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Analysis of Students' Creative Thinking Skills in Mathematics Learning with The Application of Ethnomathematics of Batik Sendang

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Abstract

One important aspect of education in the 21st century is developing students' creative thinking skills. The development of creative ideas is usually related to a person's socio-cultural. One of the cultural heritages in Lamongan is batik Sendang. Batik Sendang motifs can make students to explore, so that students can grow their creativity. Therefore, ethnomathematics plays an important role in connecting culture with mathematics learning to foster student creativity. This research aims to analyze and describe students' creative mathematical thinking skills in solving problems designed with the application ethnomathematics batik Sendang. The subjects of this research consisted of four students in class IX at MTs Tarbiyatus Shibyan Lamongan who were classified according to the criteria for creative thinking skills, namely low, medium, high, and very high. The results of this research show impressive things. That is 70.59% of students show high to very high creative thinking skills. Meanwhile 29.41% of students show low and medium creative thinking skills. It is hoped that the results of this research can help researchers and teachers to determine measuring tools or methods to improve students' creative thinking skills, one of which is ethnomathematics of batik Sendang.

Keywords: Ethnomathematics of Batik Sendang, Creative Thinking Skills, Mathematics Learning

Abstrak

Salah satu aspek penting dalam pendidikan di abad ke 21 yaitu mengembangkan kemampuan berpikir kreatif siswa. Perkembangan ide-ide kreatif biasanya berkaitan dengan sosial budaya seseorang. Salah satu peninggalan budaya di Lamongan, yaitu batik Sendang. Motif batik Sendang memungkinkan siswa untuk berekspolrasi, sehingga siswa dapat menumbuhkan kreativitasnya. Oleh karena itu, etnomatematika berperan penting dalam menghubungkan budaya dengan pembelajaran matematika untuk menumbuhkan kreativitas siswa. Penelitian ini bertujuan untuk mengalisis dan mendeskripsikan kemampuan berpikir kreatif matematika siswa dalam menyelesaikan permasalahan yang didesain dengan menerapkan etnomatematika batik Sendang. Subjek penelitian ini terdiri dari empat siswa kelas IX MTs Tarbiyatus Shibyan Lamongan yang memiliki kemampuan berpikir kreatif rendah, sedang, tingggi, dan sangat tinggi. Metode penelitian ini adalah kualitatif deskriptif. Hasil penelitian ini menunjukkan hal yang mengesankan, yaitu 70,59% siswa menunjukkan kemampuan berpikir kreatif tinggi hingga sangat tinggi. Sementara 29,41% siswa menunjukkani kemampuan berpikir kreatif rendah dan sedang. Hasil penelitian ini diharapkan dapat membantu peneliti dan guru untuk menentukan alat ukur atau metode dalam peningkatan kemampuan berpikir kreatif siswa, salah satunya dengan etnomatematika batik Sendang.

Kata kunci: Etnomatematika Batik Sendang, Kemampuan Berpikir Kreatif, Pembelajaran Matematika

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INTRODUCTION

The creative thinking is an essential skill for humans. Creative thinking skills are included among higher order thinking skills (Ikuenobe, 2011). Creative thinking skills are very important in the 21st century, where problems are increasingly complex and innovative thinking is needed (Suherman & Vidákovich, 2022). With creative thinking skills, someone can generate new ideas in solving problems (Suganda et al., 2021). Then, creative thinking skills can encourage the development of innovation to solving the problems faced (Rohaeti et al., 2019). It is also key in facing the complexity

of problems in the future (Ferdiani et al., 2022). Therefore, creative thinking skills are important to promote (Schoevers et al., 2019). 1/3 of the creative thinking skills comes from genetics, while 2/3 is obtained through education (Sitorus & Masrayati, 2016). This shows the importance of developing creative thinking skills, one of which is through formal education.

One lesson that can develop students' creative thinking skills is mathematics. According to Grégoire (2016), the essence of mathematics is creative thinking, not just the right answer. The creative thinking skills is related to several aspects, namely problem discovery, problem solving, and idea discovery (Hadar & Tirosh, 2019). Therefore, to increase student creativity, teacher mush enrich mathematics education by making connections between mathematics with other subjects or even with contexts outside of school (Colucci-Gray et al., 2017). Because creative ideas are always related to a person's socio-cultural environment (Sitorus & Masrayati, 2016). So, encouragement is needed from teachers by facilitating the learning process, (Schunk, 2012).

