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Analyzing Creative Thinking Skills of Junior High School Students in Solving Mathematical Problems with AI Assistance

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Abstract: This study analyzed the creative thinking ability of junior high school students in solving mathematics problems with the help of Artificial Intelligence (AI). The research employed a qualitative case study approach with three ninth-grade students of varying mathematical abilities (high, medium, and low). Data were collected through tests, observations, and interviews, then analyzed based on creative thinking indicators: fluency, flexibility, originality, and elaboration. The results showed that students' creative thinking skills were in line with their level of mathematical ability, where students with high mathematical ability were able to solve problems using unique approaches and detailed steps. However, there were minor errors in the conclusions. Students with moderate math abilities can use two different strategies, but they are still affected by AI solutions. Students with low math abilities tend to rely on AI-generated answers without modification. This study concludes that students' creative thinking ability is influenced by their conceptual understanding and how they utilize AI. Teachers need to guide students to use AI as an exploration tool, not just a source of answers.

INTRODUCTION

Creative thinking is a higher-order thinking skill that is crucial to be developed in mathematics learning, as it reflects students' ability to solve problems using original, varied, and detailed approaches. Damayanti and Sumardi identified three main aspects of creative thinking: fluency, flexibility, and originality, while Junaedi et al. added elaboration as an additional aspect (Damayanti & Sumardi, 2018; Junaedi et al., 2021). Thus, mathematical creative thinking can be defined as the ability to generate new, diverse, unique, and detailed ideas in solving mathematical problems—an essential skill in today's modern era of complex challenges. However, several studies have shown that this ability remains relatively low in Indonesia. Only 18.18% of junior high school students could be classified as creative, with the majority falling into the moderately creative category (Putra et al., 2018). Similar findings showed that only 14% of students were in the high category, while 69% were in the medium category and 17% in the low category (Junaedi et al., 2021). This low performance is partly attributed to students' lack of experience in solving non-routine and open-ended problems, which makes it difficult for them to interpret problem

statements, draw sketches, manipulate formulas flexibly, and construct accurate mathematical models (Damayanti & Sumardi, 2018; Junaedi et al., 2021).

Mathematical problem-solving plays a central role in developing students' critical, creative, and reflective thinking skills. Problem-solving serves a dual function—both as a means of learning mathematics and as an ultimate learning goal (Principle, 2000). It is regarded as a complex cognitive activity that involves strategic thinking processes, ranging from understanding and planning to solving and evaluating solutions (Montauge, 2007). Four fundamental steps in problem-solving are understanding the problem, devising a plan, executing the plan, and evaluating the results (Polya, 1973). Nevertheless, research has shown that many junior high school students struggle to apply these steps effectively. Students often fail to grasp the meaning of problems, are unable to devise appropriate strategies, and lack systematic verification of their solutions (Meutia et al., 2020). Additional obstacles include difficulty distinguishing between relevant and irrelevant information, as well as a tendency to guess answers without systematic reasoning (Phonapichat et al., 2014).

This condition is further exacerbated by traditional mathematics teaching practices that are procedural and rote-oriented, leaving students with little exposure to challenging problems that stimulate critical and creative thinking (Amam, 2017). The technological advancements of the Society 5.0 era present opportunities to address these limitations. Society 5.0 integrates digital technology and AI Assistance into various aspects of life, requiring mathematics learning to be more modern, innovative, and student-centered (Saputra et al., 2023). AI Assistance, which emerged from the Fourth Industrial Revolution, is capable of performing complex tasks such as decision-making, autonomous learning, and problem-solving (Sinaga, 2024). The convenience of instant AI-generated solutions can lead to "cognitive laziness" if students are not encouraged to evaluate and refine AI outputs critically (Gerlich, 2025). Although collaboration with generative AI can enhance creativity scores, it is often accompanied by a reduction in idea diversity, which may limit the breadth of students' mathematical thinking (Holzner et al., 2025).

In the context of education, AI Assistance enables personalized learning, provides real-time feedback, and helps teachers identify students' learning patterns (Auna & Hamzah, 2024). AI-assisted learning offers opportunities for new approaches, such as game-based learning, virtual tutoring, and automated assessment, enabling teachers to identify students' strengths and weaknesses quickly (Nurwahid & Ashar, 2024). However, challenges such as data privacy, the digital divide, and the need for teacher competence development must be addressed to ensure optimal integration of AI Assistance (Sinaga, 2024). These benefits can only be sustained if students remain actively engaged in the cognitive process (Gerlich, 2025). Teachers should implement strategies that encourage independent ideation to counteract the reduction in idea diversity often seen in AI-assisted tasks (Holzner et al., 2025).

The integration of AI Assistance with mathematical creative thinking holds significant potential for enhancing problem-solving skills, particularly through approaches such as Creative Problem Solving (CPS). CPS encourages students to understand problems, explore

various possibilities, and select the best strategies (Eftafiyana et al., 2018). Creative thinking in mathematics is characterized by fluency, flexibility, and novelty (the uniqueness of new ideas), with students who have higher initial abilities tending to meet the novelty indicator better (Sa'Dijah et al., 2019). AI Assistance serves as a mediator capable of analyzing students' learning process data, adjusting challenges according to their initial abilities, and providing targeted feedback.

