in supporting more complex, and more sophisticated writing functions, such as the art of persuasion, to be more persuasive and to express personal opinion.

Studies suggest that AI can enhance the leaners' communication and interpersonal skills. Jeon and Lee (2023) claim that AI guidance during the learning process helps students gain autonomy to learn and participate in real conversations, reducing anxiety about speaking. Having access to a judgment-free zone encourages students to practice communicating in a new language. Liu and Ma (2024) note that AI-based language tools may sometimes produce poorly structured or inaccurate language feedback. Nevertheless, predictive language tools can enhance the user experience by providing immediate and interactive feedback.

AI integration into education also raises several ethical concerns. Mohammed (2024) and Su et al. (2023) argue that excessive reliance on AI may reduce students' learning independence and increase the risk of new forms of academic dishonesty.

However, on the other side of the scale, the use of AI in learning can significantly improve the process of providing formative feedback and assessment from a teaching and learning perspective. Hence, there must be a balance struck between pedagogical and ethical considerations regarding the use of AI in learning.

Learner and Teacher Perspectives: Acceptance and Resistance

The incorporation of AI into English Language Teaching depends on both teachers and students' attitudes. Research indicates that students have positive perception about the use of AI teaching tools. Imran and Lashari (2023) reported that students enjoy using AI tools and resources for language learning because they are both helpful and interesting. Likewise, students are pleased about the use of AI in their learning environments (Cai et al, 2024).

To better understand these perceptions, technology acceptance models provide useful theoretical framework. One of the most well-known models is Davis's (1989) Technology Acceptance Model (TAM). According to Davis (1989) perceived usefulness and the convenience of the technology positively affect the likelihood of its adoption. Furthermore, in the Unified

Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), social influence and ease of use are also important. This is particularly relevant to the AI tools, their immediate feedback, and the real-world interactivity they provide.

The complexity of teachers' perceptions adds another layer of challenge. While teachers appreciate the value of emerging AI technologies their potential to that enhance teaching and learning and improves outcomes, they believe AI should support existing teaching practices. Although AI can transform teaching practices and learning, teachers believe there is still much to learn about its use in educational contexts and how it can be integrated with other learning resources in teaching and learning environments (Riyadini & Triastuti, 2023). Positive and negative influences identified in the surveys and interviews included the insufficient training, the quality of the AI tools, the tools' effects on their professional identities, and the ways AI enters into social and ethical issues in AI and teaching (Teo, 2011).

The incorporation of AI into classrooms has created new expectations in teaching profession. Teaching is becoming less about being the possessor of knowledge and more about being the facilitator of knowledge, and providing teachers with the skills to fulfill this role is essential in balancing their professional identity with their pedagogical knowledge and skills.

Recent Pakistani Context: Empirical Evidence on AI-Assisted ESL Learning

Recent studies in the Pakistani context of English as a Second Language (ESL) highlight the growing use of artificial intelligence (AI) in language learning. These studies have expanded the limited body of research on AI-assisted language learning in Pakistan by examining how learners and educators use AI-based tools to support English language development and class configuration, learners' language needs, academic integrity, and more. Pakistani ESL learners, for instance, often lack a number of language skills, including the ability to independent learning. As a result, there is a growing interest in research on AI applications.

Saleem et al. (2025) examined the use of AI in ESL for teachers' application, learners' outcomes, and their attitudes. According to Saleem et al. (2025), AI resources in ESL promote learning and make teachers' jobs easier. However, they claimed that the successful introduction of AI into

ESL teaching hinges on teacher training, planned institutional support, and a focused approach to teaching design. The importance of this literature to the current study is that ESL teaching resources, both in Pakistan and elsewhere, may not be developed using AI tools for ESL learning. Thus, this literature argues that the use of AI in ESL is contextualized within ESL teaching in Pakistan.

In line with this, Ahmed et al. (2025) focused on the influence of ChatGPT on English language learning among Pakistani university students. It was found that ChatGPT helped students reinforce their grammar, vocabulary, reading and writing skills. ChatGPT's ability to answer and explain questions instantly and facilitate language-learning activities underscores its value. It was found that AI applications are particularly relevant and useful to university-level ESL learners, as they provide the necessary support and feedback to help learners continue their learning beyond the classroom.

