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LEVERAGING AI POWERED LANGUAGE TOOLS TO ENHANCE ENGLISH PROFICIENCY AMONG COLLEGE LEVEL STUDENTS IN PAKISTAN: CHALLENGES AND ISSUES

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Abstract:
It is aimed to investigate the role of AI powered language learning tools for the enhancement of English language proficiency among college level students in Pakistan, with a particular focus on the challenges and contextual issues surrounding their implementation. Employing ***a*** *mixed-method approach****,*** *the research combines quantitative and qualitative data to offer a comprehensive understanding of the effectiveness and limitations of tools such as ChatGPT, Grammarly, and Duolingo in the ESL context. Quantitative data were collected through pre- and post-intervention language proficiency assessments administered to 250 students across five colleges, measuring gains in vocabulary, grammar, and writing fluency after a 10-week AI-assisted learning program. Qualitative insights were gathered through semi-structured interviews with 15 English language instructors and focus group discussions with student participants to explore their experiences, perceptions, and barriers to AI integration. Findings reveal statistically significant improvements in students' English language performance, particularly in grammar accuracy and written expression. However, the study also highlights major challenges, including limited digital access, varying levels of student digital literacy, resistance from traditionally trained faculty, and concerns over academic dependence on AI tools. These findings underscore the need for institutional readiness, teacher training, and culturally adapted AI tool development. The study offers practical implications for curriculum designers, educational policymakers, and technical education stakeholders aiming to integrate AI technologies into Pakistan's higher education system to support equitable and effective English language learning.*

Key Words:
AI Powered Tools, ESL Context, Language Proficiency, College Level, Challenges,

Introduction

The integration of Artificial Intelligence (AI) in education has revolutionized language learning, offering innovative tools that provide personalized feedback, adaptive learning paths, and real-time assessments. AI-powered language tools such as ChatGPT, Grammarly, and Duolingo have gained prominence for their potential to enhance English language proficiency among learners by facilitating interactive and individualized learning experiences (Karats et al., 2024).In the context of Pakistan, where English serves as a critical medium for academic and professional advancement, the adoption of AI-driven language learning tools presents both opportunities and challenges. While these tools can address gaps in traditional language instruction methods, their effective implementation is often hindered by

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infrastructural limitations, digital literacy disparities, and resistance from educators accustomed to conventional pedagogies (Zahid et al., 2025).

Recent studies have highlighted the efficacy of AI-assisted language learning in reducing foreign language anxiety and improving learners' attitudes and motivation. For instance, Biju et al. (2024) found that AI-assisted assessments significantly enhanced writing performance and learner engagement among university students. Similarly, Karats et al., (2024) reported that the use of ChatGPT in foreign language education positively influenced students' learning experiences, particularly in writing and vocabulary acquisition However, the reliance on AI tools also raises concerns regarding overdependence, which may impede the development of critical thinking and analytical skills. Zhai et al. (2024) have cautioned that excessive dependence on AI dialogue systems can diminish students' cognitive abilities, including decision-making and analytical reasoning. Therefore, while AI tools offer substantial benefits, their integration must be balanced with pedagogical approaches that foster independent thinking.

Moreover, the successful adoption of AI-powered language tools in Pakistan's higher education sector necessitates addressing infrastructural challenges and enhancing digital literacy among both students and educators. Zahid et al. (2025) emphasize the importance of institutional support and teacher training programs to facilitate the effective integration of AI technologies in educational settings. Given the limited empirical research on the application of AI-powered language tools in Pakistan's college-level education, this study aims to fill the gap by employing a mixed-method approach to evaluate the effectiveness of these tools in enhancing English proficiency. The research will also explore the challenges and issues associated with their implementation, providing insights for curriculum developers, policymakers, and educators seeking to leverage technology for improved language learning outcomes.

