

ENHANCING STUDENTS PROBLEM SOLVING ABILITY IN CUBE AND BEAM TOPIC USING PROBLEM POSING POST SOLUTION (STUDY IN ONE OF JUNIOR HIGH SCHOOL IN WEST NUSA TENGGARA)

Ni Made Intan Kertiyani

Department of Mathematics Education, Universitas Pendidikan Indonesia, Indonesia

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ABSTRACT

The purpose of this study was to enhance student problem-solving ability in a cube and beam topic through the application of the problem posing post solution. There were 26 students in one junior high in West Nusa Tenggara as the subject of this research. This research was action class research conducted in two cycles. In every cycle, there were five phases such as planning, doing, observing, evaluating, and reflection. The data were collecting, using problem -solving test at the end of every cycle. The result of this research shown that there was increasing on student problem -solving ability from the first cycle to the second cycle. From the result, we can conclude that problem posing post solution, enhance student problem-solving ability in a cube and beam topic.

KEYWORDS: *Classroom Action Research, Cube and Beam, Junior High School Research, Post Solution, Problem Solving*

INTRODUCTION

Problem-solving is an ability that becomes one of the main goals in studying mathematics and considered to be the essence of mathematics [1]. This ability can be done with various activities in the classroom, such as solving a word problem or solving a non-routine problem [2], [3]. However, the problem is relative because the problem for a student may not become a problem for other students [4]. A student can consider the problem as the routine problem, but another student can also consider the problem as the new thing.

Although problem-solving ability is very important, there are many students who have difficulty developing this ability. According to student score in mathematics final odd semester test, the average score of class 8th B in one of junior high school in West Nusa Tenggara was 43, 96 out of 100. It was below the standard minimum score which is set by the school. That is 70/100. From the analysis of student answer, the student whose answer correctly in word problem was below 50% of all students in class 8th B. It can be concluded that students still have difficulties in solving the word problem.

Problem posing has three categories. These are problem posing pre-solution, within-solution and post-solution. The problem posing post solution is the activity when the student poses a problem which modified from the previous problem that have been solved [5]. The student can modify the aim or the information given in the previous problem to make a new problem. As an example, the previous problem is calculating the area of rectangle with length 4 cm and width

2 cm. The new problems which student can be made are a) calculate the area of the rectangle if its width is 3cm!, b) if the length and the width of the new rectangle is twice the previous length and width, is the area of the new rectangle twice the area of the previous rectangle too?

There are several previous studies that supports the problem posing to enhance problem solving ability. Investigation about the relation between problem posing and problem-solving ability of prospective elementary mathematics teacher found that there is a positive relation between problem posing and problem-solving ability [6]. Another study found the one of large positive effect sizes that problem posing activities provide is for problem-solving ability [7]. In addition, posing complex problems requiring multiplicative thinking prompts students to use sophisticated strategies and build mathematical connections [8]. Furthermore, specifically in geometry topic, the application problem posing combined with realistic mathematics education approach help student to understand concepts and solve the problems easily [9].

Although there are several research on the relation between problem posing and problem-solving, but there is a few research that using a specific type of problem posing. So that, this research aimed to enhance student problem solving ability through the application of the problem posing post solution.

METHODOLOGY

Subject of Research

Class 8th B in one of junior high school in West Nusa Tenggara became the subject of this research because this class has the difficulties in solving a word problem. There are 26 students in class 8th B consist of 19 women and 7 males.

Research Design

This research intended to enhance student problem-solving ability in class 8th B through the application of the problem posing post solution. It examined classroom learning issues and took planned action as an effort to improve classroom learning practice, thus this research was a classroom action research [10].

The subject matter used in this study was the cubes and beams. It consisted of two sub-sections. Therefore, this study consists of two cycles. Each cycle contained five phases: planning, doing, observing, evaluating, and reflecting. In the first phase, planning, the researcher decided the learning's model which will be used in the class and made lesson plan about problem posing post solution as the learning model which will be used in class. In doing and observing phases, the student learns using problem to pose post solution. The steps of this learning model are a) in group, student were given worksheet which consists of the concept of the material and exercise, b) each group made a problem similar to the problem in the worksheet and its solution, c) another group corrected another group work (question and its solution), d) several groups presented and discussed the correction result with all the groups. In evaluating phase, the researcher gave a students the problem-solving test. Then, in reflecting phase, the researcher reflected the learning in the first cycle through the results of observation and problem-solving test and apply the results of reflection on the second cycle.