Pakistani research on AI in English-language teaching has focused on writing skills in particular. Ajmal et al. (2025) examined ChatGPT and ESL writing skills in higher education in Pakistan. It was found that ChatGPT was beneficial in helping students identify grammar issues and in developing the ability to write clear, structured paragraphs and essays. Khan et al. (2025) also conducted a study on ChatGPT and the ESL writing skills of Pakistani university students. It was found that students who received writing assistance from ChatGPT improved their writing skills. It can be concluded that in situations where students receive limited teacher feedback on their writing, AI writing assistance is beneficial.

The development of vocabulary and reading skills is also important in Pakistan. Altaf et al. (2025) researched the role of AI-based vocabulary learning among university students in Pakistan. According to them, AI-based vocabulary learning tools, through contextual examples, give classroom learners the chance to learn vocabulary repeatedly and in a tailored, individualized way. In a separate study, Shah et al. (2025) examined the role of AI-based vocabulary-learning tools for improving the reading skills of undergraduate students. The study found that AI learning tools provided classroom learners with prompt instructions on how to read and interactive support in understanding in the text. AI helps in managing the vocabulary learning and reading tasks.

Research conducted in Pakistan has shown that AI tools can encourage students and build their confidence. Fatima et al. (2025) investigated the role of AI tools for English language acquisition among ESL students in Pakistan. Participants of these studies had positive perceptions of the language tools. These tools motivated the learners and made them confident language practitioners. Like Dogar and Khan (2025), the study reflected the positive and negative aspects of AI English language learning at the undergraduate level. Using a mixed-method approach, the study reported positive learning experiences among students and personalized learning support. Nonetheless, the study also reported the prevalence and severity of insufficient digital literacy, learner dependency, and inadequate institutional support mechanisms among learners as negative aspects of the learning experience. Recent scholarship from Pakistan has pinpointed some of AI's limitations in ESL contexts.

Tahir et al. (2025) analyzed the challenges ESL learners in Pakistan face when learning academic writing. The authors explained that a number of learners exhibited both excitement and frustration when using AI. Participants found that AI was useful for identifying writing problems, boosting confidence, performing writing tasks, and simplifying the generation and organization of ideas. However, participants reported that AI-generated responses were irrelevant, that their writing became less original, and that they relied more on AI for writing tasks. These findings suggest that using AI writing tools can improve writing tasks, but reliance on them can also lead to a writing task dependency. Such dependency may help learner to reduce the learner’s ability to practice task writing task independently. Teacher-related aspects are also a concern in Pakistani ESL. Shakil and Siddiq (2024) examined ESL teachers' attitudes toward ChatGPT and its influence on students’ writing. The study found that teachers believed students may be unable to think and write analytically and creatively, or to write independently. This opinion is especially relevant, to some studies report positive results, while balancing the perspective that AI tools must be used in conjunction with the learner's own effort and thinking.

Recent studies in Pakistani literature indicate the positive implications AI-based tools can have on the development of English language skills (such as writing and vocabulary), as well as reading and motivational skills. Simultaneously, the literature identifies over-reliance, integrity issues, accessibility issues, and a lack of speaking practice and teacher training as

problems. The present study interrogates, in the Pakistani context, the impact of AI technologies on university-level ESL learners in both positive and negative terms, while also considering practical constraints and didactic challenges.

Research Gaps and Direction for the Present Study

While artificial intelligence (AI) has attracted considerable attention in English language teaching (ELT), notable gaps remain in the literature. First, most studies examining the pedagogical role of AI in ELT either concentrate on isolated language skills, such as writing or overlook the teaching of integrated language competencies. Second, the studies examined short-term teaching interventions, thereby limiting the assessment for measuring learning outcomes, as extended periods of learning are necessary (Huang et al., 2022; Ji et al., 2023).

Third, there is a lack of studies examining AI-assisted natural language learning through well-established and integrated theoretical and empirical frameworks of teaching and learning. Research on the role of AI in language learning remains limited. Finally, existing studies often fail to address ethical concerns and academic dishonesty associated with the integration of AI-assisted technologies into education.

Research Methodology

Research Design

This research adopted a quantitative approach to analyze the influence of artificial intelligence on the English language learning of university ESL students in Pakistan. The quantitative approach was considered appropriate because it allowed the Collection and analysis of numerical data to identify patterns and relationships, and to extend findings to other contexts. In a rapidly evolving digital learning landscape this study provides evidence-based insights into students' attitudes toward, use of, and learning outcomes regarding artificial intelligence learning tools, particularly ChatGPT.

