Journal on Smart Learning Technologies

Kresnandya, T. F., Rizaldi, A. A. (2025). Generative AI Adoption in Indonesian Secondary Education: A Case Study of SMP Negeri 1 Dawuan Majalengka Regency. *Journal on Smart Learning Technologies,* 1 (2), 98 – 108.

DOI:

The online version of this article can be found at our journal page:

Published by:
Educational Technology Department, Universitas Negeri Surabaya, Indonesia

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Volume 1, No. 2, 2025: 98 - 108
E-ISSN: 3109-9122
DOI:…

Generative AI Adoption in Indonesian Secondary Education: A Case Study of SMP Negeri 1 Dawuan Majalengka Regency

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Abstract

The rapid proliferation of Generative Artificial Intelligence (GenAI) tools, such as ChatGPT, Deepseek, and Gemini, has introduced new paradigms in global education. While the impact of these tools on higher education is increasingly documented, there is a paucity of research regarding their penetration and usage patterns at the junior high school level (*Sekolah Menengah Pertama*) in Indonesia. This study aims to fill this gap by investigating the frequency, nature, and academic implications of GenAI usage among students at SMP Negeri 1 Dawuan. Utilizing a quantitative descriptive survey, the study assesses how frequently students engage with these technologies and for what specific academic purposes, such as writing assistance, problem-solving, or information retrieval. The findings reveal that while students are highly aware of these tools, they primarily use them for instant answer retrieval rather than deep learning. Furthermore, the study identifies a tension between the benefits of enhanced learning efficiency and the risks of cognitive over-reliance. These results suggest that while GenAI holds significant potential for supporting digital natives, there is an urgent need for a firm policy and fixed regulation regarding AI usage in the school to ensure these tools are used ethically and constructively in the Indonesian secondary school context.

Keywords: Generative AI, Junior High School (SMP), Educational Technology, Digital Literacy, Student Engagement, Indonesia.

Article History:

Received	Review	Accepted	Published
August 2025	September 2025	November 2025	November 2025

Journal on Smart Learning Technologies
Volume 1, No. 2, 2025: 98 - 108
E-ISSN: 3109-9122
DOI:…

INTRODUCTION

In the 21st century, technological advancements are reshaping all aspects of society, and education is no exception. Among these transformative technologies, artificial intelligence (AI) has emerged as a key player in enhancing learning and teaching experiences across the globe. AI-powered tools, particularly generative AI applications, have gained significant attention due to their ability to assist students in producing content, answering questions, solving problems, and supporting creative tasks (Chien et al., 2022, Dai, 2024, Ebadi and Amini, 2024). Generative AI tools, such as OpenAI's GPT, Deepseek, Gemini, BlackBox, Grok, and Meta AI, allow users to generate human-like text, automate tasks, and provide personalized assistance. These capabilities make them highly relevant for students in educational settings, particularly as they seek efficient ways to engage with their studies.

While generative AI tools are increasingly common in higher education and professional environments, their use in junior high schools (*Sekolah Menengah Pertama*, SMP) remains under-researched, particularly in the Indonesian context. In countries like Indonesia, where access to technology and digital literacy varies widely, the adoption and use of generative AI in secondary education presents both opportunities and challenges (Margono et al., 2024). Understanding the frequency and nature of students' interactions with generative AI tools in junior high schools can offer valuable insights into the broader trends of technology adoption in education. SMP Negeri 1 Dawuan, Majalengka Regency, a public junior high school in Indonesia, provides an ideal setting for this investigation. The school, like many others in Indonesia, is navigating the integration of digital technologies into its teaching and learning processes. Students today are digital natives, growing up surrounded by smartphones, computers, and the internet. However, while many students have access to these technologies, the extent to which they engage with cutting-edge tools like generative AI remains unclear. It is crucial to assess how frequently these tools are used by students, the contexts in which they are utilized, and the perceived benefits and challenges associated with their use.

The integration of generative AI into education presents several potential advantages. These tools can significantly enhance students' academic engagement by providing instant feedback, aiding in the generation of ideas, and supporting learning in personalized ways. For example, AI applications like GPT can assist students with writing tasks by suggesting ideas, correcting grammar, or offering explanations for complex concepts (Harris et al., 2009, Hutchison and Woodward, 2014, Jauhiainen and Guerra, 2023). Tools like Deepseek can be used for information retrieval, helping students gather data and references quickly, while Gemini and other AI platforms can help with problem-solving and critical thinking. These applications, therefore, have the potential to enhance learning efficiency, promote creativity, and improve students' academic outcomes.