Nevertheless, the use of AI Assistance in mathematics learning has not yet been optimally implemented in schools, and few studies have specifically explored how AI Assistance can support students with varying levels of mathematical ability in developing creative thinking skills. This research gap forms the basis for the present study. Based on the aforementioned discussion, this study aims to analyze junior high school students' mathematical creative thinking ability in solving mathematical problems with AI Assistance, particularly when viewed from three categories of mathematical ability: low, medium, and high. The results of this study are expected to contribute to the development of innovative, technology-based learning strategies that are more adaptive to students' needs and aligned with the demands of 21st-century education.

METHOD

This study employs a qualitative approach, utilizing a case study method, to examine the creative thinking process of students in depth as they solve mathematical problems with the aid of AI. The research subjects were three ninth-grade students from SMP Negeri 2 Taman, selected purposively based on their mathematical ability levels, categorized into three groups: high ability (≥85), moderate (70–84), and low (<70), as validated through teacher recommendations.

To minimize bias, the researcher acted as an observer and interviewer, limiting intervention during the activities. Interview guidelines were consistently applied, while reflexivity was maintained through reflective note-taking and data triangulation from tests, observations, and interviews.

The research procedure included: (1) preparation of instruments and selection of subjects; (2) working on problem-solving questions using ChatGPT AI assistance, with the restriction that students were not allowed to ask for the final answer directly, but were directed to explore the steps to solve the problem. During this process, student interactions with AI were recorded; (3) independent completion of the same problems, where students could compare their work with AI solutions, modify or improve those solutions, or develop new ideas; (4) interviews to explore creative thinking strategies and perceptions of AI; and (5) data analysis using the Miles and Huberman model, namely data reduction, data display, and conclusion drawing/verification (Nurrisa et al., 2025). In addition, this research also pays attention to ethical aspects by obtaining permission from the school, asking for students' consent before the research is carried out, and maintaining the confidentiality of their identities and data. The research instruments used in this study are presented in the Figure 1.

1. Interview Guidelines

Objective:

Revealing students' creative thinking in solving quadratic equation problems with the help of AI.

Question:

1. What strategies did you use in solving the gradient and straight line, and circle problems before?
2. Do you think the use of AI affects the way you think creatively? Why?
3. What was the biggest challenge you faced when solving this problem?

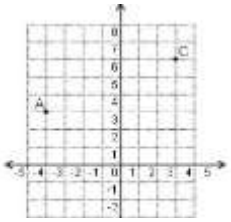
2. Mathematical Problem Solving-Problems

Instructions:

1. Work on the problems using AI according to the instructions given by the teacher.
2. Work on the following problems independently in the most creative way you can.

Questions:

1. You know triangle ABC with coordinates as shown in the picture. Lines AB, AC, and BC have specific gradients. What is your conclusion based on the gradients of these lines?



2. The picture is a cross-section of three swimming pools in the form of large and small circles that intersect each other. Points A, B, and C are the center of the circle. If a line is drawn from each center of the circle, it forms a triangle ABC with side lengths AB = 30 m, AC = 28 m, and BC = 26 m. Calculate the length of each radius of the circle in your way! Then, try to solve the problem using the AI that you are familiar with, and then compare it with the answer you have found!

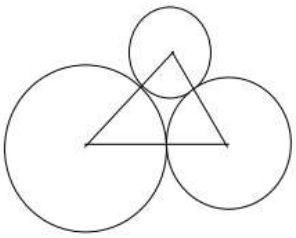


Figure 1. The Research Instrument

Student Creative Thinking Ability Assessment Rubric

The assessment rubric used in this study are presented in the following Table 1.

Table 1. Example of Student Creative Thinking Ability Assessment

Indicator	Score 1	Score 2	Score 3	Score 4
Fluency	The answer is incomplete or does not match the direction of the question	The answer is almost correct, but there are errors in the thinking process, not including the conclusion.	The answer is correct, but some parts lack detail or skip steps; the conclusion is not by the context of the problem	Complete answer, sequential and correct steps, and a conclusion according to the context of the problem
Flexibility	Only able to solve in 1 way or incomplete	Produces two different ways, although one of them is incomplete	Produce two different ways that are relevant and logical	Produce three or more different ways of solving the problem
Originality	Same approach as the example with no modifications	Uses a general/conventional approach, but still shows understanding	Uses a different approach than usual, but it is not yet very unique or original	Using unique and uncommon methods/approaches
Elaboration	Steps are minimal, not explained coherently, or not conceptualized	Shows steps, but lacks detailed explanation or visual support	Describes the steps in sufficient detail, but there are still parts that are not clear	Demonstrates understanding with complete elaboration of steps, including reasoning, auxiliary drawings, or story models

The researchers analyzed the students' work results by calculating the percentage of creative thinking scores, which is obtained by dividing the score obtained by the maximum test score, then multiplying by 100% (Qomariyah & Subekti, 2021).

$$\% \text{ Creative Thinking Ability } = \frac{\text{Score Obtained}}{\text{Maximum Score}} \times 100\% \qquad (1)$$

Next, the percentage of creative thinking skills was classified to determine the student's level of competence, using categories in Table 2 (Riduwan, 2015).