Based on the results of observations at MTs Ma'arif 11 Tarbiyatus Shibyan Lamongan, researchers found that students thought the mathematics learning process was monotonous. This condition results in decreased student interest in learning. In fact, interest in learning is an important foundation in developing students' creative thinking skills (Yuniharto & Rochmiyati, 2022). This shows that a variations of learning methods are needed to foster student interest in order to improve students' creative thinking skills. One of the strongest influences on the success of improving students' creative thinking skills is the quality and compatibility of the materials used by the teacher (Polikoff et al., 2015). Apart from that, teachers must also develop active, creative, and innovative learning systems (Pereira et al., 2021).

One innovative approach that has great potential to encourage students' creative thinking skills is the application of ethnomathematics. Ethnomathematics is a relationship between culture and mathematics (Thanheiser, 2023). Ethnomathematics has become a major force in mathematics education reform (Verner et al., 2019). Ethnomathematics can present mathematics in a more interesting way and can increase students' interest in learning (Mania & Alam, 2021). In addition, ethnomathematics can increase learning motivation, strengthen skills, and creativity (Verner et al., 2019). Therefore, in this research, students were given problems designed with the application of ethnomathematics of batik Sendang to reveal students' creative thinking skills.

This research aims to analyze and describe students' creative thinking skills in solving mathematics problem that designed with the application of ethnomathematics of batik Sendang. Ethnomathematics for batik Sendang was chosen for the problem given because the batik Sendang motifs contain mathematical elements, so students can explore (Yudhi & Septiani, 2024). Apart from that, the ethnomathematics of batik Sendang was chosen because it is based on the suitability of local culture. According to Mania & Alam (2021), the application of ethnomathematics as a learning approach and method can be adapted to the student's cultural context.

This research is important to determine students' creative thinking skills. This is because one

important aspects of education is developing students' creative thinking skills (Nufus et al., 2024). Especially in mathematics learning, because mathematics learning can provide opportunities to improve students' creative thinking skills (Švecová et al., 2014). On the other hand, creative thinking skills have been proven to have a positive impact on improving students' understanding of mathematical concepts (Hadar & Tirosh, 2019). Apart from that, this research aims to determine the influence of ethnomathematics of batik Sendang on students' creative thinking skills. However, ethnomathematics significantly encourages student creativity (Mauluah, 2022).

Based on the importance of creative thinking skills and their relationship with the application of ethnomathematics of batik Sendang, this research will analyze students' creative thinking skills in solving problems designed with the application of ethnomathematics of batik Sendang.

METHOD

This research uses descriptive qualitative methods to describe students' creative thinking skills. The data analysis technique is by calculating the average student score based on the score for each characteristic of creative thinking skills using the formula:

$$\bar{X} = \frac{\Sigma x}{n} \qquad (1)$$

Next, score matching is carried out to determine the criteria for students' creative thinking skills based on Table 1.

Table 1. Criteria for Students' Creative Thinking Skills

No	Score Range	Criteria
1	$0\% < X < 50\%$	Low
2	$50\% < X < 70\%$	Medium
3	$70\% < X < 85\%$	High
4	$85\% < X < 100\%$	Very High

The instrument of creative thinking skills test is prepared based on indicators of the characteristics of creative thinking skills (Singer et al., 2017), as in Table 2.