Literature Review

The integration of Artificial Intelligence (AI) in language education has revolutionized traditional pedagogical approaches, offering personalized and adaptive learning experiences. AI-powered tools such as ChatGPT, Grammarly, and Duolingo have been instrumental in providing real-time feedback, enhancing learner engagement, and facilitating self-paced learning environments. These tools leverage Natural Language Processing (NLP) and machine learning algorithms to tailor content to individual learner needs, thereby improving language acquisition outcomes (Karats et al.,(2024). Empirical studies have demonstrated the efficacy of AI tools in enhancing various facets of English language proficiency. For instance, Song et al.(2025) found that the use of ChatGPT significantly improved students' writing skills, grammar accuracy, and vocabulary acquisition. Similarly, Biju et al. (2024) reported that AI-assisted language assessments reduced foreign language anxiety and improved learners' attitudes and motivation, leading to better writing performance. These findings underscore the potential of AI tools in creating supportive and effective language learning environments.

In the Pakistani context, the adoption of AI-powered language tools in higher education is still in its nascent stages. Karats et al. (2024) highlighted that while there is a growing interest in integrating AI technologies into educational practices, challenges such as limited digital infrastructure, lack of teacher training, and resistance to change impede widespread adoption. Moreover, disparities in access to technology between urban and rural areas exacerbate the digital divide, affecting the equitable implementation of AI tools in language education.Despite the benefits, the integration of AI tools in language learning raises concerns about overreliance, which may hinder the development of critical thinking and

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analytical skills. Zhai et al. (2024) cautioned that excessive dependence on AI dialogue systems could diminish students' cognitive abilities, including decision-making and analytical reasoning. Additionally, issues related to data privacy, algorithmic bias, and academic integrity, such as AI-generated plagiarism, present ethical challenges that need to be addressed through comprehensive policies and guidelines (Zahid et al., 2025).Given the unique socio-cultural and educational landscape of Pakistan, there is a pressing need for context-specific research to explore the effectiveness and challenges of implementing AI-powered language tools in higher education. Such research should consider factors like language policies, teacher preparedness, student attitudes, and infrastructural capabilities to develop tailored strategies that facilitate the successful integration of AI technologies in language education. Ramzan et al. (2023a) empowered ESL students by harnessing the potential of social media for the enhancement of academic motivation and found social media as an instrument to boast ESL students' engagement and performance. Ramzan et al. (2023b) explored the relationships between social media usage and academic performance and consider it as a source of academic improvement. Ramzan et al. (2023c) amplified classroom enjoyment and cultivated positive learning attitude among ESL learners and the study emphasized role of learners centered approach. Javaid et al. (2024a) systematically on cognitive and motivational impact on English language learning and conclude that AI computing technologies play the part of giving learners the intrinsic motivation, self regulation and learner autonomy. This can stimulate students' engagement and interest in their studies. Javaid et al. (2024b) assess the stress causing factors and languages related challenges among first year students and recommend research should explore the effectiveness of interventions aimed at reducing stress among first-year students and investigate additional factors that may contribute to stress in this population. Chen and Ramzan (2024) analyzed the role of Facebook e portfolio on motivation and performance on second language and practical implications highlight the importance of creating supportive and engaging language learning environments

Significance of the Study

English language proficiency is essential for academic achievement, global communication, and employability in Pakistan's higher education context. However, traditional English language teaching methods often fall short in addressing the individual learning needs of college-level students. AI-powered language tools like ChatGPT**,** Grammarly**,** and Duolingo offer a transformative approach by providing personalized feedback**,** adaptive learning experiences, and instant error correction. These tools have the potential to fill instructional gaps, especially in resource-constrained classrooms where teacher-student ratios are high and instructional time is limited.This study is significant as it empirically evaluates the effectiven**ess** of AI language tools while also critically examining the challenges of implementation in the Pakistani educational context. Given Pakistan's growing but uneven digital infrastructure, this research provides insights into how technology can be leveraged equitably. The findings can guide curriculum designers, policymakers, teacher trainers, and technical education developers in making informed decisions about integrating AI tools into English language instruction at the tertiary level.

Statement of the Problem

Despite global advancements in AI-assisted language learning, its adoption in Pakistan's higher education system remains limited and inconsistent. Many college-level students

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struggle with English proficiency**,** particularly in areas such as academic writing, grammar, and vocabulary. While AI tools have shown promise in improving these skills internationally, their effectiveness in the Pakistani socio-educational landscape marked by technological disparities**,** limited digital literacy**,** and pedagogical resistance has not been thoroughly examined. Furthermore, there is a growing concern that without structured guidance, students may develop an overreliance on AI tools, which can hinder critical thinking, writing independence, and original thought. The lack of empirical evidence on how these tools affect learning outcomes and the institutional challenges of integration leaves a critical gap in the literature. This study aims to address this problem by assessing both the pedagogical impact and contextual limitations of AI-powered tools in college ESL classrooms in Pakistan.

