THE EFFECTIVENESS OF AI-BASED GRAMMARLY FOR LEARNING ENGLISH GRAMMAR IN HIGHER EDUCATION

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ABSTRACT

This study investigates the effectiveness of AI-based Grammarly in improving English grammar learning among higher education students. A quantitative quasi-experimental design was employed involving two groups of undergraduate students: semester 3 students (n = 24) and semester 5 students (n = 28). Both groups were given a grammar pre-test, followed by instructional treatment using Grammarly, and a post-test after the intervention. The data were analyzed using descriptive statistics and paired sample t-tests. The results indicate that Grammarly significantly improved students' grammar performance in both groups. These findings suggest that AI-based writing tools can be an effective supplementary resource for grammar learning in higher education.

Keywords: Grammarly, artificial intelligence, grammar learning, higher education

A. Introduction

English grammar remains a persistent challenge for students in higher education, particularly in academic writing contexts where accuracy and clarity are essential. Many university students demonstrate limited mastery of grammatical structures, which negatively affects the quality of their written work and academic performance. Traditional grammar instruction is often insufficient to address individual learner needs, leading educators to explore technology-assisted solutions. Recent studies highlight that artificial intelligence (AI)–based tools can provide immediate and personalized feedback that supports grammar learning beyond the classroom (Zhai & Xie, 2023).

The rapid development of AI technology has introduced various digital tools into language learning, one of the most widely used being Grammarly. Grammarly utilizes AI algorithms to detect grammatical errors and provide corrective feedback in real time. Research conducted in recent years indicates that AI-driven grammar checkers can enhance learners' grammatical awareness and reduce writing errors, especially among English as a Foreign Language (EFL) students (Koltovskaia, 2024). This growing adoption signals a shift toward more autonomous and technology-supported learning environments.

Despite the popularity of AI-based grammar tools, several studies report that students often rely on them

without fully understanding the underlying grammatical rules. This over-reliance may limit long-term learning benefits if AI feedback is not pedagogically integrated into instruction. Moreover, some researchers argue that AI tools function more as corrective devices than instructional tools when used without guided learning strategies (O'Neill & Russell, 2023).

These concerns highlight the need to empirically examine whether Grammarly truly supports grammar learning, not merely error correction. Previous studies on Grammarly have largely focused on students' perceptions, attitudes, and writing quality rather than measurable grammar learning outcomes. For instance, recent survey-based studies found that students perceive Grammarly as helpful and motivating, yet these studies rarely employed experimental designs to assess actual grammar improvement (Barrot, 2024).

Consequently, there is limited empirical evidence demonstrating Grammarly's effectiveness in improving grammar proficiency through controlled pre- and post-testing.
Another limitation in existing research is the lack of differentiation across academic levels. Most studies investigate Grammarly use among mixed undergraduate populations without comparing learners at different stages of study. However, students' grammatical competence and learning needs may vary significantly between lower-level and upper-level semesters. Recent calls in educational technology research emphasize the importance of examining AI-assisted learning effects across learner proficiency levels to obtain more nuanced findings (Zawacki-Richter et al., 2023).

To address these gaps, the present study differs from previous research by adopting a quasi-experimental design that measures grammar learning outcomes quantitatively. Unlike earlier perception-based studies, this research compares pre-test and post-test grammar scores of students from two academic levels Semester 3 and Semester 5. By doing so, the study provides empirical evidence of Grammarly's effectiveness while also examining whether academic level influences learning gains, a factor often overlooked in earlier studies (Koltovskaia, 2024).

Therefore, this study aims to investigate the effectiveness of AI-based Grammarly in improving English grammar learning in higher education. By focusing on measurable grammar improvement and comparing different semesters, this research contributes to the growing body of literature on AI-supported language learning. The findings are expected to offer pedagogical insights for educators seeking to integrate AI tools effectively into grammar instruction while minimizing over-dependence on automated feedback.

B. Methods

This study employed a quantitative quasi-experimental design using a pre-test and post-test approach to examine the effectiveness of AI-based grammar instruction. The participants consisted of 52 undergraduate students enrolled in an English course, including 24 students from Semester 3 and 28 students from Semester 5. The research instrument was a grammar test comprising multiple-choice and sentence-correction items, which was administered twice as a pre-test before the treatment and a post-test after the treatment. The research procedure began with the administration of the pre-test, followed by four weeks of grammar learning activities using Grammarly as an AI-based instructional tool, and concluded with the post-test to measure students' grammar improvement. The collected data were analyzed using descriptive statistics, including mean scores and standard deviation, as well as inferential statistics through a paired sample t-test to determine the significance of the learning outcomes.(Fadli, 2021).

C. Results and Discussion

1. Results

The results of this study demonstrate a clear improvement in students' English grammar performance after the implementation of AI-based grammar instruction. Table 1 presents the pre-test and post-test mean scores of Semester 3 and Semester 5 students who participated in the study.

