ALGEBRA : JURNAL PENDIDIKAN, SOSIAL DAN SAINS

ISSN : 2807-663X e-ISSN : 2807-629X
Journal Homepage : https://algebra.yana.or.id/index.php/ejournal/index
Volume 5 Number 4 (2025)

ANALYSIS OF STUDENTS LEVEL OF MATHEMATICAL CREATIVE THINKING ABILITY IN TERMS OF LEARNING STYLE

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ABSTRACT

The ability to think creatively is an ability that requires a process with the aim that students can solve problems variedly and correctly. Understanding and obtaining information on a problem is a process experienced by students in order to solve mathematical problems, which is called learning style. The purpose of this study is to analyze and describe students' creative thinking skills in terms of learning styles. The type of research used in this study is qualitative research. In the process of collecting data, this research uses two methods, namely tests and interviews. From the results of this study, it was concluded that 35 students had Visual learning styles, 9 who had auditorial learning styles, 7 who had kinesthetic learning styles, 2 who had kinesthetic visual learning styles, and 1 student with auditorial visual learning styles. However, this study only selected 3 students with visual learning styles. The level of creative thinking ability in conscientious students is classified at the level of creative thinking less creative, moderately creative, and creative).

Keywords: creative Thingking Skills; Learning Styles; Analysis.

INTRODUCTION

Creativity is a compotency possessed by a person to make combinations as a result of new creativity and have social meaning, not everything produced must be new, but the combinations. By combining pre-existing parts, a new combination will be obtained (Munandar, 2012). Creative thinking is a human mental activity in solving mathematical problems with the ability to find many possible answers or find one answer that is the same but in many different ways (Fardah, 2012). In the world of education, the emphasis is more on memorization and finding the right answer to the questions given. Higher thought processes including creative thinking in mathematics learning are rarely trained and lack of developing ideas that are in mind. Memorization and problem solving with formulas can inhibit creativity in students. Creative thinking is very important to face the challenges and demands of an increasingly advanced era.

Based on the results of an interview on April 3, 2023 with a mathematics subject teacher at one of the MTsN in the city of Medan, it was stated that some students only understand when the teacher explains the material and sample questions, when students are faced with slightly different questions with example questions, they also have difficulty solving them. This is because students' thinking ability in manipulating mathematical material is very lacking, so they are unable to develop their creativity in solving problems optimally. Students are able to see problems from various perspectives and are able to solve problems with various alternatives. In the world of education, the emphasis is more on memorization and finding the right answer to the questions given. Higher thought processes including creative thinking in mathematics learning are rarely trained and lack of developing ideas that are in mind.

The creativity of students when solving mathematical problems, and in achieving success can be influenced by the learning style factors owned by the students themselves (Rohmah, Rochminah, &; Idris, 2017). Learning style is one of the variables that concern the ways students understand lessons at school. In general, students have visual, auditory, kinesthetic learning styles. For a person's learning style that relies on the ability of the sense of sight it is called visual learning style, the learning style of someone who relies on the ability of the sense of hearing is called auditory learning style, and the learning style of someone with physical, movement or touch abilities is called kinesthetic learning style (De Porter &; Hernacki, 2016).

In the learning process at school, mathematics is one of the subjects that are highlighted. This is because many students have difficulty in solving math problems, especially in solving math problems. Specifically, judging from several cases in the field, students have difficulty in solving story problems (Farida, 2015). (Sudirman, 2019) said that students have difficulty in doing story problems because students are not careful in reading and understanding sentence by sentence as well as about what is known in the problem and what is asked, as well as how to solve the problem correctly.

One of the mathematics materials at the Junior High School (SMP) level in Indonesia based on the curriculum that students often have difficulty in solving story problems is the Two Variable Linear Equation System (SPLDV). This material is described in students of grade VIII. As a requirement in learning this SPLDV is that students have learned the operation of algebraic forms, one-variable linear equations, coordinate systems, relations and functions, to straight-line equations. Thus, teachers must make these materials as apperception before entering SPLDV materials (Sulfaidah, Ma'rup, &; Bahar, 2022).

