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Investigating the Role of Artificial Intelligence in the Development of English Writing Competence among University Students

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ABSTRACT

This study explores the role of artificial intelligence (AI) in enhancing English writing competence among university students at Thai Nguyen University of Agriculture and Forestry (TUAF) in an English as a Foreign Language (EFL) context. Adopting a quasi-experimental design, the research involved two groups: an experimental group that received writing instruction supplemented by AI-powered tools (e.g., Grammarly, ChatGPT), and a control group taught through traditional methods without technological assistance. Over a six-week period during the second semester of the 2024–2025 academic year, both groups completed pre- and post-writing assessments, which were evaluated based on grammatical accuracy, coherence, lexical variety, and overall writing proficiency. Additionally, student perceptions of AI-supported writing were gathered through questionnaires and interviews. The findings revealed that the experimental group made statistically significant improvements in writing performance compared to the control group. Moreover, participants expressed increased confidence and engagement in the writing process when supported by AI tools. These results suggest that integrating AI into writing instruction can be an effective pedagogical approach in Vietnamese higher education, offering both linguistic benefits and motivational support for EFL learners.Key words: Artificial Intelligence (AI); English Writing Competence; EFL Learners; Higher Education; Task-Based Instruction; Grammarly; ChatGPT.

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1. INTRODUCTION

In today's fast-evolving digital era, artificial intelligence (AI) is revolutionizing numerous sectors, including education. Language learning, especially English as a Foreign Language (EFL), faces ongoing challenges, particularly in developing countries like Vietnam where resources and personalized support are often limited. Among the four core language skills, writing remains the most demanding for many learners due to its complex integration of grammar, vocabulary, coherence, and critical thinking.

Recent advances in AI technology offer promising solutions to these challenges. AI-powered writing tools such as Grammarly and ChatGPT provide learners with instant, precise feedback, enabling them to identify and correct errors independently while enhancing their overall writing quality. Despite the growing popularity of these tools in informal learning settings, their pedagogical impact within formal academic environments remains underexplored, especially in Vietnamese higher education.

This study addresses this critical gap by examining how AI-assisted instruction influences English writing competence among university students at Thai Nguyen University of Agriculture and Forestry. By employing a quasi-experimental design to compare traditional teaching methods with AI-supported learning, this research aims to provide robust evidence on the effectiveness of AI tools in improving linguistic skills and fostering learner motivation.

Given the increasing global emphasis on integrating technology in education and the urgent need to enhance English proficiency in Vietnam, this study offers timely insights for educators, policymakers, and institutions seeking innovative strategies to elevate EFL instruction

and learner outcomes. The findings will not only contribute to academic discourse but also support practical applications of AI in language teaching, ultimately helping students develop critical writing competencies essential for academic and professional success.

2. LITERATURE REVIEW

The rapid advancement of artificial intelligence (AI) technologies has significantly influenced the field of education, particularly in language learning and teaching. AI applications, ranging from intelligent tutoring systems to automated writing evaluation tools, offer new possibilities for personalized and adaptive learning experiences (Wang & Li, 2021). These tools leverage natural language processing (NLP) and machine learning algorithms to analyze learners' input and provide instant, tailored feedback, which is often considered essential for effective language acquisition (Chen et al., 2022).

In the specific domain of English writing instruction, AI-powered tools such as Grammarly, Turnitin, and ChatGPT have gained prominence due to their ability to assist learners in multiple aspects of writing, including grammar correction, vocabulary enhancement, coherence improvement, and plagiarism detection (Johnson, 2021; Martínez & Rosales, 2023). Unlike traditional feedback methods that depend heavily on teacher availability and time constraints, AI tools provide learners with immediate responses, encouraging autonomous learning and iterative revisions (Lee & Kim, 2022). This instant feedback loop is crucial for writing, a complex skill that requires frequent practice and reflection to develop proficiency (Hyland, 2019).

Research on the effectiveness of AI in enhancing writing skills has reported promising results. Smith and Lee (2020) conducted a controlled study revealing that EFL learners using AI-based writing assistants showed significant improvement in grammatical accuracy and lexical variety compared to peers receiving conventional instruction. Similarly, Nguyen (2021) explored the Vietnamese higher education context, finding that AI tools not only improved writing quality but also boosted learners' motivation and confidence. These findings are echoed by other scholars who emphasize the role of AI in supporting differentiated instruction and meeting diverse learner needs (Brown & Wilson, 2022; García & Santos, 2023).