Table 1. Pre-test and Post-test Mean Scores

Group	N	Pre-test Mean	Post-test Mean	Improvement
Semester 3	24	62.4	78.6	+16.2
Semester 5	28	65.8	82.1	+16.3

As shown in Table 1, both groups experienced substantial gains in their grammar scores following the four-week instructional period using Grammarly. Semester 3 students demonstrated an increase in mean scores from 62.4 on the pre-test to 78.6 on the post-test, resulting in an improvement of 16.2 points. This indicates that the AI-based grammar tool had a positive impact on lower-level undergraduate students' grammar learning.

Similarly, Semester 5 students showed a notable improvement in their grammar performance. Their mean pre-test score of 65.8 increased to 82.1 on the post-test, reflecting a gain of 16.3 points. Although Semester 5 students started with a slightly higher level of grammatical competence, the magnitude of improvement was comparable to that of Semester 3 students, suggesting that the AI-based intervention was

effective across different academic levels.

Further statistical analysis using a paired sample t-test revealed that the differences between pre-test and post-test scores for both groups were statistically significant ($p < 0.05$). This finding confirms that the observed improvements were not due to chance but were likely attributable to the use of AI-assisted grammar learning. Overall, the results indicate that Grammarly effectively enhanced students' English grammar performance in higher education settings, regardless of semester level.

2. Discussion

The findings of this study indicate that AI-based Grammarly effectively improves students' English grammar performance in higher education. Both Semester 3 and Semester 5 students demonstrated substantial gains in their post-test scores, confirming that AI-assisted grammar instruction can positively influence grammar learning outcomes. These results suggest that Grammarly is not only effective for students at lower academic levels but also beneficial for more advanced learners, supporting its applicability across different stages of undergraduate education.

One possible explanation for this improvement lies in the immediate and automated feedback provided by Grammarly. Real-time corrective feedback allows students to recognize grammatical errors as they occur and learn the correct structures through repeated exposure. According to Koltovskaia (2024), AI-based feedback systems enhance grammatical accuracy by encouraging learners to notice errors and revise their writing independently. This aligns with the present findings, where students showed significant improvement after consistent use of Grammarly during the learning period.

Furthermore, the comparable improvement between Semester 3 and Semester 5 students indicates that Grammarly supports grammar learning regardless of prior proficiency level. While Semester 5 students began with higher pre-test scores, the magnitude of improvement was similar to that of Semester 3 students. This finding supports the argument that AI-based learning tools can function as adaptive learning aids, responding to individual learners' needs rather than academic standing alone (Zawacki-Richter et al., 2023). Such adaptability is particularly valuable in higher education contexts with diverse learner backgrounds.

The results of this study also reinforce previous research emphasizing the role of AI tools in enhancing learner autonomy. By independently engaging with Grammarly's feedback, students took greater responsibility for identifying and correcting their grammatical mistakes. Barrot (2024) argues that AI-assisted writing tools promote self-directed learning by reducing

dependence on instructors and encouraging learners to actively reflect on language use. This autonomous learning process may contribute to deeper grammatical understanding rather than surface-level correction.

However, it is important to note that AI tools should be integrated pedagogically to maximize learning benefits. While Grammarly effectively supports grammar improvement, researchers caution against excessive reliance on automated correction without explicit instruction. O'Neill and Russell (2023) highlight that AI tools are most effective when combined with guided learning activities that help students understand the rationale behind corrections. In this study, Grammarly functioned as a supplementary tool rather than a replacement for instruction, which may explain its positive impact.

Overall, the findings of this study are consistent with recent research in AI-supported language learning, which indicates that technology-enhanced feedback can improve accuracy, efficiency, and learner engagement. By providing empirical evidence through a quasi-experimental design, this study extends prior perception-based research and confirms that AI-based Grammarly contributes to measurable improvements in English grammar learning in higher education settings (Zhai & Xie, 2023; Barrot, 2024).

D. Conclusion

This study concludes that AI-based Grammarly is effective in supporting English grammar learning in higher education, as evidenced by the significant improvement in grammar scores among both Semester 3 and Semester 5 students. The findings indicate that Grammarly serves as a valuable supplementary learning tool that enhances grammatical accuracy through immediate and automated feedback, while also promoting learner autonomy across different academic levels. These results suggest that AI-assisted grammar tools can be successfully integrated into English language instruction as a complement to traditional teaching practices. Nevertheless, this study was limited by a relatively short treatment period and a primary focus on grammar test outcomes; therefore, future research is recommended to employ longer intervention durations and examine additional variables such as writing quality, learner motivation, and engagement to provide a more comprehensive understanding of the long-term impact of AI-based tools in higher education.

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