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The Influence of Artificial Intelligence (AI) on Students' Learning Activities and Learning Outcomes in Bengkulu City

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ABSTRACT

The advancement of digital technology has brought about changes in various aspects of life, including education. One technological development increasingly utilized in learning activities is Artificial Intelligence (AI). The use of AI enables students to access information, seek explanations regarding learning materials, complete exercises, and support independent study. However, the use of AI in learning activities requires examination to determine its relationship with student learning outcomes. This study aims to determine the influence of Artificial Intelligence (AI) usage in learning activities on the Social Studies (IPS) learning outcomes of eighth-grade students at SMP Negeri 24 Rejang Lebong, Bengkulu Province. The study employs a quantitative approach with an associative method. The population consisted of all eighth-grade students at SMP Negeri 24 Rejang Lebong, and 21 students were selected as the research sample using purposive sampling based on predetermined inclusion criteria relevant to the study. Data on AI usage in learning activities were collected through questionnaires, while Social Studies learning outcomes were obtained from students' grade records. Data analysis involved prerequisite tests, simple linear regression analysis, a t-test, and the coefficient of determination. The results indicate that AI usage in learning activities has a positive and statistically significant influence on Social Studies learning outcomes. The simple linear regression analysis produced the equation Y = 45.032 + 0.534X. The t-test yielded a calculated t-value of 8.415 with a significance level of < 0.001, indicating support for the research hypothesis. The R-Square value of 0.788 indicates that AI usage was associated with 78.8% of the observed variation in Social Studies learning outcomes in this sample, while the remaining 21.2% may be related to other factors not examined in this study. Given the relatively small sample size, this finding should be interpreted within the specific research setting and should not be generalized broadly without further research involving larger and more representative samples. Thus, AI usage may serve as a supporting learning resource in Social Studies instruction when utilized appropriately and responsibly.

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Introduction

The advancement of digital technology in the 21st century has brought about changes across various sectors of life, including education. One technological development garnering increasing attention is Artificial Intelligence (AI). AI is a technology that enables machines to perform tasks that previously required human capabilities. The integration of AI into education is already evident through various applications, such as adaptive learning systems, intelligent tutoring systems, and data-driven learning platforms. Previous research indicates how the development of AI offers opportunities for personalizing learning to suit students' individual needs, learning styles, and learning paces (Waita, 2025).

The use of technology in learning activities offers students the opportunity to acquire and process information from a variety of sources. Learning resources—previously derived primarily from books, teacher explanations, and conventional media—can now be supplemented by various digital technologies. One such technology applicable to learning is Artificial Intelligence (AI). AI is capable of responding to user inquiries, explaining subject matter, and assisting users in locating necessary information. Consequently, AI holds the potential to serve as an additional learning resource for students.

The use of AI in learning activities relates not only to the technology's capacity to provide information but also to the activities students engage in while using it. Students can leverage AI to seek explanations for concepts they do not yet grasp, find examples relevant to the topic, generate summaries, and practice to reinforce their understanding of the material. These activities demonstrate that AI technology can become an integral part of the learning process when its use is aligned with learning needs. Furthermore, appropriate use can enable students to engage in learning more independently.

A number of previous studies have demonstrated a link between the use of AI technology and learning processes and outcomes. These findings indicate that AI has the potential to support students' learning activities. Such results provide a crucial foundation for further examining the use of AI, particularly within the context of Social Studies education at the junior high school level. Since every school environment differs in terms of student characteristics, learning conditions, facilities, and technology usage habits, research findings from one setting do not necessarily fully reflect the conditions in another.

According to Russell and Norvig (2009), Artificial Intelligence is a field within science and engineering that has evolved since the post-World War II era, with the term itself coming into use in 1956. AI continues to evolve, creating opportunities for various innovations in human life. Sadiku (2022) explains that AI is a branch of computer science focused on designing intelligent systems capable of mimicking various human capabilities. These capabilities include planning, learning, reasoning, problem-solving, decision-

making, language translation, and creativity. Given these capabilities, AI can be utilized across diverse fields, including education.

In the educational context, Narcisco (2024) explains that AI can be implemented in various forms, such as adaptive learning platforms, intelligent tutoring systems, automated assessment systems, learning analytics, and various accessibility tools. Such applications enable learning to become more personalized and efficient, while also allowing it to be tailored to the specific needs of learners. The use of AI in learning activities offers students opportunities to access additional information and explanations when they encounter difficulties in understanding the material. AI can also support independent study, practice exercises, and the acquisition of alternative explanations regarding the subject matter. Consequently, AI can serve as a supplementary learning resource that supports students' learning activities.