Population and Sampling

This study examined university-level ESL students in Pakistan enrolled in learning communities who were exposed to varying levels of digital technology in their learning. This study included a sample of 300 undergraduate and graduate students. This sample was considered significant, and added a lot of confidence to this study. Since the research's

demand limits the population, the use of convenience sampling without probability was justified. Although this sampling technique limited generalizability of findings, it is widely used sampling method in most educational research studies due to limited access to the populations and research participants. The preference of this study was to include participants from a range of academic disciplines and included students with varying levels of English language competence to ensure greater diversity in responses.

Research Instrument

A structured survey was used to collect data on students' perspectives and experiences. The survey was developed based on the Technology Acceptance Model (TAM) and related models of technology use and language learning. Responses were measured using a five-point Likert scale, ranging from strongly disagree to strongly agree. The survey was organized into multiple sections covering participants' demographic information and their use of artificial intelligence (AI) tools. It also included items assessing the perceived effects of AI tools on writing, reading, grammar, and vocabulary, as well as speakers' confidence and motivation, learner autonomy, and the challenges encountered by participants. The structure of the survey was designed to capture participants' experiences of language learning from both cognitive and emotional perspectives.

Validity and Reliability

To validate and to establish the reliability of the research instrument, several steps were taken. Content validation was conducted through expert review, with the questionnaire reviewed by experts in the English language and educational technology, focusing on clarity, relevance, and alignment with the research objectives. Moreover, a pilot study was conducted with approximately 25 to 30 participants to assess the instrument's clarity and consistency. Once the pilot data were collected, the reliability of data was assessed using Cronbach's alpha, with an acceptable internal consistency level set at 0.70. Questionnaire was revised for readability and coherence were made based on the pilot testers' suggestions.

Data Collection Procedure

To maximize participant access, the survey was distributed electronically via Google Forms. Before completing the survey, participants were provided with an explanation of the study's purpose. Participants were

informed that the survey was voluntary and that responses would remain anonymous. Participants were not asked for any identifying information, and survey responses were used exclusively for academic research. All procedures were conducted in accordance with the ethical guidelines, and these were thoroughly observed in the study.

Data Analysis

Once the data were collected, respondents' answers were reviewed using the Statistical Package for the Social Sciences (SPSS). The analysis was based on both descriptive and inferential statistics. For the descriptive analysis, several statistics, including frequencies, percentages, means, and standard deviations, were calculated to summarize the participants' answers. These statistics also showed the general patterns and trends in AI use and perception. To determine the relationships and the differences between the variables of interest, Pearson's correlation, independent sample t-test, and one-way ANOVA were used. A one-way ANOVA was used to determine differences among the demographic variables of gender, academic standing, and AI use frequency. Pearson's correlation was used to assess participants' perceptions of how AI tools positively impact English language learning. These procedures examined earlier have shown the impact of AI Tools used in Learning Languages.

Ethical Considerations

The study was conducted in accordance with established ethical research standards. Participants were fully informed of the research purpose prior to provide informed consent. During research practices, the integrity of confidentiality and anonymity was sustained. Participants were free to remove themselves from the research process at any point. The data collected was managed ethically and responsibly, and was restricted to use in academic contexts only.

Results

The dataset was evaluated for accuracy and completeness before the relevant statistical analyses were conducted. There were no missing data, and all variables were found to be within ±3 standard deviations limits of the mean, suggesting there were no extreme outliers within the dataset. Using the data collection instrument, the researchers examined the overall scale for reliability and internal consistency using Cronbach's alpha. The Cronbach's alpha coefficient was found to be $\alpha = .82$ within the dataset,

suggesting high reliability and internal consistency for the overall scale.

