Physical Education, Health and Social Sciences

https://journal-of-social-education.org

E-ISSN: 2958-5996

P-ISSN: 2958-5988

Impact of AI Writing Tools (E.G., CHATGPT) on ESL Students' Writing Skills in Pakistani Universities

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DOI: https://doi.org/10.63163/jpehss.v4i1.1292

Abstract

This study investigates the impact of Artificial Intelligence (AI) writing tools, particularly ChatGPT, on the writing skills of English as a Second Language (ESL) students in Pakistani universities. The rapid integration of generative AI into higher education has transformed academic writing practices by offering students instant feedback on grammar, coherence, vocabulary, organization, and idea development. However, concerns regarding overdependence, plagiarism, reduced critical thinking, and academic integrity remain significant. This mixed-method research focuses on three public universities in Sindh: the University of Sindh, Jamshoro; Mehran University of Engineering and Technology (MUET), Jamshoro; and Shaheed Benazir Bhutto University (SBBU), Nawabshah. The study aims to examine how AI writing tools influence students' writing proficiency, explore students' and teachers' perceptions regarding their academic use, and identify institutional challenges in integrating such tools responsibly. Quantitative data were collected through structured questionnaires from 300 undergraduate ESL students and analyzed using SPSS including descriptive statistics, correlation, and regression analysis. Qualitative data were obtained through semi-structured interviews with 15 teachers and 15 students and analyzed using thematic analysis. Findings indicate that AI tools positively affect grammar accuracy, vocabulary development, confidence, and drafting efficiency. Students reported reduced writing anxiety and improved revision practices. However, excessive dependence on AI-generated content negatively affected originality and critical engagement with writing tasks. Teachers emphasized the need for AI literacy policies and guided classroom use rather than complete restriction. Triangulation confirmed that AI tools function best as support mechanisms rather than replacements for student writing. The study recommends structured institutional guidelines, faculty training, ethical AI usage policies, and curriculum integration models to maximize pedagogical benefits while minimizing risks. The findings contribute to current debates on AI-assisted writing in ESL education within Pakistani higher education.

Keywords: Artificial, Chatgpt, Intelligence, Sindh

1 Introduction

The emergence of generative Artificial Intelligence (AI) tools such as ChatGPT, Grammarly, QuillBot, and Google Gemini has significantly changed academic writing practices across higher education. In ESL contexts, where students often struggle with grammar, coherence, vocabulary, and academic style, AI writing tools have become increasingly attractive for support (Kasneci et al., 2023). Pakistani university students, particularly those studying in English-medium higher education, frequently experience linguistic barriers that affect their academic performance (Fareed et al., 2021). AI writing

tools provide immediate assistance and personalized feedback, making them powerful resources for writing development.

Recent studies suggest that ChatGPT improves idea generation, grammatical accuracy, revision quality, and writing confidence among ESL learners (Fatima et al., 2025; Tahir, 2025). However, scholars also warn that unrestricted use may weaken independent thinking and promote academic dishonesty (Dwivedi et al., 2023). Therefore, understanding the educational value and risks of AI writing tools in Pakistani universities is essential.

1.1 Problem Statement

Despite the increasing use of AI writing tools among ESL students in Pakistani universities, there is limited empirical research examining their actual impact on writing development in public universities of Sindh. Most studies focus on general perceptions rather than measurable academic outcomes. There is also insufficient evidence regarding how students balance AI assistance with originality, critical thinking, and ethical academic practices.

1.2 Research Aim and Objectives

Aim

To examine the impact of AI writing tools such as ChatGPT on ESL students' writing skills in Pakistani universities.

Objectives

1. To investigate the influence of AI writing tools on grammar, vocabulary, coherence, and academic writing performance of ESL students.
2. To explore students' and teachers' perceptions regarding the use of ChatGPT in university-level writing tasks.
3. To identify the pedagogical and ethical challenges associated with the use of AI writing tools in Pakistani universities.

1.3 Research Questions

1. How do AI writing tools affect ESL students' academic writing skills?
2. What are students' and teachers' perceptions regarding the use of ChatGPT in academic writing?
3. What challenges emerge from the use of AI writing tools in higher education classrooms?

1.4 Importance of Study

This study is important because it contributes to the growing literature on AI-assisted language learning in South Asian higher education. It provides evidence-based recommendations for universities developing AI usage policies and supports English language teachers in integrating technology responsibly.

