

THE EFFECT OF ARTIFICIAL INTELLIGENCE USE ON CREATIVITY IN WRITING SCIENTIFIC WORKS

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Abstrak

Penelitian ini bertujuan menguji apakah pemanfaatan Artificial Intelligence (AI) berpengaruh terhadap Kreativitas menulis karya ilmiah mahasiswa. Penelitian kuantitatif ini menggunakan desain kuasi-eksperimental untuk menganalisis pengaruh penggunaan AI terhadap kreativitas menulis karya ilmiah mahasiswa. Populasi dan sampel terdiri dari beberapa mahasiswa di Fakultas Ilmu Tarbiyah dan Keguruan UINSU Medan. Instrumen yang digunakan adalah tes kreativitas menulis melalui pre-test dan post-test kepada kelas eksperimen dan kelas kontrol. Data dianalisis dengan menggunakan uji-t, uji normalitas, dan uji homogenitas untuk memastikan validitas statistik. Hasil penelitian menunjukkan bahwa pemanfaatan AI secara signifikan dapat meningkatkan kreativitas mahasiswa dalam menulis karya ilmiah. Pengaruh positif pemanfaatan AI terhadap kreativitas menulis. Kesimpulan dari penelitian ini menunjukkan bahwa pemanfaatan AI secara signifikan meningkatkan kreativitas mahasiswa dalam menulis karya ilmiah. Peningkatan tersebut terlihat dari nilai rata-rata, minimum, dan maksimum setelah intervensi AI. Uji statistik mendukung bahwa AI berpengaruh positif terhadap kreativitas, memperkuat kualitas dan variasi karya ilmiah yang dihasilkan mahasiswa.

Kata Kunci: Artificial Intelligence; Kreativitas Menulis; Karya Ilmiah

Abstract

This study aims to test whether the use of Artificial Intelligence (AI) affects the creativity of writing students' scientific papers. This quantitative research uses a quasi-experimental design to analyze the influence of the use of AI on the creativity of writing students' scientific papers. The population and sample consisted of several students at the Faculty of Tarbiyah and Teacher Training UINSU Medan. The instrument used was a writing creativity test through pre-test and post-test to the experimental class and the control class. The data were analyzed using t-tests, normality tests, and homogeneity tests to ensure statistical validity. The results of the study show that the use of AI can significantly increase students' creativity in writing scientific papers. The positive influence of the use of AI on writing creativity. The conclusion of this study shows that the use of AI significantly increases student creativity in writing scientific papers. The increase can be seen from the average, minimum, and maximum values after AI intervention. Statistical tests support that AI has a positive effect on creativity, strengthening the quality and variety of scientific work produced by students.

Keyword: Artificial Intelligence; Creativity in Writing; Scientific Work

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INTRODUCTION

Artificial Intelligence, particularly in the form of Large Language Models (LLMs) such as ChatGPT, Claude, and Bard, has demonstrated impressive capabilities in assisting the writing process (Febriana Yusup, n.d.). Artificial Intelligence was officially coined and defined by John McCarthy as the science and engineering of building intelligent machines (C. Collins et al., 2021). Artificial Intelligence aims to create machines that can think and function like the human brain (Dwi Handoko, 2016) (Mohammad, 2020). AI can assist researchers in various stages of scientific writing, from brainstorming ideas and developing an outline, organizing data, to improving grammar and sentence structure (Widyatama et al., 2024) (Mahmudah, 2025). AI's ability to rapidly process and analyze large amounts of information provides significant advantages for researchers in accessing and synthesizing relevant literature (Nurina et al., 2024).

