

ESL LEARNERS' EXPERIENCES WITH AI WRITING TOOLS: A NETNOGRAPHIC STUDY AT UNIVERSITIES IN SINDH, PAKISTAN

1 Kashif Shaikh

Instructor (English) IBA Community College Jacobabad
kashif.shaikhiba@gmail.com

2 Hafeez ul Rehman

Lecturer (English) Education Department Government of Sindh
hafeez9696rehman@gmail.com

3 Waliullah Dahri

Lecturer (English) Sindh Agriculture University Tandojam
waliullahdahri@gmail.com ORCID: <https://orcid.org/0009-0005-2479-2326>

Abstract

The rapid use of digital writing tools in higher education has changed academic writing practices worldwide, yet the experiences of ESL learners in Pakistan's multilingual universities are not well represented in research. This qualitative netnographic study explored how 30 graduate ESL students at three public universities in Sindh, Shaheed Benazir Bhutto University Shaheed Benazirabad, Sindh Agriculture University Tandojam, and Mehran University of Engineering and Technology Jamshoro, experience and make sense of using writing support tools. Guided by Davis's Technology Acceptance Model, data were collected through semi-structured interviews on WhatsApp, producing rich narratives about students' experiences. Thematic analysis identified three main themes aligned with the research objectives: the perceived impact of writing tools on academic skills, challenges in using these tools, and student suggestions for addressing those challenges. The study also highlights differences between universities as well as common patterns across institutions. Findings show that students benefit from faster writing, improved language, and better organization, but they often lack formal guidance, which raises concerns about dependency and academic integrity. The study concludes with recommendations for context-sensitive policies, integration of digital literacy into curricula, and improvements in digital infrastructure in Sindh's universities.

Keywords: *AI Writing Tools, ESL Learners, Academic Writing, Netnography, Technology Acceptance Model, Higher Education, Sindh, Pakistan*

1. Introduction

1.1. Background of the Study

Artificial Intelligence (AI) has significantly changed higher education, especially academic writing. AI writing tools such as Grammarly, QuillBot, and ChatGPT help students improve grammar, vocabulary, style, and organization. These tools provide quick feedback and support students, particularly second-language learners, in understanding the conventions of academic English (Alharbi, 2023; Barrot, 2023). As a result, AI is transforming the writing process and helping learners develop their writing skills more effectively (Woo et al., 2023).

Research shows that AI technologies play an important role in second language learning and academic writing. Many AI-based tools assist students in correcting grammatical errors, improving sentence structure, and organizing ideas. They also support research writing through features such as language checking and plagiarism detection (Mohamed, 2023). Because of these functions, AI

tools have become useful resources for improving students' academic writing performance (Khabib, 2022).

In Pakistan, English is the main language used in higher education and is closely connected with academic and professional success. However, students enter universities with different levels of English proficiency, and many face difficulties in academic writing, including organization, coherence, argument development, and proper referencing (Rahman, 2020). In this situation, students increasingly rely on AI writing tools to improve their work, often without formal training or institutional guidance. Strong writing skills remain essential not only for academic tasks such as assignments and research papers but also for professional growth.

Although international research has examined the use of digital writing tools in education, few studies have explored the experiences of Pakistani students, particularly in Sindh. Universities in this region enroll students from rural and urban backgrounds who often speak multiple languages, including Sindhi, Urdu, and English. Their experiences, challenges, and perceptions regarding the use of writing support tools in English academic writing remain underexplored. This study addresses this gap by investigating how ESL students at Shaheed Benazir Bhutto University Shaheed Benazirabad, Sindh Agriculture University Tandojam, and Mehran University of Engineering and Technology Jamshoro use these tools and how they influence their learning practices, aiming to inform educators, curriculum developers, and policymakers about effective integration strategies.

Evaluating students' writing with the support of these tools provides insights into their attitudes, challenges, and motivation. Understanding how digital tools assist learners in improving academic writing can guide the development of strategies that meet the needs of multilingual ESL students in Sindh. Research shows that learners are more likely to adopt technology when it is easy to use and perceived as useful, and that individuals who value innovation tend to see technology as more beneficial and accessible (Davis, 1989; Wu et al., 2019). This study emphasizes the importance of examining both the benefits and potential impacts of technology on academic writing and explores ways to integrate these tools to support student learning and success.

