

Implementation of problem-based learning model to improve students' discipline and mathematics learning outcomes

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Abstract

Discipline is often associated with student learning outcomes. This study aim's to improve the discipline and mathematics learning outcomes of students in class VII. This research was carried out for 2 cycles. The subjects of this study were students of class VII D of SMP Negeri 1 Bantul with totaling 32 students. Data collection techniques in the form of tests and non-tests. The results of this study indicate that the application of problem based learning model can improve discipline and mathematics learning outcomes. This is evidenced by an increase in the percent of student discipline in the high category which reached 59.375% and increased in the second cycle to 68.75%, and student learning outcomes in the cycle I the percent of completeness reached 43.75% and increased to 75 % in the second cycle. The conclusion of this research is that the application of problem based learning can improve discipline and mathematics learning outcomes for grade VII students of SMP Negeri 1 Bantul for the 2021/2022 academic year.

Keywords: discipline, learning outcomes, problem based learning.

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INTRODUCTION

In an era of learning that continues to develop, educators are required to develop learning in the 21st century. Edy Syahputra (2018) states that learning in the 21st century must be able to prepare a generation of Indonesian people to meet advances in information and communication technology in social life. Meanwhile, according to Daryanto (2017) to develop 21st-century learning, educators must be able to facilitate and inspire students' learning and creativity including (1) encouraging, supporting, and modeling inventions and creative and innovative thinking; (2) involving students in exploring real-world issues (real world) and solving authentic problems using digital tools and resources; (3) support student reflection using collaborative tools to demonstrate and clarify understanding, thinking, conceptual planning and students' creative processes, and (4) capitalizing on collaborative knowledge construction by engaging in learning with students, colleagues and other people either through face-to-face activities or through virtual environments. This is supported by a research statement conducted by Salmia and Yusri (2021) which states that the learning activities designed by educators should be able to develop critical thinking skills and problem-solving, skills communication and collaboration skills creativity, and innovation. Furthermore, Salmia and Yusri said that the activity learning must also target achieving 21st-century skills integrate knowledge, skills, and attitudes, as well as mastery of information and communication technology, even in a pandemic like at the moment.

Learning in schools cannot be separated from the rules imposed in the school environment, one of which is discipline. According to Wirantasa (2017), discipline is very important for the development of students for a bright future because with discipline students will be motivated to achieve what students want and aspire to. Sugiyarto et al (2019) stated that discipline is a condition that is created and formed through the process of a series of behaviors that show the values of obedience, obedience, loyalty, order, and order. Furthermore, Sugiyarto et al stated

that discipline will make a person know and be able to distinguish what things should be done, what must be done, what can be done, and what should not be done (because they are prohibited things). According to Budiono (2017) discipline is the attitude of students' obedience in following the rules that are driven by awareness from within. Furthermore, Budiono said that discipline is behavior that is carried out by following per under the provisions, students who are disciplined have a greater opportunity to get high learning scores. In another sense, discipline is a student's attitude of obedience to a predetermined rule.

In addition to the rules that bind students, learning outcomes are also part of the learning process in the classroom. Kristin (2016) states that learning outcomes are the culmination of student learning success toward's the learning objectives that have been set. Furthermore, student learning outcomes can include aspect's of cognitive (knowledge), affective (attitude), and psychomotor (behavior). According to research conducted by Susanti (2018), it states that learning outcomes can be interpreted as abilities obtained by students after going through learning activities that include cognitive, affective, and psychomotor aspects by following per under learning objectives.

Learning outcomes are often associated with student discipline while receiving learning in class or while in a different school environment. According to Susanto (2013), internal and external factors are factors that affect student learning outcomes. Susanto further explained that there are several internal influences such as interest in learning, intelligence, attitudes, and habits. Then external factors such as family, friends and a disciplined environment. Meanwhile, according to Wirantasa (2017), discipline is a factor that must be instilled, developed, and implemented in everyday life to achieve success in all things, one of which is success in the learning process.

Based on the results of observations and interviews that have been carried out previously, it was found that the final semester assessment scores of students, especially class VII D were still below the criteria for learning completeness with an average grade value of 73.33. The criteria for learning completeness set by the school are 78. Furthermore, during the learning process in class, students are passive in responding to questions given and students' discipline in collecting assignments is still low.

