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The Effectiveness of Using AI Gemini in Learning Chronological Essay Writing Among Second-Semester Students at Universitas Bhinneka PGRI

Adinda Muslimah Wahyuning Triasmoro[1*], Ika Rakhmawati[2]

[1, 2] English Education Department, Social and Humanities Faculty,
Universitas Bhinneka PGRI, Indonesia.
Email: adindamuslimah01@gmail.com[1*], ikarakhmawati696@yahoo.co.id[2]

**Author Correspondence: adindamuslimah01@gmail.com[1]*

Abstract: This study aimed to measure the effectiveness of using AI Gemini in improving the writing ability of chronological essays among second-semester students of the English Education Department at Universitas Bhinneka PGRI. A quantitative approach with a pre-experimental one-group pretest-posttest design was applied. The instruments used were writing tests administered before and after the treatment. Data were analyzed using SPSS version 26 through descriptive statistics, normality testing, and hypothesis testing. The results indicated a significant improvement in the post-test scores, with a significance value (2-tailed) of 0.000 (<0.05). The mean pre-test score of 66.50 increased to 85.00 in the post-test. These findings demonstrate that the use of AI Gemini is effective in supporting students to improve their writing skills, particularly in grammar accuracy, sentence structure, vocabulary, and text coherence. This study also emphasizes the importance of applying AI tools in a balanced way to foster critical thinking and independent writing skills.

Keywords: AI Gemini, Chronological Essay Writing, Writing Ability, English Language Learning, Educational Technology

1. INTRODUCTION

The integration of Artificial Intelligence (AI) in the educational field has gained substantial attention, especially in improving students' learning outcomes. AI applications in language learning, such as AI Gemini, provide innovative solutions to common challenges faced by students, particularly in writing activities. Recent studies highlight that AI-based learning tools can offer instant feedback, individualized support, and flexibility that significantly improve students' language skills (Antonietti et al., 2023).

Writing remains one of the most challenging skills for English as a Foreign Language (EFL) students due to its complex requirements, including grammar accuracy, content organization, and vocabulary mastery. Despite years of studying English, many students still struggle to construct coherent and well-structured essays (Toba et al., 2019). The lack of consistent feedback and limited teacher interaction further hinder the writing development process, making it essential to explore technology-based solutions that can provide personalized support.

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AI Gemini, a large language model developed by Google, offers multimodal capabilities that enable it to process text, images, and videos, providing users with relevant feedback and suggestions in real time. Unlike conventional AI writing tools, AI Gemini is designed to offer deep contextual understanding, enhancing content generation and improving writing quality through grammar correction, vocabulary enhancement, and sentence organization (Rane et al., 2024).

The use of AI Gemini in writing instruction has shown promising results in increasing student engagement and improving writing proficiency. Kartika (2024) emphasized that AI Gemini-based applications in language learning not only provide rapid, personalized feedback but also motivate students to practice independently and explore creative writing opportunities. This dynamic feedback mechanism plays a crucial role in supporting writing development, especially in higher education settings.

Furthermore, the integration of AI Gemini in writing instruction has the potential to address writing challenges by offering real-time corrections and guiding students in structuring their essays effectively. Imran and Almusharraf (2024) noted that AI Gemini's assistance in generating ideas, refining sentence construction, and suggesting relevant vocabulary significantly enhances students' ability to produce well-developed texts. This indicates that AI Gemini can serve as a valuable educational tool for supporting writing activities in the university context.

However, despite its benefits, the use of AI in writing also raises concerns regarding over-reliance on technology and the potential decline in students' critical thinking and independent writing skills. According to Sobaih et al. (2025), students may become dependent on AI tools, neglecting the importance of developing self-monitoring and revision skills. Therefore, it is essential to apply AI Gemini in a balanced way, ensuring that it complements rather than replaces the role of the teacher.

This study aims to investigate the effectiveness of using AI Gemini in improving students' writing of chronological essays, focusing on grammar accuracy, coherence, cohesion, and vocabulary usage. The research seeks to provide empirical evidence on whether AI Gemini can significantly support the writing development of second-semester students at Universitas Bhinneka PGRI.

2. LITERATURE REVIEW

2.1 Artificial Intelligence in Education

Artificial Intelligence (AI) has revolutionized the educational landscape by providing adaptive learning environments and facilitating individualized instruction. AI technologies can automate assessments, provide instant feedback, and offer tailored learning experiences that meet the specific needs of students (Jarrahi, 2018). These advancements enable educators to optimize learning processes and address individual student challenges more efficiently.