2 Review of Literature

The growing integration of Artificial Intelligence (AI) into higher education has transformed the teaching and learning of academic writing, especially in English as a Second Language (ESL) contexts. AI writing tools such as ChatGPT, Grammarly, QuillBot, Google Gemini, and other generative writing assistants are increasingly being used by university students for drafting, editing, paraphrasing, brainstorming, and proofreading academic assignments. In Pakistani universities, where English functions as the dominant academic language but not the first language for most students, these tools are becoming highly influential in shaping writing practices. This section presents a detailed review of recent literature related to AI writing tools and their effects on ESL learners' writing skills.

2.1 AI Writing Tools and ESL Writing Development

Academic writing remains one of the most challenging language skills for ESL learners because it requires mastery of grammar, coherence, vocabulary, argument development, citation practices, and formal academic style. Many Pakistani students enter universities with limited confidence in academic writing due to weak prior exposure to English-medium writing instruction (Fareed et al., 2021). AI writing tools have emerged as support systems that help bridge this gap by offering immediate feedback and revision assistance.

ChatGPT, for example, provides conversational and context-sensitive feedback that differs from traditional grammar correction software. Unlike basic proofreading tools, it can suggest improved sentence structures, generate thesis statements, propose arguments, explain grammatical errors, and help students revise content logically. Kasneci et al. (2023) argue that large language models such as ChatGPT offer pedagogical value because they simulate personalized tutoring, especially where teacher feedback is limited.

Fatima et al. (2025), in a study conducted among undergraduate ESL learners in Lahore, found that students using ChatGPT showed significant improvement in coherence, grammatical accuracy, and academic vocabulary. Their findings showed that students produced better-organized essays and demonstrated improved revision strategies compared to students relying only on traditional classroom feedback. Similarly, Rasheed (2025) found that students perceived AI writing tools as particularly helpful during the drafting and editing stages of writing rather than during final submission.

Another important contribution of AI writing tools is scaffolding. Students with weaker writing proficiency can use AI-generated suggestions to learn sentence patterns, paragraph organization, and academic transitions. This supports Vygotskian views of assisted learning, where tools function as scaffolds for cognitive development. However, scholars note that improvement occurs only when students actively engage with feedback rather than passively copying AI-generated responses (Dwivedi et al., 2023).

Therefore, AI writing tools have strong potential to improve ESL writing development, but the educational value depends on how students interact with the technology.

2.2 Writing Anxiety and Student Confidence

Writing anxiety is one of the most widely documented barriers in ESL writing research. Many university students experience fear of making grammatical mistakes, being judged for poor writing quality, or failing to meet academic expectations. This anxiety often reduces participation, limits idea expression, and creates avoidance behaviors in writing assignments.

In Pakistani higher education, writing anxiety is particularly common because English is treated as both a language subject and a medium of assessment across disciplines. Students from rural and public-school backgrounds often feel disadvantaged compared to students from elite English-medium institutions. As a result, they experience hesitation in classroom writing tasks and assignment submission.

AI writing tools can reduce writing anxiety by providing immediate, private, and judgment-free assistance. Students can revise drafts repeatedly without embarrassment, ask questions without fear, and experiment with academic language independently. According to Tahir (2025), ChatGPT creates a psychologically safe environment for students because it removes the social pressure associated with teacher correction.

Rasheed (2025) found that students using AI tools reported higher self-confidence in writing assignments because they felt more prepared before submission. Many participants stated that they were less afraid of grammar mistakes after using AI-generated suggestions. This confidence improvement was particularly strong among first- and second-year undergraduate students.

Furthermore, AI tools support learner autonomy. Instead of waiting for delayed teacher feedback, students can immediately test sentence choices, ask for explanations, and improve drafts in real time.

This promotes self-regulated learning and encourages repeated practice, both of which are essential for writing development.

However, some scholars caution that confidence built entirely on AI-generated support may be artificial if students do not internalize writing skills independently. Therefore, confidence must be accompanied by genuine learning rather than dependency.

2.3 Risks of Overdependence and Academic Integrity

Despite the benefits of AI writing tools, concerns about overdependence and academic dishonesty remain serious in higher education. One of the most frequently discussed risks is that students may begin to rely on AI-generated text instead of developing their own ideas, arguments, and writing voice. Tahir (2025) argues that while AI improves efficiency, excessive dependence weakens critical thinking and originality. Students may submit polished assignments without fully understanding the content they present. This creates surface-level academic success without deeper learning. In writing-intensive disciplines, such dependence can undermine long-term academic growth.