Table 2. Categorization of Students' Creative Thinking Ability

Total Score Range (%)	Creative Thinking Category
81 – 100	Very Creative
61 – 80	Creative
41 – 60	Quite Creative
21 – 40	Less Creative
0 – 20	Not Creative

RESULT AND DISCUSSION

Result

This study was conducted to determine the creative thinking ability of students based on indicators of fluency, flexibility, originality, and elaboration in grade IX students of SMP Negeri 2 Taman in Sidoarjo Regency. Data collection was conducted through written tests, observations, and interviews with three research subjects who were selected purposively based on differences in mathematics ability levels to gain more comprehensive insights.

Profile of Research Subjects

Based on the recap of students' end-of-semester summative scores in mathematics that I collected, three research subjects were selected, with codes 001, 002, and 003 representing the high, medium, and low ability categories, respectively. The profiles of the three research subjects are presented in Table 3.

Table 3. Mathematical Ability Profile of the Research Subjects

Student Code	End of Semester Summative Score	Ability Category
001	48	Low
002	71	Medium
003	93	High

Student Creative Thinking Ability Assessment Test Result

Two description questions were given to the three research subjects to measure mathematical creative thinking ability. The first question addressed the topic of gradients and straight-line equations, which was intended to assess aspects of fluency and elaboration. The second problem is related to the circle material and is used to assess the aspects of flexibility and originality. The results of the assessment of the two questions are presented in Table 4.

Table 4. Results of the Student Creative Thinking Ability Assessment Test

Student Code	Problem Number 1		Problem Number 2		Total Score	Percentage
	Fluency	Elaboration	Flexibility	Originality		
001	2	1	1	1	1	31,25%
002	2	2	3	2	9	56,25%
003	2	4	3	4	13	81,25%

Based on Table 4, the percentage of achievement of creative thinking skills of code 001 students is 31.25%. The percentage of achievement of creative thinking skills of code 002 students is 56.25%. Meanwhile, the percentage of students achieving creative thinking skills, as indicated by code 003, amounted to 81.25%.

Analysis of Students' Creative Thinking Ability Code 001

Student code 001 demonstrates a low ability in creative thinking when solving mathematical problems assisted by Artificial Intelligence (AI). The following is an analysis of student code 001's ability based on four indicators of creative thinking.

Fluency

Student code 001 correctly found the gradient of the line in question number one; however, student code 001 did not include the conclusion requested in the question. The results of student code 001's work on question number one, which discusses the topic of gradient and straight-line equations, are shown in Figure 2.

Elaboration

Student code 001 worked on problem number one with limited steps and less detail. The results of student code 001's work on question number one, which discusses the topic of gradient and straight-line equations, are shown in Figure 2.

Figure 2. Test Results of the Creative Thinking Ability of Student Code 001 Problem Number 1

Figure 2 shows the work of Student Code 001 on the gradient and linear equation problem, which was used to measure the fluency and elaboration indicators. The student was able to calculate the gradient (fluency) correctly, but provided minimal solution steps and no conclusion as required (low elaboration). This pattern indicates a tendency to follow the AI method without modification, which may be due to limited conceptual understanding and low self-regulation, preventing the student from developing the answer independently.

Flexibility

Student code 001 is only able to solve the second problem in one way. The results of student code 001's work on the second problem related to the circle material are shown in Figure 2.

Originality

Student code 001 solved the second problem using the same approach as the example given by AI, without making any modifications. The results of student code 001's work on the second problem related to the circle material are shown in Figure 3.

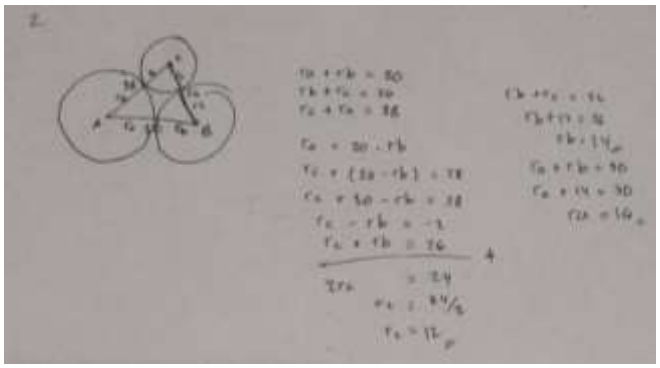


Figure 3. Test Results of the Creative Thinking Ability of Student Code 001 Problem Number 2

Figure 3 shows the work of Student Code 001 on the circle problem, which was used to measure the flexibility and originality indicators. The student solved the problem using only one method (low flexibility) and adopted precisely the same approach as the AI example without modification (low originality). This indicates a full reliance on the AI solution, likely influenced by a limited conceptual understanding and a low initiative to explore alternative strategies.

The search result for student code 001, as generated by AI (i.e., Chat GPT), is shown in Figure 4. It presents the AI ChatGPT search results used by Student Code 001 to solve the circle problem. This figure is relevant as it reveals the primary source of the student's problem-solving strategy, which was then followed without modification in the submitted answer. This reinforces the finding that the student's low flexibility and originality were caused by directly accepting the AI solution without any adaptation or independent verification.