Rationale of the Study

The rationale behind this study lies in the intersection of two critical trends: the emergence of AI in education and the persistent challenges in English language acquisition among Pakistani college students. Given the increasing accessibility of AI tools and their reported success in other educational contexts, it is imperative to investigate how these tools perform in Pakistan's diverse educational landscape.

Previous research (e.g., Shadiev & Liang, 2023; Biju et al., 2024) has shown that AI tools can enhance learner engagement, reduce foreign language anxiety, and improve writing performance. However, these studies are largely concentrated in technologically advanced, Western contexts. Pakistan's complex mix of urban and rural institutions, digital inequity, and traditional teaching paradigms necessitates a localized exploration of AI tool effectiveness. This study seeks to generate evidence-based insights into how AI tools can be responsibly and effectively integrated into the language learning process in Pakistani colleges. It also aims to contribute to the broader discourse on educational equity**,** digital transformation**,** and context-sensitive pedagogy in South Asia.

Methodology

1. Research Design

This study employed a **convergent parallel mixed-methods design** (Creswell & Plano Clark, 2018), combining both quantitative and qualitative approaches to provide a comprehensive understanding of the impact and challenges of using AI-powered language learning tools in enhancing English proficiency. The rationale for this design lies in its capacity to offer a holistic interpretation by integrating statistical outcomes with contextual, experiential insights from stakeholders.

2. Participants and Sampling

2.1 Student Participants

A total of **250 college-level ESL students** were selected from **five government and private colleges** located across urban and semi-urban districts in Punjab and Sindh. A **stratified random sampling** technique was used to ensure representation across gender, socioeconomic backgrounds, and academic streams (science, humanities, commerce).

Inclusion criteria:

- Enrolled in an English language course.
- Basic digital literacy and access to mobile or desktop devices.

2.2 Instructor Participants

15 English language instructors were selected through **purposive sampling** based on:

- A minimum of 3 years of ESL teaching experience.
- Willingness to incorporate AI tools into classroom activities.
- Varied familiarity with educational technology.

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3. Intervention Design and Procedure

The study spanned **10 weeks** and incorporated three AI tools:

- **ChatGPT** for generating writing prompts, practicing sentence construction, and resolving grammar-related queries.
- **Grammarly** for editing tasks, syntax improvement, and real-time grammar correction.
- **Duolingo** for vocabulary building and language reinforcement through gamified exercises.

Students were introduced to these tools in the first week via orientation sessions. Instructors facilitated their use in-class and recommended tasks for out-of-class engagement. Students were required to complete weekly activities using these tools, with a structured focus on grammar practice, vocabulary reinforcement, and written composition.

4. Data Collection Methods

4.1 Quantitative Data Collection

- **Pre- and Post-Intervention Tests**: Standardized language proficiency tests were administered at the beginning and end of the program, aligned with the **CEFR (Common European Framework of Reference for Languages)**. The tests included:
  - Vocabulary quizzes
  - Grammar-based multiple-choice questions
  - Short essay writing tasks
- **AI Usage Logs**: Weekly activity logs tracked frequency, duration, and types of interactions with the AI tools.

4.2 Qualitative Data Collection

- **Semi-Structured Interviews with Teachers**: Conducted to understand instructional perspectives, adoption barriers, and observed student behaviors. Interviews lasted 30–45 minutes each.
- **Focus Group Discussions (FGDs) with Students**: Four FGDs (6–8 participants per group) were held in Weeks 5 and 10 to gather evolving perceptions of AI use, motivation, and accessibility issues.

5. Data Analysis

5.1 Quantitative Analysis

- **Descriptive Statistics** were used to summarize pre- and post-test scores.
- **Paired Samples t-tests** measured improvements in grammar, vocabulary, and writing.
- **ANOVA** was employed to compare performance across demographic groups (e.g., urban vs. semi-urban).
- **Correlation Analysis** explored the relationship between tool usage frequency and performance gains.