1.2. Problem Statement

Research on AI in Pakistani ESL classrooms is still developing. A few recent studies have examined students' attitudes toward the use of AI tools and generally report positive perceptions among learners (Ahmed & Abid, 2023). However, most of these studies rely on quantitative survey methods, which may not fully capture the detailed and contextual experiences of students in their academic environments. Although some research has been conducted in the context of Sindh, the number of qualitative studies exploring students' experiences with AI in English writing remains limited. Considering the unique linguistic environment of the region, where students often use multiple languages, there is a need for deeper qualitative exploration. Therefore, this study seeks to contribute to the existing literature by providing an in-depth, emic perspective on the use of AI in academic writing through a netnographic approach. netnography is particularly suited for this context because students increasingly communicate and learn through digital platforms, making online spaces natural sites for understanding their authentic experiences.

1.3. Research Objectives

1. To explore the impact of artificial intelligence-based writing assistants on the academic writing skills of graduate learners at universities in Sindh
2. To identify the existing challenges in using artificial intelligence-based writing assistants for academic writing among these students.
3. To suggest measures based on student perspectives to address the existing challenges related to artificial intelligence-based writing assistants in the Sindhi context

1.4. Research Questions

1. How do artificial intelligence-based writing assistants impact the academic writing skills of graduate learners at universities in Sindh?
2. What specific challenges do learners face in using AI based writing assistants for academic writing?
3. What measures do students propose to address these challenges and enhance the effective use of AI writing tools?

2. Literature Review

2.1 The Use of AI Tools in Second Language Writing

The potential of AI to support L2 writers has been widely acknowledged in recent scholarship. Unlike traditional grammar checkers, modern AI tools leverage large language models to provide context aware feedback on grammar, style, tone, and even content development (Woo et al., 2023). For novice academic writers, this can be transformative. Studies have shown that AI tools can reduce surface level errors, allowing students to focus on higher order concerns like argumentation and critical thinking (Nazari, Shabbir, & Setiawan, 2021).

A study conducted by Ranalli, J. (2021) reports that AI based grammar and spelling checking writing tools are quicker and more timesaving than traditional writing lessons. According to a study by Li, J., et al. (2022), learners who use AI technology are more proficient writers. Additionally, AI based writing assistants help maintain academic writing rules by managing formatting specifications and proper style manuals (Ray, 2023).

Furthermore, the immediate, nonjudgmental feedback provided by AI can lower writing anxiety and boost learner confidence (Fitria, 2023). Chen, Zhou, and Li (2022) found that Chinese EFL learners who used AI for iterative revision demonstrated improved textual cohesion and lexical diversity over time. This suggests that AI, when used actively, can become a partner in the learning process rather than a mere proofreader.

2.2 The Role of AI in the Writing Process

Researchers caution against viewing AI solely as a corrective tool. The writing process is inherently social and cognitive, involving planning, drafting, revising, and reflecting (Flower & Hayes, 1981). AI tools are now being designed to intervene at various stages of this process. For instance, tools like ChatGPT can assist with brainstorming and outlining, while others like Grammarly offer in-depth style and tone suggestions.

2.3 Concerns and Critiques

Despite the optimism, a growing body of literature highlights significant concerns. The most prominent of these is the risk of cognitive offloading, the tendency to rely on AI to the point where it undermines genuine skill development (Dai, Liu, & Lim, 2024). If students use AI to generate entire sentences or paragraphs without critical engagement, their writing may improve in the short term, but their underlying competence may stagnate.

Another concern is the standardizing effect of AI. Most AI tools are trained on corpora of standard academic English, which may not account for the creative, hybrid, or culturally specific forms of expression that multilingual writers bring to their texts (Canagarajah, 2013). This can lead to a form of linguistic imperialism, where students' unique voices are suppressed in favor of a generic, correct style (Ushioda, 2020).

Finally, issues of access and equity cannot be ignored. Premium versions of AI tools, which offer more advanced features, are often behind a paywall. In a country like Pakistan, where students face economic disparities, this creates a digital divide between those who can afford premium tools and those who cannot (Ragnedda & Muschert, 2022).

2.4 Theoretical Framework: Technology Acceptance Model (TAM)

The present study is based on the model of Technology Acceptance, also known as TAM, developed by Davis (1989). This model refers to the user's perception of how straightforward or simple the technology appears to utilize. According to TAM, two primary factors determine an individual's acceptance and use of technology:

1. Perceived Usefulness: The degree to which a person believes that using a particular technology would enhance their job performance or learning outcomes.
2. Perceived Ease of Use: The degree to which a person believes that using a particular technology would be free of effort.