Based on research (Perbowo, 2012), students' mistakes and difficulties in mastering SPLDV:

1. Regarding the concepts of SPLDV and non-SPLDV, students mistake PLDV for SPLDV because students assume that SPLDV is a linear equation that contains two variables
2. The ability of students to represent the information contained in the story problem into mathematical form. Students misposition variables and variable coefficients, so they experience errors and make mathematical models of given problems. Students still do not understand the difference between variables and their coefficients.

SPLDV is also closely related to problem solving in everyday life. This makes students feel close to mathematics so that students can better understand mathematics itself. From the description above, the author feels the need to conduct research.

RESEARCH METHODS

Researchers classify this research as qualitative approach research. According to Imam Gunawan (2013), qualitative approach is meant as a type of research whose findings are not obtained through statistical procedures or other forms of calculation. The subjects in this study were grade

VIII MTsN students. The selection of subjects using purposive sampling techniques was that researchers selected 5 students who had visual learning styles. The data collection techniques carried out in this study are tests and interviews which are explained as follows:

1. Math creative thingking test
   The mathematical creative thinking test (TBKM) was given to 5 selected research subjects with the material Two Variable Linear Equation System (SPLDV). This test will be held on April 11, 2023 at MTsN in the city of Medan. The test results are used to get an idea of students' creative thinking ability in solving math problems. The test questions given in the study refer to indicators of creative thinking, namely fluency, flexibility, originality, elaboration. The form of the questions is given in the description test so that researchers can examine the student's thought process. Before use, the questions are validated by experts in construct and advance content
2. Interview
   In addition to TBKM, researchers also conducted interviews with 5 research subjects. The interview test is used to comprehensively examine students' thinking processes in TBKM and for information on the validity of data obtained from TBKM. The interview was conducted after TBKM on the same day

Research instruments include test sheets, interview sheets. Data analysis techniques carried out in this study are data reduction, data presentation and conclusion examination. Then for the validity of the data in the study, researchers use triangulation techniques, namely analyzing data based on test results and interviews.

RESULTS AND DISCUSSION

Based on the results of learning style tests conducted by the school on students when entering class VIII, in grades VIII-1 16 out of 35 students have Visual learning styles, 9 have auditorial learning styles, 7 who have a kinesthetic learning style, 2 who have a kinesthetic visual learning style, and 1 student with an auditorial visual learning style. However, this study only selected 3 students with visual learning styles. Researchers also consult teachers of subjects related to selected students. The subjects used in this study are seen in table 1 below:

Table 1. Research Subjects

Inisial	L/P	Learning Style	Code
SA	P	Visual	A1
AP	P	Visual	A2
FA	P	Visual	A3

After selecting the three subjects, TBKM and Interview were then carried out where then the data obtained from the two techniques were reduced by selecting data that was in accordance with the indicators of creative thinking, namely fluency, flexibility, originality, elaboration. After data reduction, data presentation and conclusions are drawn as explained below.

Analysis of subject data A1

In the creative thinking ability test that has been done, in question points 1 and 3 subject A1 is able to explain and do the questions with correct and appropriate answers so that A1 students meet the creative thinking component of fluency.