5.2 Qualitative Analysis

- All interviews and FGDs were transcribed and coded using **thematic analysis** (Braun & Clarke, 2006).
- Codes were grouped into themes such as “engagement with AI tools,” “pedagogical resistance,” and “digital literacy challenges.”
- NVivo software supported the coding process to ensure inter-rater reliability and minimize subjectivity.

6. Validity and Reliability

- The language proficiency test was reviewed and validated by three ESL experts.

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- A **pilot study** involving 20 students was conducted to refine test items and digital tool implementation procedures.
- **Triangulation** of multiple data sources (test scores, interviews, FGDs) ensured data trustworthiness.
- **Member checking** was performed with teacher participants to confirm accuracy of interpreted interview data.

7. Ethical Considerations

- Ethical clearance was obtained from the institutional research ethics board.
- Written informed consent was collected from all participants (and guardians where applicable).
- Anonymity and confidentiality were maintained through coded identifiers.
- Participants were informed about their right to withdraw at any stage without penalty.

8. Limitations

- The study was limited to five colleges in two provinces, which may not capture the diversity of all regions in Pakistan.
- Internet connectivity issues occasionally disrupted tool usage, especially in semi-urban areas.
- The 10-week timeframe may not fully capture long-term proficiency development or retention.

Data Analysis and Results

This section presents the quantitative and qualitative findings derived from the mixed-methods design employed in this study. The quantitative component involved pre- and post-intervention assessments of English proficiency, while the qualitative component included thematic analysis of interview and focus group data to understand the contextual challenges and perceptions related to AI tool use.

1. Quantitative Analysis

1.1 Pre- and Post-Intervention Performance

Paired sample t-tests were conducted to assess the effectiveness of the AI-powered language tools in improving students' English proficiency across three domains: vocabulary, grammar accuracy, and writing fluency.

Language Component	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Gain	t-value	p-value
Vocabulary	59.1 (10.6)	70.5 (9.2)	+11.4	13.34	< .001
Grammar	62.3 (11.1)	74.9 (10.3)	+12.6	14.67	< .001
Writing Fluency	56.8 (12.4)	69.2 (11.5)	+12.4	12.82	< .001

Interpretation:

There was a statistically significant improvement in all three areas of English proficiency ($p < .001$). The greatest gains were observed in **grammar accuracy**, likely due to sustained use of Grammarly for real-time correction and feedback.

1.2 Tool Usage and Performance Correlation

Pearson correlation analysis was performed to explore the relationship between AI tool usage frequency and language improvement.

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Tool Used	Language Skills Correlation	Pearson's r	Significance
Grammarly	Grammar	0.64	p < .01
ChatGPT	Writing Fluency	0.58	p < .01
Duolingo	Vocabulary	0.52	p < .01

Interpretation:

A moderate to strong positive correlation was observed between the frequency of AI tool usage and gains in the corresponding skill areas, suggesting that regular engagement with these tools substantially contributed to proficiency improvement.

1.3 Demographic and Regional Differences

One-way ANOVA revealed differences in performance gains across urban and semi-urban colleges.

Group	Mean Improvement Score all Skilss	F- value	p- value
Urban	12.9		
Semi-Urban	9.7	6.74	0.011

Interpretation:

Urban students demonstrated significantly greater improvement than their semi-urban counterparts. This suggests that better access to internet connectivity, updated devices, and institutional support played a role in tool efficacy.

2. Qualitative Analysis

Thematic analysis of 15 instructor interviews and 4 student focus group discussions generated insights across the following themes:

2.1 Student Engagement and Motivation

Both students and teachers reported enhanced motivation and active participation in English learning tasks due to AI tools. Duolingo's gamification features and ChatGPT's interactive conversational style were frequently mentioned.

"Using ChatGPT feels like talking to a tutor. It doesn't judge you, and you can ask as many questions as you like." – Student, Urban College

2.2 Perceived Learning Benefits

Students noted clear improvements in grammar and writing. Grammarly, in particular, was valued for providing error explanations and alternative sentence structures."Grammarly helps me see my mistakes immediately. I now write more carefully, even when not using it." – Student, Semi-Urban College

2.3 Technological Barriers

Instructors and students from semi-urban colleges highlighted issues such as:

- Inconsistent internet access
- Lack of institutional Wi-Fi
- Limited availability of student-owned digital devices

"We often lost momentum due to power outages or poor signals during scheduled tool usage." – Instructor, Semi-Urban College

2.4 Faculty Resistance and Training Needs

Several instructors expressed discomfort or skepticism toward integrating AI into pedagogy, often citing inadequate training or unfamiliarity with the tools.