Descriptive Statistics

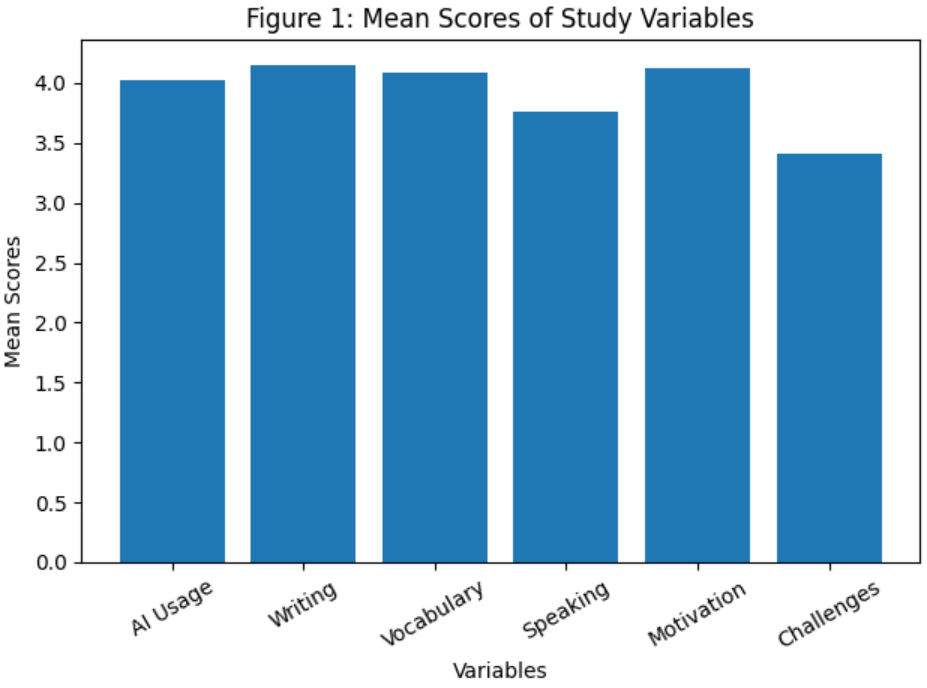
The results of the participants' responses to the study variables are presented in Table 1.

Table 1

Descriptive Statistics of Key Variables (N = 300)

Variables	*M*	*SD*
AI Tool Usage	4.02	0.78
Writing Improvement	4.15	0.72
Vocabulary Development	4.08	0.69
Speaking Confidence	3.76	0.85
Learner Motivation	4.12	0.74
Perceived Challenges	3.41	0.91

Overall, there was considerable engagement with AI-assisted tools. Writing Improvement showed the most engagement with the highest mean level, $M = 4.15$, and was followed by learner motivation, $M = 4.12$, and vocabulary Development, $M = 4.08$. Speaking confidence and perceived challenges had lower mean values, of $M = 3.76$ and $M = 3.41$, respectively.



In Figure 1, the average scores to assess the effects of AI-powered tools on English language learning. The measures include improvements in writing skills, learner motivation, and vocabulary development.

It shows that writing improvement ($M = 4.15$) has the greatest average. AI tool use has an average of ($M = 4.02$). Speaking confidence has a comparatively lower average ($M = 3.76$), and perceived challenges have the lowest average ($M = 3.41$) of all measures. Most of the averages fall on the side of being positive, especially for writing improvement and learner motivation.

Table 2

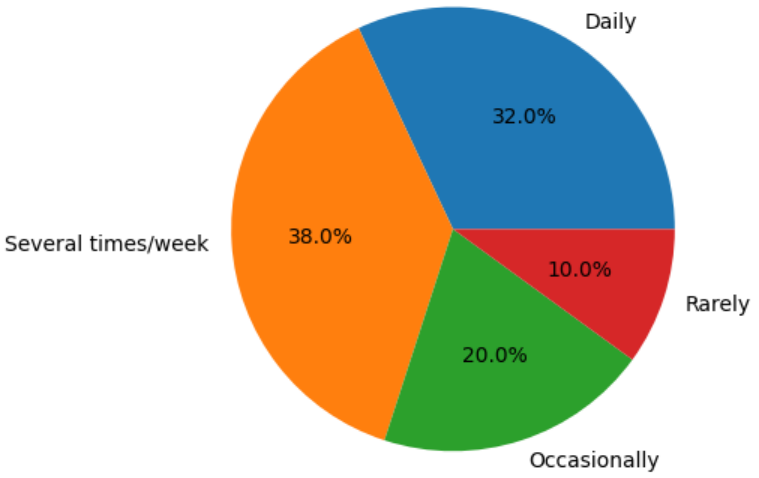
Frequency Distribution of AI Tool Usage

Anchors	*f*	%
Daily	96	32.0%
Several times/week	114	38.0%
Occasionally	60	20.0%
Rarely	30	10.0%

According to the frequency distribution, a majority of users, 70%,

reported that they used the tools daily or several times per week. This indicates that most of the participants in this study experienced a significant degree of exposure to AI-based learning tools.

