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ANALYSIS OF CREATIVE THINKING SKILLS IN SOLVING STORY PROBLEMS IN SOLID FIGURE

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ABSTRACT
This study aims to describe the creative thinking ability of students in solving story problems of solid figure. The method used is descriptive qualitative. The subjects of this study were 3 students of class VII SMP Negeri 1 Batu Sopang who were selected based on the test results and categorization of high, medium, and low levels of creative thinking. The results indicated that students with a high level of creative thinking ability achieved the *fluency*, *originality*, and *elaboration* indicators very well. While for the *flexibility* indicator the subject is still classified as good. Students whose level of creative thinking ability is moderate can achieve *fluency* and *originality* indicators well while for *flexibility* and *elaboration* indicators are still not good. Students whose level of creative thinking ability is low do not achieve all indicators of creative thinking.
Keywords: Creative Thinking, Solid Figure, Story Problem

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PRELIMINARY

In the world of education, mathematics lessons from elementary school to college level are considered important to increase students' knowledge to think logically, critically, systematically, analytically, cooperatively, and creatively (Pratiwi et al., 2021). This education is in line with the objectives of the 2013 curriculum stated in the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 69 of 2013, namely training students to be able to think creatively and carefully individually. The learning objectives can be met when a teacher knows the various learning styles and cognitive abilities of students who will receive instruction. One of the things teachers do to help students understand math is to teach them how to use their creativity to solve problems. The same goes for the much-needed skill of creative thinking, one of the talents needed for excellent, reliable and competitive human resources with the outside world. In learning activities, a high level of creativity is necessary for every student (Zubaidah et al., 2017).

Solving a problem does not only use perseverance but also requires creativity, so student creativity plays an important role. According to Huliatunisa et al. (2020) there are benefits to having the ability to think creatively, namely being able to grow new ideas spontaneously without realizing it with one's own thoughts. Creative thinking skills are an important aspect in achieving learning goals because they provide useful experience and knowledge in the future (Nesti et al., 2023). Activities carried out in honing creative thinking skills include combining, generating, and determining the effectiveness of existing ideas (Wahid & Karimah, 2022).

According to Fitriani & Yarmayani (2018) there are three aspects of thinking creatively in solving math problems, namely *fluency*, *flexibility*, and *novelty*. *Fluency* is the ability to answer questions in various ways, *flexibility* is the ability to handle problems in various ways, and *novelty* is the ability to innovate or do novel*ty* that students find data to overcome difficulties in solving problems (Shofiah et al., 2018). Students whose creative thinking skills are low are in line with research by Nurjamilah & Marlina (2019) which revealed that students' creative thinking skills were very low because of the average percentage of all existing indicators, only one was more than 50%. According to the Mendikbud (2016) training students to think creatively is very important because the learning process for each student must be fun, interactive, inspiring, challenging, and designed to encourage students to participate actively. To hone students' creative thinking skills, educators can provide problems in the form of story problems because they can increase students' understanding of mathematical concepts and are able to improve thinking skills by determining the steps of problem solving first.

For example, daily life problems can be used as story problems. Problems in the form of story problems look very difficult to solve because of the long narrative, this requires techniques and strategies that are not instant in solving them by practicing a lot of story form problems (Amir, 2015). In solving story form problems not only get the final result of solving the problem, but can train students to understand how to think in compiling step by step solutions that will be used and communication skills are needed to connect ideas owned with new ideas. According to Soedjadi (Kurniawan et al., 2017), the steps needed to solve math story problems include: 1) carefully read the story to understand the meaning of each sentence, 2) identify questions and question needs, 3) form a mathematical model, 4) work on the mathematical model, and 5) change the answer to the mathematical model to answer the original question. This triggers students to think critically, creatively, and systematically in developing problem-solving steps. Based on the

description above, the researcher was interested in examining "Analysis of Students' Creative Thinking Skills In Solving Story Problems In Solid Figure ".

METHODS

The form of this research is descriptive qualitative which was conducted at SMP Negeri 1 Batu Sopang. The research subjects were selected based on the results of student test answers after being analyzed from 32 students of class VII A and 3 students were selected to be interviewed. Data were taken from test results, interviews, and documentation of the subjects. The research uses an interactive method by applying data analysis techniques in the form of technical and source tringulation, where technical tringulation is by comparing test results with interview results while source tringulation is comparing subject interview results.