Table 2. Indicators of The Characteristic of Creative Thinking Skills

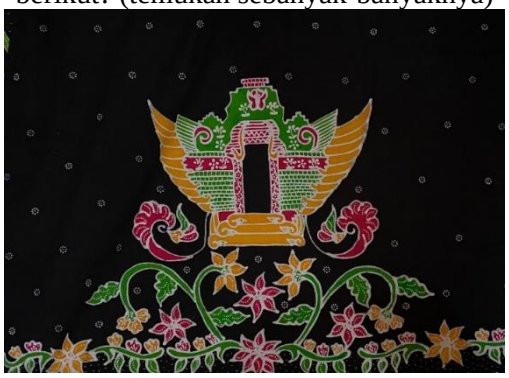
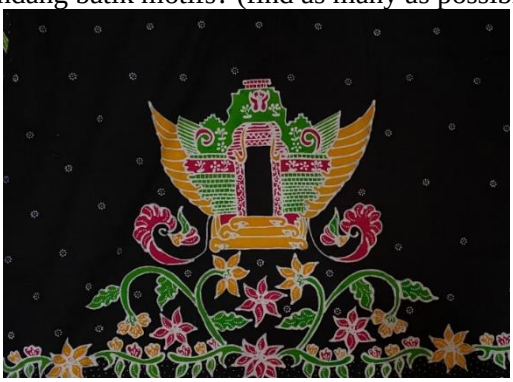
No	Characteristics of Thinking	Indicators
1	Originality	- Find other unusual strategies to solve problems. - Think differently from others.
2	Fluency	- Plan and implement various problem-solving strategies when faced with complex problems and dead ends. - Change the problem solving strategy if the selected person experiences a deadlock in solving the problem.
3	Flexibility	- Think about different ways to solve problems. - Introduce various ways to solve problems
4	Elaboration	- Take detailed steps to discover the deeper meaning of the answer or solution to your problem.

The subjects of this research consist of 4 students, namely students with low, medium, high, and very high creative thinking skills. Students are considered to be research subjects, namely students with good communication.

The data collection procedure used included carrying out a worksheets given to all class IX students of MTs Ma'arif 11 Tarbiyatus Shibyan Lamongan. After that, the students selected as research subjects interviews will be interviewed..

The instruments in this research are worksheets and interview guides. The worksheet consists of two problems. The two problems given is the problem designed with the application of ethnomathematics of batik Sendang and open-ended type. So that from the results of students' work, the students' creative thinking skills can be identified. The problems given are presented in Table 3.

Table 3. The Problems Given for Students

In Indonesian	In English
Permasalahan 1 Adillah sedang mengamati motif batik sendang. Dia ingin mencari tau konsep matematika bangun datar yang terdapat pada pola motif batik sendang. Bantu Adillah untuk menemukan bangun datar yang terdapat dalam pola motif batik sendang berikut? (temukan sebanyak-banyaknya) 	**Problem 1** Adillah is observing the batik Sendang motifs. She want to find out the mathematical concept of flat shapes contained in the pattern of batik Sendang motifs. Help Adillah to find the flat shapes contained in the following patterns of sendang batik motifs? (find as many as possible) 
Permasalahan 2 Adillah adalah putri Pak Jauhari. Adillah sedang belajar membatik dengan ayahnya. Adilla diberi tugas oleh ayahnya untuk membuat desain batik yang ada motif berbentuk segitiga. Pak Jauhari berkeinginan setiap motif yang berbentuk segitiga memiliki dua sisi yang panjangnya 6 cm dan 8 cm. Bantu Adilla untuk menentukan bentuk segitiga yang bisa dibuat, serta menentukan panjang satu sisi segitiga yang lain? (minimal dua bentuk segitiga)	**Problem 2** Adillah is Mr.jauhari's daughter. Adillah is learning to make batik with her father. Adilla was given the task by her father to make a batik design with a triangle-shaped motif. Mr.jauhari wants each triangle-shaped motif to have two sides that are 6 cm and 8 cm. Help Adilla determine the shape of a triangle that can be made, and determine the length of one side of the other triangle? (minimum two triangle shapes)

Meanwhile, the interview guide is used to find out and clarify students' thinking processes in solving problems, so that researchers can reveal students' creative thinking skills. After the data is collected, the researcher will carry out data analysis, reduce data, validate data, present data, and draw conclusion.

RESULTS AND DISCUSSION

In this research, the problems given are designed with application of ethnomathematics of batik Sendang and open-ended type. The application of ethnomathematics of batik Sendang provides an students with opportunity to explore mathematical concepts contained in batik motifs (Yudhi & Septiani, 2024). Meanwhile, open-ended questions are used to provide space for students to find ideas freely (Irawan & Surya, 2017). Therefore, the problems given allow students to think creatively, because students are actively involved in the problem solving process (Malik, 2022).

