

Application of Problem Posing Learning Model to Improve Student Problem Solving on Opportunity Materials

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Abstract

The purpose of this study was to improve students' problem-solving skills in the matter of opportunity through a problem posing learning model in class XI students in the even semester of the 2021/2022 academic year. This research method is classroom action research that follows the Kemmis and Tanggart model. This study covers 3 cycles where each cycle includes 4 stages, namely planning (planning), acting (implementation), observing (observation), and reflecting (reflection). The research time was 3 months, from February 2022 to April 2022 with 30 students as research subjects, while data were collected through tests, interviews, observations, and questionnaires. The results showed that there was a significant increase in test results in each increasing cycle, namely in cycle I = 78.5; cycle II = 84.7; cycle III = 86, 7 and the results of interviews conducted concluded that learning mathematics through problem posing learning models is fun for students. This study concludes that learning mathematics by using a problem posing learning model can improve students' problem solving abilities.

Keywords: learning model, problem posing, problem solving ability.

1 INTRODUCTION

People's lives are currently experiencing continuous development and change, which, like science and technology, is a response to these developments and changes. Developments and changes can encourage improvements in the education system as it is already known that education aims to educate the nation's life. The development of the times is very rapid, greatly affecting the field of education. Therefore, it is necessary to increase the ability to use learning techniques in schools. This is a challenge for teachers of SMK Tunas Bangsa Bekasi to improve effective and efficient learning techniques. Likewise with student learning outcomes in learning which is the task of the teacher to guide the creation of intelligent and skilled students, so that in this case the teacher must know the developmental tasks of his students. Thus, it can determine educational goals in schools and can choose learning materials according to students' abilities.

Mathematics in Vocational High Schools has a formal and material nature. If this trait is associated with the level of thinking of Vocational High School students where there are still many students who are in the stage of concrete thinking, this will result in a gap that will result in a failure to understand or learn it. One of the failures in question is low learning outcomes, as happened at SMK Tunas Bangsa Bekasi in class XI students with opportunity material.

The low learning outcomes of students of SMK Tunas Bangsa Bekasi on the material of opportunity are caused by two factors, namely factors within students and factors originating from outside students. Factors in students are the lack of students' attention to the opportunity material presented by the teacher which causes students to not be able to understand the concept of opportunity. While factors from outside the students, one of

which is the condition or learning situation that is carried out in the classroom itself, which is then proven by the results of the mid-semester test of 30 students, there are 15 students who have not met the KKM or if presented there are still 50% of students get grades unfinished.

Conditions or learning situations in the classroom can also affect student learning outcomes, these conditions or situations include the learning model used has not been able to optimize activities and problem solving abilities, teachers only use expository methods and practice questions without using supporting media. So that it makes students feel bored and bored with learning mathematics.

One alternative or solution that will be done in overcoming these problems is by using a problem posing learning model. Problem posing learning model is a learning model by involving students directly and focusing on students to formulate questions that have been given according to the material being studied. So that the learning model can increase students' attention, students' understanding of the discussion of opportunities and problem solving skills of SMK Tunas Bangsa Bekasi students with a problem posing learning model.

Based on the description above, the authors are motivated to conduct research on effective learning methods to improve mathematical problem solving skills on the material opportunity by applying the problem posing learning model.

2 RESEARCH METHODS

This research was conducted at SMK Tunas Bangsa Bekasi, Bekasi Regency. This research was carried out from February to April 2022, precisely on February 21 to April 4, 2022 in the even semester 2021/2022 academic year. The time was chosen because the implementation of research activities was determined referring to the school's academic calendar.

The method used in this research is Classroom Action Research (CAR). The model used is a problem posing learning model to improve students' problem solving abilities. The subjects of this research are students of class XI SMK Tunas Bangsa Bekasi which is located in Sukatenang Village, Sukawangi District, Bekasi Regency. Data collection techniques in this study consisted of tests, observations, interviews, documentation, and questionnaires. The test technique is in the form of an essay question, which consists of 5 questions in each cycle. Problems are used to measure the learning outcomes of problem solving abilities obtained by students. The observation technique is used to measure the learning process which includes the activities of students and teachers in applying the problem posing learning model. Interview technique was used to find out the obstacles and facilities experienced by students towards the application of the problem posing learning model. Documentation is used to provide evidence in the form of photographs during the learning process or activity. Questionnaires are used to determine student responses in the teaching and learning process.

Classroom Action Research is research that describes the cause and effect of treatment, as well as describes what happens when the treatment is given, and describes the entire process from the beginning of the treatment to the impact of the treatment (Arikunto et al, 2016). Classroom action research is research conducted by the teacher in his own class through self-reflection with the aim of improving its performance so that student learning outcomes increase (Wulandari et al, 2018).