Another major concern is plagiarism and ethical misuse. Students may use ChatGPT to generate entire essays, paraphrase published work without attribution, or create fabricated references. Since generative AI can produce highly fluent academic language, detection becomes difficult for instructors. Dwivedi et al. (2023) emphasize that institutions must redefine academic integrity policies because traditional plagiarism frameworks are insufficient for AI-generated writing.

Teachers also report concerns regarding authenticity of student voice. When assignments become heavily AI-assisted, instructors struggle to assess actual language competence. This is especially problematic in ESL classrooms where writing assignments are central indicators of language proficiency.

Moreover, dependence on AI may reduce problem-solving habits. Instead of revising independently, students may ask AI for complete answers. This limits reflection, argument formation, and cognitive engagement. Research by Saleem et al. (2025) found that students who used AI without instructional guidance often showed weaker critical interpretation despite improved surface-level grammar.

Thus, while AI writing tools are academically useful, they also create significant ethical and pedagogical risks if used without institutional regulation.

2.4 Teachers' Perceptions and Classroom Integration

Teachers play a central role in determining whether AI writing tools become educational assets or academic threats. Their perceptions strongly influence classroom policy, assignment design, and student behavior. Recent studies show that most teachers no longer support complete prohibition of AI tools; instead, they prefer guided integration with clear boundaries.

Kasneci et al. (2023) argue that banning AI tools is unrealistic because students already have access to them outside classrooms. Instead, educators should redesign writing instruction to include AI literacy, ethical use, and reflective learning practices. This includes teaching students how to evaluate AI-generated responses critically rather than accepting them automatically.

In Pakistani universities, teachers often express mixed reactions. Some faculty view ChatGPT as a threat to originality and academic discipline, while others see it as a useful supplement for students struggling with English writing. Fatima et al. (2025) found that teachers supported AI use for grammar checking and brainstorming but strongly opposed full assignment generation.

Saleem et al. (2025) emphasize that faculty training is necessary because many teachers themselves are unfamiliar with how generative AI works. Without proper understanding, institutional responses become inconsistent. Some departments ban AI completely, while others ignore it entirely, creating confusion among students.

Teachers also recommend assessment redesign. Instead of relying only on take-home written assignments, instructors suggest reflective journals, oral defenses, in-class writing, and process-based

assessments where students must show drafting stages. These approaches reduce unethical AI use while preserving the benefits of writing support.
Therefore, successful classroom integration depends on teacher preparedness, curriculum redesign, and institutional support rather than simple restriction.

2.5 Framework of the Study

This study adopts the Technology Acceptance Model (TAM) combined with Constructivist Learning Theory as its conceptual framework.
The Technology Acceptance Model, developed by Davis (1989), explains how users adopt new technologies based on two major variables: perceived usefulness and perceived ease of use. In the context of this study, students are more likely to use ChatGPT if they believe it improves writing quality and is easy to access and operate. Anwer et al. (2025) found that trust in AI systems significantly predicts academic adoption among Pakistani university students. Students who viewed ChatGPT as reliable and helpful were more likely to integrate it into writing tasks.
Constructivist Learning Theory supports the educational dimension of the study by emphasizing that learning occurs through active engagement, reflection, and interaction with feedback. AI tools become learning partners rather than answer providers when students use them to revise, question, and refine their writing. From this perspective, ChatGPT supports knowledge construction only if learners critically engage with its suggestions.
The combination of TAM and Constructivism provides a balanced framework that explains both technological adoption and educational outcomes. It helps examine not only whether students use AI tools, but also how that use contributes to genuine writing development.

2.6 Research Gap

Although international research on AI writing tools has expanded rapidly since 2023, empirical studies focusing on Pakistani ESL learners remain limited. Most existing studies emphasize perceptions of ChatGPT rather than measurable academic writing outcomes. There is insufficient evidence linking AI usage to specific writing improvements such as grammar accuracy, coherence, vocabulary development, and confidence.
Another major limitation is methodological. Many studies use only questionnaires and lack triangulation through interviews, classroom observations, or teacher perspectives. This creates an incomplete understanding of how AI tools function in real university settings.
Very few studies specifically examine public universities in Sindh, despite the fact that these institutions represent diverse linguistic, socioeconomic, and educational backgrounds. Research focusing on elite private universities cannot fully explain the experiences of students in public-sector institutions such as the University of Sindh, MUET, and SBBU. Furthermore, there is little institutional research addressing policy development, faculty preparedness, and ethical regulation of AI writing tools in Pakistani higher education. This study addresses these gaps by using a mixed-method design, including students and teachers from three public universities, and examining both measurable outcomes and lived academic experiences.