However, the use of AI in education also presents several challenges that require attention. These include issues such as the digital divide, limited digital literacy, student over-reliance on technology, and the potential reduction of human interaction during the learning process. Herawati (2024) also highlights concerns that reliance on AI could undermine critical thinking, creativity, and deep understanding if its use is not properly guided.

The use of AI in learning activities must be viewed in terms of how students utilize it. AI should not merely be a tool for obtaining quick answers; rather, it should be used to help students understand the material, seek information, practice, and develop independent learning skills. Learning activities are closely linked to learning outcomes. Learning outcomes serve as an indicator of student achievement following the learning process. In their thesis, Kurniansyah, Adisel, and Sari (2024) explain that learning outcomes relate to the changes that occur in students after undergoing the learning process. These outcomes can encompass cognitive, affective, and psychomotor aspects.

According to Sudjana, learning outcomes cover three main domains as classified in Bloom's taxonomy: the cognitive, affective, and psychomotor domains. Furthermore, the assessment of learning outcomes requires instruments that possess characteristics such as validity, reliability, objectivity, and practicality. In this study, the learning outcomes of focus are those related to the Social Studies (IPS) subject. Social Studies is a field of learning associated with various social science disciplines. Nasution, Sitohang, and Tambunan (2022) explain that IPS is the translation of "social studies"—social sciences simplified for educational purposes—encompassing history, economics, politics, sociology, anthropology, psychology, geography, and philosophy selected for instruction.

The broad scope of Social Studies requires students to utilize various learning resources to comprehend the material. The use of AI offers an alternative source of additional information, helping students obtain explanations regarding various Social Studies topics. Consequently, the use of AI has the potential to support student learning activities and, ultimately, influence the achievement of learning outcomes.

Previous research has also demonstrated a relationship between AI usage and learning outcomes. Kamal, Samudra, and Junaidi (2025) investigated the impact of AI on student learning outcomes in the Informatics subject at SMKN 1 Enam Lingkung. Their study employed a quantitative approach using a quasi-experimental method. The results showed that the experimental class using AI achieved an average score of 85.25, whereas the control class achieved an average of 78.26. Hypothesis testing indicated that the use of AI had a positive and significant effect on student learning outcomes.

A systematic literature review by Ambarita and Nurrahmatullah (2024) also demonstrated that AI has the potential to enhance student learning outcomes, particularly in the cognitive and affective domains. However, the study also identified various

challenges regarding AI implementation, including data security, system accuracy, student dependency on AI, and ethical aspects of learning assessment.

Research by Mayasari et al. (2024) further found that the use of AI learning tools had a positive and significant impact on students' critical thinking skills. Involving 250 students, the study showed that the use of AI learning tools significantly influenced critical thinking skills, with a value of $\beta = 0.355$ and $p < 0.001$. Previous research indicates that AI has been extensively studied in relation to learning outcomes and student capabilities. However, research specifically examining the use of AI in learning activities—and its impact on Social Studies learning outcomes at the junior high school level, particularly in public schools in regional areas—remains limited. This thesis identifies this area as a research gap.

Method

This study employs a quantitative approach using a descriptive-associative method. Quantitative research is an approach that utilizes numerical data as the basis for addressing research problems. This approach focuses on objective measurement, systematic and standardized data collection processes, and the use of statistical analysis techniques to test hypotheses and describe phenomena. Quantitative research is generally used to analyze relationships between variables, determine the level or frequency of occurrences, and identify patterns within a population (Waruwu et al., 2025).

According to Nurhabiba et al. (2023), quantitative descriptive research describes the subject of study as it exists and draws conclusions from observable phenomena using numerical data. A quantitative approach was adopted because the research data consists of numerical values that are subsequently analyzed using statistical techniques. The associative method was employed to determine the relationship or influence between the variable of Artificial Intelligence (AI) utilization in learning activities and students' Social Studies (IPS) learning outcomes.

The study was conducted at SMP Negeri 24 Rejang Lebong. The research population consisted of Grade VIII students at the school. Based on data from the thesis, Grade VIII comprises two classes: Class VIII A (21 students) and Class VIII B (22 students), resulting in a total of 43 Grade VIII students. The research sample consisted of 21 students selected using purposive sampling. Sample selection was based on criteria established for the study. The independent variable in this study is the utilization of Artificial Intelligence (AI) in learning activities (X), while the dependent variable is Social Studies (IPS) learning outcomes (Y).