Artificial intelligence was officially coined and defined by John McCarthy as the science and engineering of creating intelligent machines (C. Collins et al., 2021). Artificial intelligence aims to create machines that can think and function like the human brain (Mohammad, 2020). AI tutoring systems can provide personalized guidance, support, or feedback by tailoring learning content based on learning patterns or knowledge levels. AI tutoring systems can provide personalized guidance, support, or feedback by tailoring learning content based on learning patterns or knowledge levels (Hwang et al., 2020). In line with this statement, Dina W. Kariodimedjo, a lecturer at the Faculty of Law at Gadjah Mada University (UGM), said, "ChatGPT results constitute a form of plagiarism if the user does not cite the source. Furthermore, copying someone else's work without citing the source of the information has a negative impact on the learning process. This awareness urgently needs to be raised, especially regarding AI assistance used for scientific writing. The main goal is to uphold ethics and avoid plagiarism," (Ainia et al., 2023).

However, the use of AI in scientific writing has also raised concerns about its impact on authors' creativity. Creativity in the context of scientific writing includes the ability to generate original ideas, develop innovative arguments, and present new perspectives on a phenomenon or problem (Syahara & Handoko, 2023). Some academics worry that reliance on AI could diminish researchers' critical thinking skills and original creativity, potentially resulting in homogenous and less innovative work.

On the other hand, there is a view that AI is a tool that can enhance creativity by freeing researchers from mechanical tasks and allowing more time to focus on deeper conceptual and analytical aspects (Sulartopo et al., 2023). AI can function as a "collaborative partner" that helps researchers explore new ideas and broaden their horizons through broader and faster access to information (S. P. Collins et al., 2021).

Several previous researchers, such as Helen Crompton and Diane Burke (Crompton & Burke, 2023), have reviewed the findings of this study. The findings indicate that in 2021 and 2022, publications increased nearly two- to threefold compared to previous years. The rapid increase in AIED HE publications occurred across six of the world's seven continents, with a new trend emerging that shifted the United States to China as the leader in the number of publications. This systematic review reveals gaps in the literature that will serve as a foundation for future researchers, including new tools such as Chat GPT. Gwo-Jen Hwang, Benjamin W Wah, Haoran Xie, and Dragan Gasevic (Hwang et al., 2020) demonstrate that Artificial Intelligence in Education (AIED) has great potential in improving the quality of teaching and learning. The article highlights the role of AI in education, such as being an intelligent tutor, learner, learning tool/partner, or policy advisor. Furthermore, this article also identifies several potential research topics in AIED, such as the development of AI-based learning models, evaluation of student learning using AI

systems, and investigation of the effectiveness of AI-based learning systems from various perspectives. Dhanan Abimanto and Iwan Mahendro (Mahyudi, 2023) demonstrated significant improvements in listening, speaking, reading, and writing skills after the implementation of artificial intelligence.

Previous research has yielded mixed results regarding the relationship between technology and creativity. Some studies suggest that technology can enhance creativity by providing new tools and platforms for exploring ideas, while others indicate the potential negative impact of technology on creative and original thinking (Asmara et al., 2023). In the context of academic writing, research specifically exploring the influence of AI on creativity is still relatively limited and requires further investigation. However, in reality, many students still experience difficulties in producing low-quality scientific works, this is in line with the statement of Nizam as Acting Director General of Higher Education, Ristekdikti Kemendikbud that "Several times we get posts on social media that bully us all because of Indonesian publications, even though there are many, but they are fake. The journals are unclear, predatory journals" (Habibah, 2024). In addition, international scientific publications are considered one of the benchmarks of world-class university productivity. However, universities in Indonesia still face challenges in increasing the quantity and quality of their publications, including ownership of internationally reputable scientific journals (Napitupulu, 2022). This is in line with the research problem of Giglio and Costa that scientists who are not native English speakers face a number of difficulties in composing writing that is clear, concise, and free from grammatical errors. Even though they use word processing tools and spell checkers, the final results of the text are still not as good as those produced by native English speakers. This has resulted in a low chance of these papers being accepted into leading scientific journals (Giglio & da Costa, 2023). AI can assist students in various aspects of scientific writing.