Research subjects who have been selected based on creative thinking indicators are then categorized into three levels, namely high, medium, and low. The basic criteria for categorizing research subjects and selected subjects are presented in Tables 1 and 2.

Table 1. Research Subject Categorization Criteria

Interval	Creative Thinking Ability Criteria
$x > 44$	High
$31 \leq x \leq 44$	Medium
$x < 31$	Low

Table 2. Research Subjects

No.	Subject Code	Score	Ability Level	Frequency	Precentage(%)
1.	S-KT	65	High	9	30
2.	S-KS	35	Medium	10	33
3.	S-KR	17	Low	11	37

The research instrument uses 4 description questions which are arranged based on indicators: 1) *Fluency*, 2) *Flexibility*, 3) *Originality*, and 4) *Elaboration*. The test instrument is shown in the following figure.

1. Mrs. Rina wants to decorate a cookie jar that is shaped like a block to make it look more attractive on the next holiday. The jar that Mrs. Rina has has a length of 28 cm and 10 cm with a rectangular base. If the base area of the jar is 252 cm^2, then the surface area of the jar is ...
2. Not only watches that can be made from wood, a tube-shaped bed lamp can also be made with wood raw materials equipped with various unique carvings and looks elegant. This bed lamp is suitable to be placed in the bedroom and used as a table decoration. This bed lamp has a circle diameter of 8 cm, a lamp height of 10 cm and a lamp surface area of 351.68. cm^2. Use at least two different ways to determine the area of the bed lamp cover?
3. Perfume is a mixture of essential oils and aroma compounds used to provide a fragrant effect for the body, object, or room. Perfume has various forms of packaging, one of which is block-shaped. If a block-shaped perfume package has a length of 5 cm, a width of 3 cm, and a perfume surface area of 190 cm with a square base. cm^2 with a square base. What is the volume of the perfume?
4. Kue lapek bugis is one of the traditional snacks from Minangkabau that is shaped like a square pyramid. This cake is made from glutinous rice flour filled with grated old coconut then wrapped in banana leaves and steamed. If the lapek bugis cake has a base side length of 5 cm and the height of the triangle on the upright side of the cake is 6 cm, what is the surface area of the lapek bugis cake?

Figure 1. Creative Thinking Ability Test Questions

The data analysis technique applies the Miles and Huberman model, which is a process that uses three activities including:

1. Data Collection

   Data collection starts from compiling instruments that will be used such as creative thinking ability test instruments and interview instruments as well as validation of question instruments. Then the data is collected by conducting tests with story form questions, interviews and tringulation of research subjects.

2. Data Reduction

   Data reduction is the stage of selecting, simplifying and summarizing important information and focusing on important data needed in research. By reducing the data, a clearer picture will be obtained which makes it easier for researchers to collect data to the next stage (Sidiq & Choiri, 2019). In this study, researchers can reduce data from interviews, tests, and documentation.

3. Data Presentation

   Data presentation is the stage where the data is presented in the form of important notes that are organized and arranged in a relationship pattern regarding the information and data obtained so that it is easy to understand to plan the next steps which are usually in the form of brief descriptions, *flowcharts*, relationships between categories, charts, and others of the same kind. This research presents data in the form of narratives from test results and interviews. The research subject code was taken

based on the test results of the subject's creative thinking levels from high, medium, and low. Researchers applied technical tringulation, namely taking data from the same source using different collection techniques (Hardani et al., 2022).

4. Inference

Drawing conclusions aims to conclude the results of the reduction and presentation of previously analyzed data and can answer the formulation of the problems that have been submitted (Yusuf, 2013). Conclusions are drawn by comparing the results of student work with the results of student interviews, to assess how well students' creative thinking skills are.

RESULT AND DISCUSSION

The results of the analysis of students' creative thinking skills in solving story problems on the material of solid figure for the 3 selected subjects are as follows.