Davis (1989) argued that individuals are more likely to accept and use a technology which has been shown to be user-friendly, intuitive, and require little effort to understand and use. These perceptions collectively shape attitudes toward technology, which in turn influence behavioral intentions and actual system use.

This framework is ideal for understanding, through their own words, how ESL learners in Sindh perceive and adopt AI writing tools based on their perceived usefulness and ease of use. By analyzing students' narratives about their experiences with AI tools, this study illuminates how TAM's core constructs manifest in the specific context of academic writing in Pakistani universities. Learners tend to use technology if it is user-friendly, effortless, and easy to understand (Davis, 1989), making TAM particularly relevant for exploring both the adoption and the challenges associated with AI writing assistants.

4. Methodology

4.1 Research Design

This study used a qualitative approach with netnography to carry out the research. netnography, also called virtual ethnography (Hine, 2000) or online ethnography (Markham, 2005), is a method designed to study communities and cultures that develop through computer-mediated

communication. This approach was selected to collect detailed textual data from participants in their natural online settings, enabling the researchers to reach a larger group of students across three cities in Sindh.

The concept of netnography was introduced by Kozinets (1998) as an anthropological method for studying online communities. It is a fully online approach that can include graphical, video, and photographic data, and allows communication between researchers and participants through email, websites, or other feedback tools. Netnographers can also use asynchronous communication platforms such as WhatsApp (Kozinets, 2010). With the growing popularity of online learning, collecting data virtually provided an effective way to gather diverse perspectives from students in different locations across Sindh.

4.2 Population

The population of the study was 30 ESL graduate students selected from three public sector universities in Sindh, Pakistan. These students were enrolled in Master's and M.Phil. programs across various disciplines.

4.3 Sample and Sampling Technique

A two-stage sampling approach was used: first, three universities were selected through convenience sampling based on researcher access. Second, 10 students from each university were randomly selected from a pool of self-identified AI tool users.

University	N	Gender (M/F)	Age Range	Discipline Areas
SBBU	10	4M / 6F	22–28	Social Sciences, Natural Sciences
SAU Tandojam	10	5M / 5F	23–29	Agriculture, Computer Science
MUET Jamshoro	10	5M / 5F	22–27	Engineering, Sciences

All participants were active users of AI writing tools including Grammarly, Quill Bot, and ChatGPT, and had been using these tools for academic writing purposes for a minimum of three months prior to data collection. The sample included 16 women and 14 men, ranging in age from 22 to 29 years.

4.4 Data Collection

The researcher used WhatsApp for data collection by sharing a semi structured interview guide with the respondents. The interview schedule was comprised of five open-ended questions designed to encourage detailed, narrative responses about their experiences with AI writing tools:

1. How did you start using AI writing tools, and how do you typically use them in your academic writing?
2. What differences have you noticed in your writing since you began using these tools?
3. What specific aspects of your writing do you think AI helps you with the most?
4. What challenges or difficulties have you faced while using AI writing tools?
5. What suggestions do you have for universities or teachers to help students use AI tools more effectively?

Follow-up questions were asked via WhatsApp chat to clarify and probe deeper into initial responses. Participants responded in English, Urdu, or a mix of both languages, and responses were compiled into a single document for each participant. Data collection spanned four weeks, during which the researcher maintained regular contact with participants to ensure richness and depth in responses.

4.5 Data Analysis

Data were analyzed using thematic analysis technique. The thematic analysis was carried out by following the six phases outlined by Braun and Clarke (2021):

Phase 1: Getting familiarized with data through reading and rereading all WhatsApp transcripts.

Phase 2: Generating initial codes from the data.

Phase 3: Searching for themes by grouping related codes.

Phase 4: Reviewing themes to ensure they accurately represented the data and aligned with the research objectives.

Phase 5: Defining and naming themes.

Phase 6: Producing the final report with illustrative quotes from the participants.

The analysis was iterative, moving back and forth between the data and emerging themes. To ensure alignment with the research objectives, themes were developed to directly address each of the three research questions. To ensure university specific insights, responses were analyzed both collectively and separately for each institution, allowing for comparison across the three universities.

4.6 Ethical Considerations

Ethical approval was obtained from relevant departmental authorities. All participants were provided with information about the study and assured of their anonymity and the confidentiality of their data. Pseudonyms are used in the reporting of findings, and university affiliations are indicated only to provide contextual analysis. Participants provided informed consent through WhatsApp messaging before data collection began.