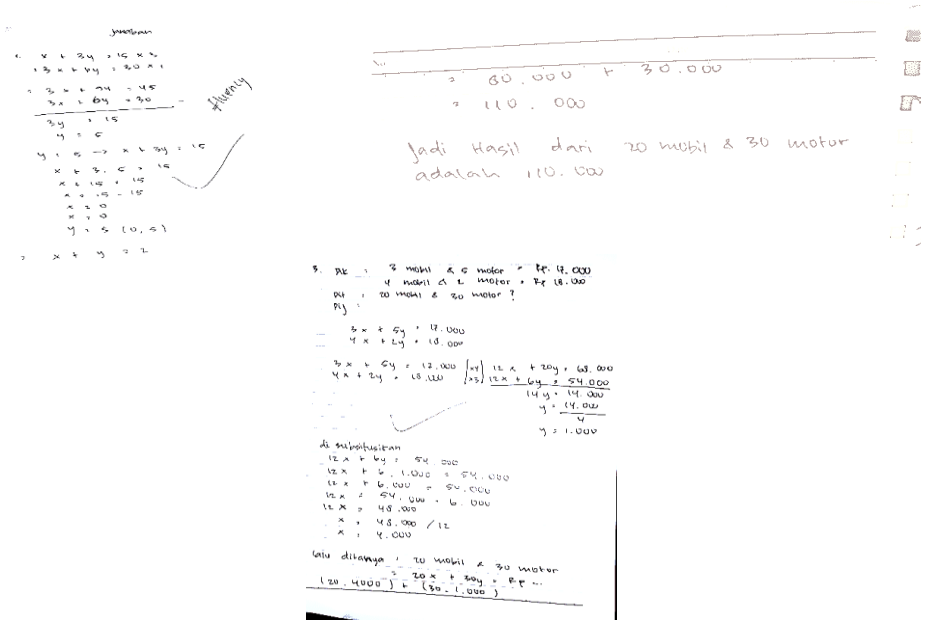

Figure 1. subjek A1 Answers Point 1

In question point 2, A1 students answer the question correctly and precisely. However, A1 students only use one method so that A1 students have not fulfilled the flexibility reative thinking component.

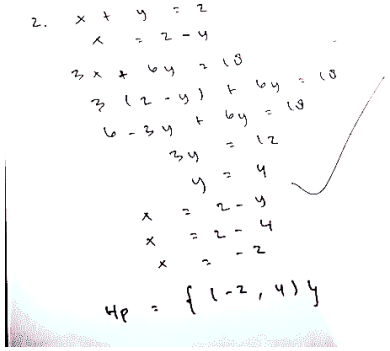

Figure 2. subjek A1 Answers Point 2

In question point 4, A1 students are able to answer the question correctly and precisely. But A1 students can't solve it in a new way. Still using the method that is usually used so that A1 students have not fulfilled the originality component.

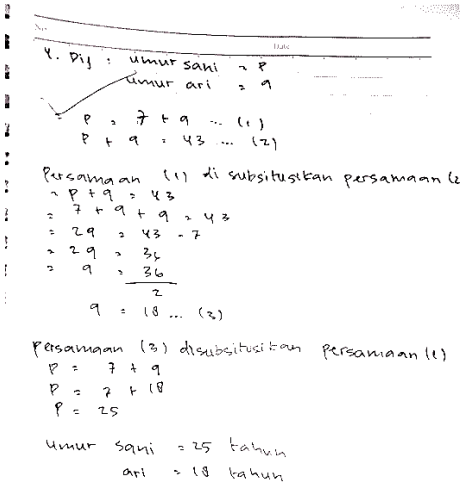

Figure 3. subjek A1 Answers Point 4

Question point 5 A1 students are able to answer the questions correctly and precisely. A1 students are also able to add and detail in detail from one completion step to another. So that A1 students fulfill the creative thinking component of elaboration.

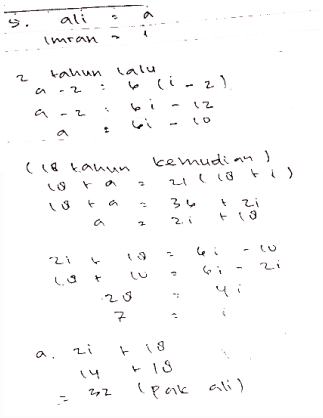

Figure 4. subjek A1 Answers Point 5

It can be concluded that subject A1 in the classification of creative thinking according to Inge Wiliandani (Wiliandani, 2017) has a level of creative thinking in the creative category because it is able to bring up 3 indicators of creative thinking

Analisis data subjek A2

In the creative thinking ability test that has been done, on question number 1 A2 students solve the questions correctly and precisely so that A2 students meet the creative fluency thinking component.

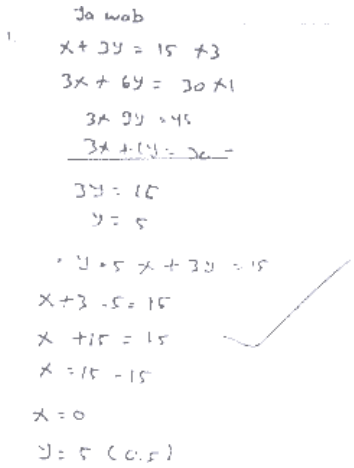

Figure 5. subjek A2 Answers Point 2

Student A2 answers question 2 with the wrong answer. So that A2 students do not meet the creative thinking component of flexibility.