The phenomenon of utilizing AI in scientific writing also raises complex ethical questions (Adzan & Azhar, 2024). Issues of originality, plagiarism, and academic integrity become increasingly relevant when AI is used as a writing aid. The need for clear ethical guidelines and standards in the use of AI for academic writing is an urgent matter that cannot be ignored (Dewantara & Dewi, 2025).

Given the complexity and relevance of this issue, research exploring the impact of AI utilization on creativity in scientific writing is crucial. This research is expected to provide empirical contributions to understanding the dynamics of the relationship between AI technology and academic creativity and provide insights that can be used to optimize the use of AI to support, rather than hinder, creativity in scientific writing.

Based on this background, this study aims to analyze in-depth the influence of Artificial Intelligence utilization on creativity in scientific writing, with the hope of providing a more comprehensive understanding of the potential and challenges associated with integrating AI into the academic writing process.

METHOD

This study used a quasi-experimental design to analyze the effect of Artificial Intelligence (AI) on the creativity of scientific writing in students at the Faculty of Islamic Education and Teacher Training (FITK) at the State Islamic University of North Sumatra (UINSU) Medan. This design was chosen because it allows for partial control of external variables that could influence the research results, although not all variables can be fully controlled. The study was conducted from May to September 2024.

The sampling technique used was proportional purposive sampling, where the sample was selected based on certain criteria: students currently writing scientific papers or theses, students with access to and a basic understanding of the use of AI in writing, and students willing to participate in the research. The sample was drawn proportionally from each study program at FITK UINSU, taking into account the proportion of students in each study program, which totals 136 students.

The instruments used in this study include a scientific paper writing creativity test, which will be used to measure the level of writing creativity before (pretest) and after (posttest) the intervention using AI. Creativity will be measured based on several indicators, namely scientific scope, insight aspirations, originality of work, contribution to scientific progress, scientific impact, literature ratio, degree of up-to-dateness of literature, analysis and synthesis, and conclusions.

This study was conducted through a pre-experimental phase: initial measurements of writing creativity were conducted on the experimental and control groups; an intervention phase, in which the experimental group was given training and the opportunity to use AI in the scientific paper writing process; while the control group wrote their scientific papers without AI assistance; and a post-experimental phase, in which writing creativity measurements were repeated on both groups after the intervention.

Data obtained from the creativity test and questionnaire will be analyzed using a t-test to examine differences in average writing creativity scores between the experimental and control groups. Normality and homogeneity tests will also be performed as prerequisites for statistical analysis. These two tests are essential to ensure that the data meets the necessary assumptions before proceeding to further statistical testing.

RESULT

The findings were calculated using initial and final test data. Based on these calculations, the research findings regarding student creativity in writing scientific papers using and without AI are described in Table 1 below.

Table 1. Descriptive Analysis Of The Experimental Group

Statistics	Conclusion	
	Pretest	Posttest
N	68	68
Total Score	3197	4615
Mean	47,01	67,87
Variance	69,78	137,04
Standard Deviation	8,353	11,706
Maximum	61	82
Minimum	53	24

Based on the analysis above, it can be understood that the use of AI provided a difference in the average scores between the experimental and control groups. AI contributed to improving the overall quality of writing and assisting students who may have difficulty writing without technological support. Although there was a greater variability in the control group, this indicates that without AI, there is greater variation in performance and potentially lower results.

A normality test for the sample of students' pretest results on creativity in scientific writing using Artificial Intelligence (AI) yielded an L-count of 0.101 and an L-table of 0.107. Since L-count < L-table, i.e., $0.101 < 0.107$, the null hypothesis can be concluded. Therefore, it can be concluded that the sample of students' creativity in scientific writing using Artificial Intelligence (AI) came from a normally distributed population. Based on the normality test for the sample of

students' creativity in scientific writing without the use of Artificial Intelligence (AI), an L-count of 0.103 and an L-table of 0.107 were obtained. Since the calculated L-value $<$ L-value, it can be concluded that the sample of students' creativity in scientific writing using Artificial Intelligence (AI) comes from a normally distributed population. Since the calculated L-value $<$ L-value, i.e., $0.103 < 0.107$, it can be concluded that the null hypothesis is accepted. Therefore, it can be concluded that the sample of students' creativity in scientific writing taught without the assistance of Artificial Intelligence (AI) comes from a normally distributed population.