1. Subjects with High Level Creative Thinking Ability (S-KT)

The following is the answer sheet from subject S-KT

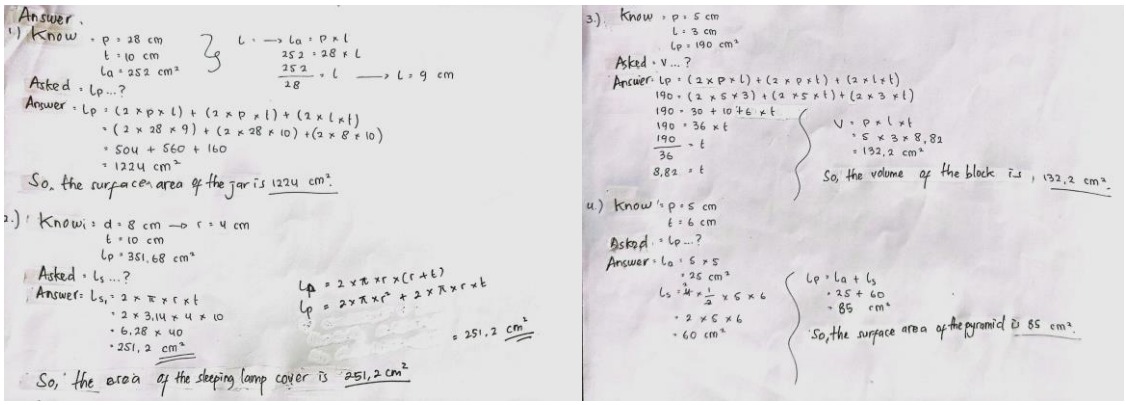

Figure 2. S-KT Answer Sheet

a) Problem Number 1

This question indicates that subject S-KT can understand the information in the problem, determine the strategy, write down the steps in detail, and answer in his own way correctly. Below are the results of interviewing subject S-KT:

P : Explain what is known and what is asked?

S-KT : You are given a length of 28 cm and a height of 10 cm and the area of the base of the jar is 252. cm^2. What is asked is the surface area.

P : Briefly explain the steps to solve the problem.

S-KT : Find the width first using the base area formula. After obtaining the width, then we can calculate the surface area.

Q : Is there any other way to solve this problem?

S-KT : There is no kak.

The interview results showed that the subject S-KT could explain the information in the problem and the subject explained that to get the correct answer, he had to find the width value first and then the known values were substituted into the surface area formula.

b) Problem Number 2

This question indicates that subject S-KT can understand the information in the problem, determine the strategy, write down the steps in detail, and answer using various methods correctly. Below are the results of interviewing subject S-KT:

P : Explain what is known and what is asked?

S-KT : The diameter is 8 cm, the height is 10 cm, and the surface area of the lamp is 351.68. cm^2*. What is asked is the area of the bed lamp cover.*

P : Briefly explain the steps to solve the problem.

S-KT : Because phi, r, and t are known, we can substitute them into the formula for the area of the tube blanket with r=4 cm because it is half of the diameter.

Q : Is there any other way to solve this problem?

S-KT : There is using the surface area of the tube. Because the surface area of the tube is known and 2 x phi x r x t is the blanket area formula, the surface area minus (2 x phi x r x r) results in 251.2. cm^2.

The interview results showed that the subject S-KT could explain the information in the problem and the subject explained that the subject was able to work on the problem using other methods that were rarely used such as finding the blanket area from the tube surface area formula.

c) Problem Number 3

This question indicates that subject S-KT can understand the information in the problem, determine the strategy, write down the steps in detail, and answer in his own way but the results are less precise. Below are the results of interviewing subject S-KT:

P : Explain what is known and what is asked?

S-KT : We know the length is 5 cm, the width is 3 cm, and the surface area of the perfume is 190. cm^2*. What is asked is the volume.*

P : Briefly explain the steps to solve the problem.

S-KT : Looking for the height of the perfume from the surface area, but I was confused in the 30 + 10 + 6t part so I just wrote 36t, so the height is 8.82 cm. After that, I went straight to the beam volume formula and the result was 132.2 cm. cm^2.

P : Is there any other way to solve this problem?

S-KT : I don't think so.