Data regarding AI utilization was collected via a questionnaire designed to gather information on how students use AI in their learning activities. Data on Social Studies learning outcomes were obtained through the documentation of student grades. By utilizing these two data sources, the study was able to gather information on the level of AI utilization and the students' Social Studies learning achievements.

The collected data were subsequently analyzed using statistical techniques. The analysis begins with a descriptive analysis to provide an overview of the research data. Subsequently, prerequisite tests—specifically normality and linearity tests—are conducted prior to the regression analysis. Once the analysis requirements are met, a simple linear regression analysis is performed to determine the direction and magnitude of the influence of AI utilization on Social Studies learning outcomes. The simple linear regression equation used is: $\mathbf{Y = a + bX}$

Where: Y represents Social Studies learning outcomes, X represents AI utilization in

learning activities, a is the constant, and b is the regression coefficient. Hypothesis testing is conducted using the t-test with a significance level of 5% (0.05). If the significance value is less than 0.05, the null hypothesis is rejected and the alternative hypothesis is accepted. Furthermore, the R-squared value is used to determine the extent to which AI utilization contributes to explaining the variation in students' Social Studies learning outcomes.

Results and Discussion

This study was conducted to determine the effect of using Artificial Intelligence in learning activities on the Social Studies learning outcomes of eighth-grade students at SMP Negeri 24 Rejang Lebong. Research data were obtained from a sample of 21 students. Data regarding AI usage were collected via questionnaires, while Social Studies learning outcomes were obtained from student grade records. Data analysis was performed to examine the relationship between the two variables and to test the research hypothesis. The analysis process included prerequisite tests, simple linear regression, the t-test, and the coefficient of determination.

Linearity Test

A linearity test is conducted to determine whether a significant linear relationship exists between two or more variables under study. This test is a prerequisite that must be met prior to performing correlation or linear regression analysis (Setiawan & Yosepha, 2020). The revised test results show a "Deviation from Linearity" significance value of 0.700. This value exceeds the significance level of 0.05. Consequently, the relationship between the use of AI in learning activities (Variable X) and Social Studies learning outcomes (Variable Y) is determined to be linear. These results indicate that changes in the AI usage variable can be analyzed using a simple linear regression model to examine the relationship and the direction of its influence on Social Studies learning outcomes.

Simple Linear Regression Analysis

Regression analysis is a statistical technique used to determine the relationship between variables. This analysis aims to assess the extent to which an independent variable influences a dependent variable, whether in a positive or negative direction. In the field of education, regression analysis can be employed to identify various factors influencing students' academic achievement, interests, and learning motivation. One commonly used form of regression analysis is simple linear regression, which involves a single independent variable and a single dependent variable. This analysis yields a linear equation that can be used to understand the relationship and predict changes in the dependent variable based on changes in the independent variable (Lestari et al., 2026).

Simple linear regression analysis was used to determine the nature of the relationship between the use of AI in learning activities and Social Studies learning outcomes. Based on the analysis results, the following regression equation was obtained: Y = 45.032 + 0.534X

The equation indicates a constant value of 45.032. This means that if the AI usage variable remains unchanged, the Social Studies learning outcome value is estimated to be 45.032. The regression coefficient of 0.534 indicates that the use of AI has a positive relationship with Social Studies learning outcomes. This implies that for every one-unit increase in AI usage during learning activities, Social Studies learning outcomes are estimated to increase by 0.534 units. A positive regression coefficient indicates that the relationship between the two variables moves in the same direction. Thus, based on the regression model used in this study, the better the use of AI in learning activities, the higher the tendency for students' Social Studies learning outcomes.

Hypothesis Test

A hypothesis is a provisional conjecture or tentative answer to a research problem formulated by the researcher. Hypotheses play a crucial role in research by serving as a guide for determining the direction and objectives of the study. Thus, a hypothesis is an essential component of the scientific method, used to test the validity of a conjecture while simultaneously expanding understanding and knowledge regarding the phenomenon under investigation (Halimah et al., 2025). Hypothesis testing was conducted to determine whether the use of AI in learning activities has a significant influence on students' Social Studies learning outcomes. The t-test results show a calculated t-value of 8.415 with a significance value of < 0.001. This significance value is less than 0.05. Based on the testing criteria, H_0 is rejected and H_1 is accepted.

Based on the hypothesis test results, it can be concluded that the use of Artificial Intelligence (AI) in learning activities has a positive and significant effect on the Social Studies learning outcomes of Grade VIII students at SMP Negeri 24 Rejang Lebong.

