The Effectiveness of Creative Problem Solving Through Concrete Media Towards Creative Thinking Skill of the Fourth Grade Students at SDN 1 Kaliombo

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ABSTRACT

The process of learning mathematics only focuses on understanding students but have not been able to develop their creative way of thinking. Students do not have the opportunity to explore answers or ways that are different from what the teacher teaches, so students cannot be creative in finding answers. The application of the creative problem solving learning model and concrete media in the form of nets of cubes and blocks is one solution to this problem. The purpose of this research is to find out: the difference in the average value of creative thinking skills after using the creative problem solving model and concrete media for fourth-grade students at SDN 1 Kaliombo. The experimental approach used in this research is the Pre-Experimental Design model in the form of a Pretest-Posttest Group Design. This study used fourth-grade students at SDN 1 Kaliombo as subjects, taking samples using total sampling or census. The research data was obtained from a statistical analysis of the t-test in the form of a Paired Sample t-Test. This study shows that: there is a difference in the average value before and after using the creative problem solving model and concrete media with a significance of 0.000 < 0.025. Therefore, the CPS model assisted by concrete media can be said to have an effect on students' creative thinking abilities.

Kata Kunci: Creative Problem Solving, Creative Thinking Ability, Concrete Media, Math

ABSTRAK

Proses pembelajaran matematika hanya menitik beratkan pada pemahaman siswa, namun belum mampu mengembangkan cara berpikir kreatifnya. Siswa tidak memiliki kesempatan untuk mengeksplorasi jawaban atau cara yang berbeda dengan yang diajarkan guru, sehingga siswa tidak dapat kreatif dalam menemukan jawaban. Penerapan model pembelajaran Creative Problem Solving dan media konkret berupa jaring-jaring kubus dan balok merupakan salah satu solusi dari permasalahan tersebut. Tujuan penelitian ini untuk mengetahui: perbedaan nilai rata-rata kemampuan berpikir kreatif setelah menggunakan model Creative Problem Solving dan media konkret untuk siswa kelas IV SDN 1 Kaliombo. Pendekatan eksperimen yang digunakan dalam penelitian ini adalah model Pre-Experimental Design berupa desain Pretest-Posttest Group Design. Penelitian ini menggunakan siswa kelas IV SDN 1 Kaliombo sebagai subjek, pengambilan sampel menggunakan total sampling atau sensus. Data penelitian diperoleh dari analisis statistik uji-t berupa Paired Sample t-Test. Penelitian ini memperlihatkan bahwa: terdapat perbedaan nilai rata-rata sebelum dan sesudah menggunakan model Creative Problem Solving dan media konkret dengan signifikansi 0,000 < 0,025. Oleh karena itu, model CPS berbantuan media konkret dapat dikatakan berpengaruh terhadap kemampuan berpikir kreatif siswa.

Keywords: Creative Problem Solving, Kemampuan Berpikir Kreatif, Media Konkret, Matematika

Introduction

The development of education and technology requires a person to have systematic, critical and creative thinking skills. Therefore, students need to think creatively at the elementary school level. In elementary school, it is important to have the ability to think creatively to find solutions to problem solving. Students need to have more advanced creative thinking skills in order to allow them to find solution in learning mathematics (Muktiari & Dewi, 2021). Mathematics is a basic science that underlies all other sciences. Mathematics plays an important role in many fields of study and helps creating the human mind working (Khoeriyah & Ahmad, 2020). Mathematics is one of the subject matter which is used as the foundation of science. As a result,
students must be able to master the material covered in mathematics lessons. Mathematics is part of national-based school assessment, so it is very important for schools to teach this content. Mathematics is a learning content that is always used in daily life. Mathematics is very closely related to life (Yulianti, 2019). The content of mathematics lessons focuses more on formulas that make children bored, their level of understanding is low and they tend to forget things easily. Students have not been able to develop their way of thinking when solving math problems; instead they are still concentrated on the method of completion given by the teacher (Pujiati et al., 2018). The ability to think creatively of students is less developed; this is because the teacher still uses monotonous learning method and has not used various learning models and media (Kasmantoro et al., 2022). The results of observations on fourth grade students at SDN 1 Kaliombo showed that the students were still unable to answer questions in their own language and often copied their friends. They cannot produce mathematics project not be able to solve problems. Therefore, creative thinking is needed so that students can solve problems in various ways.

