Students' Creative Thinking Ability in Solving Mathematical Problems

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Abstract:
This research aims to determine the description of students' creative thinking abilities in solving mathematical problems in learning Trigonometry. The research design is descriptive qualitative. The research subjects were Class X high school students. Data collection instruments included Creative Thinking Ability TESTs and interviews. The data analysis technique used is time triangulation. This research explores students' creative thinking abilities in solving mathematical problems. The results show that the ability to think creatively Students' mathematics is described based on a review of the answers to the mathematical creative thinking ability test which consists of 4 aspects, namely fluency, flexibility, novelty and detail. Based on the average results of students' answers in solving questions regarding mathematical creative thinking abilities, there were 5 questions, which had different averages, although none of their creative thinking abilities reached the very high category. This shows that students are less able to solve problems with mathematical creative thinking skills. The ability to think creatively at the high strata is at high criteria with an average of 28.6. The highest score achieved by students was 32 and the lowest score was 23.

Keywords: Creative Thinking Ability; Math Problems; Solving Mathematical Problems

1. Introduction

Mathematics is a subject that is considered difficult by many students. This is often caused by mathematics learning which focuses on memorizing formulas and procedures, so that students are less trained in creative thinking. In fact, the ability to think creatively is very important in solving mathematical problems (Afifah & Asikin. 2018; Maharani, Hevy Risqi. 2014)

Creative thinking is the ability to generate new and original ideas. In the context of mathematics, creative thinking means the ability to find new and innovative solutions to mathematical problems (Mahmudi, Ali. 2010).

According to Torrance (in Supriatna, 2012), there are four main components in creative thinking: Fluency: the ability to generate many ideas in a short time; Flexibility: the ability to produce diverse and different ideas; Originality (originality): the ability to generate new and unusual ideas; Elaboration (elaboration): the ability to develop and refine ideas.

2. Methods

Aims to determine the description of students' creative thinking abilities in solving mathematical problems in learning Trigonometry. The research design is descriptive qualitative. The research subjects were Class X high school students. Data collection instruments included Creative Thinking Ability TESTs and interviews. The data analysis technique used is time triangulation.

3. Results and Discussion

Creative thinking indicators are used to make it easier for researchers to measure each student's creative thinking ability. Researchers use indicators of fluency, flexibility and novelty. Indicators of creative thinking are presented in Table below.

Table 1. Indicators of creative thinking

No.	Indicators of creative thinking	Student activities
1	Fluency	a. Write down the information contained in question b. Answer problems with appropriate answers true and varied
2	Flexibility	a. Provides a variety of solutions b. Using an approach (point of view) different
3	Novelty	a. Provide a solution method different from other individuals

Students' mathematical creative thinking abilities can be seen based on the results of a test consisting of 5 questions. The questions given contain trigonometry material studied in the even semester of class X SMA. Based on the description of the average results of high school students' mathematical creative thinking abilities which include aspects of fluency, flexibility, recency and detail. This situation occurs allegedly because of several influencing factors, including students who are used to being given routine model questions, students are unable to understand the instructions on the questions given, students work on solving questions only in the way used by the teacher, most students are unable to provide new ideas. Or what is unique about solving mathematics problems, most students are unable to answer questions completely, systematically and sequentially. Another possibility that makes students unable to solve mathematical creative thinking questions in the form of essays is because students are rarely challenged to solve non-routine questions which basically prioritize open-minded answers, the learning model is still teacher-centered, also causes students not to dare to ask questions and express their own opinions. Apart from that, many students themselves are less careful in solving problems, sometimes they forget the formula that should be used in the problem. The category value range is very low if the score obtained by small students is equal to 15.75. Students get the low category if the score range is between 15.75 and 20.25. The sufficient category is in the range of 20.25 and 24.75. Students who have a score range between 24.75 to 29.25 will be included in the high category, and if there are students who have a score exceeding 29.25 they will be categorized as very high. Students' mathematical creative thinking abilities are described based on a review of the answers to the mathematical creative thinking ability test which consists of 4 aspects, namely fluency, flexibility, novelty and detail. Based on the average results of students' answers in solving questions regarding mathematical creative thinking abilities, there were 5 questions, which had different averages, although none of their creative thinking abilities reached the very high category. This shows that students are less able to solve problems with mathematical creative thinking skills. The ability to think creatively at the high strata is at high criteria with an average of 28.6. The highest score achieved by students was 32 and the lowest score was 23.

4. Conclusion

The creative thinking abilities of high school students from each strata did not reach the very high category and no school was in the very low category. Overall, the average creative attitude of students is in the medium category. This can be seen when students take essay tests that are given, students are less able to work on questions independently, students are not fully able to provide new ideas, or unique ways of solving questions, and students are less able to solve questions that require students to provide other examples in everyday life. When working on math problems, students also lack confidence in their own answers so they tend to look at how their friends do it. This also influences students' mathematical creative thinking abilities in solving essay questions. Most of them prefer to imitate some of their friends' solutions rather than trying to solve the problem themselves

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