Despite these advantages, some studies raise concerns regarding the potential drawbacks of AI integration. For instance, Brown and Wilson (2022) caution that overdependence on AI-generated corrections may hinder learners' critical thinking and self-editing skills development. Furthermore, the ethical implications of AI usage, including data privacy and algorithmic bias, have become topics of increasing scrutiny (Martin & Rodriguez, 2023). From a pedagogical standpoint, successful integration of AI tools requires thoughtful instructional design to balance technology use with human guidance (Tran & Pham, 2023).

In Vietnam, the incorporation of AI in English language teaching is still in its nascent stages. Traditional methods such as lecture-based teaching and rote memorization remain predominant in many universities (Pham & Nguyen, 2022). However, the growing availability of AI applications and increasing internet penetration have created opportunities for educational innovation (Le, 2023). Existing Vietnamese research primarily focuses on vocabulary acquisition and listening skills with AI support, while investigations into AI-assisted writing instruction remain limited. This gap highlights the necessity for empirical studies examining the effectiveness and learners' perceptions of AI tools in writing classes within Vietnamese higher education contexts.

Moreover, recent trends in AI development, such as large language models (e.g., GPT-4), have introduced more sophisticated interactive writing assistants capable of generating coherent and contextually relevant text (OpenAI, 2023). These advances present new possibilities and challenges for language educators, emphasizing the importance of ongoing research to understand how these technologies can be harnessed pedagogically.

By addressing these gaps, this study aims to contribute to the growing discourse on AI in language education by providing evidence on both linguistic outcomes and affective factors related to AI-assisted writing instruction. Such insights are critical for educators, curriculum designers, and policymakers striving to integrate innovative technologies into English language teaching,

particularly in contexts similar to Thai Nguyen University of Agriculture and Forestry.

3. METHODOLOGY

3.1. Research Design

This study employs a quasi-experimental design to investigate the impact of integrating artificial intelligence (AI) tools in teaching English writing skills. Two groups of second-year students at Thai Nguyen University of Agriculture and Forestry participated: the experimental group received AI-assisted writing instruction, while the control group followed traditional teaching methods.

3.2. Participants

The participants were 60 second-year English major students, divided evenly into two groups of 30. They were selected using purposive sampling based on their consent and availability during the second semester of the 2024–2025 academic year.

3.3. Instruments

Writing Tests: Both groups completed pre-test and post-test writing tasks to assess improvements in writing skills based on grammatical accuracy, coherence, vocabulary diversity, and overall writing quality.

AI Tools: The experimental group used AI-powered writing assistants such as Grammarly and ChatGPT throughout the intervention.

Questionnaires and Interviews: To collect qualitative data on students' perceptions and experiences using AI tools, questionnaires were distributed to all participants, and semi-structured interviews were conducted with selected students from the experimental group.

3.4. Procedure

The study lasted six weeks. Initially, both groups completed the pre-test writing task. Then, the experimental group received instruction and practice supported by AI tools, while the control group continued with traditional writing exercises without technological assistance. After the intervention, both groups completed the post-test writing task. Questionnaires were then administered to all participants, followed by interviews with a subset of the experimental group to gain deeper insights into their attitudes and experiences.

3.5. Data Analysis

Quantitative data from writing tests were analyzed using independent and paired samples t-tests to determine statistically significant differences between groups and between pre- and post-tests. Qualitative data from questionnaires and interviews were thematically analyzed to explore students' perceptions, attitudes, and challenges in using AI tools during the writing process.

4. RESULT AND DISCUSSION

Table 1: Comparison of Pre-test and Post-test Writing Scores Within Each Group

Group	Time Point	Mean Score	Standard Deviation (SD)	t-test Result (p-value)
Experimental Group	Pre-test	65.2	7.5	
	Post-test	78.9	6.3	$t = 5.32$, $p < 0.001$
Control Group	Pre-test	64.8	7.1	
	Post-test	67.0	7.0	$t = 1.45$, $p = 0.15$

Table 1 compares the mean writing scores of the experimental group and the control group before and after the intervention. It can be clearly seen that the experimental group showed a substantial improvement in their writing scores, with the mean score rising from 65.2 in the pre-test to 78.9 in the post-test. This increase was statistically significant, as indicated by the t-test result ($t = 5.32$, $p < 0.001$).