In the interview, student code 001 answered the researcher's questions as follows.

A : What strategies did you use in solving the gradient and straight line, and circle problems before?
B : For the gradient, the strategy I used was to first form a right triangle from the existing shape. For the straight line, the strategy I used was to determine where the straight line was formed.

A : Do you think the use of AI affects the way you think creatively? Why?
B : Yes, because sometimes the answers given by AI are more straightforward to understand. So that it can facilitate the process of working on a problem.

A : What was the biggest challenge you faced when solving this problem?
B : I think the biggest challenge is understanding the concepts used in the question.

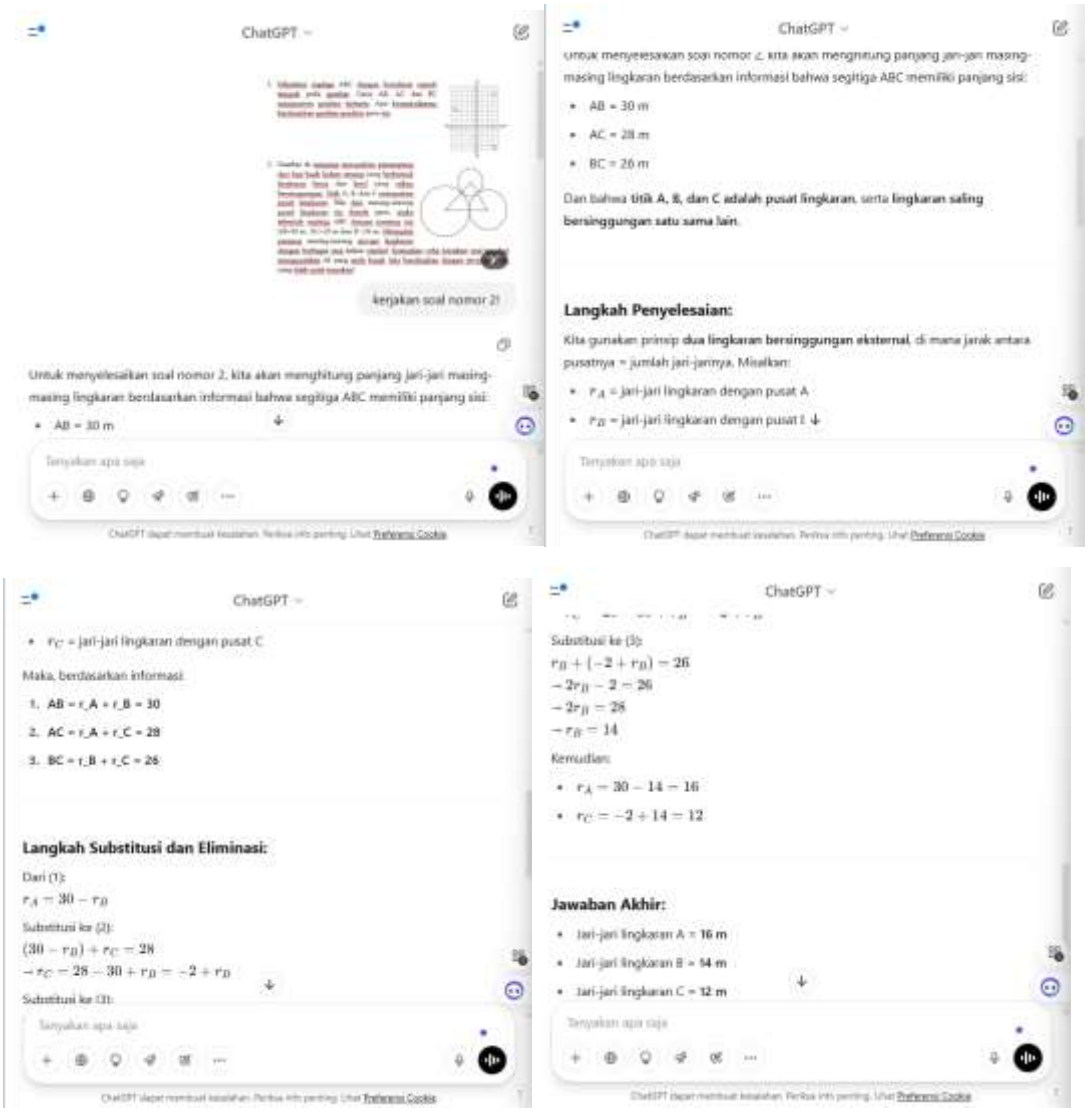


Figure 4. Student Search Result Code 001 with AI (Chat GPT)

Analysis of Students' Creative Thinking Ability Code 002

Student code 002 shows sufficient creative thinking ability in solving mathematical problems assisted by Artificial Intelligence (AI). The following is an analysis of student code 002's ability based on four indicators of creative thinking.

Fluency

Student code 002 correctly finds the gradient of the line in question number one, but has not been able to provide the conclusion requested in the question. The results of student code 002's work on question number one, which discusses the topic of gradient and straight-line equations, are shown in Figure 5.