The evolution of AI is significantly influenced by interdisciplinary contributions from fields such as linguistics, mathematics, and cognitive science, which have expanded the application of AI in language learning (Dunjko et al., 2018). These developments have allowed AI to be integrated into learning platforms that support students in mastering complex skills, including writing.

One of the notable contributions of AI to education is the creation of intelligent tutoring systems that facilitate self-directed learning. Chen et al. (2020) emphasized that AI-powered educational systems, including bots and virtual assistants, offer flexible learning opportunities without time or place constraints, enabling students to access resources and guidance independently.

2.2 AI Gemini in Language Learning

AI Gemini is a large language model developed by Google that surpasses the capabilities of previous AI tools by providing multimodal processing and contextual understanding. Unlike many conventional AI tools that focus solely on text, AI Gemini can process text, images, and videos simultaneously, offering a more comprehensive and interactive learning experience (Rane et al., 2024).

The integration of AI Gemini in language learning enhances students' engagement by providing dynamic feedback, personalized learning paths, and multimodal instructional support. Kartika (2024) highlighted that AI Gemini-based chatbots and learning applications increase students' motivation, help them practice writing more effectively, and provide adaptive assistance in real time.

Moreover, AI Gemini contributes to the improvement of writing skills by offering automated suggestions related to grammar, vocabulary, and sentence structure. Imran and Almusharraf (2024) found that AI Gemini not only assists students in correcting their linguistic

errors but also stimulates creativity by generating writing prompts and supporting narrative development, making it a valuable writing companion.

Gemini's advanced features significantly impact students' writing performance by promoting the development of analytical, descriptive, and coherent writing. According to Link et al. (2020), AI-assisted writing tools, including Gemini, provide immediate feedback that encourages frequent writing practice, ultimately leading to noticeable improvements in writing proficiency and student confidence.

However, the application of AI Gemini in learning also presents potential drawbacks. Sobaih et al. (2025) warned that excessive reliance on AI for writing tasks may hinder students' ability to think critically and independently revise their work. They emphasized the importance of balancing AI support with teacher guidance to ensure that students develop essential cognitive and language skills.

2.3 Writing in English Language Learning

Writing is recognized as one of the most challenging aspects of learning English as a foreign language. Harmer (2008) explained that writing is a structured process that involves planning, drafting, revising, and editing to produce a coherent text. It requires students to master linguistic accuracy, logical organization, and effective communication through written language.

Writing is not only a linguistic activity but also a cognitive process that demands critical thinking, logical structuring, and the ability to articulate ideas clearly. Nunan et al. (2003) asserted that writing involves mental and physical processes that must be continuously developed through practice and feedback to achieve fluency and coherence.

In the context of second language acquisition, Brown (2004) emphasized that writing presents unique challenges because students must internalize grammar, vocabulary, and discourse conventions while constructing accurate and meaningful texts. Writing in a foreign language requires deliberate attention to form and meaning, which can be particularly demanding for EFL learners.

Hyland (2004) noted that writing serves as a primary medium for academic communication, knowledge construction, and self-expression in both educational and professional contexts. Proficiency in writing enables students to participate in scholarly discussions, present arguments, and convey complex ideas effectively.

Writing also plays a crucial role in language acquisition by reinforcing grammatical structures and vocabulary usage. Harmer (2007) underlined that writing activities help students internalize linguistic elements and improve their overall language competence through active practice.

3. RESEARCH METHOD

3.1 Research Design

This study employed a quantitative research approach using a pre-experimental one-group pretest-posttest design. This design is appropriate for determining the effectiveness of a treatment by comparing students' performance before and after the intervention (Creswell, 2014). The pretest was conducted to assess the initial writing ability of the students, followed by the treatment using AI Gemini, and concluded with a posttest to measure any improvement in writing performance.

3.2 Research Subjects

The population of this study consisted of second-semester students from the English Education Department at Universitas Bhinneka PGRI, academic year 2024/2025. The total population was 25 students. Due to the relatively small size, the study applied total sampling, which means that all 25 students were selected as the research subjects (Ary et al., 2014). However, based on data availability, the number of students who completed both the pretest and posttest was 22.

3.3 Research Variables

There were two variables in this study:

Independent Variable (X): The use of AI Gemini as a learning tool in the writing process.

Dependent Variable (Y): Students' writing ability in composing chronological essays.