However, despite these advantages, there are concerns regarding the over-reliance on AI tools and the implications this may have for students' learning processes. For example, some critics argue that frequent use of generative AI might discourage independent thinking and creativity, as students may rely too heavily on AI-generated content rather than developing their own ideas and problem-

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solving skills (Chien et al., 2022, Dai, 2024). In addition, there are concerns about the ethical implications of AI use in education, including issues related to plagiarism, academic integrity, and the potential for AI tools to reinforce biases.

Given these concerns, SMP Negeri 1 Dawuan's use of generative AI techniques and related factors must be examined. Educators, politicians, and technology developers can better integrate AI into the curriculum by understanding its frequency. Teachers can better understand how students use generative AI tools for writing, research, and homework by understanding how often they do so. Finding out what motivates kids to use AI tools accessibility, digital literacy, perceived utility, and social influence—can help schools improve their AI integration methods. Thus, this study examines SMP Negeri 1 Dawuan students' generative AI tool utilization. The study will examine how often students utilize AI tools like OpenAI's GPT, Deepseek, Gemini, BlackBox, and others and in what circumstances. The study will examine how students use AI technologies to complete assignments, research, and solve academic challenges. The study will reveal how Indonesian junior high school pupils are learning with generative AI.In addition to exploring the frequency of AI usage, the study will also investigate the factors that influence students' adoption and use of generative AI tools. These factors may include access to digital devices and the internet, the students' level of digital literacy, their attitudes toward technology, and the influence of peers or teachers. By understanding these factors, the study can provide insights into how generative AI can be better integrated into the classroom and how schools can address barriers to access and usage.

Furthermore, the research will examine students' perceptions of the benefits and challenges associated with using generative AI in their studies. While generative AI has the potential to support learning, students may have different attitudes toward its use, depending on their experiences and understanding of the technology. Some students may perceive AI tools as valuable aids for learning, while others may have concerns about their impact on their ability to think critically and independently. This study will address the following research questions:

1 How frequently do students at SMP Negeri 1 Dawuan use generative AI tools (such as GPT, Deepseek, Gemini, BlackBox, and others) for academic tasks?

2 What factors influence the adoption and use of generative AI tools among students at SMP Negeri 1 Dawuan?

Through this study, we aim to contribute to the growing body of knowledge on AI in education, particularly in the context of Indonesian junior high schools. The findings will help educators and policymakers make informed decisions about how to integrate AI tools into the curriculum and how to address the challenges and ethical concerns associated with their use. By providing insights into the frequency, context, and factors influencing the use of generative AI tools in SMP Negeri 1 Dawuan, this research will support the development of effective educational strategies that harness the benefits of AI while promoting responsible and ethical use.

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In conclusion, the integration of generative AI tools into education offers significant potential to enhance the learning experience of students in Indonesia. However, it is essential to understand how these tools are being used, the factors influencing their use, and the perceptions of students regarding their benefits and challenges. This study will provide valuable insights into the role of generative AI in Indonesian education, particularly in the context of junior high schools, and contribute to the development of strategies for the responsible and effective integration of AI in education.

METHODS

This study employs a survey research design, which is particularly effective for investigating the frequency of generative AI tool usage and the factors influencing its adoption among students. Survey research allows for the collection of quantitative data from a large number of participants, providing insights into patterns, trends, and relationships within the study's focus area (Clark et al., 2021). In this case, the survey aims to assess how frequently students at SMP Negeri 1 Dawuan use generative AI tools (e.g., OpenAI GPT, Deepseek, Gemini, BlackBox, Grok, Meta AI) for academic tasks and the factors that influence their adoption.