Based on the description above, several alternative solutions can be used to improve student discipline and learning outcomes. The use of appropriate learning models provides opportunities for students to be more active in exploring knowledge and can improve student discipline and learning outcomes. The solution that researchers is using problem based learning model. In BDK Denpasar (2020) problem based learning is defined as problem based learning, which is a type of learning model that involves students in an activity (project) to produce a product. It was further explained that the problem based learning model emphasizes more on the long-term learning process, student's are directly involved with various issues and problem's of daily life, learn how to understand and solve the real problem's, are interdisciplinary, and involve participants. Students as the main actor's in designing, implementing and reporting the result's of activities (student-centered).

Based on the description above, the researchers are interested in conducting research by applying the Problem Based Learning (PBL) model to improving the discipline and learning outcomes of class VII student's at SMP N 1 Bantul.

RESEARCH METHOD

The type of research is classroom action research. The stages of classroom action research used are Kemmis and Mc Taggart's classroom action research model in Arikunto et al (2012) . The research model consists of planning, implementation, observation, and reflection. This research was conducted in two cycles with 2 meetings. Visually, the stages of each cycle are presented in Figure 1.

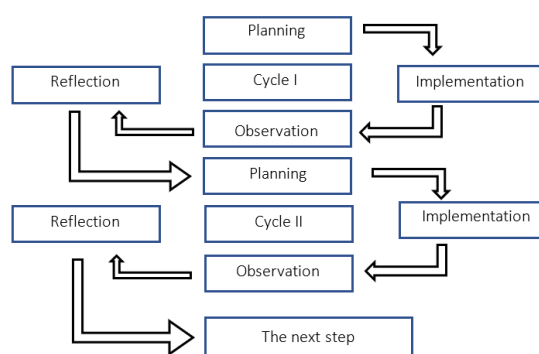


Figure 1. Kemmis and Mc Taggart's classroom action research model in Arikunto et al (2012)

At the planning stage, the researcher prepares a learning unit that includes a learning implementation plan, student worksheets, and evaluation assessments that are adapted to the Problem Based Learning learning model with a cumulative achievement index adjusted to the revised Bloom's Taxonomy. Continued at the implementation stage, the researchers applied the problem-based learning model in the learning process. Activities in implementation consist of initial activities, core activities, and closing activities. In this observation stage, the researcher acts as an observer with the help of one other observer to observe the ongoing learning process, supervise how to apply the media and observe student activities in receiving learning when using the Problem Based Learning learning model. Reflection activities are carried out after the researcher takes the action of the researcher by looking at the results of the action taken. The result of the researcher 's observations regarding the discipline and student learning outcomes during the learning process has become a record to find out the weaknesses or mistakes that occur.

The research was conducted in 2 months, from April to Mei 2022. The subjects of this research were students of class VII D SMP Negeri 1 Bantul Yogyakarta which consisted of 22 male students and 20 female students. The reason for taking the subject of the research because the class has several issues with the discipline and outcomes of mathematics in learning.

The techniques used to collect data were observation and test. The observation is used as an observation sheet that is used to measure student discipline during learning in class both online and offline. The following are indicators of discipline. The indicators according to Moenir in Khairinal et al (2020) used in making observation sheets are shown in table 1.

Table 1. Discipline indicators

Aspect	Indicator
Discipline	On-time in studying
	Be present in learning activities
	Completing tasks within the allotted time
	Obey the school rules
	Study diligently
	Independent in learning
	Honest
	Fun behavior

Discipline measurement results are calculated from the number of scores from each respondent and then added up, analyzed, and categorized using a formula. Calculation of categorization with three levels is obtained by the following formula (Azwar, 2012).

Table 2. Interval and category of discipline

Interval	Category
$x > (\mu + 1.\sigma)$	High
$(\mu - 1.\sigma) < x \leq (\mu + 1.\sigma)$	Currently
$x \leq (\mu - 1.\sigma)$	Low

Information :

μ =Mean score ideal = $1/2 \times$ (maximal score+minimum score)

σ =Standar deviasi= $1/6 \times$ (maximal score+minimum score)

x = empiris score

In calculating the average value, the researcher adds up the scores obtained by the students which are then divided by the number of students in the class so that it can be formulated as follows.

$$\bar{X} = (\sum X) / N$$

Information :

\bar{X} = class average

$\sum X$ = the sum of student scores

N = number of student's

(Sudjana: 2013)

In contrast to student learning outcomes, test results obtained at the beginning and end of the action cycle were analyzed quantitatively. Based on the analysis of the results of this test, it will be known the increase in learning outcomes in each cycle. The test results are then searched for the class average and the percent of student learning completeness.