3.4 Instruments of the Research

The instruments used in this study included:

a. Pre-Test and Post-Test:

   Both tests were designed to assess students' grammar, sentence types, and writing ability. The writing task required students to compose a chronological essay based on a given topic. The test items were adapted from Azar (1999) for grammar, and Oshima & Hogue (2006) for sentence types and essay writing.

b. Scoring Rubric:

The assessment of the students' writing was based on five components: content, organization, vocabulary, language use, and mechanics, using the rubric developed by Jacob et al. (1981).

3.5 Procedure of the Research

The research was conducted through the following stages:

a. Pre-Test:

Students were asked to complete a writing test to measure their initial writing ability before using AI Gemini.

b. Treatment:

The students were introduced to AI Gemini and were guided on how to use its features for writing tasks, including grammar correction, sentence structuring, and vocabulary enhancement. The treatment was conducted over 2 to 3 weeks, during which students actively used AI Gemini in writing sessions and assignments.

c. Post-Test:

After the treatment, students took a post-test with a similar format to the pre-test to assess improvements in their writing ability.

3.6 Data Collection Technique

Data were collected through the administration of pre-tests and post-tests. Both tests were designed to capture the students' progress in writing skills. The results of the tests were scored using a standardized rubric, and the scores were tabulated for statistical analysis.

3.7 Validity and Reliability

The research instruments were validated by an expert lecturer from Universitas Bhinneka PGRI to ensure content validity. The reliability of the scoring rubric was tested using Cronbach's Alpha formula in SPSS version 26. The reliability coefficient obtained was 0.771, indicating that the scoring rubric was reliable (Ary et al., 2014).

3.8 Data Analysis

The collected data were analyzed using SPSS version 26. The analysis steps were as follows:

a. Descriptive Statistics:

Mean, minimum, and maximum scores were calculated to describe the students' writing performance in the pre-test and post-test.

b. Normality Test:

The Shapiro-Wilk test was used to determine whether the data were normally distributed. This step is essential for selecting the appropriate statistical test.

c. Hypothesis Testing:

1) If the data were normally distributed, a paired samples t-test was used to compare the pre-test and post-test scores.
2) If the data were not normally distributed, the Wilcoxon Signed-Rank Test was employed as a non-parametric alternative.

A significance level of 0.05 was used to determine whether there was a statistically significant improvement in students' writing ability after using AI Gemini.

4. FINDINGS

This study aimed to investigate the effectiveness of using AI Gemini in learning writing of chronological essays among second-semester students. The data were collected through pre-test and post-test writing assessments.

4.1 Descriptive Statistics

The descriptive analysis showed that the mean pre-test score was 66.5, with a minimum score of 49 and a maximum score of 84. After the treatment using AI Gemini, the mean post-test score increased to 85, with a minimum score of 79 and a maximum score of 91. This result indicates a substantial improvement in students' writing ability after using AI Gemini.

Tabel 1. Descriptive Statistics

Test	Minimum	Maximum	Mean
Pre-Test	49	84	66.5
Post-Test	79	91	85

The significant improvement in the post-test scores indicates that AI Gemini provides effective support in improving students' writing performance. This finding is in line with Imran and Almusharraf (2024) who argued that AI Gemini helps students develop their grammar, sentence structure, and vocabulary through personalized and real-time feedback. It also supports Kartika (2024), who found that AI Gemini-based tools increase students' engagement and independent writing practice.

4.2 Reliability Testing

The reliability of the writing assessment instrument was tested using Cronbach's Alpha and the result was 0.771, which indicates that the instrument was reliable and consistent.

Tabel 2. Reliability Testing

Cronbach's Alpha	N of Items
0.771	5

This reliability result confirms that the scoring rubric adapted from Jacob et al. (1981) is appropriate to measure the five essential writing aspects: content, organization, vocabulary, language use, and mechanics.

4.3 Normality Test

The normality test was conducted using the Shapiro-Wilk test because the sample size was less than 50. The significance value (Sig.) for the pre-test was 0.081, and for the post-test was 0.112. Since both values were greater than 0.05, it can be concluded that the data were normally distributed.

Tabel 3. Normality Test

Variable	Shapiro-Wilk Sig.
Pre-Test	0.081
Post-Test	0.112

The use of a parametric test was therefore appropriate.

4.4 Hypothesis Testing

A paired samples t-test was conducted to determine whether there was a significant difference between the pre-test and post-test scores. The result indicated a significance value (2-tailed) of 0.000, which is less than 0.05. This means that the use of AI Gemini had a significant effect on improving students' writing ability.

