

PAPER

THE IMPACT OF GENERATIVE AI ON EFL ACADEMIC WRITING SKILLS: A QUASI-EXPERIMENTAL STUDY IN UZBEKISTAN

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Abstract

This quasi-experimental study examines the impact of generative artificial intelligence (AI) on EFL academic writing skills at Fergana State University, Uzbekistan. Grounded in Vygotsky's Zone of Proximal Development, Self-Regulated Learning theory, and the Process Writing Approach, the study investigates whether guided AI-assisted instruction improves writing performance relative to traditional teacher-led instruction. Sixty intermediate-level students (B1–B2 CEFR) completed a seven-week intervention, with pre- and post-test argumentative essays assessed using an IELTS-based analytic rubric. Quantitative data are analyzed using paired and independent-samples t-tests; qualitative data are gathered through perception surveys and semi-structured interviews. The study specifically explores the differential effects of AI on lexical resource, grammatical accuracy, coherence, and higher-order argumentation, alongside student attitudes toward AI use and its implications for writing autonomy and academic integrity. Findings are expected to contribute empirical evidence to the limited body of quasi-experimental AI research in Central Asian EFL higher education.

Key words: Generative AI; EFL academic writing; ChatGPT; quasi-experimental design; higher education; Uzbekistan; writing performance; learner autonomy.

INTRODUCTION

The rapid advances in generative artificial intelligence (AI) technologies have fundamentally disrupted established higher education models and transformed the boundaries of pedagogical

practice. Simultaneously, the development of academic writing expertise remains one of the most challenging aspects of English as a Foreign Language (EFL) instruction. EFL learners in non-Western universities must acquire a range of writing sub-skills — including grammar, academic

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vocabulary, cohesion, argumentation, and citation conventions — in order to communicate effectively in academic contexts (Barrot, 2023; Crompton & Burke, 2023).

Generative AI technologies, particularly LLM-based applications including ChatGPT, have generated meaningful attention as education technology tools. The academic interest in such educational use cases for generative AI has increased dramatically since ChatGPT's release to the public in November 2022 (see Lendvai, 2025). Given that grammar, vocabulary, and syntax are harder for EFL students to acquire, scholars have examined the potential of these tools to provide real-time feedback in those areas (Song & Song, 2023; Alkamel & Alwagieh, 2024), though the pedagogical applications of AI writing tools remain debated, and fears persist about their student dependency and potential to ease academic dishonesty (Barrot, 2023; Caprioglio & Paglia, 2023).

While the impact of generative AI on EFL academic writing has been reported internationally, few empirical studies have explored its implications for academic writing in Central Asian higher education contexts, such as Uzbekistan. Although Mirzayev et al. (2025) documented EFL teacher perceptions of ChatGPT at Fergana State University (FSU), student-centered quasi-experimental studies investigating its effects on writing performance remain absent from the literature. This study addresses that gap by investigating whether guided generative AI-assisted instruction improves the academic writing quality of second-year EFL students at Fergana State University.

This study addresses the following four research questions:

RQ1. Does guided generative AI-assisted instruction significantly improve the overall academic writing performance of EFL undergraduates compared to traditional teacher-led instruction?

RQ2. What are the differential effects of generative AI on specific writing sub-skills — namely lexical resource, grammatical accuracy, coherence and cohesion, and task achievement?

RQ3. What are students' attitudes and perceptions toward the use of generative AI in academic writing tasks? RQ4. How does AI-assisted writing instruction affect students' sense of writing

autonomy and academic integrity?

LITERATURE REVIEW

Academic writing challenges in EFL contexts

Academic Writing Challenges and the Uzbek Higher Education Context Academic writing in English presents considerable difficulties for EFL learners, who must simultaneously manage argument development, academic register, lexical precision, and citation conventions in a non-native language (Barrot, 2023; Crompton & Burke, 2023). These challenges are compounded in contexts where instructor-to-student ratios are high and individualized written feedback is limited by time and resources (Al-Mansouri et al., 2025). In Uzbekistan specifically, government-led reforms have accelerated the alignment of higher education with CEFR standards; however, English for Academic Purposes (EAP) instruction — including academic writing — remains underdeveloped in many regional universities (Akhmedjanova, 2022; Tursunova & Rahimov, 2022; Bezborodova, 2022).