Figure 2: Distribution of AI Tool Usage Frequency



The frequency of AI tool use among students is shown in Figure 2. Most of the respondents use AI tools several times a week (38%), followed by daily use (32%). Occasional use was reported by 20%, while only 10% cited infrequent use. The results here suggest participants in the sample use AI-Assisted tools frequently.

Correlation Analysis

AI usage, writing improvement, and learner motivation were analyzed using Pearson product-moment correlation. The findings are presented in Table 3.

Table 3

Pearson Correlation Matrix

Variables	1	2	3

1. AI Usage	-		
2. Writing Improvement	.62	-	
3. Motivation	.58	.65	-

Note. $p < .01$

The analysis reveals that all variables have a positive correlation. The use of AI is strongly and positively correlated with writing improvement and a Similar correlation with motivation ($r = .62$, $p < .001$; $r = .58$, $p < .001$). Writing improvement and motivation also showed a strongly correlation ($r = .65$, $p < .001$).

For all variables, AI tools have a positive correlation. The coefficients of determination (r^2) show that AI usage is responsible for explaining writing improvement ($r^2 = .38$) and variance ($r^2 = .34$) in learners' motivation, indicating strong associations.

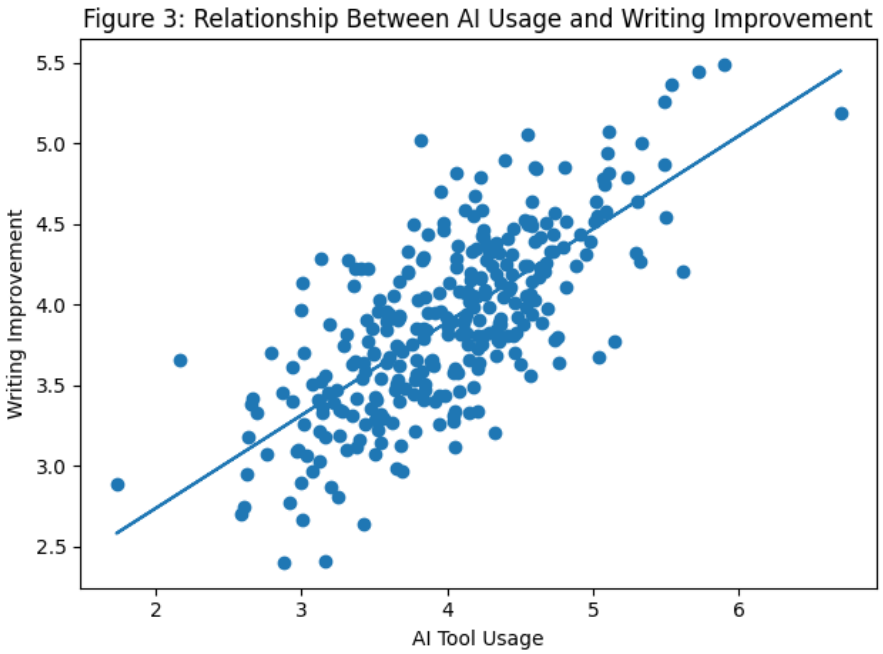


Figure 3 shows a scatterplot analyzing the relationship between AI tool usage and perceived writing improvement. It shows a positive trend illustrating the relationship between writing improvement and AI tool usage. The fitted regression line also supports the relationship direction, showing that a higher AI tool usage aligns with a higher perceived level of

writing improvement. The correlation analysis supports this regression relationship.

Independent Samples t-Test

An independent samples t-test was conducted to explore the differences in AI tool usage across genders. The results are displayed in Table 4.

Table 4

Gender Differences in AI Usage

	n	*M*	*SD*	*t*	*p*
Male	148	3.95	0.81		
Female	152	4.08	0.74	1.72	0.086

There was also no statistically significant difference for gender; t (298) = 1.72, p = 0.086. The small effect size is quantified by Cohen's d = 0.17.

One-Way ANOVA

Figure 3 shows the scatter plot of AI tool usage and improvement in writing. A one-way ANOVA was conducted to determine the differences in improvement in writing with AI tool usage.