In contrast, the control group's scores increased only slightly, from 64.8 in the pre-test to 67.0 in the post-test. However, this improvement was not statistically significant ($t = 1.45$, $p = 0.15$),

suggesting that the traditional teaching method had a limited effect on enhancing students' writing skills during the study period.

Overall, the data suggests that the use of AI tools in the experimental group contributed to a more effective development of writing competence compared to the control group. The significant progress observed among the experimental group participants may be attributed to the immediate feedback and personalized support provided by AI-assisted writing tools.

Table 2: Comparison of Post-test Writing Scores Between Experimental and Control Groups

Group	Mean Score	Standard Deviation (SD)	Independent t-test Result (p-value)
Experimental	78.9	6.3	
Control Group	67.0	7.0	t = 3.98, p < 0.001

Table 2 presents the comparison of the post-test writing scores between the experimental group and the control group. The experimental group achieved a higher mean score of 78.9 with a standard deviation of 6.3, whereas the control group obtained a mean score of 67.0 with a standard deviation of 7.0.

The independent t-test results show that the difference in post-test scores between the two groups is statistically significant ($t = 3.98$, $p < 0.001$). This indicates that the experimental group, which used AI-assisted writing tools, outperformed the control group that followed traditional writing instruction.

These findings suggest that incorporating AI technology in writing instruction can lead to improved writing performance among university students, supporting the effectiveness of AI tools in enhancing language learning outcomes.

5. CONCLUSION

This study aimed to investigate the role of artificial intelligence (AI) tools in enhancing English writing competence among second-year students at Thai Nguyen University of Agriculture and Forestry. The findings from the quasi-experimental design clearly demonstrate that the integration of AI-assisted instruction significantly improves students' writing skills compared to traditional teaching methods. Specifically, the experimental group, which utilized AI tools such as Grammarly and ChatGPT, showed substantial gains in grammatical accuracy, coherence, and lexical variety, as evidenced by the statistically significant increase in their post-test writing scores ($t = 5.32$, $p < 0.001$). In contrast, the control group exhibited only minimal improvement, which was not statistically significant ($t = 1.45$, $p = 0.15$).

Moreover, the independent samples t-test revealed a significant difference between the post-test scores of the experimental and control groups ($t = 3.98$, $p < 0.001$), further underscoring the effectiveness of AI technology in facilitating better writing performance. These quantitative results are supported by qualitative data collected through questionnaires and interviews, where students expressed positive attitudes towards AI tools, highlighting their usefulness in providing immediate, detailed feedback and fostering self-correction skills.

However, the study also identified some challenges related to the use of AI in language learning, such as occasional technical difficulties and the risk of students becoming overly dependent on AI suggestions. Despite these limitations, the overall evidence strongly supports the integration of AI-assisted tools as a valuable pedagogical strategy to enhance writing competence in higher education.

In conclusion, this research contributes to the growing body of literature on the application of AI in language education and offers practical implications for educators aiming to improve English writing skills. It is recommended that universities and language instructors incorporate AI-based tools alongside traditional teaching to

provide a more engaging and effective learning experience. Future studies could explore long-term impacts and the integration of AI across other language skills to further understand its potential benefits and limitations.

6. RECOMMENDATIONS

Based on the findings of this study, several recommendations are proposed for educators, institutions, and future researchers:

1. **Integration of AI Tools in Curriculum:** English language programs at universities should consider incorporating AI-assisted writing tools such as Grammarly and ChatGPT into their curricula. These tools can provide timely, personalized feedback that enhances students' grammatical accuracy, coherence, and vocabulary usage.
2. **Teacher Training and Support:** Educators should receive adequate training to effectively integrate AI technologies into their teaching practices. Understanding how to balance AI feedback with traditional pedagogical methods will help prevent students' overreliance on technology while maximizing learning outcomes.
3. **Encouraging Autonomous Learning:** Students should be guided to use AI tools as aids rather than crutches. Encouraging critical thinking and self-editing alongside AI support will foster greater learner independence and confidence in writing.
4. **Addressing Technical Challenges:** Institutions should ensure reliable access to the necessary technological infrastructure, including stable internet and appropriate devices, to minimize technical difficulties that may hinder the effective use of AI tools.
5. **Future Research:** Further studies are encouraged to explore the long-term effects of AI-assisted writing instruction, its impact on other language skills, and the effectiveness of different AI tools across diverse learner populations.

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