Students who have an attitude would be sensitive or aware of problems and understanding gaps that have not been studied, take knowledge obtained from memory or external sources, define difficulties or identify missing elements, make alternative hypotheses, solve problems, and finally report results (Putraniti et al., 2021). Creative thinking is the ability to create or build something that is actual and different from the views of most people (Marliani, 2015). This type of thinking involves unique skills and results. Creative thinking is a style of cognition that produces fresh perceptions, methods, viewpoints or methods of understanding.

Advances in psychology and the physical sciences depend on mathematics as a tool of scientific thought. Mathematics is the content of lessons that are decisive in the field of education (Tanjug, 2018). The main foundation for the importance of mathematics is the ability of students to think logically, clearly, systematically, and creatively, as well as having personality and the ability to solve everyday problems. However, most people are lazy to learn mathematics because they think that learning mathematics is just formulas and difficult calculations (Septian & Rizkiandi, 2017). Some students are less interested in learning mathematics, students think that mathematics is just a collection of formulas and only use numbers to solve problems, students are also less creative in developing answers and have not been able to create solutions (Riswari & Ermawati, 2020).

One of the lesson contents that is difficult for students to understand during the learning process is mathematics (Khurriyati et al., 2022). Mathematics in general is knowledge that is abstract in nature, so that many students view mathematics as a difficult subject matter. Therefore, to make the material be easier to understand and the learning objectives can be achieved, the teacher must be able to provide knowledge using several models. The use of learning models makes students more active and happier, because the teacher does not only give lectures but involves them in the learning process. In addition, the provision of this learning model gives students real practical knowledge to exchange ideas and participate. Explained how teachers can grow students by determining the right learning model (Septian et al., 2019). Learning model is an overall conceptual framework connected with methods built from theory to produce learning experiences and achieve learning goals (Yusnita, 2018).

One of the learning models that can be applied to the content in mathematics is creative problem solving. The creative problem-solving learning model is a teaching strategy that teaches students to work in groups to solve problems, so they can discuss how much each student has
learned (Sulaeman et al., 2021). The stages of the learning process use the creative problem-solving learning model according to (Lestari & Yudhanegara, 2015) as Table 1.

Table 1. Syntax Creative Problem-Solving Learning Model

<table>
<thead>
<tr>
<th>Number</th>
<th>Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Students are divided into several different groups.</td>
</tr>
<tr>
<td>2.</td>
<td>Learning process begins with giving problems based on the material through question and answer.</td>
</tr>
<tr>
<td>3.</td>
<td>Students and groups determine existing problems from group worksheets.</td>
</tr>
<tr>
<td>4.</td>
<td>Students and groups identify ideas that can be proposed as solutions.</td>
</tr>
<tr>
<td>5.</td>
<td>Students deliver presentations represented by one of the group members.</td>
</tr>
<tr>
<td>6.</td>
<td>Students in groups discuss to summarize the material that has been obtained.</td>
</tr>
</tbody>
</table>

Creative thinking is the ability of students to draw conclusions about mathematical problems in non-routine steps (Andiyana et al., 2018). Through creative thinking, students can do different things to solve mathematical concepts from different perspectives. Creative thinking requires persistence, self-discipline, and mindfulness, including mental activities such as: 1) asking questions; 2) considering new information and unusual ideas with an open mind; 3) making connections especially between different things; 4) connecting things independently; 5) using imagination to come up with something new and different in every situation; and 6) listening to intuition (Ananda, 2019). From this explanation, support is needed so that students can think creatively. In addition to the use of learning models, the content of mathematics lessons which are considered abstract can be solved by using learning media. Learning media must be used as a learning model to assist teachers in presenting material (Wardana et al., 2023). For this reason, teachers must realize that proper learning for students requires media that is appropriate to the material (Kironorat, 2020). In accordance with the opinion of (Kusno & Kusuma, 2018) learning mathematics that is abstract requires media to demonstrate the material, especially mathematical material that is abstract and requires demonstration. Learning media that can be used to explain abstract material is concrete media. Concrete media is one of the real media that is easy to find and create. Using concrete media is able to provide direct experience to students (Narayani, 2019). The use of concrete media is used to arouse students’ interest in completing mathematics learning assignments. Expressed an opinion about the use of concrete media. During learning activities at school, students will get a process that changes students based on the knowledge gained from the learning process (Prananda et al., 2021). Students will be more involved and have a deeper understanding of the material by using concrete media, which will increase student understanding. Concrete media in this study uses cube and block nets. According to preliminary research data from (Apriliyana et al., 2023) it is known that students' abilities in learning mathematics are still low in the material of cubes and blocks.