This structural gap means that undergraduate EFL learners often complete university without systematic exposure to academic writing pedagogy, making them particularly dependent on instructor feedback that may not be consistently available. Generative AI as a Tool for Writing Instruction: Affordances and Limitations Since ChatGPT's public release in November 2022, scholarly attention to its role in writing instruction has grown rapidly. Crompton and Burke (2023) found in a large-scale review that EFL writing is among the most common applications of AI in higher education globally. Lee et al. (2025), reviewing 92 studies through a systems theory lens, confirmed that language learning is one of the most heavily researched domains within AI-in-education scholarship. Within writing specifically, generative AI has been found to support lexical enrichment and grammatical accuracy through real-time, iterative feedback (Alkamel & Alwagieh, 2024; Song & Song, 2023).

Crompton et al. (2024) further identified personalized feedback and revision scaffolding as key affordances of AI in English Language Teaching. However, the literature also reveals important limitations. Teng (2024) cautioned that AI-generated feedback tends toward formulaic, surface-level commentary and frequently fails

to support higher-order argumentation. Lin and Crosthwaite (2024) similarly found that AI feedback performs unevenly across writing sub-skills, with greater reliability on local linguistic features than on global content or rhetorical structure.

Bozkurt et al. (2024) argued for a critical, pedagogically deliberate approach to AI integration, while Barrot (2023) specifically flagged overreliance and threats to academic integrity as persistent concerns that any AI-assisted writing intervention must address explicitly. Learner Perceptions and the Question of Writing Autonomy A growing body of research examines how learners perceive and respond to AI-assisted writing. Fontao et al. (2024), in a quasi-experimental study in Spain, found that students using ChatGPT demonstrated greater writing confidence alongside measurable knowledge gains. Chan et al. (2024) reported that GPT-generated feedback increased not only essay quality but also student engagement and motivation.

In the Uzbek context, Amonov et al. (2024) found that 88.4% of 207 surveyed undergraduates used AI tools regularly and expressed strong expectations about their educational value, while simultaneously voicing concerns about plagiarism, misinformation, and dependency. A 2025 study similarly found that while EFL students made meaningful progress using AI for idea generation and drafting, they preferred AI as a supplement to, rather than a replacement for, teacher instruction (OJCMT, 2025). These findings point toward a nuanced relationship between AI use and writing autonomy. Kasimova (2024) cautioned that uncritical AI use may obstruct authentic language development, and Mirzayev et al. (2025) found that Uzbek EFL teachers at Fergana State University, while generally positive about ChatGPT, worried that student overreliance could diminish critical thinking capacity. This tension between AI as a scaffolding tool and AI as a crutch is central to the pedagogical design of the present study. Research Gap: The Need for Quasi-Experimental Evidence in Central Asian EFL Contexts Despite the growing body of international literature on AI and EFL writing, empirical evidence from Central Asia remains sparse and methodologically limited. Existing Uzbek scholarship is predominantly survey-based and teacher-centered (Mirzayev et al., 2025; Shakib Kotamjani et al., 2023), capturing

perceptions rather than measured outcomes. Internationally, quasi-experimental designs have demonstrated the impact of AI-assisted instruction on writing performance (Fontao et al., 2024; Mohammed & Khalid, 2025; Al-Mansouri et al., 2025), yet no such study has been conducted with undergraduate EFL learners at a regional Uzbek university.

METHODS AND MATERIALS

Similar to quasi-experimental pre-test/post-test studies employing an experimental and control group design to evaluate the effectiveness of educational technology in EFL contexts (see, for instance, Fontao et al., 2024; Mohammed & Khalid, 2025), this design allows for the investigation of both AI-assisted and customary language instruction while maintaining the authenticity associated with classroom settings.

Participants

The participants are 60 second-year undergraduate EFL learners attending the Faculty of Foreign Languages at Fergana State University, Uzbekistan. The sample is selected from two intact classes using the convenience sampling technique. The experimental group ($n = 30$) receives AI-assisted writing instruction while the control group ($n = 30$) receives customary writing instruction by a teacher. All participants are intermediate English-language learners, between B1 and B2 on the CEFR scale (Council of Europe, 2001). Expertise was checked with a pre-study skill screening, and informed consent to participate along with data confidentiality were ensured, in accordance with ethical research practices.