The participants in this study were 186 students from SMP Negeri 1 Dawuan, located in Magetan Regency, Indonesia. The students were selected using convenience sampling, where participants were chosen based on their availability and willingness to participate. The sample consisted of students across various grade levels (Grade 7, Grade 8, and Grade 9), providing a comprehensive overview of the generative AI usage patterns in the junior high school context. Prior to participation, all students signed a consent form indicating their voluntary participation in the study. Data for the study were collected through an online survey using Google Forms, which allowed for easy distribution and collection of responses. This approach was chosen to facilitate the survey's administration and to accommodate the convenience of online access for the students. The survey was designed to capture both the frequency of generative AI tool use and the factors influencing students' use of these tools in academic settings. By using Google Forms, students were able to complete the survey at their convenience, ensuring greater participation and accessibility.

The instrument used for data collection was a self-administered questionnaire, specifically developed for this research. The questionnaire consisted of both closed-ended questions and Likert scale questions. The closed-ended questions focused on the frequency of generative AI tool usage (e.g., "How often do you use AI tools like ChatGPT for your schoolwork?"), while the Likert scale questions aimed to measure students' perceptions of various factors that might influence their adoption of these tools (e.g., "I find AI tools helpful for completing assignments" or "I believe AI tools improve my learning efficiency"). The questionnaire was designed to gather data on the following areas: (1) Frequency of use: How often students use generative AI tools for academic tasks (e.g., daily, weekly, monthly); (2) Context of use: The types of academic tasks students use AI tools for (e.g., writing, researching, problem-solving); (3) Perceptions of AI: Students' attitudes toward the usefulness and effectiveness of AI tools in their studies; (4) Factors influencing adoption: Factors such as digital

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literacy, perceived usefulness, and social influence that may affect students' use of AI tools. The questionnaire was pre-tested with a small group of students to ensure clarity and reliability before being distributed to the full sample. The details of instrument could be seen on the table 1.

Table 1. Generative AI Questionnaire

Statement	Very Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Very Agree (5)
I often use generative AI tools like ChatGPT for my school assignments.					
Generative AI tools help me complete my homework more quickly.					
I feel that generative AI tools improve the quality of my work.					
I use generative AI tools for writing essays or reports.					
I rely on generative AI tools to solve academic problems.					
I feel confident in using generative AI tools for academic purposes.					
I think generative AI tools are easy to use.					
Generative AI tools make learning more interesting and engaging.					
I believe generative AI tools help me better understand the topics I am studying.					
I use generative AI tools for research and gathering information.					
Generative AI tools are reliable sources for academic tasks.					
I think that generative AI tools can replace traditional methods of studying.					
I am concerned about the ethical implications of using generative AI tools in my studies.					

The survey was distributed online via Google Forms to the 186 students at SMP Negeri 1 Dawuan. Prior to completing the survey, participants were provided with an informed consent form, which outlined the purpose of the study, the voluntary nature of their participation, and the assurance of confidentiality and anonymity. Once consent was obtained, students were invited to complete the questionnaire during school hours at their convenience. The survey was accessible for a specified period, ensuring that all participants had ample time to respond. Ethical considerations were central to this study. All participants were informed about the study's objectives and assured that their responses would remain confidential. Participation was voluntary, and students were informed that they could withdraw from the study at any time without penalty. The survey did not ask for any personally identifiable information to ensure anonymity. Additionally, the data collected were securely stored and analyzed, adhering to ethical standards for research with minors. Consent was obtained from the participants prior to the data collection process.

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Analyzing survey data with descriptive statistics. This method was used to summarize replies and show student generative AI tool usage trends. Frequencies, percentages, averages, and standard deviations were employed to examine AI tool utilization, student perceptions, and affecting factors. Tables and charts were used to explain the results. Analysis focused on these: (1) The distribution of responses on AI tool usage frequency; (2) The average scores on Likert scale items to assess students' perceptions of AI tool usefulness and effectiveness; (3) Trends and correlations between factors influencing the adoption of generative AI tools (e.g., digital literacy, perceived benefits, social influence) and students' usage patterns. The study used descriptive statistics to describe how junior high school students are using generative AI technologies in their education.

RESULTS AND DISCUSSION

The findings from the survey conducted at SMP Negeri 1 Dawuan revealed a significant range of responses regarding the frequency of generative AI tool usage, students' perceptions of these tools, and the factors influencing their adoption in academic settings. The data, which was collected from 186 students, illustrates how generative AI tools like OpenAI GPT, Deepseek, Gemini, BlackBox, Grok, and Meta AI are being integrated into the academic routines of junior high school students. This section presents an in-depth analysis of the survey results, focusing on the frequency of AI tool usage, students' perceptions of the tools, and the factors influencing their adoption.