Based on the results of the students' work, it was found that there were 7 students with low creative thinking skills, 8 students with medium creative thinking skills, 25 students with high creative thinking skills, and 11 students with very high creative thinking skills. A summary of the criteria for students' creative thinking skills is presented in Table 4.

Table 4. Data on Criteria of Students' Creative Thinking Skills

Criteria	Many Students	Presentation
Low	7	13,72%
Medium	8	15,69%
High	25	49,02%
Very High	11	21,57%

Based on the results above, it shows a positive thing that there are 70.59% of students who have high to very high creative thinking skills. This shows the effectiveness of applying ethnomathematics of batik Sendang to the problem given. It is known that batik motifs contain mathematical concepts such as points, lines and flat shapes, so students can explore the patterns of typical spring batik motifs and relate them to mathematical concepts (Amirah & Budiarto, 2022). This shows that ethnomathematics needs to be applied in mathematics learning in order to improve students' creative thinking skills (Deda et al., 2024).

In this research, the characteristics of students' creative thinking skills are divided into four, namely elaboration, fluency, flexibility, and originality (Kartikasari & Usodo, 2022). Indicator of elaboration is said to be fulfilled when students can explain answers in detail, such as students can write down what is known, describe the solution process, and provide conclusions (Kim et al., 2004). Indicator of fluency is said to be fulfilled when students can understand various solutions (Kozlowski et al., 2019). Indicator of flexibility is said to be fulfilled when students can find varied solution ideas (Jawad et al., 2021). The indicator of originality is said to be fulfilled when students can operate different perspectives in producing systematic thinking about new ideas (Hadar & Tirosh, 2019).

Next, the results and analysis of students' work will be presented, including the results of the work of subject 1 (S1), namely students with low creative thinking skills; the results of the work of subject 2 (S2), namely students with medium creative thinking skills; the results of the work of subject 3 (S3), namely students with high creative thinking skills; and the results of the work of subject 4 (S4), namely students with very high creative thinking skills.

Students with Low Creative Thinking Skills (S1)

Based on the results of the work of S1 on the problem given, the problem was designed with application of ethnomathematics of batik Sendang and open-ended type, S1 can understand the first problem, but S1 did not understand the second problem. S1 thinks that the second problem is only asked to create two triangles. The results of the work of S1 are shown in Figure 1.

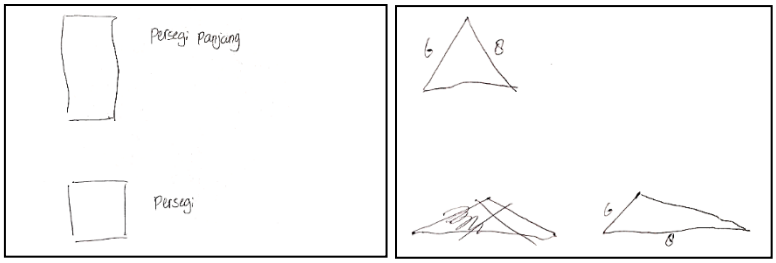


Figure 1. The Results of The Work of S1

Based on Figure 1, the results of the work of S1 on the first problem, S1 can find two types of flat shapes in the Sendang batik motifs, namely rectangular and square. However, S1 did not provide a detailed description of the motif from which S1 got the rectangle and square images on the worksheet. When S1 was confirmed through interviews, S1 was able to explain that S1 found a rectangular from the batik Sendang motif on the gate door. Meanwhile, for the flat shape, square, S1 found the batik Sendang motif on the walls of the gate.

Based on Figure 1, the results of the work of S1 on the second problem, S1 immediately created two triangles spontaneously. Then, S1 also substitute the numbers 6 and 8 as side lengths spontaneously. In the first triangle, the number 6 is substituted on the left side of the triangle as the length of that side and the number 8 is substituted on the right side of the triangle as the length of that side. Meanwhile, in the second triangle, the number 6 is still substituted on the left side of the triangle as the length of that side, while the number 8 is substituted at the bottom or base of the triangle as the length of that side. This was done by S1 with the aim of making the first triangle and the second triangle different.