The data which were collected in this research was the data of student problem-solving ability through the problem-solving test at the end of each cycle. The success indicator of this research is student problem-solving student increase, thus the average score of student problem solving ability more than 70/100 and classical completeness up to 85%.

RESULTS AND DISCUSSIONS

Problem Solving Ability in First Cycle

The result of student problem solving ability in first cycle shown in the table below.

Table 1: The Result of Student Problem Solving Ability in First Cycle

The number of student taking the test	26
Maximal score	93/100
Minimal score	52/100
The average score	82/100
The number of student whose score above the standard score	20
The number of student whose score below the standard score	6
The percentage of classical completeness	77%

According to table 1, the average score of student problem solving was 82/100 and percentage of classical completeness still below the success indicator, 85%. It means that the research had not reached the success. Various reflections were needed to make the learning in cycle 2 less successful.

Reflecting of Learning in First Cycle

In the first cycle, the student learns using problem posing post solution. In this cycle, the student made the question similar to the question given on the worksheet. There were various question on worksheet, thus the students could choose which question they want to modify. After that, the question and solution were corrected by another group. Since the question corrected by another group was not the same question which they modified before, it caused the students needed more time to do the correction. The students needed to understand the previous question and the modified question first, then studied the solution so they able to made the correction. This lack of time caused student could not make the correction as well The solution of this problem was a limited number of questions which would be modified so that the student can focus on some question to modify.

In the case of answering the modified problem, several groups could not write the answer systematically. Some groups did not write not writing the known and asked questions and the conclusion of the answer. In addition, the several groups did not the solution step by step so that it became unclear solution. The cause of this problem was the students were still not accustomed to systematically writing solutions. The solution of this problem was the teacher would spend more time to explain the step of writing the solution and emphasized the student to make the solution clearer so that another group who corrected the step to answer the problem would understand it without asking the group who made the solution's step.

Problem Solving Ability in Second Cycle

The result of student problem solving ability in first cycle shown in the table below.

Table 2: The Result of Student Problem Solving Ability in Second Cycle

The number of students taking the test	26
Maximal score	100/100
Minimal score	69/100
The average score	91/100
The number of student whose score above the standard score	25
The number of student whose score below the standard score	1
The percentage of classical completeness	96%

According to table 1, the average score of student problem solving was 91/100 and percentage of classical completeness was above the success indicator, 85%. It means that the research on cycle 2 was successful.

DISCUSSIONS

In the first cycle, classical completeness still below the indicator standard. It may be caused by the way student wrote the answer. On the reflection of learning on the first cycle, there were problem that some student could not write the answer systematically. They tended to not wrote the know and asked questions. This made the first step of problem solving by Polya, understanding the problem, was not done well. Thus, the next step of problem solving will not done properly [11]. Therefore, in the second cycle, the teacher spends more time to explain the step in answering the problem because writing down what is known and asked becomes important in the problem solving steps.

After applying the reflection's result of learning on first cycle, the student of class 8th B was able to increase problem solving ability through the application of the problem posing post solution. When making the problem, the students have to understand the problem [12]. So that, the first step of solving problem by Polya, understand the problem can be done correctly [11]. This make the next step of problem solving will be done easily.

CONCLUSIONS

The learning using problem posing post solution in class 8th B in one of junior high school in West Nusa Tenggara shown that there was increasing in a student's average score of problem solving test from the first cycle to the second cycle. In the second cycle, the average score of student was above the standard score. In addition, the classical completeness also increase, which above 85%. Thus, according to success indicator, this research can be categorized as successful. Therefore, it can be concluded that problem solving ability in a cube and beam topic could enhanced by using problem posing post solution.

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