The nets are the points of intersection of several plane shapes that are connected to each other, thus forming a certain geometric shape. Meanwhile, cube nets are combinations of flat shapes which, when combined or folded with adjacent lines, form cubes. The cube space has eleven forms of nets (Yuliawati, 2017). The cube net consists of six different square shapes. However, not everything with six squares is a net made up of cubes and blocks. The number of blocks and cubes is based on the slice pattern (Yuliani et al., 2018). Classifies the nets into four patterns, namely 1-4-1, 2-3-1, 2-2-2, and 3-3, namely as follows (Shadiq, 2014).
According to (Heruman, 2010: 116) in his book entitled "Mathematics Learning Models in Elementary Schools", the form of nets for geometric blocks is as Figure 2.

The objective of conducting research is to find out whether there is a significant difference in Pretest and Posttest scores after using the creative problem-solving learning model through concrete media of cube nets and blocks of class IV students at SDN 1 Kaliombo towards creative thinking skills. The use of the creative problem-solving model on the material of nets of cubes and blocks is expected to give these students the ability to think creatively to produce their own work.
Research Methods
This research was conducted at SDN 1 Kaliombo, Jepara Regency, which is located at Kaliombo, Pecangan, Jepara. This research method used the quantitative Pre-Experimental Design method with the One-Group-Pretest-Posttest design (Sugiyono, 2020: 112). The population of this study was the fourth grade students at SDN 1 Kaliombo, with the consideration that the school is located in a rural area. The sample of this study was the students of class IV with a total of 18 students. This study used total sampling or census sampling technique, which is used when the population is less than 100 (Sugiyono, 2020: 134). The instruments used in this study are in the form of tests and non-tests. The test consisted of questions containing indicators of students' mathematical creative thinking, while the non-test is in the form of documentation. A type of written test used in this study used a description test to measure students' mathematical creative thinking abilities. This test was given twice, the first was given before the treatment (Pretest) and after the treatment was given (Posttest). The test instrument consisted of eight description questions that were in accordance with indicators of students' mathematical creative thinking abilities, namely fluency, flexibility, originality, and elaboration as Table 2.

<table>
<thead>
<tr>
<th>Aspects of Creative Thinking</th>
<th>Indicator</th>
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<tbody>
<tr>
<td>1. Fluency</td>
<td>students are able to solve the problems related to learning mathematics by providing answers to many ideas</td>
</tr>
<tr>
<td>2. Flexibility</td>
<td>Students are able to solve the mathematical problems in various ways.</td>
</tr>
<tr>
<td>3. Originality</td>
<td>Students are able to find solutions in solving mathematical problems in their own way.</td>
</tr>
<tr>
<td>4. Elaboration</td>
<td>Students are able to describe mathematics learning material in detail</td>
</tr>
</tbody>
</table>

Before data processing, the data analysis technique used was data normality. This study used a normality test in the form of the Shapiro-Wilk test. The normality test used the Shapiro-Wilk test when the number of samples used was <50 (Hartono, 2013). To test the difference in the average value of the ability to think creatively used the t-test. The t-test analysis used was the Paired Sample t-Test. Paired Sample t-Test data analysis was used to compare the average value of two variables in one group against two paired samples. The research process was divided into three stages, including: a) research preparation stage, which includes writing research proposals, observing and requesting research permits, developing instruments, and testing instruments; b) the implementation stage of the research which includes giving the Pretest, implementing the learning according to the learning plan, and giving the Posttest; and c) data processing stage.

Result and Discussion
From the results of observations made at SDN 1 Kaliombo, it appears that students have not been able to think or solve problems on their own. However, students are passive when the learning process takes place. In FAW's opinion as a grade IV teacher, students have not been able to exchange opinions in groups and have not been able to produce works in mathematics content. From there, the researcher had an idea in the form of a solution using the CPS model and concrete media in a lesson. From there, the center of learning is no longer the teacher but the students. Each group of students is given a net of cubes and blocks and given a problem to be solved by exchanging ideas and using the media. and at the last meeting, students were
required to be able to make nets of cubes and blocks with the help of group mates, as well as directions from the teacher.

Analysis of the Paired Sample t-test was carried out to find out the difference of the average score of the creative thinking skill test between the pretest and posttest using CPS model assisted by concrete media. It tested the percentage of students' Pretest and Posttest results according to Learning Objective Completeness Criteria Scores (LOCCS) in the school.