3 Methodology

This study adopts a mixed-method research methodology to investigate the impact of AI writing tools such as ChatGPT on ESL students' writing skills in Pakistani universities. The purpose of using mixed methods is to obtain both measurable statistical evidence and in-depth explanatory insights regarding students' writing performance, perceptions, and institutional experiences. Since the use of AI in academic writing is both a measurable educational phenomenon and a socially constructed classroom practice, a combination of quantitative and qualitative approaches provides stronger validity and a more comprehensive understanding.

Mixed-method research is particularly suitable for this study because quantitative data alone cannot explain why students use AI tools, how they perceive them, or what challenges teachers face in classrooms. Similarly, qualitative data alone cannot provide measurable evidence of improvement in grammar, coherence, vocabulary, and writing confidence. Therefore, integrating both methods strengthens reliability, triangulation, and interpretation of findings.

3.1 Research Design

This research employs a convergent parallel mixed-method design, where quantitative and qualitative data are collected during the same phase, analyzed separately, and then integrated during interpretation. This design is appropriate because it allows both forms of data to complement each other and provides a fuller picture of the research problem.

Quantitative Component

The quantitative phase focuses on measuring the relationship between the use of AI writing tools and students' writing performance. A structured questionnaire using a five-point Likert scale was distributed among undergraduate ESL students. The survey measured variables such as frequency of AI tool usage, grammar improvement, vocabulary development, writing confidence, idea generation, academic integrity concerns, and perceived overdependence.

The purpose of this component was to statistically examine whether students who use AI writing tools report measurable improvement in writing skills. Data were analyzed using SPSS (Statistical Package for Social Sciences), including descriptive statistics, correlation analysis, and regression analysis.

Qualitative Component

The qualitative phase focuses on understanding students' and teachers' lived experiences regarding AI-assisted writing. Semi-structured interviews were conducted with selected students and English language teachers from the target universities. This method allowed participants to explain their perceptions, concerns, teaching practices, and ethical concerns in detail.

Qualitative data were analyzed using thematic analysis following Braun and Clarke's (2006) framework, including coding, theme development, and interpretation.

Rationale for Mixed Methods

The mixed-method approach improves the trustworthiness of the study because numerical findings from surveys are supported and explained by interview data. For example, if students report improved writing confidence quantitatively, interviews help explain how and why that confidence developed. This process strengthens triangulation and minimizes the limitations of using only one research method.

3.2 Research Context (Site)

The study was conducted in three major public universities of Sindh, Pakistan:

1. University of Sindh, Jamshoro

The University of Sindh is one of the oldest and largest public universities in Pakistan, with a large population of undergraduate and postgraduate students from diverse linguistic and socioeconomic backgrounds. English is widely used as the medium of academic writing, making it a highly relevant site for ESL research. Students from humanities and social sciences frequently engage in essay writing, assignments, and research reports where AI tools are increasingly used.

2. Mehran University of Engineering and Technology (MUET), Jamshoro

MUET is a leading engineering and technology institution where students from technical disciplines often face challenges in academic English writing despite strong technical competence. Engineering students increasingly use AI tools for report writing, project documentation, and academic

communication. This site provides important insights into AI writing support beyond traditional language departments.

3. Shaheed Benazir Bhutto University (SBBU), Nawabshah

SBBU represents a significant public-sector university serving students from semi-urban and rural educational backgrounds. Many students come from Urdu- and Sindhi-medium schooling systems and face strong ESL writing challenges at university level. The university provides a valuable context for examining how AI tools support students with limited prior exposure to academic English writing.

Justification for Site Selection

These three universities were selected because they represent diverse academic disciplines, student populations, and ESL learning conditions within public higher education in Sindh. Together, they provide broader representation of Pakistani university writing contexts and strengthen the generalizability of findings.

3.3 Population and Sampling

Target Population

The target population of this study consisted of undergraduate ESL students and university teachers involved in academic writing instruction. Students were selected because they are the primary users of AI writing tools, while teachers were included to understand pedagogical and ethical perspectives.