The interview results showed that the subject S-KT could explain the information in the problem and the subject explained that the subject looked for height first through the surface area, then entered the beam volume formula, but because there was an error in the calculation, the results obtained were not correct.

d) Problem Number 4

This question indicates that subject S-KT can understand the question information, determine the right strategy, write down the steps in detail, and answer using his own method correctly. Below are the results of interviewing subject S-KT:

P : Explain what is known and what is asked?

S-KT : The length of the base side of the square is 5 cm and the height of the triangle on the upright side of the cake is 6 cm. What is asked is the surface area.

P : Briefly explain the steps to solve the problem.

S-KT : Calculate the area of the base of the pyramid side x side because it is square and then calculate the area of the pyramid's blanket with the formula $\frac{1}{2}$ *x a x t. So that the surface area of the pyramid is the area of the base + the area of the blanket the result is 85* cm^2.

Q : Is there any other way to solve this problem?

S-KT : I don't know.

The results of the interview showed that the subject S-KT could explain the information in the problem and the subject explained that the base area of the building was square so that the base area was side x side and the blanket area was 4 x the area of the upright side so that the answer obtained was correct.

2. Subjects with Medium Level Creative Thinking Ability (S-KS)
   The following is the answer sheet from subject S-KS

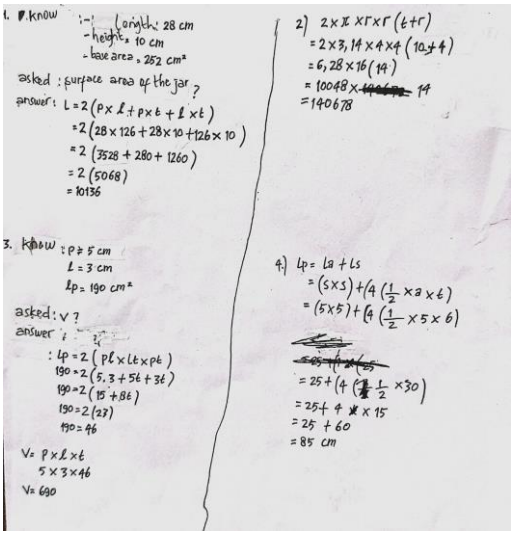

Figure 3. S-KS Answer Sheet

a) Problem Number 1

This question indicates that subject S-KS is able to understand the problem information, determine the strategy and write down the steps used and provide answers in his own way but less precise. Below are the results of interviewing subject S-KS:

P : Explain what is known and asked?

S-KS : You know the length is 28 cm, the height is 10 cm and the area of the base of the jar is 252. cm^2. What is asked is the surface area of the jar.

P : Briefly explain the steps to solve the problem.

S-KS :Directly enter the formula 2(p x l + p x t + l x t). So 28 times 126 then plus 28 times 10 plus 126 times 10 the result is 10136 kak.

Q : What is the width of 126?

S-KS : From the area of the base, it is 252 and then I divided it by 2 to 162.

Q : Is there any other way to solve this problem?

S-KS : There is no kak.

The results of the interview showed that the subject S-KS could explain the information in the problem and the subject explained that to find the width of the base area of 252 which was divided by 2 so that the width was *126.* cm^2 so that the subject made a mistake in the calculation and the results obtained were not correct.

b) Problem Number 2

This problem indicates that the subject S-KS is able to understand the problem information, but the subject is less precise in determining the strategy and

choosing the formula used so that the subject's answer is less precise. Below are the results of interviewing subject S-KS:

P : Explain what is known and what is asked?

S-KS : The diameter of the circle is 8 cm, the height is 10 cm, and the surface area of the lamp is 351.68. cm^2. What is asked is the area of the blanket.

P : Briefly explain the steps to solve the problem.

S-KS : Directly substituted into the formula which is 2 x π x r x r x (t + r) and the result is 140678 kak. The radius is 4 because it is half of the diameter.

Q : Is there any other way to solve this problem?

S-KS : I don't know.