Tabel 4. Hypothesis Testing

Test	t	df	Sig. (2-tailed)
Pre-Test vs Post-Test	-15.748	21	0.000

This result confirms that AI Gemini significantly improves students' writing ability. This finding supports the theory from Rane et al. (2024) which emphasizes that AI Gemini's multimodal capability and deep contextual understanding can assist students in generating more coherent and well-structured written texts. Additionally, the improvement aligns with Link et al. (2020), who stated that AI-based writing tools encourage students to write more frequently and receive immediate feedback that accelerates learning.

Furthermore, the findings are consistent with Sobaih et al. (2025) who highlighted that AI Gemini can improve writing accuracy and fluency. However, their study also warned of the potential over-reliance on technology. In this study, students appeared to benefit significantly from AI Gemini without neglecting their writing responsibility, as they actively engaged in writing exercises throughout the treatment period.

In conclusion, the statistical data and the theoretical support indicate that AI Gemini is an effective learning tool for enhancing writing performance, particularly in improving grammar, coherence, cohesion, and vocabulary in students' chronological essays.

5. DISCUSSION

The results of this study demonstrate that the use of AI Gemini significantly improves students' writing ability in chronological essays. The statistical analysis showed a considerable increase in the students' post-test scores compared to their pre-test scores, with a significance value of 0.000 ($p < 0.05$). This indicates that AI Gemini is effective in enhancing students' writing skills, particularly in grammar accuracy, sentence structure, coherence, and vocabulary development.

These findings are consistent with Imran and Almusharraf (2024) who emphasized that AI Gemini provides personalized feedback that helps students refine grammar, word choice, and sentence organization. The improvement in students' writing performance after using AI Gemini supports the idea that technology-based writing assistance tools can substantially contribute to the development of writing competence.

Furthermore, this study reinforces the theory from Rane et al. (2024) that AI Gemini, as a multimodal language model, offers comprehensive language support through deep contextual understanding and dynamic content generation. The ability of AI Gemini to process complex language structures and offer instant correction aligns with the observed improvement in the students' writing quality in this research.

The improvement in students' writing ability also supports the research conducted by Kartika (2024), which found that AI-powered chatbots can increase student engagement and motivation in writing activities. In this study, students were consistently enthusiastic during writing sessions using AI Gemini, indicating that the interactive nature of AI Gemini can make writing tasks more enjoyable and less stressful for learners.

Additionally, the findings correspond with Link et al. (2020), who suggested that AI-based writing tools can foster writing fluency by providing rapid feedback that encourages more frequent writing practice. Throughout the treatment period in this study, students had the opportunity to write, revise, and improve their essays with the immediate assistance of AI Gemini, leading to more accurate and structured writing outputs.

However, the results of this study also need to be considered in light of the caution raised by Sobaih et al. (2025) regarding potential over-reliance on AI writing tools. Although students in this study benefited from using AI Gemini, teachers must ensure that students remain actively involved in the writing process and develop their own critical thinking and editing skills. AI Gemini should be positioned as a complementary tool, not a replacement for human effort in learning.

Moreover, this study aligns with the writing process theory proposed by Harmer (2008) and Nunan et al. (2003), which emphasizes the importance of planning, drafting, revising, and editing in developing writing proficiency. The feedback provided by AI Gemini facilitated students in revising their drafts, thus supporting each stage of the writing process effectively.

In conclusion, the findings of this study not only confirm the effectiveness of AI Gemini as a writing support tool but also emphasize the need for balanced integration between technology and human supervision in writing instruction.

6. CONCLUSION

Based on the findings and analysis, this study concludes that the use of AI Gemini is effective in improving students' writing ability in composing chronological essays. The statistical results showed a significant increase in the students' writing performance after using AI Gemini, particularly in grammar accuracy, sentence structure, vocabulary, and coherence. The improvement was supported by the students' post-test scores, which were significantly higher than their pre-test scores.

The application of AI Gemini provided real-time feedback, enhanced students' engagement, and supported the writing process through grammar correction and vocabulary enhancement. These results are consistent with previous studies which emphasized the positive impact of AI-based tools on writing development.

However, it is important to note that AI Gemini should be used as a supportive learning tool, not as a replacement for students' critical thinking and independent writing skills. Teachers should guide students to use AI responsibly to ensure the development of both their writing competence and their cognitive abilities.

Future studies are recommended to explore the long-term effects of using AI Gemini in writing and to investigate its application in other language skills or different educational contexts.

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