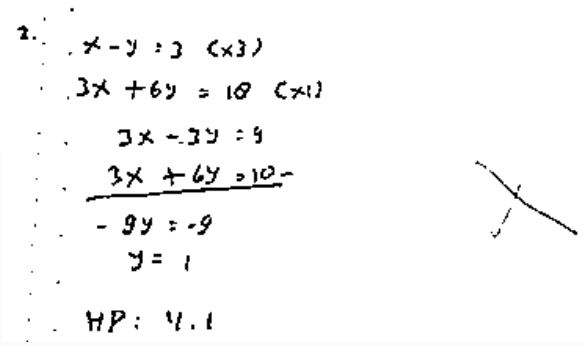

Figure 6. subjek A2 Answers Point 2

Student A2 did not answer question 3. Student A2 did not answer question 4. Student A2 did not answer question 5. It can be concluded that subject A1 in the classification of creative thinking according to Inge Wiliandani (Wiliandani, 2017) has a level of creative thinking in the less creative category because it is only able to bring up 1 indicator of creative thinking.

Analisis data subjek A3

In the creative thinking ability test that has been done, on question number 1 A3 students solve the questions correctly and precisely so that A3 students meet the creative thinking fluency component.

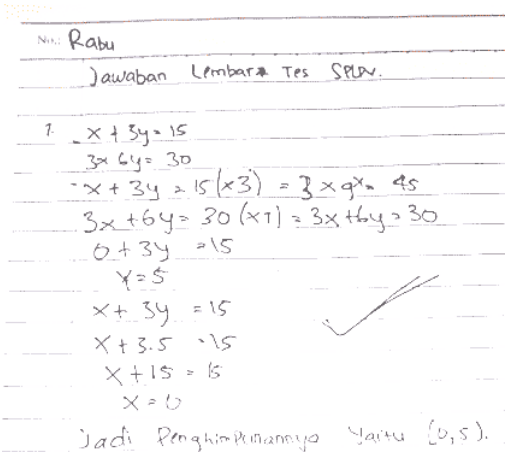

Figure 7. subjek A3 Answers Point 1

A3 students are able to answer question 2 correctly and precisely. But A3 students only use one way, only using the substitution method, so A3 students have not fulfilled the creative thinking flexibility component.

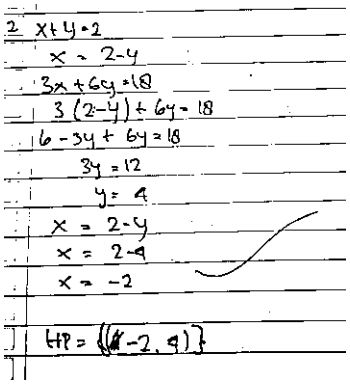

Figure 8. subjek A3 Answers Point 2

A3 students answer question 3 by eliminating first. But at the elimination stage, student A3 incorrectly wrote down the answer to the variable y. But at the end of the answer, student A3 answered correctly. So that A3 students have not fulfilled the creative thinking component of fluency.

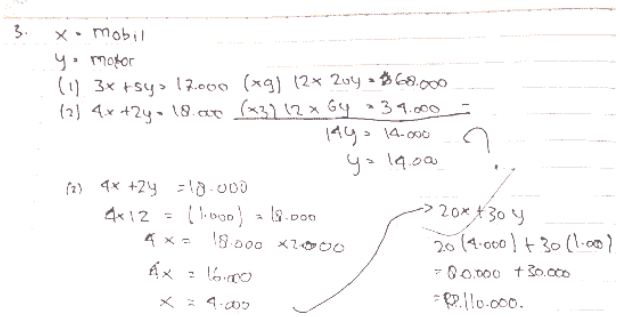

Figure 9. subjek A3 Answers Point 3

A3 students are able to answer questions correctly and precisely. But A3 students are unable to solve problems with new expressions. A3 students still use x dany as a variable. Thus, A3 students have not fulfilled the creative thinking component of originality.