Table 5

ANOVA Summary

	df	*F*	*p*
Between Groups	3	9.84	0.000
Within Groups	296		
Total	299		

Results showed the differences in writing improvement. AI usage was rare (N = 67), occasional (N = 107), and daily (N = 21). Results showed improvement scores as F (3, 296) = 9.84, p < .001. According to one-way ANOVA, the effect size was small (η^2 = .09). Post hoc analysis (Tukey HSD) was conducted to compare writing improvement scores across different frequencies of AI tool usage. Daily users (M = 9.17) showed improvement over others who used it occasionally (M = 6.67) and rarely (M = 4.13). Statistically, this was significant (p < .05).

The average differences in writing improvement associated with the frequency of AI tool usage are shown in Figure 4. The results indicate a

trend where the greatest average improvement in writing was observed among participants who reported daily usage of the AI tool, and subsequent groups who used tools a few times a week, occasionally, and rarely. The error bars indicate the degree of variation in each group and suggest that the differences are fairly consistent within each usage category. The figure supports the results of the ANOVA, showing that greater usage of AI tools correlates with greater writing improvement.

Discussion

Findings of this study indicates, university-level ESL learners found that AI-assisted tools benefited their learning of the English language. AI tools contribute significantly to the development of writing skills. The AI-generated feedback assists the development of the English language (Escalante et al., 2023; Jeon & Lee, 2023; Widiati et al., 2023). Adaptive AI tools that provide feedback to the learner and that are in the learner's zone of proximal development are shown to enhance learning motivation and engagement (Cai et al., 2024; Li, 2023).

Frequent Engagement with AI tools enhances the learner's perception of improvement in writing skills, and is shown to enhance writing skills when used more frequently (Al-Obaydi et al., 2025; Jeon & Lee, 2023). The enhancement of writing skills and the limited enhancement of speaking skills and confidence show the limitations of AI tools when communicative and productive skills of the language are required. This emphasizes that AI is most effective when used to support human teaching and communicative teaching practices (Kohnke et al., 2023; Mohamed, 2024).

This research assessed the role of artificial intelligence–based resources in improving the English language skills of university-level ESL students in the Pakistani context. The study revealed that students use AI resources considerably. This use is positively related to writing skills and the development of motivation in learners. The study also revealed that the greater the frequency of AI use, the greater the perceived improvement in writing skills, suggesting that the impact of consistent technology engagement surpasses that of simply interacting with the technology. However, the comparatively lower impact on learners' confidence in speaking suggests that the interactive communication skills of learners are not advanced to the level expected despite the use of AI tools, and sustaining communication remains a major challenge. AI tools are valuable resources

for integration in the language learning process, especially for developing skills in communication. The use of AI tools should complement rather than replace the interaction that occurs in a conventional classroom.

Author Contribution

Syyed Sheraz Ali Sherazi: Writing - Orignal Draft. **Muhammad Sheheryar:** writing – review & editing, Investigation. **Azha Farid:** Methodology, conceptualization.

Conflict of Interest

The authors of the manuscript have no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

Data supporting the findings of this study will be made available by the corresponding author upon request.

Funding Details

No funding has been received for this research.

Generative AI Disclosure Statement

The authors did not use any type of generative artificial intelligence software for this research.

References

Ahmed, K., Akhter, S., Siwok, S. R., Tambi, F., Khan, A. A., & Farooqi, U. R. (2025). Role of ChatGPT in enhancing English language learning: A case study of university students. *Forum for Linguistic Studies*, *7*(7), 460–469. https://doi.org/10.30564/fls.v7i7.9165

Ajmal, A., Aslam, S., Yousaf, M. S., & Raza, M. A. (2025). Using ChatGPT to enhance ESL writing skills in Pakistani higher education. *International Journal of Social Sciences Bulletin*, *3*(3), 666–673. https://doi.org/10.5281/zenodo.15062528

Al-Obaydi, L. H., Pikhart, M., & Hossain, M. K. (2025). ChatGPT and the development of core language skills: An exploratory study of EFL college students. *Contemporary Educational Technology*, *17*(4), Article ep591. https://doi.org/10.30935/cedtech/17242

Altaf, A., Khan, M. S., & Wahida, S. H. (2025). Artificial intelligence-powered vocabulary acquisition: Perceptions and performance of university students in Pakistan. *Contemporary Journal of Social Science Review*, *3*(3), 2325–2338. https://doi.org/10.63878/cjssr.v3i3.1257