The interview results showed that the subject S-KS could explain the information in the problem and the subject explained that the formula for the area of the tube blanket was *2 x π x r x r x (t + r)* with r = 4 cm. The subject made a mistake in using the formula to solve the problem so that the answer was not correct.

c) Problem Number 3

This question indicates that subject S-KS was able to understand the problem, determine the right strategy, write down the steps in detail, and answer using his own method but less precise. Below are the results of interviewing subject S-KS:

P : Explain what is known and what is asked?

S-KS : You know the length is 5 cm, the width is 3 cm, and the surface area is 190. cm^2. What is asked is the volume.

P : Briefly explain the steps to solve the problem.

S-KS : Finding the height first from the surface area. After that, substitute it into the beam volume formula which is 5 x 3 x 46, the result is 690.

Q : Where do you get 46 as the height?

S-KS : I'm also a bit confused kak, I got it from 2 times 23.

Q : Is there any other way to solve this problem?

S-KS : None

The results of the interview showed that the subject S-KS could explain the information in the problem and the subject explained that he had to find the height first from the surface area and obtained a height of 46 cm because 2 times 23 as

written on the answer sheet. It can be seen that the subject made a mistake when calculating so that the answer was not correct.

3. Subjects with Low Level Creative Thinking Ability (S-KR)

The following is the answer sheet of subject S-KR

English Version

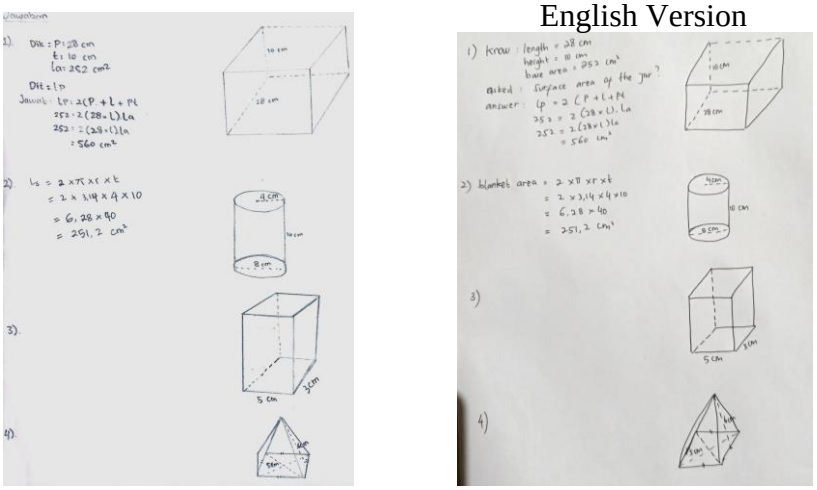

Figure 4. S-KR Answer Sheet

a) Problem Number 1

This problem indicates that subject S-KR is able to explain the problem information, but the subject cannot solve the problem. Below are the results of interviewing subject S-KR:

P : Explain what is known and what is asked?

S-KR : We know the length is 28 cm, the height is 10 cm and the area of the base of the jar is 252. cm^2. What is asked is the surface area of the jar.

P : Briefly explain the steps to solve the problem.

S-KR : Surface area = 2 x (p + l + p x t), with surface area 252=2x(28+l)La, the result is 560. cm^2.

P : Is that the formula for the surface area of a block and is there any other way?

S-KR : I don't know.

The results of the interview showed that the subject S-KR could explain the information in the problem and the subject explained that the subject could not describe the answer correctly and did not understand the concept of using the formula from the problem.

b) Problem Number 2

This question indicates that subject S-KR was able to explain the problem information, determine the strategy and concept of selecting the right formula but

was unable to provide answers in other ways. Below are the results of interviewing subject S-KR:

P : Explain what is known and what is asked?

S-KR : Given a diameter of 8 cm, a height of 10 cm, and a lamp surface area of 351.68 cm^2. What is asked is the area of the bed lamp cover.

P : Briefly explain the steps to solve the problem.

S-KR : Yes, substitute what is known into the blanket area formula which is 2 x 3.14 x 4 x 10. So, the result is 251.2. cm^2.

Q : Is there any other way to solve this problem?

S-KR : I don't know.

The interview results showed that the subject S-KR could explain the information in the problem and the subject explained that the subject was able to find the radius of the tube correctly.

c) Problem Number 3

This problem indicates that subject S-KR could not write down the information in the problem and did not solve the problem at all. Below are the results of interviewing subject S-KR:

P : Explain what is known and what is asked?

