



XORIJY TILLARNI O'QITISHDA INNOVATSION YONDASHUVLAR NAZARIYANING AMALIYOTGA TATBIQI

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AI AS AN ASSISTANT TEACHER: A MIXED-METHODS STUDY INTO EFFECTS OF AI-GENERATED FEEDBACK ON STUDENT WRITING QUALITY

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DOI: <https://doi.org/10.5281/zenodo.15175512>

Abstract: *This study investigates how sophomore students at Kimyo International University in Tashkent, Uzbekistan implemented generative AI, specifically ChatGPT and Gemini for vocabulary learning, grammar correction, and providing feedback on their essay drafts. The main focus of the study is to establish the amount of vocabulary retention and the extent of grammar refinement. The students took a 15-week writing course, in which they learned how to write different types of essays. By implementing mixed-methods study design (essay analysis and survey), 15 randomly chosen students' essays (at the beginning, middle and end of semester) out of over 100 were analysed. Findings suggest a significant improvement in students' vocabulary (a 10 percent increase in the use of C1 level vocabulary) and grammatical accuracy, particularly in punctuation. The research suggests that teachers can use AI as a tool to help students improve their vocabulary and punctuation, while maintaining a focus on human guidance to address contextual word choice.*

Keywords: *generative AI, ChatGPT, Gemini, vocabulary retention, writing style, grammar, outlining.*

Introduction

In recent years, text-generative artificial intelligence has gained considerable attention, sparking discussions about its potential applications and limitations. While some have speculated that AI could eventually replace human writers, ongoing research suggests that significant advancements are still required to fully replicate human writing abilities. Huang et al. (2023) conducted a comprehensive review of 516 research papers, exploring various aspects of AI learning, including vocabulary acquisition. Although vocabulary is a fundamental component of academic writing, its integration into AI models remains a challenging area. Traditionally, vocabulary has been viewed as an isolated skill, often taught separately from writing instruction. This approach can hinder students' ability to effectively utilize their word knowledge in writing tasks. Furthermore, there is a lack of strategies for employing AI, specifically chatGPT and Gemini, as a tool to enhance vocabulary development and writing skills.

This research aims to evaluate the effectiveness of using AI to check and improve second-year student essays at Kimyo International University in Tashkent, Uzbekistan, with a particular focus on vocabulary. It will analyze students'



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experiences with grammar correction and their overall impressions of the AI tool throughout the semester. Additionally, the study will examine the extent to which students integrated AI-driven vocabulary into their writing and the overall improvement in their essays by the end of the semester. By investigating these areas, this research seeks to contribute to a deeper understanding of the potential benefits and limitations of AI-powered language tools in enhancing student writing.

Literature Review

Teacher workload, particularly the time-consuming task of essay checking, has long been a significant concern in education. The sheer volume of essays requires substantial time and effort from educators, often impacting their ability to provide timely and constructive feedback. This issue has led to a search for innovative solutions to alleviate the burden on teachers while maintaining the quality of student writing. Reynolds et al. (2020) presented a range of strategies to enhance academic integrity, such as peer review, restricted grading, collaboration with experts, diminished incentives for cheating, and flexible approaches. While artificial intelligence was not explicitly included in their recommendations, it offers a potential avenue for reducing teacher workload.

1. Generative AI in Education and Writing

General Applications

The rise of generative AI, particularly large language models (LLMs) like ChatGPT and Gemini, has prompted extensive discussion about their role in education (Kasneci et al., 2023). These tools are being explored for various tasks, including content generation, personalized learning, and feedback provision. Studies have investigated the potential of AI to support writing instruction, focusing on its ability to provide feedback on grammar, style, and structure (Zawacki-Richter et al., 2019). Research has also explored the ethical considerations and potential challenges associated with using AI in educational settings, such as plagiarism and the need for critical evaluation of AI-generated content (Baidoo-Anu & Owens Owusu Ansah, 2023).

AI as a Writing Assistant:

Several studies have explored the use of AI as a tool to enhance student writing, examining its impact on various aspects of the writing process, including brainstorming, drafting, and revision (Holmes et al., 2022). Researchers have investigated the effectiveness of AI-powered grammar and style checkers in improving student writing quality (Johnson & Smith, 2021). The use of AI for



outlining and structuring essays has also been explored, with studies examining its potential to help students organize their thoughts and create coherent arguments (Lee et al., 2020).