Beatty, K. (2013). *Teaching & researching: Computer-assisted language*

learning (2nd ed.). Routledge. https://doi.org/10.4324/9781315833774

Burston, J. (2015). Twenty years of MALL project implementation: A meta-analysis of learning outcomes. *ReCALL*, *27*(1), 4–20. https://doi.org/10.1017/S0958344014000159

Cai, Q., Lin, Y., & Yu, Z. (2024). Factors influencing learner attitudes towards ChatGPT-assisted language learning in higher education. *International Journal of Human–Computer Interaction*, *40*(22), 7112–7126. https://doi.org/10.1080/10447318.2023.2261725

Chapelle, C. A. (2001). *Computer applications in second language acquisition: Foundations for teaching, testing and research*. Cambridge University Press.

Chapelle, C. A. (2003). *English language learning and technology: Lectures on applied linguistics in the age of information and communication technology* (Vol. 7). John Benjamins Publishing Company. https://doi.org/10.1075/lllt.7

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Dogar, M. F., & Khan, S. (2025). AI-enhanced English language learning at the undergraduate level: A mixed-methods analysis of effectiveness and challenges. *Advance Social Science Archive Journal*, *4*(2), 503–513. https://assajournal.com/index.php/36/article/view/976

Escalante, J., Pack, A., & Barrett, A. (2023). AI-generated feedback on writing: Insights into efficacy and ENL student preference. *International Journal of Educational Technology in Higher Education*, *20*(1), Article e57. https://doi.org/10.1186/s41239-023-00425-2

Fatima, T., Azhar, W., & Dur-E-Sameen. (2025). AI-driven English language learning tools for Pakistani ESL learners: A case study. *International Premier Journal of Languages & Literature*, *3*(2), 430–443.

Huang, W., Hew, K. F., & Fryer, L. K. (2022). Chatbots for language learning—Are they really useful? A systematic review of chatbot-supported language learning. *Journal of Computer Assisted Learning*, *38*(1), 237–257. https://doi.org/10.1111/jcal.12610

Hubbard, P. (Ed.) (2009). *Computer assisted language learning: Critical concepts in linguistics* (Vols. 1–4). Routledge.

Hwang, G.-J., & Chang, C.-Y. (2023). A review of opportunities and challenges of chatbots in education. *Interactive Learning Environments*, *31*(7), 4099–4112. https://doi.org/10.1080/10494820.2021.1952615

Ibrahim, K., & Kirkpatrick, R. (2024). Potentials and implications of ChatGPT for ESL writing instruction. *The International Review of Research in Open and Distributed Learning*, *25*(3), 394–409. https://doi.org/10.19173/irrodl.v25i3.7820

Imran, A. A., & Lashari, A. A. (2023). Exploring the world of artificial intelligence: The perception of university students about ChatGPT for academic purposes. *Global Social Sciences Review*, *8*(1), 375–384. https://doi.org/10.31703/gssr.2023(VIII-I).34

Jeon, J., & Lee, S. (2023). Large language models in education: A focus on the complementary relationship between human teachers and ChatGPT. *Education and Information Technologies*, *28*(12), 15873–15892. https://doi.org/10.1007/s10639-023-11834-1

Ji, H., Han, I., & Ko, Y. (2023). A systematic review of conversational AI in language education: Focusing on the collaboration with human teachers. *Journal of Research on Technology in Education*, *55*(1), 48–63. https://doi.org/10.1080/15391523.2022.2142873

Khan, A. F., Jawad, M., & Ahmed, Z. (2025). The influence of ChatGPT-generated feedback on the writing skills of Pakistani ESL high school students: An experimental study. *Research Consortium Archive*, *3*(1), 141–151.

Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). ChatGPT for language teaching and learning. *RELC Journal*, *54*(2), 537–550. https://doi.org/10.1177/00336882231162868

Koltovskaia, S. (2020). Student engagement with automated writing corrective feedback (AWCF) provided by Grammarly: A multiple case study. *Assessing Writing*, *44*, Article e100450. https://doi.org/10.1016/j.asw.2020.100450

Krashen, S. D. (1985). *The input hypothesis: Issues and implications*. Longman.