Elaboration

Student code 002 worked on problem number one with limited steps and less detail. The results of student code 002's work on question number one, which discusses the topic of gradient and straight-line equations, are shown in Figure 5.

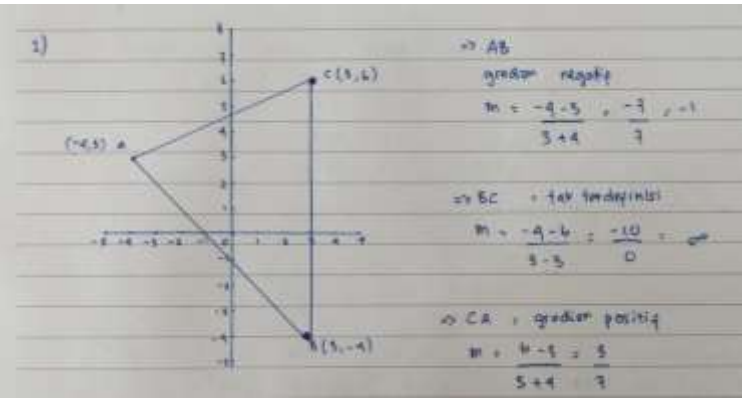


Figure 5. Test Results of the Creative Thinking Ability of Student Code 002 Problem Number 1

Figure 5 shows the work of Student Code 002 on the gradient and linear equation problem, which was used to measure the fluency and elaboration indicators. The student was able to calculate the gradient (quite good fluency) correctly, but provided limited and insufficiently detailed solution steps (relatively moderate elaboration). This pattern suggests that although the student understands the basic concept, they tend to simplify the explanation, possibly due to a habit of focusing on the final answer rather than providing a complete calculation process.

Flexibility

Student code 002 can solve problems in the second problem in only two ways that are still relevant and logical. The results of student code 002's work on the second problem related to the circle material are shown in Figure 6.

Originality

Student code 002 solved the problem in the second part using a general approach, but still demonstrated an understanding of the problem's context. The results of student code 002's work on the second problem related to the circle material are shown in Figure 6.

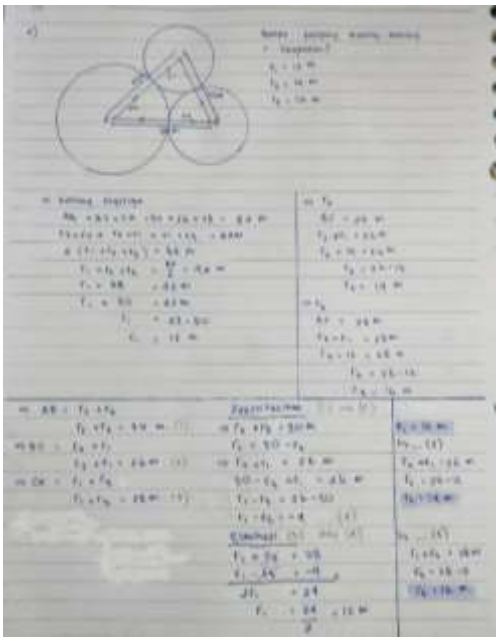


Figure 6. Test Results of the Creative Thinking Ability of Student Code 002 Problem Number 2

Figure 6 shows the work of Student Code 002 on the circle problem, which was used to measure the flexibility and originality indicators. The student was able to solve the problem using two relevant strategies (quite good flexibility). However, the approaches used were still common and did not demonstrate a distinctive, unique trait (relatively moderate originality). This indicates that the student can explore alternative strategies but is not yet accustomed to developing truly original methods beyond common patterns or given references.

The search result for student code 001, as generated by AI (i.e., Chat GPT), is shown in Figure 7.