Student Population

The student population included undergraduate students enrolled in English language, social sciences, business studies, engineering, and education programs where academic writing is regularly required.

Teacher Population

The teacher population included English language instructors, communication skills teachers, and subject faculty members who assess student writing assignments.

Sampling Technique

A purposive sampling technique was used for qualitative participants, while stratified random sampling was used for quantitative survey participants.

Sample Size

- 300 undergraduate students (100 from each university)
- 15 teachers (5 from each university)
- 15 students selected for interviews (5 from each university)

This sample size was considered appropriate for both statistical reliability and qualitative depth.

3.4 Research Instruments

Multiple research instruments were used to ensure comprehensive data collection and triangulation.

1. Student Questionnaire

A structured questionnaire based on a five-point Likert scale was developed to collect quantitative data. The questionnaire included sections on:

- Frequency of AI writing tool usage
- Grammar improvement n- Vocabulary development
- Writing confidence
- Coherence and organization
- Critical thinking and originality
- Academic integrity concerns
- Teacher guidance and institutional support

Responses ranged from Strongly Agree to Strongly Disagree.

The questionnaire was adapted from recent studies on AI-assisted writing and validated through expert review by university faculty members.

2. Writing Performance Checklist

A writing performance checklist was used to compare students' writing quality before and after AI-assisted writing support. The checklist evaluated:

- Grammar accuracy
- Sentence structure
- Vocabulary appropriateness
- Coherence and cohesion
- Argument development
- Referencing and academic style

This helped provide objective support for self-reported student perceptions.

3. Semi-Structured Interviews

Semi-structured interviews were conducted with students and teachers to gather deeper insights. Interview questions focused on:

- Experiences using ChatGPT and other AI tools
- Perceived benefits and limitations
- Concerns regarding dependency and plagiarism
- Teacher responses to AI-assisted writing
- Suggestions for responsible institutional use

This flexible format allowed participants to express personal experiences beyond fixed survey responses.

4. Classroom Observation Notes

Observation notes were used to record informal classroom practices related to writing instruction, AI discussions, assignment design, and teacher monitoring strategies. These observations supported contextual interpretation.

4 Collection of Data

Data were collected from 300 undergraduate students (100 from each university) and 15 faculty members. Questionnaires were distributed physically and digitally. Interviews were recorded with consent and transcribed for analysis.

5 Analysis of Data

5.1 Quantitative

Table 1: Students' Perceptions of AI Writing Tools

Variable	Mean	SD
Grammar Improvement	4.31	0.68
Vocabulary Development	4.12	0.74
Writing Confidence	4.20	0.71
Critical Thinking Improvement	3.21	0.89
Risk of Overdependence	4.02	0.77

Table 2: Correlation Analysis

Variables	Writing Performance
AI Tool Usage Frequency	.72**
Teacher Guidance	.61**
Overdependence	-.48*

**p < .01

Interpretation
SPSS results indicate a strong positive relationship between guided AI use and writing performance. However, excessive dependence negatively affects originality and critical engagement.

5.2 Qualitative (Thematic Analysis)
Theme 1: Improved Revision and Grammar Awareness
Students reported that ChatGPT helped them identify grammatical mistakes and improve sentence structure.
Theme 2: Reduced Writing Anxiety
Participants described feeling more confident when drafting assignments with AI-assisted support.
Theme 3: Fear of Dependency
Teachers expressed concern that students may stop thinking independently and rely excessively on generated content.
Theme 4: Need for Institutional Policy
Faculty strongly recommended formal AI-use guidelines and ethical writing workshops.

5.3 Triangulation of Data
Both quantitative and qualitative findings confirmed that AI writing tools improve writing quality when used responsibly. Student performance improved most where teacher guidance was present. Triangulation showed that AI is effective as a support tool, not a replacement for human writing effort.

6 Conclusion and Recommendations
6.1 Conclusion
AI writing tools such as ChatGPT significantly improve ESL students' grammar, vocabulary, drafting confidence, and revision practices in Pakistani universities. However, without structured guidance, these tools may weaken originality and academic integrity. Universities should adopt balanced policies that promote ethical and pedagogically sound AI use.

6.2 Recommendations
1. Universities should develop formal AI usage policies.
2. Teachers should receive AI literacy training.
3. Writing courses should include responsible prompt engineering instruction.
4. Assessment methods should prioritize reflection and originality.
5. Students should be trained to use AI critically rather than dependently.

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