This research shows that S1 is basically less interested in learning mathematics. Complex mathematics learning often makes students disinterested (Rebollo et al., 2022). This is because students think mathematics is a difficult subject (Qohar et al., 2021). Conventional and monotonous learning methodology become a factor in students' difficulties in learning mathematics (Zapata et al., 2024). Therefore, creative and innovative learning models need to be emplemented (Pereira et al., 2021). One of them is the application of ethnomathematics, because the application of ethnomathematics can increase students' motivation in learning mathematics (Wassahua et al., 2023). However, this research found that students with low creative thinking skills are still less interested in the application of ethnomathematics of batik Sendang.

Based on the results of student work and results of interview, students with low creative thinking skills still do not fulfill all the characteristics of creative thinking skills, namely elaboration, fluency,

flexibility, and originality. In this case, students with low creative thinking skills are unable to elaborate answers in detailed steps. Whereas elaboration is important because with good elaboration skills students can provide a reasonable explanation for the solution provided (Kozlowski et al., 2019). Students also only make triangles without understanding the meaning of what they are made (Malik et al., 2024). Likewise, students are still unable to find new ideas, even though find new ideas is very important in developing creative thinking skills (Yayuk et al., 2020).

Students with Medium Creative Thinking Skills (S2)

Based the results of the work of S2 on the problem given, the problem was designed with application of ethnomathematics of batik Sendang and open-ended type, S2 can understand the first and second problems well, but S2 thought that the second problem was only asked to make two triangles. Even though there should be at least two triangles. The results of the work of S2 are shown in Figure 2.

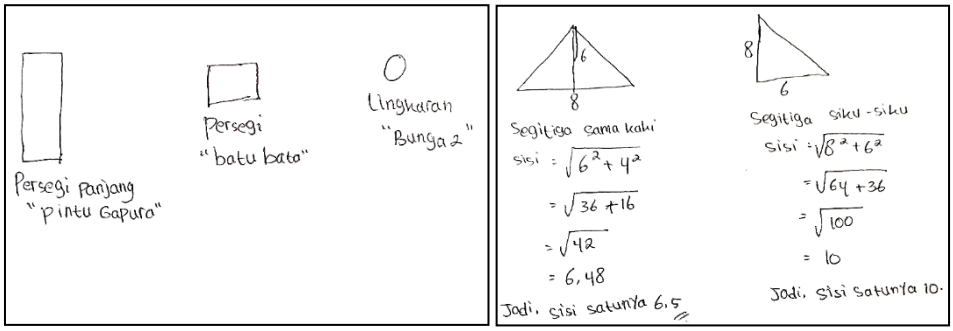


Figure 2. The Results of The Work of S2

Based on Figure 2, the results of the work of S2 on the first problem S2 can find three types of flat shapes in the batik Sendang motifs, namely rectangles, squares, and circles. S2 also provided a description of the parts of each flat shape found in the Sendang batik motifs.

Next, in the second problem, S2 decided to create an isosceles triangle. However, S2 made a mistake. S2's error started when entering the number 6 which should be the length of one side of the triangle, but S2 made the number 6 the height of the isosceles triangle. Then, S2 subtituted the number 8 as the length of the base of the isosceles triangle. S2 did not realize the error had been made until the end of the work. This was revealed during the interview session. The following is an excerpt from an interview with S2, which is shown in Table 5.

Table 5. Excerpt from an Interview with S2

In Indonesian	**In English**
P : Kenapa kamu taruh angka 8 di sini (sebagai alas segitiga) dan angka 6 di sini (sebagai tinggi segitiga)?	P : Why do you put the number 8 here (as the base of the triangle) and the number 6 here (as the height of the triangle)?
S2 : Coba-coba saja sih Pak.	S2 : Just try it, sir.

After that, S2 created a second triangle, namely a right triangle with a height of 8 cm and a base of 6 cm. Then, S2 found the length of the hypotenuse using the Pytagoras formula. Until the result obtained was 10 cm. In this case S2 did it well and correctly.