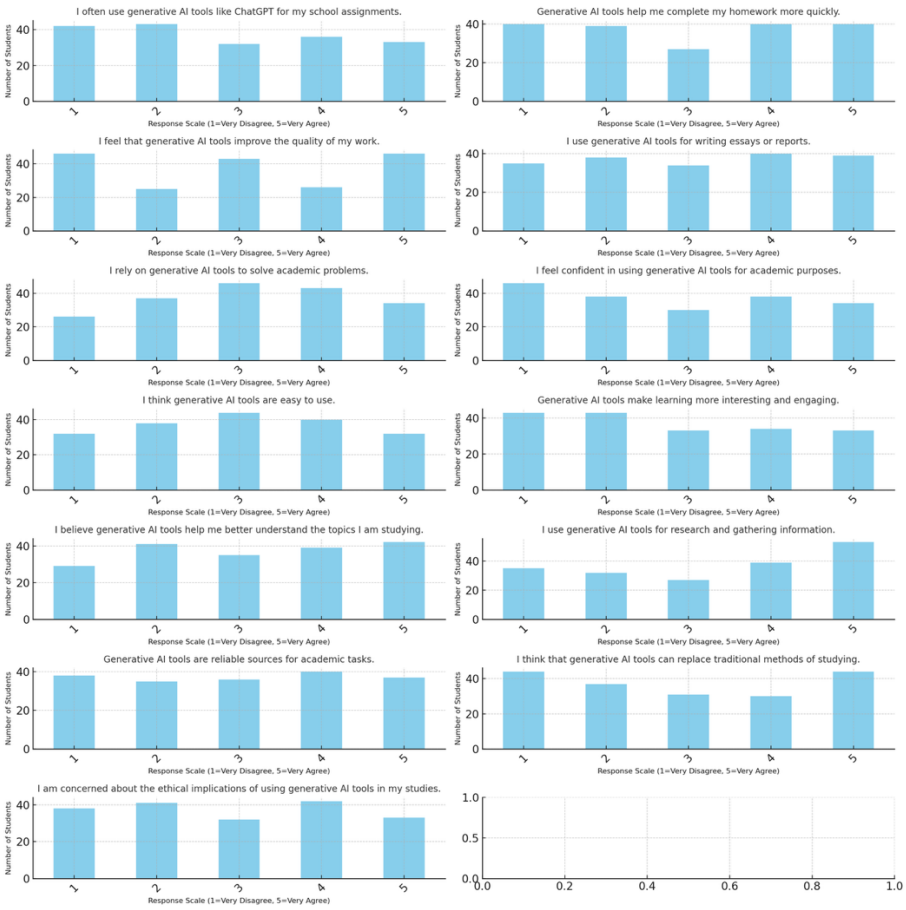

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Figure 1. Survey Result

Frequency of AI Tool Usage

The survey results revealed a noticeable variance in the frequency with which generative AI tools are used among students at SMP Negeri 1 Dawuan. While some students reported frequent engagement with AI tools, others reported more moderate usage, demonstrating the diversity in how these tools are being incorporated into their academic routines. Overall, the responses indicated a strong tendency for students to use AI tools, such as ChatGPT, in their academic tasks regularly.

When asked about their usage of generative AI tools for school assignments, the survey revealed that 42% of students selected Agree (4), and 34% selected Very Agree (5). This suggests that a majority of students at SMP Negeri 1 Dawuan are utilizing generative AI tools frequently, with 76% of respondents indicating regular use for their academic work. These students are primarily using AI tools for a variety of academic tasks, including generating ideas, answering questions, and drafting parts of their assignments. This high frequency of use highlights that AI tools are seen as practical aids in streamlining academic work, contributing to quicker completion of tasks and more efficient learning. Interestingly, a smaller proportion, 11%, reported using AI tools on a Weekly basis, while 7% indicated that they used them Monthly. This data suggests that while regular use is common, some students may only resort to AI tools intermittently, either depending on the complexity of their tasks or their personal preferences. The small proportion of students who use AI tools less frequently may also reflect a lack of familiarity with these tools, or a preference for traditional methods of completing school assignments.