This research is said to be successful if the learning outcomes obtained by students increase and reach the value of teaching completeness criteria, namely 78. Meanwhile, the discipline be successful if the disciplinary data from the first cycle to the cycle II has increased. The data obtained in this study are the results of measuring discipline and learning outcomes given at the beginning of learning and after receiving learning. The data that has been obtained is then analyzed to determine the results of the actions in each cycle.

RESULTS AND DISCUSSION

This classroom action research began with pre-action activities. Pre-action activities were carried out to determine the initial abilities of student. Based on preliminary observation regarding aspect of mathematics learning outcomes still below the completeness criteria. For the disciplinary questionnaire given on each cycle before and after using problm based learning model.

In the preliminary activities, teachers and students prayed together. The teacher also called the roll to check student's attendance. The students were given ice breaking guided by the teacher to help them focus on learning. They were also given the reading material related to the material to be taught. . At the main activity, PBL that has been integrated with a scientific approach was carried out.

The first stage is orienting the students to the problem. The teacher is given contextual problem related to the material, lets the students to observe, understand the problem, and express relevant ideas. Classically, the teacher introduces the topic of learning and provides problems for each group to be solved later.

The second stage is organizing the students to study. The students are divided into four heterogeneous groups. The students gather according to the group. Then the teacher given student worksheet to discuss together with their groups.

The third stage is guiding individual and group investigations. The students prepare equipment and materials according to the instructions, discuss them to solve problems given. The teacher goes around monitoring the work of the students.

The fourth stage is developing and presenting the work. Group representatives present practice reports and discussion results. Other groups must express their opinions and express different concepts or findings. The teacher also provides stimulus so that the students can express concepts that have not been revealed in their own words.

The fifth stage is analyzing and evaluating the problem-solving process. Classically, the teacher reviewed what has been presented and evaluates the teaching and learning process in class. The students would pay their attention and checked the work results of each group. In the closing activity, the teacher and students conclude the material that has been learned, give homework, and give a closing greeting.

After carrying out the research for two cycles, the researchers obtained the results that the application of problem based learning model through the correct and appropriate steps could improve student learning outcomes. This can be seen from the average value of student learning outcomes which increased in each cycle, with 76 in the cycle I to 88 in the cycle II, then the frequency of students who met the target also increased from 14 students in the cycle I to 24 students in cycle II. Table 3 presents the detail of the values of mathematics outcomes.

Table 3. Ratio of inter-cycle student learning outcomes

No	Action	Average student score	Student learning outcomes			
			Meet the target		Not yet fulfilled	
			Number	Percent (%)	Number	Percent (%)
1	Cycle I	76	14	43.75%	18	56.25%
2	Cycle II	88	24	75%	8	25%

The percent of student discipline, in the cycle I, the percent of student completeness is 59.375 %, then in the second cycle it increases to 68.75%. Table 4 presents the detail of discipline data, from the implementation of a cycle I and cycle II.

Table 4. Ratio of discipline data results

Interval	Discipline data acquisition				Category
	Pre-test		Post-test		
	Number	Percent (%)	Number	Percent (%)	
$x > 83,3$	19	59.375%	22	68.75%	High
$41,7 < x \leq 83,3$	13	40.625%	10	31.25%	Medium
$x \leq 41,7$	0	0	0	0	Low
Total	32	100%	32	100%	-

Application of problem-based learning has been has an impact on discipline and learning outcomes that can be known from the increase in each cycle. In the first cycle, the average student score was 76, then increased to 88 in the second cycle. Then for the percent of student discipline, in the first cycle, the percent of student completeness is 59.375 %, then in the second cycle it increases to 68.75%.

CONCLUSION

Based on the results of research using a problem based learning model, it can be concluded that there is an increase in student discipline and learning outcomes. This is evident from the results of the cycle I test to the cycle II test which increased by 31.25% from the initial average of 76 to

88, and the discipline data increased by 4.375% in the high category. Problem based learning model that is used in learning mathematics has received positive responses from students, including students who are more active in discussing with their groups in solving existing problems so that student learning outcomes have increased.

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