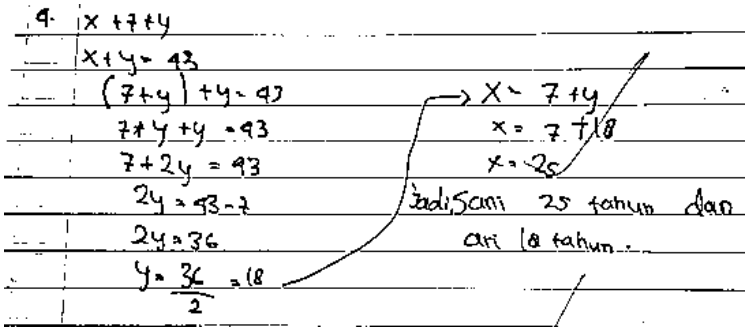

Figure 10. subjek A3 Answers Point 4

A3 students are able to answer question 5 correctly and precisely. A3 students are also able to add and detail in detail from one step of completion to another. So that A3 students fulfill the creative thinking component of elaboration.

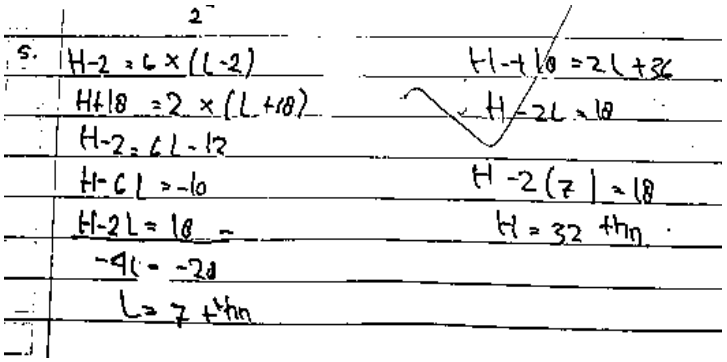

Figure 11. subjek A3 Answers Point 5

It can be concluded that subject A3 in the classification of creative thinking according to Inge Wiliandani (Wiliandani, 2017) has a creative thinking level category quite creative because it is able to bring up 2 indicators of creative thinking.

The levels of creative thinking can be grouped into 5 levels. The first level is said to be uncreative, this level is if students have no indicators appearing, then level two or said to be less creative, this level if one of the creative indicators appears. The third level or said

Based on the results of this study, it was found that the level of creative thinking of students with visual learning styles showed significant variation, ranging from less creative, moderately creative, to creative. This finding shows that learning style does not directly determine student creativity, because creative thinking ability is also influenced by conceptual understanding, problem-solving experience, and flexibility of strategies used (Yulianto, Dwijanto, & Mulyono, 2021).

These results are in line with research showing that learning models that provide room for exploration, particularly Creative Problem Solving (CPS), can improve indicators of creative thinking such as fluency, flexibility, and elaboration (Rulyansah, Asmarani, & Mariati, 2022). Other studies also confirm that problem-based learning (PBL) consistently improves mathematical creative thinking skills through analysis, representation, and alternative strategy development activities (Abid & Waluya, 2024).

Previous research findings on SPLDV also reinforce these results, where students who are able to represent information accurately and explain the steps of the solution in detail tend to be at a higher level of creativity (Pasaribu, 2023). Therefore, mathematical creativity is not only related to learning styles but also to opportunities for students to think openly and try various approaches to solving problems.

Overall, the results of this study indicate that the development of mathematical creativity needs to be facilitated through learning that requires students to explore ideas, use alternative strategies, and reflect on their thinking processes. This is in line with recent literature which confirms that open-

ended, CPS, and PBL approaches are effective in improving students' creative thinking skills in the context of mathematical problem solving (Yulianto et al., 2021; Rulyansah et al., 2022; Abid & Waluya, 2024).

CONCLUSIONS

Based on the research results, students' creative thinking levels can be classified into several levels, ranging from non-creative to creative, as indicated by the emergence of creative thinking indicators such as fluency, flexibility, originality, and elaboration. The research findings show that students with visual learning styles have varying levels of creative thinking, namely less creative, quite creative, to creative, so it can be concluded that learning styles do not directly determine student creativity. Creative thinking ability is also influenced by conceptual understanding, experience in problem solving, and the flexibility of the strategies used. These results are in line with previous research which states that learning models that provide space for exploration, such as Creative Problem Solving (CPS) and Problem-Based Learning (PBL), are effective in improving mathematical creative thinking skills. Therefore, the development of students' mathematical creativity needs to be facilitated through learning that encourages students to think openly, use various problem-solving strategies, and reflect on their thought processes in solving mathematical problems.

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