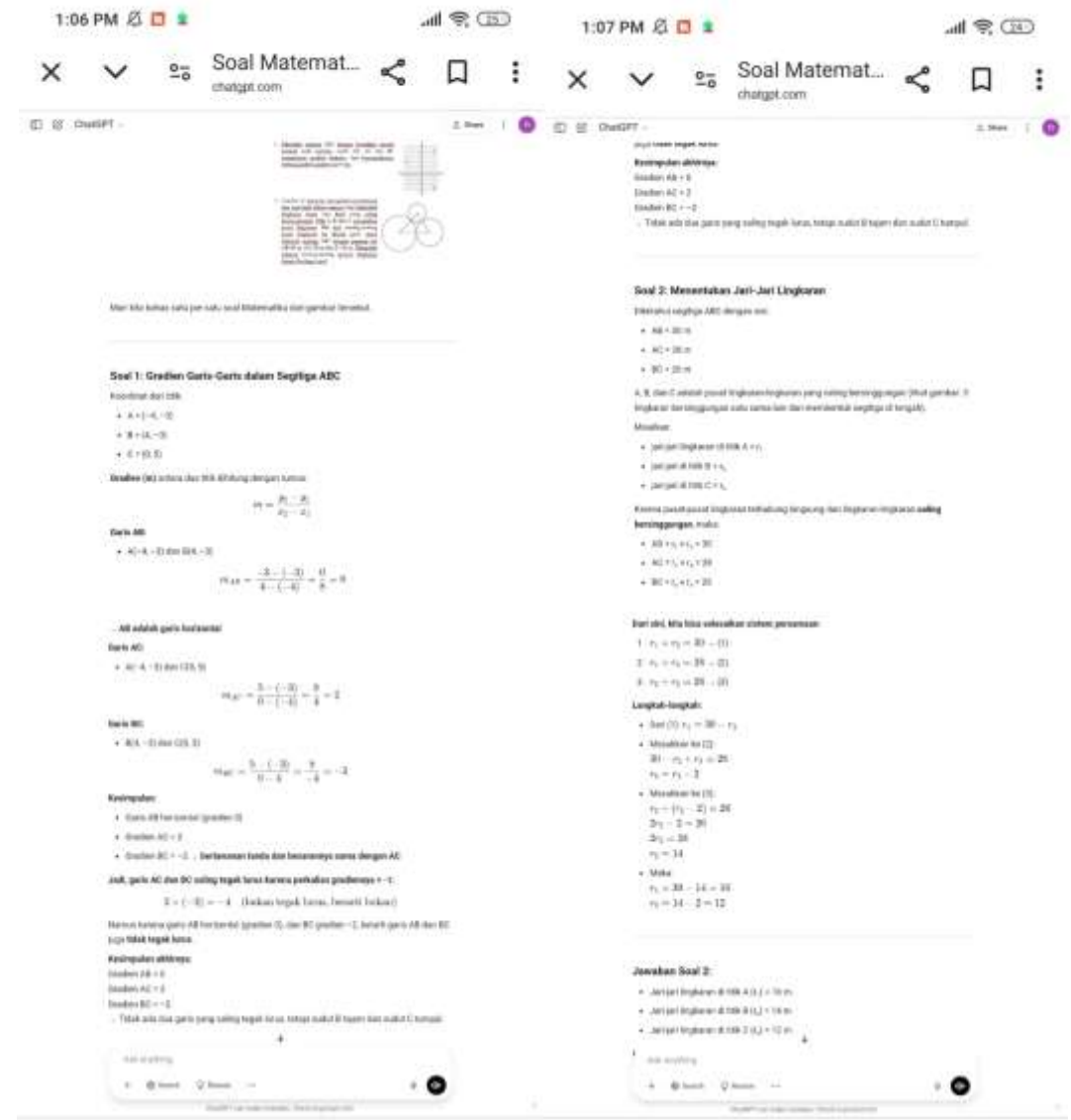


Figure 7. Student Search Result Code 002 with AI (Chat GPT)

Figure 7 presents the AI ChatGPT search results used by Student Code 002 to solve the circle problem. This figure is relevant as it shows how the student used AI as one of the solution references, then modified the answer into two different strategies. This demonstrates that although the initial solution originated from AI, the student still made adjustments that enhanced flexibility, albeit with a limited level of originality.

In the interview, student code 002 answered the researcher's questions as follows.

A : What strategies did you use in solving the gradient and straight line, and circle problems before?
B : In solving gradient problems, I will first understand the meaning of the problem and what is known as material to solve the problem. Then, determine the coordinate location of each point to find and calculate the gradient according to the formula.

A : Do you think the use of AI affects the way you think creatively? Why?
B : Yes, it is very influential. To me, everyone has a different perspective on solving a problem. Therefore, it requires a creative way of thinking so that it can be solved quickly and accurately. AI offers multiple perspectives, particularly in problem-solving. AI can also make calculation errors; therefore, it must be rechecked during the calculation process.

A : What was the biggest challenge you faced when solving this problem?
B : The biggest challenge is when arranging the calculation steps, what is the correct sequence or process so that the problem can be solved quickly. There is not much time, and an effective way.

Analysis of Students' Creative Thinking Ability Code 003

Student code 003 demonstrates a high level of creative thinking in solving mathematical problems, assisted by Artificial Intelligence (AI). The following is an analysis of student code 003's ability based on four indicators of creative thinking.

Fluency

Student code 003 was able to find the gradient of the line correctly in question number one; however, student code 003 experienced thinking errors regarding the concept of mutually perpendicular lines when making conclusions. The results of student code 003's work on question number one, discussing the topic of gradient and the equation of a straight line, are shown in Figure 8.

Elaboration

Student code 003 worked on problem number one with limited steps and less detail. The results of student code 003's work on question number one, which discusses the topic of gradient and straight-line equations, are shown in Figure 8.