Instruments

The data was collected using four instruments. The first two instruments were pre and post-test academic essay tasks that required students to write a 300 to 400 word argumentative essay on an academic topic assigned to them. Scores were then assigned using an IELTS-based rubric for each construct: task achievement, coherence and cohesion, lexical resource and grammatical range and accuracy, on a 1 to 9 band scale. Second, a 20-item Likert scale (1 = strongly disagree; 5 = strongly agree) student perception questionnaire measuring students' writing attitudes, writing utility, writing autonomy, and writing ethics toward AI-assisted

writing was developed.

This questionnaire was adapted from the questionnaires used in previous studies (Amonov et al., 2024; Mirzayev et al., 2025). Third, inter-rater reliability is established by having all essays scored independently by two trained raters before a reliability check is performed (Pearson correlation coefficient, $r \geq 0.85$). Fourth, optional semi-structured interviews are conducted with a subset of students from the experimental group ($n = 10$), to obtain qualitative data on students' experiences of generative AI.

Procedure

For the first week, the pre-test essay task is administered; each group completes this task under identical invigilated conditions. In weeks 2-6, the experimental group drafts and revises their essays with the assistance of generative AI (ChatGPT) to generate ideas, assist in drafting, and provide feedback for revision. The experimental group learns to use the generative AI tool with the instructor's prompting strategies. The AI+ group's teacher also tracks usage of the AI tools and delivers short debriefings to provide critical analysis of the AI responses and avoid uncritical use of AI tools. The control group receives normal instruction and only teacher-written corrective feedback on the same weekly tasks. In Week 7, the two groups of subjects are administered the post-test essay task under the same conditions as the pre-test task.

DATA ANALYSIS

Responses to the writing test are statistically analyzed with SPSS statistics software (Version 26). For within-group improvement, a paired-sample t-test between the pre-test and post-test result of every experimental group is carried out. An independent-sample t-test will be conducted for the experimental group and control group to compare their performance in the post-test to test H1 (the post-test performance of the AI-assisted group will be statistically considerably better than the control group). Descriptive statistics (mean and standard deviation) will be calculated for each dimension of the analytic rubric to test H2. Data from the perception questionnaire are analyzed using descriptive statistics and Pearson correlations. This analysis examines the relationship between patterns of AI technology use and self-reported

autonomy. Data from interviews are analyzed using thematic analysis (Braun & Clarke, 2006) to develop themes, which are then interpreted in light of quantitative results.

RESULTS AND DISCUSSION

Writing Performance before and after the Tests

It is worth mentioning that the results below are predictions based on the existing body of research since the data collection for this study is yet to be completed. However, we believe that the experimental group will show statistically meaningful pretest to posttest growth in composite scores for writing (i.e., paired t-test, $p < 0.05$), as per Mohammed and Khalid's (2025) study, where AI-based formative feedback improved EFL writing expertise. The control group is expected to show smaller but still moderate improvement based only on normal instructional feedback.

An independent t-test comparison of post-test means for the experimental and control groups is expected to reveal a considerably higher mean score for the experimental group to confirm H1. This result corroborates the findings of a Springer Nature study that the experimental group of postgraduate EFL students in Egypt attained considerably higher means on the post-test writing skill test than the control group after AI-assisted feedback (Al-Mansouri et al., 2025). Furthermore, Chan et al. (2024) observed that GPT-generated feedback increased the quality of essay text and increased student engagement and motivation.

Dimension-Level Analysis

At the sub-skill level, the highest effect sizes are expected in the lexical resource and grammatical range and accuracy components (H2). This converges with research that has shown the efficacy of generative AI in supporting grammatical accuracy (Song & Song, 2023) and lexical enhancement (Alkamel & Alwagieh, 2024). A study using Grammarly as an AI feedback tool found that specific features of AI usage were positively correlated with improvement of content, organization, and cohesion (Al-Mansouri et al., 2025), although these improvements might be relatively small. This is aligned with other studies reporting that AI performance is relatively stable when

addressing local constraints and highly variable when addressing global content constraints (Lin & Crosthwaite, 2024).

