

Creative Thinking Ability In Mathematics Problem Solving Reviewed by The Personality Type of Senior High School Students In Makassar City

Ahmad Talib¹

¹Makassar State University

Email: matalibunm@yahoo.com.

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Abstract

This research is a qualitative research with descriptive method. This study aims to describe the ability to think creatively based on the type of student personality, the type of choleric personality in solving mathematical problems. The research subjects were students in the odd semester of class XII IPA 1 SMA Negeri 22 Makassar, the 2019/2020 school year. This subject was chosen by giving a personality questionnaire to students. The data was collected using a mathematical problem solving test instrument on the number sequence material and interviews. The validity of the data was checked by using the triangulation method. The results showed: Students with choleric personality in solving mathematical problems. In question number 1, the subject had difficulty in finding the formula for the n th term. But the subject kept trying and the spirit of trying until finally found the correct formula for the n th term. The subject of the choleric personality type is also said to be able to fulfill the three indicators of creative thinking, namely fluency, flexibility, and novelty. In question number 2, the subject had difficulty finding many ways to solve the problem and only met one indicator of creative thinking, namely fluency.

Keywords: creative; mathematics, problem, solving

INTRODUCTION

Creativity and problem-solving skills are skills demanded by today's world of work. According to the Career Center Maine Department of Labor (2001), some of the characteristics of individuals desired by the world of work are: (1) having self-confidence, (2) having motivation to excel, (3) mastering basic skills such as reading, writing, listening, speaking, and computer literacy, (4) mastering thinking skills, such as solving problems (problem solving), making questions (problem posing), making decisions (decision making), analytical thinking (analytical thinking), and creative thinking (creative thinking), and (5) mastering interpersonal skills, such as the ability to work in teams and negotiate. Creativity and problem solving are also skills demanded by the business world. Ekawati (2013), in her study, describe the number sense profile of the 7th-grade students in Mojokerto, found that students from different level (high, middle, and low) are: Not flexible in terms of using their comprehension about integers and their relationship to solving the problem, Unaware of the number's operation and the relationship between the operation of integers and their properties, Unable to estimate a calculation using the concept of the numbers and their operation.

Thus the importance of creativity and the ability to solve problems in various fields requires various parties, including educational institutions, to develop them. According to Mann (2005), nowadays, more than ever, the demands on educational institutions to prepare graduates to be able to develop their creativity are increasingly prominent. The development of creativity by educational institutions is also stated by the United States Department of Labor (Berg, 1999) which hopes that educational institutions provide opportunities for students to construct their knowledge through creative problem solving activities. Strictly speaking, McBeath (McGregor, 2007) also states that educational institutions should emphasize students' mastery of various thinking skills such as critical thinking, creative thinking, and problem solving abilities.

Creativity in learning mathematics is an effort to provide conditions so that students are encouraged to learn better, and influence them so that in students there is an urge to learn, so that understanding, knowledge, attitudes and mastery of skills, and students' creative abilities can be obtained. solve math problems effectively. The ability to think creatively in solving mathematical problems is interesting to study. So far, problem solving is often seen as a mechanistic, systematic, and abstract skill. However, with the development of cognitive learning theories, problem solving is seen as a complex mental activity that includes various cognitive skills. In the context as described above, creative thinking is seen as a requirement for the growth of problem solving abilities. However, on the other hand, problem solving based on certain personality types can also be seen as a means to foster creative thinking skills.

METHOD

This type of research is a qualitative research with a descriptive approach. Descriptive approach is done to reveal a picture of creative thinking ability, in solving mathematical problems based on the type of student's choleric personality. The data of this research is the result of a mathematical problem test in the form of an open-ended number sequence problem and an interview. The analysis was carried out after the diagnostic test process for open ended problems and interviews, where the results of the number series problem test were used as a reference for making interview guidelines. Data analysis in this study refers to the stages of qualitative data analysis, namely data reduction, data presentation, and drawing conclusions.

In this study, data collection was carried out through: (a) Personality questionnaire to determine the research subject. (b) Furthermore, a mathematical problem test is also used in solving the number sequence problem. (c) Interview method, interviews are used to obtain information and find out errors, and reveal variations in students' creative thinking abilities

RESULT AND DISCUSSION

1. The ability to think creatively on the subject of the Choleric Personality Type (SBK) in solving mathematical problems with the number sequence material in question number 1

Nama: Andini Rustan
Kelas: XII IPA 1

Cara 1. Jarak antara U_1 ke $U_2 = 6$
 U_2 ke $U_3 = 8$
 U_3 ke $U_4 = 10$
 U_4 ke $U_5 = 12$
 U_5 ke $U_6 = 14$
 U_6 ke $U_7 = 16$
 U_7 ke $U_8 = 18$
 U_8 ke $U_9 = 20$

• nilai $U_8 = U_7 + 18$
 $= 72 + 18$
 $= 90$

• nilai $U_9 = U_8 + 20$
 $= 90 + 20$
 $= 110$

Jadi, nilai suku ke 9 adalah 110.