Homogeneity of variance testing for a normally distributed population is performed using a t-test. If both values are accepted and rejected, the variance is homogeneous.

Based on the homogeneity test, the calculated F-value is 1.37 and the F-value is 3.13. Since the calculated F-value $<$ F-value, i.e., $1.37 < 3.13$, H_0 is accepted and H_a is rejected. Therefore, the variance of the data on student creativity in scientific writing comes from a homogeneous population.

The hypothesis testing for this research data used the Separated Variance t-test formula, supported by Microsoft Excel. The statistical hypothesis is as follows:

First, an independent sample t-test was used to compare the mean differences between the experimental groups (student creativity in writing scientific papers using Artificial Intelligence (AI) and the difference between student creativity in writing scientific papers using Artificial Intelligence (AI) and student creativity in writing scientific papers without the use of Artificial Intelligence (AI)). This test is useful for determining whether there are significant differences in the measured variables.

The Independent Sample t-test on student creativity in writing scientific papers revealed a calculated T value of 8.45 and a T value of 2.06, indicating that T value $>$ T value. Based on these data, it can be concluded that the hypothesis is rejected and accepted, indicating that there is an effect of AI utilization on student creativity in writing scientific papers using Artificial Intelligence (AI). This hypothesis test indicates that there is a significant difference between the conditions being compared (e.g., the experimental group and the control group, or before and after AI utilization). A calculated T value significantly greater than the T value indicates that the tested effect, in this case, the use of AI, likely has a significant impact on student creativity in writing scientific papers. Regarding the experiment on the use of AI in scientific writing, it can be concluded that the use of AI has a significant positive impact on students' writing creativity.

The second hypothesis, based on calculations of students' creativity in scientific writing, yielded the following data:

An Independent Sample t-test on students' creativity in scientific writing revealed a calculated T value of 2.32 and a T value of 2.06, indicating that T value $>$ T value. Based on these data, it can be concluded that the test results are rejected and accepted, indicating a difference between the creativity of students in scientific writing using Artificial Intelligence (AI) and those without the use of Artificial Intelligence (AI). This conclusion supports the assertion that technology (such as AI) has a positive and significant impact on the variables tested in this study.

DISCUSSION

This section presents an analysis and interpretation of the data obtained from the research. The analysis and interpretation focus on the impact of Artificial Intelligence (AI) use on student creativity in writing scientific papers, as well as a comparison of the levels of academic writing creativity between students who utilize AI technology and those who do not.

This study used the null hypothesis (H_0) stating that AI technology has no significant impact on students' academic writing creativity, and the alternative hypothesis (H_1) stating the opposite. Based on the analysis, H_0 is rejected and H_1 is accepted, thus categorizing AI technology as having a significant impact on improving students' creativity in writing academic papers.

This finding indicates that the implementation of AI substantially contributes to developing students' creative abilities when writing scientific papers. The statistical test results showed that the calculated T-value significantly exceeded the T-table value, indicating a statistically significant difference between the group of students using AI and the control group. This finding confirms that AI makes a substantial positive contribution to improving students' writing creativity, as reflected in the increased quality and innovation of the scientific papers produced.

This is in line with research by Helen Crompton and Diane Burke (Crompton & Burke, 2023). The results of this study showed that during the 2021-2022 period, there was a two- to three-fold increase in publications compared to previous years. Significant growth in AIED HE publications has occurred globally across six of the seven continents, with emerging patterns indicating a shift in publication dominance from the United States to China.