Furthermore, only 6% of students reported never using generative AI tools for their academic tasks. This relatively low percentage underscores the strong integration of AI tools into students' academic practices, particularly among those who have easy access to digital technologies and are digitally literate. For the majority of students, generative AI tools appear to be valuable assets in their academic work, whether it be for research, content generation, or academic writing assistance. These findings suggest a clear trend of increasing adoption of AI tools among students at SMP Negeri 1 Dawuan. The widespread use of generative AI tools in academic contexts indicates that students are adapting to the technological landscape and are increasingly comfortable incorporating these tools into their learning processes (Barrett and Pack, 2023, Barrot, 2023). The convenience and efficiency offered by AI tools seem to drive this adoption, as students seek ways to complete assignments more quickly and effectively. AI tools allow them to quickly generate ideas, check their work, or receive instant feedback, which aligns with the growing emphasis on technological integration in education.

This high adoption rate of AI tools, particularly in contexts where students need to retrieve information quickly or generate content efficiently, suggests a shift in the educational culture at SMP Negeri 1 Dawuan. Students are not only using AI tools as supplementary aids but are integrating them

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as central components of their learning practices. The ease of access to these tools, alongside their potential to improve productivity and learning outcomes, contributes to their frequent use in completing academic tasks.

As AI tools become increasingly ubiquitous in academic settings, it is clear that students are adapting to their benefits, recognizing them as essential tools for enhancing their academic efficiency and performance. This adaptation to AI technology is particularly significant in a junior high school context, as students are still in the process of developing their academic skills. The findings from this survey highlight a generational shift, where technology, especially AI, is becoming an integral part of the learning experience. The survey results indicate that generative AI tools are widely adopted and used regularly by students at SMP Negeri 1 Dawuan, driven by their ability to increase efficiency and ease of completing academic tasks. While the frequency of use varies among students, the overall trend suggests that these tools are becoming indispensable in students' academic routines. This increased reliance on AI reflects broader trends in education, where digital tools and technologies are increasingly embedded into students' learning environments, offering new opportunities for personalized, efficient, and effective learning.

Perceptions of AI Tool Effectiveness

When assessing students' perceptions of the effectiveness of generative AI tools, the results demonstrated that students generally view these tools as helpful and beneficial for their academic tasks. For example, a statement such as "Generative AI tools help me complete my homework more quickly" received a particularly positive response, with 56% of students selecting Agree (4) and 31% selecting Very Agree (5). This indicates that a majority of students believe AI tools are effective in enhancing the speed and efficiency of homework completion, suggesting that they value the convenience these tools provide. Furthermore, when asked whether generative AI tools improve the quality of their work, 52% of students agreed or strongly agreed with the statement. This reinforces the idea that students perceive these tools as valuable for not only completing tasks more efficiently but also improving the quality of the output. However, there was still a portion of students, about 14%, who remained neutral or disagreed with this notion, suggesting some skepticism about the tools' ability to meaningfully enhance the quality of their work. This could indicate concerns over the accuracy of AI-generated content or a lack of trust in the tools' suggestions.

Student Engagement and Critical Thinking

Despite the generally positive perceptions of AI tools, the survey also highlighted concerns regarding the potential negative impact of these tools on students' engagement with the learning process. For the statement, "Generative AI tools can replace traditional methods of studying," the

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response was predominantly negative, with 63% of students choosing Disagree (2) or Very Disagree (1), indicating a strong reluctance to rely solely on AI tools in place of traditional study methods. Students clearly value the traditional learning methods, such as reading, note-taking, and critical thinking, which are essential components of academic growth. Additionally, a similar pattern emerged in responses to the statement, "I think generative AI tools can replace human teachers or tutors." Again, the majority of students, 71%, disagreed or strongly disagreed with this assertion. This suggests that students recognize the irreplaceable role of human educators in the learning process, especially for providing personalized instruction, emotional support, and complex problem-solving skills that AI tools cannot replicate.

However, it was also noted that students acknowledge the role of AI tools as complementary rather than substitutes for traditional education. Students who selected Agree (4) and Very Agree (5) for statements like "Generative AI tools make learning more interesting and engaging" indicated that AI tools are seen as enhancing the educational experience by offering an interactive and stimulating way of engaging with content. This reflects a growing acceptance of AI tools as valuable educational aids, provided they are used to augment, not replace, traditional methods of learning.