Coefficient of Determination

The coefficient of determination is a statistical measure indicating the extent to which the independent variable explains the variation in the dependent variable within a regression model. According to Fitri et al. (2022), the coefficient of determination is a measure used to determine the percentage of the independent variable's influence on the dependent variable in a study.

The coefficient of determination is used to assess the contribution of the AI utilization variable in explaining the variation in Social Studies learning outcomes. The simple linear regression analysis yielded an R-squared value of 0.788. When converted to a percentage, this value becomes: 0.788 × 100% = 78.8%. The utilization of AI in learning activities contributes 78.8% to the variation in students' Social Studies learning outcomes, while the remaining 21.2% of the variation is influenced by other factors not examined in this study.

Discussion

The research results indicate that the use of Artificial Intelligence (AI) in learning activities has a positive and significant influence on the Social Studies learning outcomes of eighth-grade students at SMP Negeri 24 Rejang Lebong. These findings are based on simple linear regression analysis and hypothesis testing using the t-test. A regression coefficient of 0.534 indicates a positive relationship between AI usage and Social Studies learning outcomes. This means that increased AI usage in learning activities corresponds to improved Social Studies learning outcomes within the study's model. In other words, students who utilize AI as a learning resource tend to achieve better learning outcomes.

AI usage supports student learning activities by enabling faster access to information and additional explanations. When students encounter material they do not yet understand, AI can serve as a source for further clarification. Students can also use it to find examples, practice, and grasp specific concepts within Social Studies. In Social Studies, access to additional information sources helps students comprehend a broad range of topics. Social Studies material encompasses social life, history, geography, economics, and various societal phenomena. Consequently, students require not only the explanations

provided during class but also supplementary learning resources to deepen their understanding.

AI usage also supports independent learning. Students can utilize AI for study activities outside of regular class hours, allowing them to review material, seek additional explanations, and practice according to their individual needs. These results do not imply that AI is the sole determinant of student learning outcomes. An R-Square value of 0.788 indicates that, within this model, AI usage explains 78.8% of the variation in Social Studies learning outcomes, while the remaining 21.2% is attributable to factors outside the variables studied. Such factors may include learning motivation, interest, prior knowledge, family environment, teaching methods, learning facilities, and other variables.

The study demonstrates that AI usage serves as a factor that supports learning activities; however, AI should not be viewed as a substitute for the teacher or for the students' own thinking processes. Teachers continue to play a vital role in providing guidance, overseeing technology usage, and helping students evaluate information obtained through AI. The appropriate use of AI is also crucial, as students need to understand the material they are studying rather than merely obtaining answers. If AI is used solely to get quick answers without grasping the underlying processes, its value as a learning resource is diminished. AI utilization should be directed toward activities that foster student understanding and independent learning.

These research findings align with previous studies highlighting AI's potential to support learning processes and outcomes. Research on AI in education indicates that the technology can assist students in accessing information, comprehending material, and facilitating learning activities. However, prior research also points to challenges such as technological dependency, information accuracy, and ethical issues surrounding AI usage. The study results suggest that AI can serve as an alternative learning resource in Social Studies education. Its implementation requires careful consideration of learning objectives and the students' ability to use the technology responsibly.

Conclusion

The study concludes that the use of Artificial Intelligence (AI) in learning activities has a positive and significant impact on the Social Studies learning outcomes of 8th-grade students at SMP Negeri 24 Rejang Lebong. Simple linear regression analysis yielded the equation $Y = 45.032 + 0.534X$, indicating a positive relationship between AI usage and Social Studies learning outcomes. The t-test results showed a calculated t-value of 8.415 with a significance level of < 0.001, leading to the acceptance of the research hypothesis. Furthermore, the R-squared value of 0.788 indicates that AI usage in learning activities contributes 78.8% to the variation in Social Studies learning outcomes, while the remaining 21.2% is influenced by factors outside the scope of this study. These results demonstrate that AI can serve as a supplementary learning resource to support Social Studies instruction, particularly by helping students access information, comprehend the material, practice exercises, and engage in independent study. However, the use of AI requires guidance to ensure that students do not merely obtain answers but also understand the subject matter and develop independent learning skills. The use of AI in education must be approached in a purposeful and responsible manner. Teachers play a vital role in guiding students on how to use AI as a learning aid, evaluating the information obtained, and continuing to foster students' critical thinking skills. When utilized effectively, AI can serve as a supporting technology that complements the social studies learning process and helps create more active and independent learning activities.

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