Table 3. Results of Analysis of Achievement Value of Students' Mathematical Creative Thinking Skill

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of students</th>
<th>Score of LOCCS</th>
<th>Number of students who achieve LOCCS</th>
<th>Percentage</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>18</td>
<td>74</td>
<td>0</td>
<td>0%</td>
<td>Very low</td>
</tr>
<tr>
<td>Posttest</td>
<td>18</td>
<td>74</td>
<td>16</td>
<td>88.89%</td>
<td>Very high</td>
</tr>
</tbody>
</table>

Based on the data of the Pretest and Posttest scores before and after using the creative problem-solving learning model towards concrete media produced an improving score during Posttest. It can be seen that during the Pretest there were no students who were able to achieve the LOCCS score out of Table 3, whereas during the Posttest there were 16 students or 88.89% of students who were able to get scores above the LOCCS out of 18 students. Only 15 of 27 students got LOCCS if it compared with the test results last year on the material for nets of cubes and blocks. The Posttest score was in a very high category after using the creative problem-solving learning model towards concrete media on students' creative thinking abilities.

The implementation of material of cube nets which contain related sides, edges, angles, parallel and perpendicular sides, parallel and perpendicular edges, and make cube nets and beams, showed that the students were very enthusiastic in the teaching learning process, moreover students could directly use concrete media in the form of pulled nets. The results study obtained
the data on students' creative thinking skills. The data was the score of Pretest and Posttest (Figure 3). The first step was analyzing the ability to think creatively before giving treatment in the form of using the creative problem-solving learning model in learning mathematics through concrete media in the form of nets of cubes and blocks.

After obtaining the results of statistical tests on the initial ability to think creatively, then the treatment was carried out in the form of using the creative problem solving learning model through concrete media on the material of cubes nets cubes and blocks. After giving the treatment, the posttest was carried out again to see the difference of the average value of students' creative thinking abilities. It showed that the increasing of posttest scores is quite higher compared to the pretest results carried out by students. That was because the students got treatment using CPS model and concrete media that are in accordance with the material delivered by the teacher.

In order to see the gain score of Pretest and Posttest creative thinking skills, it can be seen in the t-test Table 4.

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest - Posttest</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The use of the creative problem-solving learning model through concrete media got the difference in the average score of students' creative thinking skills. It can be seen in the t-test results. Before conducting t-test, it determined whether the two groups' scores were normally distributed or not. The Shapiro-Wilk was used as a normality test because it can be applied to samples < 50 (Hartono, 2013). The results obtained from the normality test were 0.85 (Pretest) and 0.40 (Posttest) which means more than 0.05 or normally distributed.

The results of paired sample t-test of the creative thinking skill score on table 3 showed the results of Sig. (2-tailed) or probability 0.000, because the probabilities for two sides, then sig. (2 – tailed) that was 0.000 <0.025 so that Ho was rejected and Ha was accepted (Santoso, 2022). Thus it can be said that the student scores after giving treatment using creative problem solving learning model through concrete media were better than student scores before getting treatment. The first meeting of group 1 consisted of MIY, LH, FRFA, and MFS groups were still unable to answer the characteristics of cubic and rectangular geometric shapes. Furthermore, there was an increasing in the second meeting where the students were able to mention the characteristics of cubes and blocks, although they still could not answer questions related to parallel and perpendicular ribs. In the third meeting, the students were able to understand all the material for building cubes and blocks, starting from the characteristics, drawing nets, mentioning perpendicular and parallel sides, and mentioning the ribs that were perpendicular and parallel to each other. In the fourth meetings, students can also make nets of cubes and blocks using buffalo paper, wool yarn, and double tips. Teachers used concrete media as an alternative to help students understand thing abstracy. The cubes nets and blocks can be used as hands-on practice tools for children. Students could learn about sides, edges, angles, parallel and perpendicular sides, and parallel and perpendicular edges from concrete media. The use of concrete media can help children learn (Prananda et al., 2021) and (Putranti et al., 2021).
Giving treatment using creative problem-solving learning model through concrete media was able to support students more quickly in understanding the material and in generating the ability to think creatively. During the teaching learning process through groups discussion, the students were able to solve problems given by the teacher using group questions by discussing and exchanging ideas.

This was influenced by the steps taken of the students to identify objects, facts, problems, ideas, solutions, and acceptance so that they became very creative who can solve problems and answer questions more easily. This was proven, when students were assigned by the teacher to make several nets of cubes and blocks, they were able to create as the directions from the teacher and also discuss with group members.

**Conclusion**

Based on the research findings, the students' scores of before giving treatment (Pretest) were low, after giving treatment (Post-test) using the creative problem-solving learning model through concrete media in the form of nets of cubes and blocks has increased and reached indicators of creative thinking ability. It showed that creative problem-solving model can help students to improve their mathematical creativity. There was a much better average score between Pretest and Post-test. Creative problem-solving learning model through concrete media was effective in increasing students' mathematical creativity skills.

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**References**


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