This research shows that S2 is basically less interested in learning mathematics. but the student understands little about the mathematical concept of flat shapes. Apart from that, the student was also interested in the problem given because the problems were designed with application ethnomathematics of batik Sendang. Students' interest in the application of ethnomathematics is because students can explore connecting mathematics with everyday life and culture (Wassahua et al., 2023). So, it can influence students' motivation and interest in mathematics (Yavuz Mumcu, 2018). Apart from that, it can improve student academic achievement (Fouze & Amit, 2017). Therefore, it is important for a teacher to design interesting learning, one of which is learning with application of ethnomathematics of batik Sendang.

Based on the results of student work and results of interview, students with medium creative thinking skills only fulfill two characteristics of creative thinking skills, namely elaboration and fluency. Meanwhile, the characteristics of flexibility and originality are still not fulfilled. In this case, students with medium creative thinking skills can explain answers in detail even though there are mistakes made by students. This shows that students fulfill the characteristics of elaboration (Setyaningsih & Kustiana, 2023). Students can provide two triangles and apply the concept of the pythagoras formula to triangles. This shows that students fulfill the characteristics of fluency (DeWyngaert, 2016). However, in determining the sides of the triangle, students make mistakes. This error is caused by students' less flexible thinking processes, so students are said to not fulfil the characteristics of flexibility (Vally et al., 2019). Apart from that, the strategy used by students is also not a unique solution. This shows that students do not fulfil the characteristics of originality (Setyaningsih & Kustiana, 2023).

Students with High Creative Thinking Skills (S3)

Based on the results of the work of S3 on the problems given, the problem was designed with application of ethnomathematics of batik Sendang and open-ended type, S3 can understand the first and second problems well. The results of the work of S3 are shown in Figure 3.

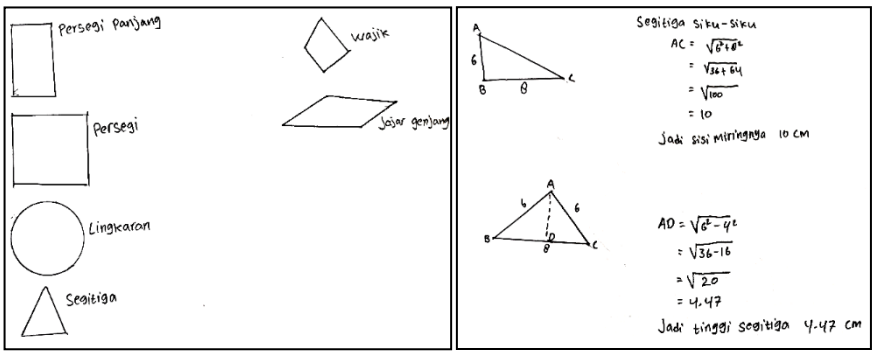


Figure 3. The Results of The Work of S3

Based on Figure 3, the results of the work of S3 on the first problem. S3 can find six types of flat shapes in the batik Sendang motif, namely rectangle, square, triangle, circle, rhombus, and parallelogram. However, there is one flat shape whose naming is less precise. S3 states that the rhombus image is a diamond. S3 also illustrates the flat shape of the given batik motif. Furthermore, in the second problem, S3 provided two triangle shapes, namely a right triangle and an isosceles triangle. First, S3 creates a right triangle with length AB, it is 6 cm, and length BC, it is 8 cm. Next, S3 used the pythagoras formula to find the other side, namely AC. S3 got a result of 10 cm. Next, S3 creates an isosceles triangle. The isosceles triangle created by S3 has side BC as the base with a length of 8 cm. Meanwhile, sides AB and AC are sides of the same length, with a length of 6 cm each. Then, the height of the triangle is drawn on the line AD. Next, S3 found the height of the triangle even though it is not requested in the problem.

This research shows that S3 has good abilities in learning mathematics. Apart from that, this student also has interest in the application of ethnomathematics of batik Sendang to the problems given. This is because applying ethnomathematics provides learning that is not monotonous (Wassahua et al., 2023). This also shows that ethnomathematics can be used as an effective strategy (Wassahua et al., 2023).

Based on the results of student work and results of interview, students with high creative thinking skills only do not fulfill one characteristic of creative thinking, namely originality. This is because S3 only focuses on mathematical formulas or concepts that are understood. In addition, S3 can not provide unique answer options. In fact, according to Vally et al (2019), the extent that the ideas presented by students are unique, the students are said to fulfill originality. Originality is a very unique and unusual individual ability to find solutions or ideas (Suherman & Vidákovich, 2022).