2. Vocabulary Acquisition and AI:

Vocabulary Integration in AI:

Huang et al. (2023)'s comprehensive review highlights the complexities of vocabulary acquisition within AI models, emphasizing the need for more effective strategies to integrate vocabulary into writing instruction. Traditional vocabulary instruction often focuses on isolated word lists, which may not translate into effective use in writing contexts (Nation, 2013). Research is needed to explore how AI can be used to promote contextualized vocabulary learning and facilitate the integration of new words into student writing (Schmitt, 2008).

AI for Vocabulary Development:

Studies are beginning to explore the potential of AI to provide personalized vocabulary feedback and suggest alternative word choices to enhance student writing (Brown et al., 2022). It is vital to understand the difference between if the AI is teaching vocabulary, or if it is just suggesting alternative words. Research is needed to determine the extent to which AI-generated vocabulary suggestions are retained by students and incorporated into their long-term writing skills.

3. Grammar Refinement and AI:

AI-Powered Grammar Correction:

AI-powered grammar checkers have become increasingly sophisticated, capable of identifying and correcting a wide range of grammatical errors (Chodorow et al., 2007). Studies have examined the effectiveness of these tools in improving student grammar and reducing errors in written assignments (Wareham, 2018). However, it is important to consider the limitations of AI-powered grammar checkers, as they may not always accurately identify or correct errors in complex or nuanced writing (Foster, 2020).

Impact on Student Learning:

Research is needed to explore the impact of AI-powered grammar correction on student learning and the development of their own grammar skills. It is crucial to determine whether relying on AI for grammar correction leads to a decline in students' ability to identify and correct their own errors.

4. Student Perceptions and Experiences:

Student Attitudes toward AI:



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Studies have examined student attitudes toward the use of AI in education, exploring their perceptions of its usefulness and potential benefits (Crompton & Burke, 2018). Research is needed to understand students' experiences with using AI as a writing assistant, including their perceptions of its impact on their learning and writing skills.

Integration of AI Feedback:

It is important to investigate how students integrate AI-generated feedback into their writing process and whether they find it helpful in improving their essays. It is also important to understand if students are just accepting the changes that the AI is suggesting, or if they are learning from the changes.

Research Design

This study employed a mixed-methods research design, combining quantitative and qualitative approaches to investigate the impact of generative AI (ChatGPT and Gemini) on the academic essay writing of sophomore students. The quantitative aspect focused on measuring vocabulary retention and grammar refinement through statistical analysis of student essays. The qualitative aspect involved a survey to gather student perceptions and experiences with using AI as a writing assistant. The study spanned a 15-week academic writing course, allowing for longitudinal analysis of student progress.

Participants/Subjects

The participants in this study were sophomore students at Kimyo International University in Tashkent, Uzbekistan, enrolled in an academic writing course. The overall participant pool consisted of 100 students. For the quantitative analysis, a random sample of 15 students was selected from this pool. The demographic characteristics of the 15 selected students were: ages ranging from 18 to 22 years old, with 9 females and 6 males.

Instruments/Materials

The following instruments and materials were used in this study:

Student Essays: The primary data source was the collection of student essays produced throughout the 15-week writing course. These essays, encompassing various academic writing genres, served as the basis for analyzing vocabulary usage and grammatical accuracy.

AI Tools: Students were instructed to use ChatGPT and Gemini as assistant teachers, specifically for vocabulary enhancement, grammar correction, and essay outlining.



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Student Survey: A survey was developed to gather qualitative data on students' perceptions of using AI as a writing assistant. The survey included questions regarding their experiences with AI-driven feedback, their perceived improvement in writing skills, and their overall impressions of the AI tools.

Online Grammar and Vocabulary Analysis Tools: Online tools were used to analyze the complexity of vocabulary and the frequency of grammatical errors in student essays.

Procedure

The study was conducted over a 15-week academic writing course. The procedure involved the following steps:

Course Introduction: Students were introduced to the concepts of generative AI and its potential applications in academic writing.

AI Tool Integration: Students were instructed on how to use ChatGPT and Gemini as tools for vocabulary enhancement, grammar correction, and essay outlining.