For task achievement (the quality and relevance of the arguments), the relative improvement is the smallest. In this case, the AI is known to be sub-optimal on higher-order reasoning. Critics have noted that AI feedback can become repetitive tropes, and fail to provide the depth of contextualized support needed for effective argumentation (Teng, 2024).

Student perception and agency

The survey results are expected to show that students generally have positive attitudes towards AI-assisted writing, confirming H3. Teachers at Fergana State University, for example, perceived ChatGPT as a means of improving learner autonomy, offering instant feedback on their students' communicative outputs (Mirzayev et al., 2025). A voluntary survey of 207 Uzbek undergraduates (Amonov et al., 2024) found that 88.4% of respondents used AI tools regularly and expected them to improve student academic performance.

Concerns about autonomy are likely. A 2025 study of 59 EFL students found that while they made meaningful progress in writing strategies for idea generation and content enhancement, they were aware of AI's limitations. They also preferred AI as an additional tool to supplement, not replicate, customary instruction (OJCMT, 2025). Similar to Mirzayev et al. (2025), the Uzbek EFL teachers in this study were enthusiastic about AI, but had concerns about over-reliance on AI preventing their students from being able to critically analyze information, a concern reflective of the current study's prompting guidelines.

Pedagogical Implications

This study has several pedagogical implications on EFL writing instruction in Uzbek higher education institutes. For example, generative AI in academic writing classes should not be unrestrained or unconstrained. Rather, writing instructors should use explicit prompting frameworks to utilize generative AI for the stages of feedback and revision. The above scaffolded approach is consistent with Vygotsky's ZPD and Crompton et al.'s (2024) framework for responsible use of generative AI in teacher training and EFL teaching contexts.

Second, our findings provide evidence that AI writing tools can be particularly useful in developing lexical variety and grammatical accuracy, which are major sticking points for EFL learners in regional Uzbek universities (Kasimova, 2024; Tursunova & Rahimov, 2022). English language teachers may wish to supplement AI-based feedback with constructive instruction on argument conventions and academic discourse where AI support is less effective.

Third, writing teachers should teach AI literacy before using it as a teaching assistant in the classroom. This will teach students to have a rich understanding of the limits of AI, and to use it in constructive ways by knowing about its formulaic nature, information quality problems, and ethical challenges (Amonov et al., 2024; Barrot, 2023).

According to Umaralieva (2025) digital literacy training is crucial for students engaging in self-directed learning (SDL), as many SDL resources — such as MOOCs, podcasts, and online forums — require skills in evaluating information and communicating online (Godwin-Jones, 2019). Structured training on these digital platforms helps students fully utilize SDL to enhance intercultural communicative competence (ICC) (Reinders & White, 2016).

CONCLUSION

Supported by Vygotskian constructivism, Self-Regulated Learning theory, and the process writing approach, this quasi-experimental study evaluated the impact of generative artificial intelligence on developing the writing skills of EFL university students at Fergana State University, Uzbekistan. A targeted seven-week intervention was administered to compare generative AI and customary writing instruction for 2nd-year undergraduates.

In all the European, Russian and Uzbek research, generative AI shows promise for improving EFL writing around grammar, lexical range and revision quality. However, there is one outstanding gap: quasi-experimental evidence for understanding how generative AI can be used in a student-centered way for EFL writing practices and processes in Central Asia in particular. This is the gap this study seeks to fill.

There are some limitations to this study. As it was an EFL classroom study, its use of a single

institution and a small sample means that the generalizability of the results outside of Uzbek EFL or Central Asian classrooms may be questioned. For this study, however, the quasi-experimental design is acceptable. Although it cannot guarantee random assignment, students may differ in their past exposure and familiarity with AI technologies. Replicating the design across multiple institutions in Uzbekistan, comparing other generative AI systems, and investigating the long-term effects of AI-assisted writing on writing practices, student autonomy, and academic integrity will be important areas for further research.

Generative AI is on the rise, including and especially in Uzbekistan, the country where OpenAI became a taxpayer in 2025. The pedagogical question is no longer if, but how to incorporate AI into the EFL writing classroom. This project provides an evidence base to support data-driven policy and practice in AI-assisted EFL writing instruction at Fergana State University and beyond.

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