Cara 2. Untuk mencari suku ke 9, dicoba mencari perkalian yg menghasilkan angka pd Suku sebelumnya. (nilai n = suku yg dicari)

misal, $U_1 = 6$
 $= 2 \times 3$
 $U_2 = 12$
 $= 3 \times 4$
 $U_3 = 20$
 $= 4 \times 5$
 $U_4 = 30$
 $= 5 \times 6$
 $U_5 = 42$
 $= 6 \times 7$
 $U_6 = 56$
 $= 7 \times 8$

• Kita coba masukkan $n + \dots + 2$
 $U_1 = n + 1 = 2$
 $1 + 1 = 2$
 $U_2 = n + 1 = 3$
 $2 + 1 = 3$

Barak di dapat untuk mencari perkalian 5 nya di dpt rumus $n + 1$

2. Kita cekahkan $n + \dots + 3$
 $U_1 = n + \dots + 3$
 $1 + 2 = 3$
 $U_2 = n + 2 = 4$
 $2 + 2 = 4$

Jadi, di dpt rumus keduanya $n + 2$

Sehingga untuk mencari ^{nilai} suku ke 9 bisa di gunakan rumus tsbbt:

$U_1 = (n+1)(n+2)$ jadi, $U_9 = (n+1)(n+2)$
 $= (1+1)(1+2)$
 $= 2 \cdot 3$
 $= 6$ (terbukti)

$= 10 \cdot 11$
 $= 110$

Cara 3:
 1. pada cara 2, sudah ditemukan pdanya, pada cara ke-3 kita coba menggunakan perpankahan,

$2^2 + 2 = 6$
 $3^2 + 3 = 12$
 $4^2 + 4 = 20$
 $5^2 + 5 = 30$
 $6^2 + 6 = 42$

$(n+1)^2 + (n+1) = U_n$

Jadi, untuk mencari $U_9 = (9+1)^2 + (9+1)$
 $= 10^2 + 10$
 $= 100 + 10$
 $= 110$

The answers given by students will be analyzed using three components to determine students' creative thinking abilities, namely:

1) Fluency

The following is an excerpt from the SBK interview to determine fluency in solving problems.

Q When you first saw the question, what did you have in mind?

J For question number 1, you immediately imagine, oh, this is an arithmetic problem, a series that looks for the n th terms means that you must first know how much the difference is from each number.

From the results of the problem-solving test and interview quotes, the subject of the Choleric Personality Type (SBK) can understand the questions given, and can reveal what is known and what is being asked.

The subject stated that the difficulty faced in solving problem number 1 was that it was difficult to find the correct n th term formula. As in the following interview excerpt.

Q If so, please tell us about the difficulties you faced in doing the questions?

A The difficulty from number 1 is that it is difficult to find the correct n -term formula, but after trying many times finally got the right answer.

Subjects can find the formula for the n th term after trying many times by linking multiplication and exponents to find the appropriate formula. Choleric personality type (SBK) subjects can find two correct n th term formulas and the process of finding these formulas is written in detail, so that fluency can be met.

2) Flexibility

The following is an excerpt from the SBK interview to find out flexibility in solving problems.

P The answer you wrote down from question number 1 has 2 ways. Is there any other way to think about it?

A There must be another way but I'm still confused and haven't thought of it. So just 2 ways that I get.

From the results of the problem solving test and interview quotes, it can be seen that the subject uses two ways to obtain the n th term formula. At the time of the interview, even though the subject no longer found another way, the subject was still said to be able to fulfill flexibility because previously there were two different methods obtained and proven to be applicable.

3) Novelty

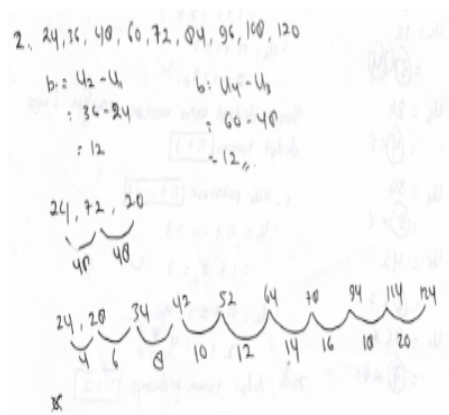
The following is an excerpt from the SBK interview to find out the novelty in solving the problem.

Q Have you received this answer or method before?

A Question number 1 I just think about and apply now. The way I often get to find the n th term is the general formula only.

The subject of the choleric personality type said that the two methods used to obtain the n th term formula were new ways that had never been obtained before. According to him, the formula obtained is a new formula because what is often obtained to find the n th term is the general formula and has been taught by the teacher, so the subject is said to be able to meet the novelty.

2. The ability to think creatively on the subject of the choleric personality type (SBK) in solving mathematical problems with the number sequence material in question number 2



The answers given by students will be analyzed using three components to determine students' creative thinking abilities, which are as follows:

1) Fluency

The following is an excerpt from the SBK interview to determine fluency in solving problems.

Q When you first saw the question, what did you have in mind?

A For question number 2, it seems we have to find a multiple that can produce 24 and 120 first.