S-KR : The length is 5 cm, the width is 3 cm, and the surface area is 190. cm^2. What is asked is the volume of the perfume.

Q : How did you solve this problem?

S-KR : I don't know, I don't know how to do it and I forgot the formula.

The interview results showed that the subject S-KR could explain the information in the problem but could not write it on the answer sheet and the subject explained that the subject could not solve the problem.

d) Problem Number 4

This problem indicates that subject S-KR could not write down the information in the problem and did not work at all. Below are the results of interviewing subject S-KR:

P : Explain what is known and what is asked?

S-KR : The length of the base side is 5 cm and the height of the triangle on the upright side is 6 cm. What is asked is the surface area of the cake.

Q : How did you solve this problem?

S-KR : I don't know, I don't know how to do it either.

The interview results showed that the subject S-KR could explain the information in the problem but could not write it on the answer sheet and the subject explained that the subject could not solve the problem.

The results of the tests and interviews indicated that the subjects' creative thinking abilities were different and classified as low. Students with a high level of creative thinking can achieve *fluency*, *originality*, and *elaboration* indicators very well. As for the *flexibility* indicator, the subject is still classified as good. This is in line with research (Damayanti & Sumardi, 2018) which revealed that students with a high level of creative thinking can achieve indicators very well. Students whose level of creative thinking is moderate can achieve *fluency* and *originality* indicators well while for *flexibility* and *elaboration* indicators are still not good. This is in line with the research of Firdaus et al. (2018) who said, of the four indicators, the *fluency indicator* is the ability most achieved by students while the *flexibility* indicator cannot be achieved by students. Students whose level of creative thinking is low cannot achieve all indicators. The low level of creative thinking ability is caused by students who lack practice problems in the form of story problems so that they are not accustomed to it, in line with the research of Pratiwi et al. (2021) who revealed that students in the low category were less able to apply the information obtained from the problem, making it difficult for the solution steps to be followed and resulting in students not being able to express their mathematical ideas and students lacking detail and detail in writing answers.

Nasiruudin et al. (2019) stated that the factors that cause students to lack creative thinking are due to lack of participation in the classroom, educators teach too fast, the classroom atmosphere is not conducive, do not like math and do not want to ask. How to hone students' creative thinking skills is to familiarize students to solve various problems that involve creative thinking indicators (Putra et al., 2018) therefore, teacher involvement is very important. As a facilitator, teachers can change learning models that are more interesting, provide diverse and open problem exercises, and pay attention to students who are less active in thinking creatively (Maryani et al., 2019).

Students' creative thinking skills when working on story problems are low and must be developed or improved again. Based on the results of the study, there were 37% low-level students, 33% medium-level students, and 30% high-level students. The low level of creative thinking ability of junior high school students is in line with the research of Andiyani et al. (2022) which states that in the material of solid figure, the mathematical creative thinking ability of junior high school students is very low, seen from the average

percentage of 51%. The highest presentation is in the *flexibility* indicator, 56% *fluency* indicator, 50% *elaboration* indicator and *originality* indicator of 50% and 12.5% as the lowest indicator because students cannot give the right answer. Nopitasari (2017), stated that 84.61% of student respondents with a moderate level of mathematical creative thinking, 12.82% in the very low category and 2.56% in the uncreative category. In this study, researchers used one of the previous studies with the same theory but different research subjects. In previous studies, the results were different from this study where the percentage results obtained were still quite high compared to this study, the percentage results obtained were quite low due to the lack of optimal student work in solving test questions.

CONCLUSION

Based on the results of the study, it is concluded that high criteria students can master all indicators while medium and low criteria students have not been able to master all indicators of creative thinking ability. Students whose level of creative thinking is high can achieve *fluency*, *originality*, and *elaboration* indicators very well. While for the *flexibility* indicator the subject is still classified as good. Students whose level of creative thinking ability is moderate can achieve *fluency* and *originality* indicators well while for *flexibility* and *elaboration* indicators are still not good. Students whose level of creative thinking ability is low cannot achieve all indicators of creative thinking.

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