4.7 Delimitations

This study was delimited to three public sector universities in Sindh and 120 graduate students. The study's findings are qualitative in nature and aim for transferability rather than broad statistical generalizability. The insights are specific to the context of these institutions and the experiences of the participants involved.

5. Findings

The thematic analysis of the interview transcripts revealed three major themes; each directly aligned with one of the research objectives.

Theme 1: Perceived Impact of AI on Academic Writing Skills

This theme addresses Research Objective 1: To explore the impact of artificial intelligence-based writing assistants on the academic writing skills of graduate learners.

Students reported that AI tools positively influenced their writing in three main areas: efficiency and speed, language accuracy and vocabulary, and content organization.

Efficiency and Speed

- "Before using AI tools, I would spend days on one assignment. Now I can finish in hours, and my writing is clearer" (Student 10, SBBU).
- "For my research proposal, AI helped me quickly format citations and check grammar. What used to take a day now takes just a few hours" (Student 3, SAU Tandojam).
- "I use AI to generate ideas and rephrase sentences faster. It has taken a huge burden off my shoulders" (Student 5, MUET Jamshoro).

Language Accuracy and Vocabulary

- "AI corrects my grammar mistakes and explains why they are wrong. I am learning and my English is improving" (Student 9, SBBU).
- "It suggests formal academic words that make my writing sound professional. My supervisor even noticed the improvement" (Student 2, SAU Tandojam).
- "Before AI, my sentences were very simple. Now I see how AI rephrases them, and I am learning new vocabulary" (Student 4, MUET Jamshoro).

Content Organization

- "Sometimes I have all the ideas in my head, but I don't know how to start. I ask AI to create an outline, and it gives me a clear structure" (Student 5, SBBU).
- "In agriculture research, AI helps me organize my report sections and ensures coherence between them" (Student 3, SAU Tandojam).
- "For my first research proposal, AI showed me exactly what sections I need and what to write in each. Without it, I would have been lost" (Student 9, MUET Jamshoro).

Students perceive AI tools as highly useful for improving academic writing. The main benefits include faster writing, better grammar and vocabulary, and clearer organization of content. Many students also reported learning from AI explanations, indicating that AI tools support both practical writing tasks and language development. Although the impact varies depending on prior English proficiency and academic background, AI tools generally enhance writing performance and learner confidence across diverse contexts.

Theme 2: Existing Challenges in Using AI Writing Assistants

This theme addresses Research Objective 2: To identify the existing challenges in using artificial intelligence-based writing assistants for academic writing.

Students reported several challenges in three main areas: lack of guidance, dependency and cognitive concerns, and infrastructure and access barriers.

Lack of Guidance

- "We were never taught how to use these tools properly. I worry if I am using them correctly or cheating myself out of real learning" (Student 11, SBBU).
- "Teachers tell us not to use AI, but they don't explain why. If they guided us, we could learn to use it properly" (Student 8, MUET Jamshoro).
- "I don't know if using AI is cheating or not. Nobody has told us the boundaries" (Student 33, SAU Tandojam).

Dependency and Cognitive Concerns

- "Sometimes I feel my brain is becoming lazy. Why think of a sentence when AI can write it for me?" (Student 26, SBBU).
- "AI makes things so easy that sometimes I just let it do the work. Then I feel guilty because I didn't really learn" (Student 54, MUET Jamshoro).
- "Last week the internet was down and I had to write without AI. I struggled so much. Maybe I am not improving my own skills" (Student 38, SAU Tandojam).

Infrastructure and Access Barriers

- "The internet on campus is very slow. Sometimes I have to go to the city center just to complete my assignments" (Student 14, SBBU).
- "In Shikarpur, internet is slow and using AI tools is expensive because of data costs" (Student 2, MUET Jamshoro).
- "Some students cannot afford smartphones or premium tools, so they are left behind" (Student 51, MUET Jamshoro).

Students face systemic challenges in using AI tools effectively. Lack of formal guidance creates uncertainty about ethical use and appropriate learning strategies. Many worries about over-dependency and the potential negative impact on their language development, particularly those with weaker English skills. Infrastructure problems, including poor internet connectivity and the high cost of premium tools, limit consistent access and may exacerbate inequalities. These factors highlight that while AI tools are useful, their benefits are moderated by pedagogical, developmental, and infrastructural constraints.

Theme 3: Student-Proposed Measures to Address Challenges

This theme addresses Research Objective 3: To suggest measures, based on student perspectives, to cope with the challenges of using AI-based writing assistants.