This systematic review successfully identified gaps in the literature that can serve as a foundation for future research, including the utilization of emerging technologies such as ChatGPT. The fundamental difference between this study and the current study lies in the methodological approach used: a literature review with a sample of 138 articles and a focus solely on the use of AI ChatGPT. This aligns with Pratiwi's research findings that the use of ChatGPT in scientific writing significantly improves students' academic skills and digital literacy. Therefore, it is recommended to develop advanced training and more comprehensive learning modules to optimize the use of AI technology in academic settings (Purba, 2025). Meanwhile, the author's research adopted a quantitative approach implemented at the Faculty of Tarbiyah and Teacher Training, UINSU Medan, utilizing various AI platforms including ChatGPT, Bard, Quillbot, Connected Papers, DeepL, Perplexity, Smodin, Consensus, Paraphrasing Tools, and ChatPDF.

The results of the first hypothesis test concluded that there is a significant disparity in creative academic writing skills between students who utilize artificial intelligence (AI) technology and those who do not, with scores of 4.22 and 2.00, respectively, resulting in a calculated T-value exceeding the calculated T-value. A two-sample t-test was applied to compare the means of the two separate groups and identify any statistically significant differences between them. In this study, the experimental group consisted of students who integrated AI into their academic writing process, while the control group consisted of students who wrote scientific papers without the aid of AI technology.

The statistical analysis results demonstrate substantial differences in academic writing creativity between the two groups of students. This finding confirms that the implementation of AI technology has an impact on increasing students' creative capacity in the process of writing scientific papers. This is in line with research by Gwo-Jen Hwang, Benjamin W Wah, Haoran Xie, and Dragan Gasevic (Hwang et al., 2020), which shows that Artificial Intelligence in Education (AIED) has great potential in improving the quality of teaching and learning. The article highlights the role of AI in education, such as being an intelligent tutor, learner, learning tool/partner, or policy-making advisor. In addition, this article also identifies several potential research topics in AIED, such as the development of AI-based learning models, evaluation of student learning with AI systems, and investigation of the effectiveness of AI-based learning systems from various perspectives. The similarity in this study is that both research AI. The difference is that previous research examined AIED such as mapping tools, while the researcher's study uses AI in the form

of Chatgpt, Bard, Quillbot, Connected Papers, DeepL, Perplexity, Smodin, Consensus, Paraphrasing Tools, and Chatpdf. Artificial Intelligence aims to create machines that can think and function like the human brain (Muin & Kusmaladewi, 2025). AI tutoring systems can provide personalized guidance, support, or feedback by tailoring learning content based on learning patterns or knowledge levels (Octavia et al., 2025). AI has great potential to enhance student creativity in scientific writing (Hindra Kurniawan et al., 2024) (Laily Fitria et al., 2024). By using this technology, students can focus more on research and idea development, while AI assists them with the administrative and technical aspects of writing. Therefore, this study aims to identify the impact of using AI technology in improving students' scientific writing skills and measure its effectiveness in the context of higher education.

This discussion indicates that the use of AI in scientific writing can enhance student creativity, as evidenced by a significant difference in the two-sample t-test. Research conducted over the past five years supports these findings, and the grand theories of Amabile and Vygotsky provide a strong foundation for understanding how AI can positively impact creativity.

CONCLUSION

This study aims to examine the effect of Artificial Intelligence utilization on the creativity of scientific writing of FITK UINSU Medan students and prove a significant difference between students who use AI and those who do not use it in the writing process. The findings indicate that the use of AI significantly increases students' creativity in scientific writing, as seen from the increase in quality, variety, and innovation in the resulting work. The discussion reveals that AI plays a role as an aid that allows students to focus more on developing ideas and research, while the technical and administrative aspects of writing are supported by technology. The impact of this research in the context of higher education shows the great potential of AI to improve the quality of learning and academic productivity, but it needs to be accompanied by an understanding of ethical use to avoid plagiarism. Future research should further explore the optimal implementation of AI in various disciplines, as well as develop a framework that can maximize the benefits of AI while maintaining the academic integrity and originality of student work.

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