For the other three characteristics of creative thinking, namely elaboration, fluency, and flexibility, S3 has fulfilled. In this case, students with high creative thinking skills can elaborate answers in detailed steps. This shows that students have fulfilled the characteristics of elaboration (Wilkie, 2024). Students can give two answers and determine the other side of the triangle using the Pythagoras formula. This shows that students fulfill the characteristics of fluency (Yayuk et al., 2020). Ideas and strategies for determining each of the different sides of a triangle well and smoothly. This shows that students fulfill the characteristics of flexibility (Vally et al., 2019). However, the strategies used by students are not new and unique solutions, but solutions that are commonly used by students.

Students with Very High Creative Thinking Skills (S4)

Based on the results of the work of S4 on the problems given, the problem was designed with application of ethnomathematics of batik Sendang and open-ended type, S4 can understand the first and second problems well and correctly. The results of the work of S4 are shown in Figure 4.

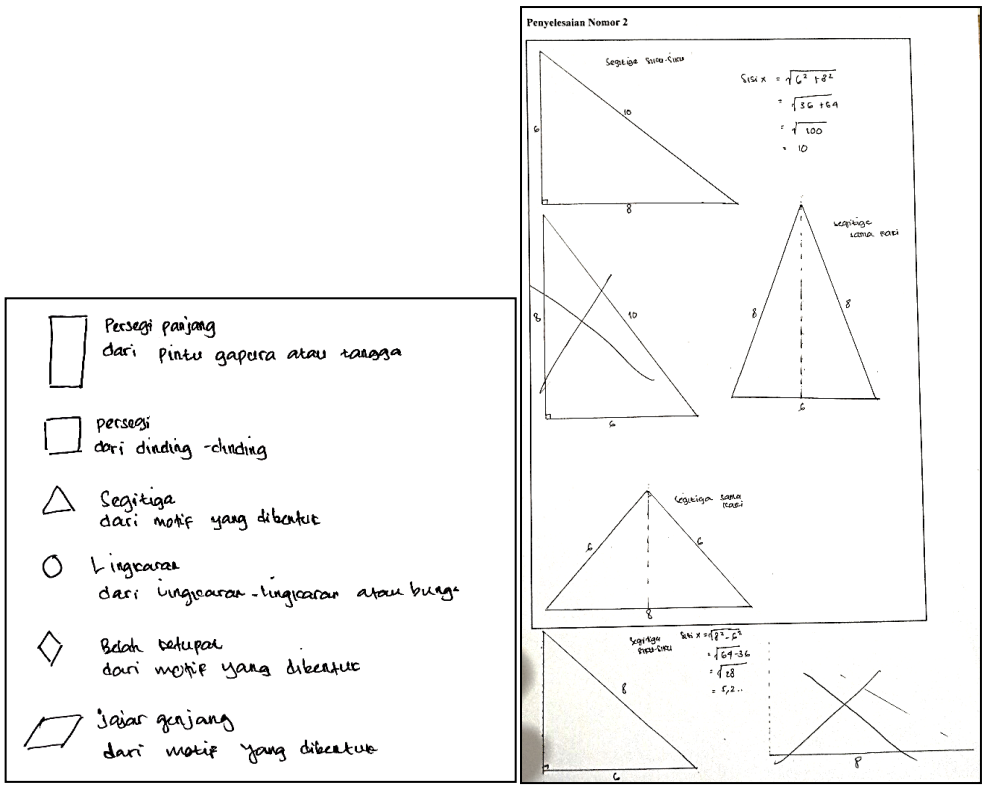


Figure 4. The Results of The Work of S4

Based on Figure 4, in the first problem, S4 can find six types of flat areas in the Sendang batik motifs, namely rectangle, square, triangle, circle, rhombuse, and parallelogram. In this case, S4 was able to provide answers well, correctly, and in detail.