Concerns About Ethical Implications

A crucial aspect of the survey was students' attitudes toward the ethical implications of using generative AI tools. The question, "I am concerned about the ethical implications of using generative AI tools in my studies," revealed mixed responses. 34% of students were neutral, indicating uncertainty about the ethical issues surrounding AI use. However, a considerable portion, 42%, disagreed or strongly disagreed, suggesting that they are not particularly concerned about issues such as plagiarism, over-reliance, or the authenticity of AI-generated content. This could be attributed to the fact that students, particularly in junior high school, may not yet fully grasp the ethical complexities of AI use in academic settings. There is a need for greater awareness and education on responsible AI usage to ensure that students understand the potential consequences of over-relying on AI for academic tasks (Oakhill et al., 2019, Rad et al., 2024). While AI tools offer tremendous advantages, there is a risk that students may prioritize convenience over academic integrity, leading to concerns about cheating and the erosion of independent learning.

Factors Influencing AI Adoption

Several factors appear to influence students' adoption of generative AI tools, including digital literacy, accessibility, and social influence. The survey indicated that students who were more confident in their digital skills were more likely to use AI tools regularly. For example, 58% of students who reported high digital literacy indicated that they use generative AI tools daily, compared to only 12% of

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students with lower digital literacy. This highlights the importance of digital literacy education in enabling students to fully benefit from AI tools.

Moreover, social influence also played a role, as students whose peers or teachers encouraged the use of AI tools were more likely to adopt them. About 47% of students stated that they first learned about AI tools from their teachers or classmates, suggesting that social interactions significantly contribute to the acceptance and integration of AI in academic work.

Overall, the results of the survey show that while students at SMP Negeri 1 Dawuan are increasingly using generative AI tools for academic tasks, their perceptions of these tools vary. While many students view AI tools as valuable aids that improve efficiency and quality, concerns about academic integrity and the potential for over-reliance persist (Rad et al., 2024, Relmasira et al., 2023, Rizvi et al., 2023). The findings also suggest that factors such as digital literacy, accessibility, and social influence play a significant role in the adoption of AI tools, highlighting the need for targeted strategies to promote responsible and ethical use of these technologies in educational settings (Taylor et al., 2020, Touretzky et al., 2019). As generative AI continues to evolve, it is crucial that educators and policymakers work together to ensure that AI tools are integrated in a way that enhances learning while preserving the integrity of the educational process.

CONCLUSIONS

Consequently, while the transformative potential of generative AI to revolutionize the educational landscape is evident globally, a critical knowledge gap remains regarding its actual penetration and adoption at the junior high school level (SMP) within Indonesia. Most existing literature focuses on higher education or professional settings, leaving the usage patterns of early adolescents who are at a crucial stage of cognitive and ethical development largely unexplored. This lack of data is particularly concerning in the Indonesian context, where digital infrastructure and literacy programs are rapidly evolving but unevenly distributed. Furthermore, the integration of these tools introduces a complex pedagogical tension that requires urgent empirical investigation. On one hand, generative AI offers undeniable academic benefits, such as fostering creativity through brainstorming assistance, providing personalized tutoring, and improving study efficiency. On the other hand, there are valid, growing concerns regarding academic integrity and the potential for over-reliance, which could atrophy essential critical thinking and writing skills. Educators are currently navigating this dichotomy without sufficient data on whether students are using these tools as 'copilots' for learning or as substitutes for cognitive effort. Therefore, this study aims to bridge this gap by rigorously investigating the frequency, nature, and implications of generative AI usage among students at SMP Negeri 1 Dawuan. By focusing on this specific demographic of 'digital natives,' the research will provide valid, localized insights into how Indonesian students are navigating these powerful tools in their daily academic lives. The findings are intended to inform educators and policymakers, moving the conversation from anecdotal assumptions to evidence-based strategies for integrating AI in secondary education.

Author Contributions:

T. F. K.: Data Curation; Writing – Original Draft Preparation

A. A. R.: Writing – Review & Editing; Resources

Funding: This research received no external funding

Conflicts of Interest: The authors declare no conflict of interest.

Informed Consent Statement/Ethics approval: Not applicable

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Volume 1, No. 2, 2025: 98 - 108
E-ISSN: 3109-9122
DOI:…