Students offered practical suggestions focusing on infrastructure, pedagogical support, and institutional policies.

Infrastructure

- "The university should provide better WiFi so we can use AI tools without going elsewhere" (Student 14, SBBU).
- "Computer labs with good internet and AI tools installed would help students who cannot afford data or smartphones" (Student 2, MUET Jamshoro).
- "Better internet in hostels is essential for all students to access AI tools" (Student 36, SAU Tandojam).

Pedagogical Support

- "We need workshops on how to use AI properly, including ethics and learning, not just shortcuts" (Student 11, SBBU).
- "Teachers should learn about AI so they can guide us instead of just saying no" (Student 8, MUET Jamshoro).
- "Universities should arrange sessions on using AI as a learning tool and not just for completing work" (Student 42, SAU Tandojam).

Institutional Policies

- "The university should create clear rules about AI use so we know what is allowed" (Student 54, MUET Jamshoro).
- "If the university buys software licenses for all students, everyone benefits equally" (Student 21, SBBU).
- "Clear policies about AI would reduce confusion and help us use it responsibly" (Student 33, SAU Tandojam).

Students' proposals show a clear understanding of what would help them use AI effectively and ethically. Improved infrastructure, pedagogical guidance, and clear institutional policies directly address the challenges of access, dependency, and ethical uncertainty. These measures also reflect students' awareness of equity and the importance of structured support. From a TAM perspective, implementing these suggestions would reduce barriers, increase confidence, and promote responsible integration of AI in academic writing.

6. Discussion

This study provides a detailed understanding of how ESL learners at three universities in Sindh experience digital writing tools. Students reported improvements in writing efficiency, language accuracy, and organization of content, while also noting support in structuring assignments and developing grammar and vocabulary skills. These benefits align with Davis's Technology Acceptance Model, reflecting perceived usefulness and ease of use. However, concerns about overreliance and potential long-term effects on independent learning indicate that acceptance of educational technologies depends on both individual attitudes and broader institutional factors. Key challenges included limited guidance, risk of dependency, inconsistent internet access, and unequal availability of devices and premium software. These barriers highlight both pedagogical and infrastructural gaps and point to broader issues of digital inequality.

Experiences varied across institutions. Students at SBBU emphasized grammar and workload management, SAU Tandojam students focused on research writing and discipline-specific vocabulary, and MUET Jamshoro students faced basic language difficulties alongside significant access constraints. Students suggested measures such as workshops, teacher training, improved internet access, institutional software provision, and clear usage guidelines. These suggestions demonstrate that students are reflective users who recognize both the benefits and potential risks of these tools and can propose practical strategies to enhance learning outcomes.

Based on these findings, universities should incorporate digital literacy into curricula, design assignments that integrate writing support in meaningful ways, and encourage reflective engagement with technological suggestions to promote learning rather than dependence. Clear institutional policies, guidance on ethical use, and strategies to support independent writing are essential. Investments in infrastructure, computer labs, and differentiated support for students at varying proficiency levels can address equity concerns. Teachers should be trained to guide students effectively and foster discussions about the benefits, limitations, and responsible use of digital tools in writing.

Overall, technology-mediated writing is now a permanent part of academic practice, and students seek structured support rather than prohibition. By listening to student perspectives and implementing context-sensitive measures, universities in Sindh can create an environment that strengthens learning, builds confidence, and supports the development of academic writing skills ethically and effectively.

7. Conclusion

This qualitative study explored the experiences of 30 ESL graduate students at three universities in Sindh, Shaheed Benazir Bhutto University Shaheed Benazirabad, Sindh Agriculture University Tandojam, and Mehran University of Engineering and Technology Jamshoro, as they used digital writing tools in their academic work. Students reported that these tools helped them write more efficiently, improve language accuracy, expand vocabulary, organize ideas, and build confidence. These benefits reflect perceived usefulness and ease of use as described in Davis's Technology Acceptance Model. At the same time, students faced challenges including lack of formal guidance, ethical uncertainty, risk of dependency, and infrastructural barriers such as poor internet access, high costs, and limited availability of devices, with these issues being more pronounced in rural and disadvantaged contexts. Students proposed practical solutions including better connectivity, institutional software access, workshops, teacher training, and clear policies, emphasizing the need for structured support to use these tools effectively for learning rather than only for completing tasks. The study also shows that students' needs and challenges vary across institutions, suggesting that context-sensitive strategies are essential for equitable and effective integration of technology into academic writing practices.

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