Kuhail, M. A., Alturki, N., Alramlawi, S., & Alhejori, K. (2023). Interacting with educational chatbots: A systematic review. *Education and Information Technologies*, *28*(1), 973–1018. https://doi.org/10.1007/s10639-022-11177-3

Li, R. (2023). Investigating effects of computer-mediated feedback on L2 vocabulary learning. *Computers & Education*, *198*, Article e104763. https://doi.org/10.1016/j.compedu.2023.104763

Liu, G., & Ma, C. (2024). Measuring EFL learners' use of ChatGPT in informal digital learning of English based on the technology acceptance model. *Innovation in Language Learning and Teaching*, *18*(2), 125–138. https://doi.org/10.1080/17501229.2023.2240316

Widiati, U.M., Rusdin, D., Darwin, & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education*, *10*(2), Article e2236469. https://doi.org/10.1080/2331186X.2023.2236469

Mohamed, A. M. (2024). Exploring the potential of an AI-based chatbot (ChatGPT) in enhancing English as a foreign language (EFL) teaching: Perceptions of EFL faculty members. *Education and Information Technologies*, *29*(3), 3195–3217. https://doi.org/10.1007/s10639-023-11917-z

Nelson, A. S., Santamaría, P. V., Javens, J. S., & Ricaurte, M. (2025). Students' perceptions of generative artificial intelligence (GenAI) use in academic writing in English as a foreign language. *Education Sciences*, *15*(5), Article e611. https://doi.org/10.3390/educsci15050611

Or, C., & Chapman, E. (2022). Development and validation of an instrument to measure online assessment acceptance in higher education. *British Journal of Educational Technology*, *53*(4), 977–997. https://doi.org/10.1111/bjet.13180

Saleem, T., Saleem, A., & Aslam, M. (2025). Integrating AI in Pakistani ESL classrooms: Teachers' practices, perspectives, and impact on student performance. *PLOS ONE*, *20*(9), Article e0333352. https://doi.org/10.1371/journal.pone.0333352

Shah, S. H. R., Altaf, A. R., & Mughal, K. H. (2025). Exploring the impact of AI tools on reading proficiency among undergraduate students. *The Critical Review of Social Sciences Studies*, *3*(3), 663–670.

https://doi.org/10.59075/gpsyvt20

Shakil, E., & Siddiq, S. (2024). ESL teachers' perceptions about ChatGPT as a threat to the analytical writing abilities of ESL learners at the graduate level. *Pakistan Languages and Humanities Review*, *8*(1), 115–128. https://doi.org/10.47205/plhr.2024(8-I)10

Stockwell, G. (2010). Using mobile phones for vocabulary activities: Examining the effect of platform. *Language Learning & Technology*, *14*(2), 95–110. https://doi.org/10.64152/10125/44216

Su, Y., Lin, Y., & Lai, C. (2023). Collaborating with ChatGPT in argumentative writing classrooms. *Assessing Writing*, *57*, Article e100752. https://doi.org/10.1016/j.asw.2023.100752

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. M. Gass & C. G. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Newbury House.

Tahir, F., Kanwal, H., & Bibi, A. (2025). Role of AI tools in shaping the lived experiences of Pakistani ESL learners in academic writing. *Journal of Applied Linguistics and TESOL*, *8*(2), 153–167. https://jalt.com.pk/index.php/jalt/article/view/592

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, *57*(4), 2432–2440. https://doi.org/10.1016/j.compedu.2011.06.008

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Riyadini, M. V., & Triastuti, A. (2023). Teachers' perspectives on ChatGPT as a language teaching resource: Benefits, challenges, and pedagogical considerations. *Conference on English Language Teaching*, 1105–1115. https://proceedings.uinsaizu.ac.id/index.php/celti/article/view/614

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press. https://doi.org/10.2307/j.ctvjf9vz4

Wang, D. (2025). Mind the gap in AI integration: A comparative study of language teachers' responses in a national survey. *Language, Culture and Curriculum*. Advance online publication. https://doi.org/10.1080/07908318.2025.2574633

Warschauer, M., & Ware, P. (2006). Automated writing evaluation: Defining the classroom research agenda. *Language Teaching Research*, *10*(2), 157–180. https://doi.org/10.1191/1362168806lr190oa

Wei, L. (2023). Artificial intelligence in language instruction: Impact on English learning achievement, L2 motivation, and self-regulated learning. *Frontiers in Psychology*, *14*, Article e1261955. https://doi.org/10.3389/fpsyg.2023.1261955