In the second problem, S4 provided four triangle shapes, namely two right triangles and two isosceles triangles. First, S4 created a right triangle with a height of 6 cm and a base of 8 cm. then S4 found the length of the hypotenuse of triangle. S4 got a hypotenuse length of 10 cm. Next, S4 created another right triangle with a height of 8 cm and a base of 6 cm. In this case, the S4 also would find the length of the hypotenuse of triangle. When S4 solved the second right triangle, S4 also got a hypotenuse length of 10 cm. S4 realized that the two triangles created are the same. Finally, S4 crossed out the answer.

Next, S4 created an isosceles triangle. S4 created two isosceles triangles, namely an isosceles triangle with a base length of 6 cm and two sides that have the same length, namely 8 cm. Then, S4 created another isosceles triangle with a base side length of 8 cm and two sides that have the same length, namely 6 cm.

Next, S4 created a right triangle with a base of 6 cm and a hypotenuse of 8 cm. By using the pythagoras formula, S4 got a triangle height of 5,2 cm. Then, S4 tried to make a right triangle with a combination of 6 cm and 8 cm. S4 created a straight line as a base with a length of 8 cm. Then, S4 tried to make another triangle with a hypotenuse length of 6 cm. S4 realized that it is impossible for the hypotenuse to be shorter than the other side. Because the hypotenuse of a right triangle is the longest side.

This research shows that S4 has good abilities in learning mathematics. Students also basically have an interest and talent in mathematics. Apart from that, the application of ethnomathematics of batik Sendang to the given problem further increases S4's interest, because S4 can explore and be creative. Ethnomathematics can also be a powerful approach to improve students' critical thinking (Wassahua et al., 2023). Therefore, it is necessary to develop an ethnomathematics-based curriculum because ethnomathematics contributes to the development of students' skills and talents, to increase more meaningful understanding, and to make better achievement in mathematics (Fouze & Amit, 2017).

With a good understanding of mathematical concepts and with problems that make S4 able to provide many answer options, S4 can explore and provide answers well, correctly, and in detail. Apart from that, S4 also can apply unique solutions. It can be concluded that S4 can fulfill all the characteristics of creative thinking, namely elaboration, fluency, flexibility and originality (Kartikasari & Usodo, 2022). According to Urban & Urban (2024), students who are able to provide various creative answers have high metacognitive abilities.

Based on the results of student work and results of interview, students with very high creative thinking skills can elaborate answers in detailed steps. So, it can be said that these students fulfill the characteristics of elaboration because students can detail, assess, develop, and enrich ideas (Kartikasari & Usodo, 2022). Students can give more than two good and correct answers. According to Yayuk, et al (2020), students who can express mathematical ideas fluently and correctly in solving problems are said to fulfill the characteristics of fluency. When students encounter an impasse, students can solve the problem by taking other steps. According to Leikin & Lev (2007), students fulfill the characteristics of flexibility because students can change the flow of thinking when facing dead ends or obstacles. In addition, the ideas and strategies used by students are unique strategies. strategies also are not commonly used by other students. According to Goulet-Pelletier, et al (2023), who state that students with creative thinking skills are able to solve problems originaly with strong motivation.

CONCLUSION

The results of this research show that students' creative thinking skills is impressive, with 70.59% of students showing high to very high creative thinking skills in solving problems designed with application of ethnomathematics of batiuk Sendang. Furthermore, students with very high creative thinking skills fulfill all the characteristics of creative thinking skills, namely elaboration, fluency, flexibility, and originality. Students with high creative thinking skills only do not fulfill one characteristic of creative thinking skills, namely originality. Meanwhile, 29.41% of students showing low and medium creative thinking skills. Furthermore, students with low creative thinking skills do not fulfill all the characteristics of creative thinking skills. Temporary students with medium creative thinking skills only fulfill two characteristics of creative thinking skills, namely elaboration and fluency.

This research only focuses on exploring students' creative thinking skills in solving problems problems designed with application of ethnomathematics of batik Sendang. Therefore, future researchers can develop learning media with application of ethnomathematics to support mathematics learning, so that they can improve other skills. Besides that, It is hoped that the results of this research can provide an overview and help researchers and teachers to determine measuring tools or methods to improve students' creative thinking skills, one of which is ethnomathematics of Sendang batik.

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