From the results of the problem solving test and interview quotes, the subject of the Choleric Personality Type (SBK) can understand the questions given, and can reveal what is known and what is being asked. Subjects can give 3 answers, namely forming 3 different number sequences, so that SBK is said to meet fluency.

2) Flexibility

The following is an excerpt from the SBK interview to find out flexibility in solving problems.

Q What about number 2, is there another way you can think of?

A For number 2, that's the only way I remember, which is to determine the difference/difference.

From the results of the problem solving test and interview quotes, it can be seen that the subject found three different number sequences, but the method used in finding the three number sequences only used one method, namely by determining the difference/difference, so that SBK could not fulfill flexibility.

The subject has tried to find many ways to solve the problem in order to meet the flexibility indicator, but the result is only one way that can be obtained. The subject finds it difficult to find many ways and look for patterns/lines, as described in the following interview excerpt.

Q If so, please tell us about the difficulties you faced in doing the questions?

J...

Likewise with number 2, I find it difficult to find many ways and look for patterns because to make it a series we have to know how the pattern is, where it must be between 24 and 120.

3) Novelty (novelty)

The following is an excerpt from the SBK interview to find out the novelty in solving the problem.

Q Have you received this answer or method before?

J ... the method that I used in number 2 I have come across before so I thought of using that method.

The subject of the choleric personality type said that the method used to obtain the sequence of numbers between 24 and 120 had been obtained before, so the subject could not meet the novelty.

The creative thinking ability of the choleric personality type (SBK) subject in solving problems, from the results of the above analysis can be described as follows:

1. In question number 1, the subject has difficulty in finding the formula for the n th term. But the subject kept trying and the spirit of trying until finally found the correct formula for the n th term. The subject of the choleric personality type is also said to be able to meet the three indicators of creative thinking, namely fluency, flexibility, and novelty.
2. In question number 2, the subject has difficulty finding many ways to solve the problem and only meets one indicator of creative thinking, namely fluency.

Choleric personality type (SBK) subjects are able to understand the questions given, and can express what is known and what is being asked. At the first time seeing the problem, the subject can imagine how the completion of the two questions will look like. However, the subject found difficulties in determining the formula for the n th term in question number 1, as well as difficulties in finding many ways to answer question number 2.

The subject is able to answer question number 1 by writing 2 different n th term formulas, and able to answer question number 2 by writing 3 different sequences of numbers. The written answers are then identified to see the indicators of creative thinking that are met. In the fluency indicator, for question number 1 the subject of the choleric personality type (SBK) can find two correct n -term formulas and the process of finding the formula is written in detail, so that fluency can be met. For question number 2, the subject can give 3 answers, namely forming 3 different number sequences, so that SBK is said to meet fluency. This is in accordance with the opinion expressed (Fitria & Siswono, 2014: 25) that students are able to meet fluency if they are able to solve problems with at least two different and correct answers.

In the flexibility indicator, for question number 1 the subject uses two ways to obtain the n th term formula so that it is said to be able to meet flexibility. For question number 2, the subject finds three different number sequences, but the method used in finding the three number sequences only uses one method, namely by determining the difference/difference, so that SBK cannot fulfill flexibility. This is in accordance with the opinion expressed (Fitria & Siswono, 2014: 25) that students are said to meet flexibility if they are able to provide solutions to problems using at least two ways.

In the novelty indicator, for question number 1, the subject of the choleric personality type said that the two methods used to obtain the n th term formula were new methods that had never been obtained before. According to him, the formula obtained is a new formula because what is often obtained to find the n th term is the general formula and has been taught by the teacher, so the subject is said to be able to meet novelty. For question number 2, the subject of the choleric personality type said that the method used to obtain a sequence of numbers between 24 and 120 had been obtained before, so the subject could not fulfill the novelty. This is in accordance with the opinion (Fitria & Siswono, 2014:25) that students meet the novelty aspect if students are able to explain problem solving using methods that do not exist or are unusual for students.

CONCLUSIONS AND SUGGESTIONS

Based on the results of data analysis referring to the research objectives, the results of the research in the odd semester, class XII IPA 1 SMA Negeri 22 Makassar, the 2019/2020 school year can be concluded as follows:

1. Subjects are able to understand the questions given, and can express what is known and asked. However, the subject found difficulties in determining the formula for the n th term in question number 1, as well as difficulties in finding many ways to answer question number 2.
2. In question number 1, the subject meets fluency because he can find two correct n th term formulas and the process of finding the formula is written in detail, the subject also meets flexibility because he uses two ways to obtain the formula for the n th term. n . And the last indicator, namely novelty, can also be fulfilled by the subject because the method used to obtain the n th term formula is a new method that has never been obtained before.
3. In question number 2, the subject meets fluency because it can provide 3 answers, namely forming 3 different number sequences, but the subject does not meet flexibility because the subject finds three different number sequences, but the method used in finding three The sequence of numbers only uses one way, namely by determining the difference / difference. Likewise, the last indicator, namely novelty, cannot be fulfilled because the method used to obtain a sequence of numbers between 24 and 120 has been obtained previously.

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