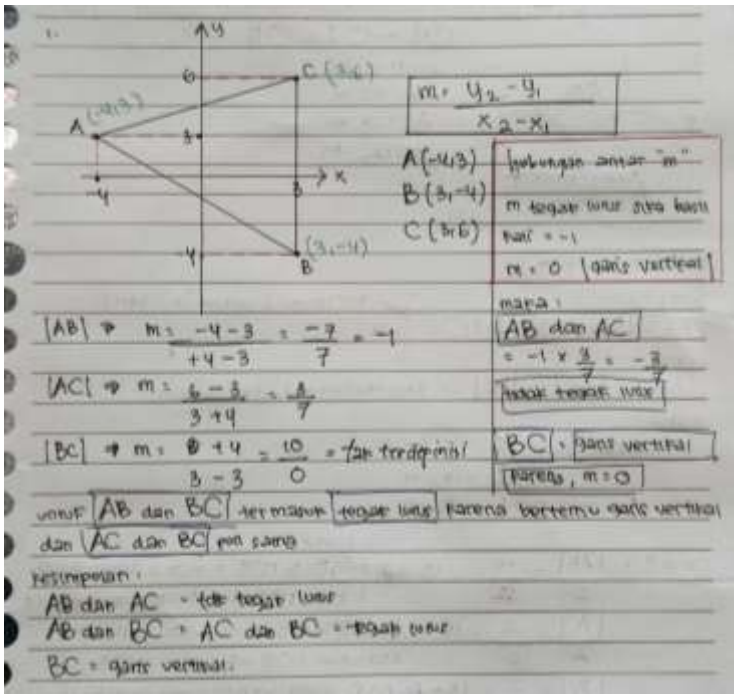


Figure 8. Test Results of the Creative Thinking Ability of Student Code 003 Problem Number 1

Figure 8 shows the work of Student Code 003 on the gradient and linear equation problem, which was used to measure the fluency and elaboration indicators. The student was able to calculate the gradient (quite good fluency) correctly, but made a conceptual error in the conclusion related to the property of perpendicular lines, and the solution steps provided were still lacking in detail (relatively moderate elaboration). This pattern suggests that although the student's procedural understanding is strong, they were less careful in verifying the concept, possibly due to haste or overconfidence.

Flexibility

Student code 003 can solve the second problem in only two ways that are still relevant and logical. The results of student code 003's work on the second problem related to the circle material are shown in Figure 8.

Originality

Student code 003 solved the problem in the second problem using a unique and uncommon method/approach. The results of student code 003's work on the second problem related to the circle material are shown in Figure 9.

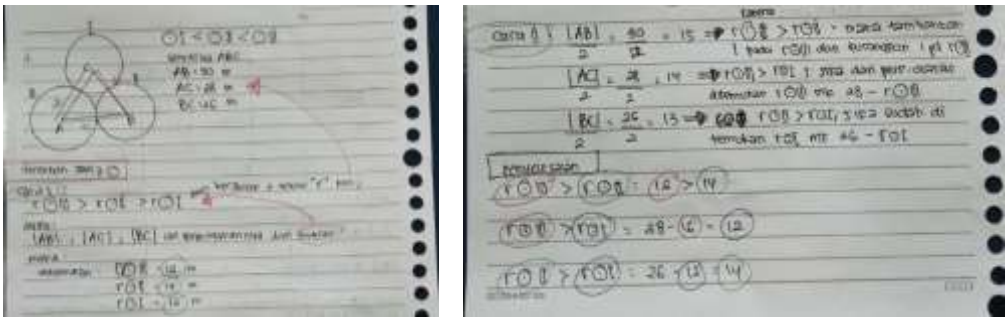


Figure 9. Test Results of the Creative Thinking Ability of Student Code 003 Problem Number 2

Figure 9 shows the work of Student Code 003 on the circle problem, which was used to measure the flexibility and originality indicators. The student was able to solve the problem using two relevant strategies (quite good flexibility) and applied a unique and rarely used approach (high originality). This demonstrates the student's ability to modify strategies from various sources, including AI, into solutions that are more creative and distinct from standard patterns.

The search result for student code 001, as generated by AI (i.e., Chat GPT), is shown in Figure 10. It presents the AI ChatGPT search results used by Student Code 003 to solve the circle problem. This figure is relevant as it illustrates how the student utilized AI as an initial source of inspiration and then developed a distinct and more creative solution method. This reinforces the finding that the student possesses considerable flexibility and strong originality, with the ability to adapt AI-generated information into innovative solutions.

Figure 10. Student Search Result Code 003 with AI (Chat GPT)

In the interview, student code 003 answered the researcher's questions as follows.

A : What strategies did you use in solving the gradient and straight line, and circle problems before?
B : The strategy in solving the gradient problem in this problem, namely in understanding the concept that if the multiplication of m1 and m2, then it is perpendicular.

A : Do you think the use of AI affects the way you think creatively? Why?
B : The use of AI is beneficial in finding more creative patterns and can be used according to the understanding of each student, and can be used as a stimulus to come up with better ideas.

A : What was the biggest challenge you faced when solving this problem?
B : The biggest challenge is the use of logic and reasoning so that in working on the questions, it is very effective and does not waste time.

Discussion

Based on the research results presented, it is evident that there are variations in creative thinking abilities among ninth-grade junior high school students who serve as research subjects in solving mathematical problems with the aid of AI.

Creative Thinking Ability of Students Code 001

The researcher selected Student Code 001 to represent the category of students with low mathematical ability. Based on the analysis results, this student's creative thinking ability percentage was 31.25%, which falls into the less creative category. The lowest score, namely

1, was obtained for the indicators of elaboration, flexibility, and originality. In answering the questions, the student did not provide detailed steps; the final answer did not match the requirement, and only one solution method was used, identical to the AI's answer without modification. For the fluency indicator, the student obtained a score of 2 because the answer was almost correct, but the conclusion drawn was inaccurate.