Problem posing learning model is a learning model that requires students to compose their own questions or solve a problem into simpler questions (Aris Shoimin, 2014). Problem posing learning model is a learning model that requires student to compose their own statements or solve a problem which becomes simpler questions that refer to solving the problem (Guntara, 2014). Problem posing is a process designed to assist students in solving problems (Irfan, Syarif, 2018). The problem posing learning model is a learning model that involves student activity and also their creativity in the learning process, this

learning model focuses on problem solving that comes from the student themselves. With this learning model it is hoped that student who were originally passive will become active.

Problem solving is an attempt to find a way out of a difficulty and is about dealing with real problem, guessing, finding, and understanding mathematics (Meta, Erlina, 2021). Problem solving is a process that starts with student facing problem until they get an answer and students have tested the solution (Mairing, 2018). Problem solving is strategic competencies shown by students in understanding, choosing approaches and problem solving strategies, using models to solve problems (Arin, 2016).

The data analysis technique used is quantitative data analysis which is done by comparing learning outcomes based on test scores in each cycle, from pre-cycle, first cycle, second cycle, and third cycle. Data obtained from observations of student and teacher activities during learning activities. The factors studied in this study are students' problem-solving abilities on the material of opportunity.

3 RESULTS AND DISCUSSION

The first cycle of student activity in the learning process is still not optimal. This is because students are still not familiar with the problem posing learning model, students still feel shy in asking questions and students still feel confused in discussing, solving problems and presenting the results that have been found in front of the class. In Cycle II, students began to get used to the learning model used, students felt happy in the learning process and discussion activities began to look active even though there were still some who were confused and still not active in discussing. Cycle III students already feel very fun and make it very easy for them to understand and complete the material and make them more aware that learning mathematics is very much contained in everyday life, also makes them like the problem posing learning model that has been applied, and there are still some students who still do not get maximum results. The results of observations on student learning activities are as shown in Table 1.

Table 1. Student Learning Activities in Each Cycle

Cycle I	Cycle II	Cycle III
68.57%	73.90%	80.09%

Based on Table 1, student activity in each cycle obtained the results of observation of student activity in the first cycle. It can be seen that 68.57% of students were active in learning the opportunity material with the problem posing learning model. The results of observation of student activities in cycle II have shown an increase, namely 73.90% of students who are active in learning activities of opportunity material with problem posing learning models. In the first cycle it reached 68.57%, so it can be said that in the second cycle the student activity had increased by 5.33%. The results of the observation of student activities in cycle III have shown an increase, namely 80.09% of students who are active in learning activities of opportunity material with problem posing learning models. In the second cycle reached 72.90%.

Table 2. Recapitulation of Final Scores of Test Results for Each Cycle

Score	Cycle I	Cycle II	Cycle III
Lowest	55	65	60
Highest	100	100	100
Average	78.5	84.7	86.7
Mastery learning (%)	56.7%	73.3%	93.3%

This study has shown good test results, namely the first cycle obtained the lowest score of 55, the highest score of 100, and an average of 78.5 with a test completeness of 56.7%,

the second cycle obtained the lowest score of 65, the highest score of 100, and the average 84.7 with a completeness of 73.3%, and the third cycle obtained the lowest score of 60, the highest score of 100, and an average of 86.7 with a completeness of 93.3%. This means that the research has been completed because the indicators of success have been achieved.

3.1 Opportunity

Opportunity is a quantity used to measure how likely something is to happen. Before discussing this probability material, we will first discuss the counting rules which there are three kinds of methods including the rules of multiplication, permutations, and combinations (Zuliana et al, 2020).

The probability of an event has two parts, namely the probability and the frequency of expectations, as explained above that opportunity is a quantity used to measure how likely something is to happen. Opportunity can be formulated mathematically as follows.

$$P(A) = \frac{n(A)}{n(S)}$$

Based on the above formula that if the number of members contained in an event A is $n(A)$ and the number of sample points or the total of all events A is $n(S)$, while the probability of an event A can be expressed or can be symbolized by $P(A)$ (Lukito et al, 2014).

4 CONCLUSION

The results of Classroom Action Research conducted by researchers for three cycles, students experienced an increase in problem solving skills, especially on the opportunity material by using the problem posing learning model for class XI SMK Tunas Bangsa Bekasi.

The conclusion of cycle I, cycle II, and cycle III can improve problem solving ability of opportunity material in class XI at SMK Tunas Bangsa Bekasi, namely with KKM 78, in cycle I the average value of test results reaches 78.5 with a learning completeness percentage of 57% , the second cycle the average score of the test results reached 84.7 with a percentage of 73%, and the third cycle the average value of the test results reached 86.7 with a percentage of 93%.

This shows that learning by using a problem posing learning model can improve students' problem solving abilities as evidenced by student learning outcomes on opportunity material.

Learning using the problem posing learning model has provided a new atmosphere in learning activities in the classroom, especially in mathematics. Previously, learning activities looked saturated or monotonous, became varied, previously less active became active. Learning activities using the problem posing learning model can bring up student ideas in the form of questions submitted in ongoing learning activities, so as to hone and build more creative, critical, logical, mathematical thinking, and a tolerant attitude towards students.

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