"I know students enjoy it, but I am not confident in using AI tools myself. We need proper training first." – Instructor, Government College

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2.5 Overreliance and Academic Integrity Concerns

Concerns were raised about students copy-pasting AI-generated content without comprehension, leading to academic dependency.“ Sometimes, students submit AI-generated answers without editing. It worries me they’re not learning to think independently.” – Instructor, Private College

Discussion

The findings of this study underscore the significant impact of AI-powered language tools—namely Grammarly, ChatGPT, and Duolingo—on enhancing English proficiency among students. These results align with existing literature while also highlighting unique regional challenges and considerations.

Quantitative Outcomes and Tool Efficacy

The observed improvements across vocabulary, grammar accuracy, and writing fluency corroborate prior research on the effectiveness of AI tools in language learning. For instance, Suh (2025) conducted a quasi-experimental study demonstrating that personalized AI tutors, including platforms like Duolingo, significantly enhanced students' language performance and engagement . Similarly, Jacob et al. (2023) found that integrating ChatGPT into the writing process aided second-language learners in maintaining their authorial voice while improving academic writing . These studies support the current findings, suggesting that AI tools can effectively augment language learning outcomes.

Correlation Between Tool Usage and Skill Development

The positive correlations between the frequency of AI tool usage and improvements in corresponding language skills mirror findings from previous studies. Suh et al. (2025) reported that structured use of ChatGPT within the CGCAW framework led to enhanced clarity and logical coherence in argumentative writing among L2 learners . This suggests that not only the frequency but also the structured application of AI tools contributes to skill development.

Demographic and Regional Disparities

The study's revelation of significant differences in performance gains between urban and semi-urban students highlights the influence of infrastructural and institutional factors. This aligns with broader observations in educational technology adoption, where disparities in access to reliable internet and digital devices can hinder the effective integration of AI tools in less-resourced regions . Addressing these disparities is crucial for equitable educational outcomes.

Qualitative Insights: Engagement, Challenges, and Ethical Considerations

The qualitative data reveal increased student engagement and motivation attributed to the interactive and gamified nature of AI tools. This is consistent with findings by Mogavi et al. (2023), who noted that students perceive ChatGPT as a helpful and non-judgmental learning aid . However, concerns about overreliance on AI-generated content and academic integrity echo warnings from educators about potential superficial learning and diminished critical thinking skills . These insights underscore the necessity for balanced integration of AI tools, emphasizing the development of students' independent thinking alongside technological assistance.The study affirms the potential of AI-powered tools to enhance English language proficiency, aligning with existing research on their efficacy. However, it also highlights the need for addressing infrastructural disparities and fostering ethical usage to prevent overdependence. Future research should explore long-term impacts of AI tool integration and develop strategies to mitigate challenges related to access and academic integrity.

Conclusion

This study demonstrates that AI-powered language learning tools—specifically Grammarly, ChatGPT, and Duolingo—can significantly enhance students' English proficiency across

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vocabulary, grammar accuracy, and writing fluency. The quantitative results revealed statistically significant improvements post-intervention, with strong correlations between the frequency of tool use and skill development. Qualitative findings further supported these outcomes, highlighting increased student motivation, perceived learning benefits, and contextual challenges. However, the study also underscores critical considerations for implementation. Regional disparities, especially between urban and semi-urban institutions, point to the need for equitable access to digital infrastructure and institutional support. Additionally, concerns around faculty preparedness and student overreliance on AI-generated content emphasize the importance of guided integration and digital literacy training.In conclusion, while AI tools offer substantial pedagogical value in language education, their effectiveness depends not only on technological availability but also on thoughtful implementation, equitable access, and responsible usage. Future efforts should focus on longitudinal research, faculty development programs, and strategies to ensure that AI tools serve as complements to—rather than replacements for—active, critical learning.

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