Essay Writing and AI Feedback: Students wrote essays throughout the semester, utilizing AI tools to revise and refine their work.

Data Collection: Student essays were collected at the beginning, middle, and end of the semester. The student survey was administered at the end of the semester.

Data Analysis

Quantitative Analysis

The frequency of high-level vocabulary usage in student essays was analyzed to assess vocabulary retention and integration. Online tools were used to determine the level of vocabulary used. Grammatical errors were identified and categorized as either minor (e.g., punctuation, subject-verb agreement) or major (e.g., sentence structure, complex grammatical errors). Statistical analysis was performed to determine the frequency and types of grammatical errors, and how those errors changed over the 15 week course. The statistical data was created to find the occurrences of grammar mistakes, both small mistakes and big mistakes in grammar.

Qualitative Analysis

Survey responses were analyzed using thematic analysis to identify recurring themes and patterns in students' perceptions and experiences with AI. Student feedback was considered to see how the student was using the AI, and if they were learning from the AI's feedback.

Results



Vocabulary

Figure 1



Note: This data is made after analysing all words that students used in their essays.

Initially, the student group's vocabulary was heavily weighted towards basic (A2) and intermediate (B1) levels. A large 40% of their vocabulary fell within the A2 range, and 30% within the B1 range. Advanced vocabulary (C1) represented only 10% of their overall usage. After using the generative AI tools, there was a noticeable shift. The proportion of advanced (C1) vocabulary doubled, now representing 20% of their usage. This was accompanied by a reduction in the B2 vocabulary level. Although there was an increase in the usage of advanced words, the majority of the students vocabulary is still in the A2 and B1 levels

Figure 2.



Note: This shows the shift, with the C1 level section doubling in size.

Grammar



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At the beginning of the semester, punctuation errors were a significant issue, with 80 instances identified across the analyzed essays. This represented a large portion of the written work. By the end of the semester, this number dramatically decreased to only 10 instances. This shows a very large improvement in punctuation. However, there was a slight increase in subject-verb agreement errors in the final essays, indicating that while overall grammar improved, specific areas still needed attention. The students outlining skills improved over the semester. At the beginning of the semester, most of the students had poor outlining skills. By the end of the semester, the majority of the students had good outlining skills. This shows that the AI tools, or tutor, was able to help the students improve their essay structure. Even with the improvements, students still struggled with word choice and contextual usage, indicating that these are areas where human guidance remains essential.

Survey results

Student feedback indicated a generally positive perception of AI's assistance in writing improvement. On average, students rated the AI's vocabulary suggestions as highly helpful (4.2/5), with a majority finding significant or partial improvement in their grammar skills. While contextual usage remained a challenge, most students acknowledged the AI's positive impact on essay structure and reported increased confidence in their writing. Notably, a significant majority (90%) viewed AI as a valuable learning tool for vocabulary and grammar. Thematic analysis of open-ended responses highlighted the immediacy of grammar feedback, vocabulary suggestions, and outlining assistance as the most beneficial aspects

Conclusion

This research contributes to the growing body of literature on the integration of generative AI into educational settings, particularly in the context of academic writing. It demonstrates the potential of AI tools to effectively assist students in improving their vocabulary and grammar. The study underscores the importance of understanding both the benefits and limitations of AI in education. While AI can significantly enhance students' technical writing skills, it cannot fully replace the nuanced guidance and contextual understanding provided by human educators. This study offers valuable insights for educators seeking to leverage AI as a supplementary tool to enhance student writing skills. The findings of this study suggest that generative AI, when used as an assistant teacher, can be a powerful tool for improving students' academic writing. The observed enhancements in vocabulary and grammar, as well as essay structuring, highlight the potential benefits of



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integrating AI into writing instruction. However, it is crucial to recognize that AI is not a panacea. The continued challenges students faced with word choice and contextual usage emphasize the irreplaceable role of human teachers in providing personalized feedback and nuanced instruction. As AI technology continues to evolve, future research should explore more effective strategies for integrating AI into the classroom, ensuring that it complements rather than replaces human teaching. Furthermore, continuous evaluation of student's abilities to learn from the AI's feedback is required to ensure that the students are not just accepting the changes, but learning from them.

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