Based on the interview results, the less creative thinking ability of Student Code 001 was caused by two main factors. First, difficulty in understanding the relevant mathematical concepts, which made it challenging to determine the appropriate problem-solving steps. Second, a tendency to rely on answers from ChatGPT or other AI tools, which limited the potential to explore various alternative methods.

These findings are consistent with recent research indicating that the use of AI without an appropriate learning strategy often leads students to accept answers as they are, without attempting to develop or modify existing ideas. This condition limits opportunities to produce more diverse and innovative solutions (Gerlich, 2025). Similarly, while human–AI collaboration can enhance creative performance, it can also reduce idea diversity when its use is passive and without further exploration (Holzner et al., 2025).

Creative Thinking Ability of Students Code 002

The researcher selected Student Code 002 to represent the category of students with moderate mathematical ability. Based on the analysis results, this student's creative thinking ability percentage was 56.25%, which falls into the quite creative category. The highest score was obtained for the flexibility indicator, with a value of 3, as the student was able to solve the given mathematical problems using two logically valid methods. For the other indicators—fluency, elaboration, and originality—the student scored two each. This was due to the conclusion not being entirely accurate and some solution steps partially following ChatGPT's results, although with slight modifications.

Based on the interview results, two main factors influenced this outcome. First, the student began the problem-solving process by identifying the key information in the question and then determining appropriate solution steps. Second, the student viewed AI as a tool for providing additional perspectives rather than as the sole source of answers, thereby making an effort to modify and adapt the AI solutions to be relevant and logical.

These findings align with research showing that when students are encouraged to explain their reasoning and compare solution steps, passive dependence on AI decreases, thus maintaining the quality of creative reasoning (Gerlich, 2025). Student Code 002 demonstrated this condition, in which AI served as a hinting and confirmation tool, while the thinking process remained active through verification and explanation of the steps. This result also supports the view that human–AI collaboration can enhance creative performance (Holzner et al., 2025). However, idea diversity tends to decrease when exploration of alternative strategies is still limited.

Creative Thinking Ability of Students Code 003

The researcher selected Student Code 003 to represent the category of students with high mathematical ability. Based on the analysis results, this student's creative thinking

ability percentage was 81.25%, which falls into the very creative category. The highest scores were obtained for the fluency and elaboration indicators, with a value of 4, as the student was able to provide complete, systematic, and accurate answers according to the question requirements. For the flexibility indicator, the student scored 3, showing the ability to use several different and logical methods. Meanwhile, the originality indicator received a score of 2, because although the methods varied, the approaches still followed common patterns frequently found in AI or other learning resources.

Based on the interview results, factors supporting the student's high creativity included a strong understanding of mathematical concepts, the ability to organize information from the problem quickly, and the habit of verifying solution steps even after obtaining an answer from AI assistance. The student utilized AI as an initial source of inspiration and a confirmation tool, but ultimately adjusted the methods to align with their thinking style and strategy.

These findings are consistent with the view that the active use of AI, where students combine AI input with their knowledge, can maintain and even enhance creativity (Gerlich, 2025). This result also supports the finding that human–AI collaboration can lead to high creative performance when accompanied by the exploration of alternatives and modification of solutions (Holzner et al., 2025). Student Code 003 demonstrated that the role of AI as a support for reflection and idea development, rather than as a mere answer provider, can maximize students' creative thinking potential.

CONCLUSION AND SUGGESTIONS

The results of this study indicate that students' creative thinking ability in solving mathematical problems with the assistance of artificial intelligence (AI) varies widely, depending on their level of conceptual understanding and problem-solving strategies. Students with strong conceptual knowledge tend to use AI as a source of inspiration and confirmation, then develop their solutions with complete, flexible, and relevant steps. In contrast, students with weaker understanding tend to rely on instant answers from AI without significant modification, resulting in limited creativity.

Barriers to creativity include difficulties in understanding mathematical concepts, limitations in formulating solution steps, and dependence on direct AI-generated answers. On the other hand, creativity can flourish when students have a structured initial strategy, can explore various alternatives, and use AI as a trigger for ideas rather than as the sole solution.

Therefore, the role of teachers is crucial in guiding students to use AI reflectively and productively. The integration of AI in mathematics learning should be designed to encourage original, flexible, and meaningful thinking, so that technology can function as a catalyst for creativity development rather than as a substitute for the thinking process.

Based on the results of this study, the authors provide the following suggestions. Teachers are expected to guide students in using AI wisely as an exploration tool, not just to get answers. Teachers also need to provide direction so that students can creatively

modify the solutions provided by AI. The mathematics learning process needs to be designed to encourage students to think creatively, for example, through giving open-ended problems and class discussions that raise various solution strategies. This research can be continued with a broader range of subjects, different levels of education, or quantitative approaches to strengthen the generalizability of the findings. The results of this study can be taken into consideration in developing a curriculum that integrates the use of AI to improve students' creative thinking skills. Students need to be equipped with good technological literacy in order to use AI critically and responsibly in solving math problems.

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