

Implementation of Problem Based Learning to Improve the Activity of Class V Students in Mathematics Learning in Elementary School

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1. Abstract

This research is carried out in the context of SD mathematics learning activities that are still teachers centered. Teachers tend to give material explanations and then students are trained so that students become passive. Mathematical learning requires a learning model that supports the active involvement of students in order to optimal learning success. The aim of this study is to know the improvement of student activity through the application of the Problem Based Learning model. This collaborative class action research uses a Kemmis and Mc Taggart model consisting of planning, action, observation and reflection. The subjects in this study were 28 elementary school students. Data collected using observation sheets, interviews and documentation. The data analysis techniques used are descriptive quantitative and qualitative. The results of the study showed an increase in student activity in the pre-cycle reached 51% (low category), in cycle I reached 71% (medium category), and in the cycle II increased to 87% (high category). Thus, it can be concluded that the implementation of the Problem Based Learning model can improve the activity of V elementary school students because they have achieved the presentation of their indicators of success.

Keywords: *Mathematics, Student Activity, Problem Based Learning*

2. Introduction

Education is a conscious effort to develop potential, acquire knowledge and intelligence and develop abilities, attitudes and behaviors. The development of education in Indonesia creates the presence of a new paradigm in the learning system. The improvement of the curriculum transforms the teacher-centric learning pattern into student-centered and passive learning patterns into active learning. (Kemendikbud, 2013).

The implementation of student-centered learning can be observed through how student activity during the learning process in the classroom. Students' activity in learning is all physical and non-physical activities of students in the process of optimal teaching activities. (Rahmatin, 2022). Through the presence of learning activity, students have the ability to investigate problems, have the courage to ask teachers or friends about ununderstood subject matter, be able to work on tasks independently, present specific tasks or projects, participate actively in discussions or in answering questions. (Prasetyo & Abduh, 2021). Thus, student activity plays a fundamental role in the success of a learning in the classroom. Learning outcomes are potentially improved (Nugroho & Nugroho, 2019) as Sardiman (2017) explains that student learning activity is a fundamental element for achieving learning success.

One of the areas of study that is studied in all levels of education including in primary school is mathematics. Mathematics is a study material with objects that are abstract and constructed through deductive reasoning so that the truth between concepts in math is very strong and clear. (Wahyudi, 2016). However, the abstract nature of mathematical objects makes it difficult for students to understand the matter. This is in line with the results of a survey by Restati (2017) that showed that as many as 65% of SD students said mathematics was quite difficult to learn. Therefore, teachers need to design effective learning models to teach mathematical materials.

Based on Piaget's theory, the characteristics of class V students in elementary school are at the concrete operational stage, i.e. they tend to like practical and concrete things, have a high sense of curiosity and group enthusiasm (Alfin, 2017). Thus, learning mathematics in elementary schools is more effective if using a learning model that involves students actively (student centered) to investigate, solve problems and discuss groups so that students can understand abstract and complex materials. (Riswati,

Alpusari, Marhadi, 2018).

Problem-based learning (PBL) is a student-centered learning model. Problem-based learning is a learning model that begins with a problem to gather and integrate new knowledge. (Harwati, 2021). Through this learning model, students will actively engage in finding solutions in the problem-solving process, and discuss with the group, to gain the knowledge and skills needed on the problem. According to Sukma & Novelni, the (2018) model of Problem Based Learning consists of 5 syntax which are: 1) Student orientation on the problem, 2) Organizing students to be ready to learn, 3) Guiding individual or group research, 4) Developing and presenting the results of the work, 5) Analyzing and evaluating the problem-solving process.

Based on the results of observations carried out in class V, the implementation of mathematics learning activities is still teacher centered. During the course of teaching, teachers are more frequently presenting materials. Students tend to be passive by listening to the material explanations of the teacher and working on the exercises given. In such situations, students do not dare to ask questions that are difficult to understand, and there are no activities involving students actively learning mathematics. Teaching learning activities indicate a lack of student activity in learning mathematics.

Subsequently, the results of interviews with teachers of the fifth grade explained that mathematical learning is rarely implemented using a particular learning model. This is due to the limited time the teacher has to design learning with innovative learning methods and models. Teachers more often apply conventional learning by explaining the material and then giving the exercises.

Based on the description of the problem, the Problem Based Learning learning model can be a solution to improve the learning activity of elementary school students in mathematics learning. This is in line with the results of the study conducted by Vitasari (2018) entitled "Improving Mathematics Learning Activity and Results Through Problem Based Learning Model of Class V SD Students" which shows that student activity on mathematics learning each cycle has improved. The average student activity in cycle I was 61.2%, and cycle II was 90.5%. Thus, from cycle I to cycle II student activity increased by 29.3%.

From the outline above, it is necessary to do Collaborative Class Action Research using the Problem Based Learning model on Mathematics learning. The researchers

chose the title of the study on "Implementation of Problem Based Learning to Improve the Activity of Class V Students in Mathematics Learning in Elementary School".

3. Methods

3.1 Participants and context

This study uses a qualitative method of collaborative class action research. (PTKK). This research model uses a model from Kemmis and Mc Taggart that consists of four stages, namely: planning, action, observation and reflection (Prihantoro, Agung, 2019). The subject of this study was a V class elementary school student, with a total of 28 students. This collaborative class action research is carried out in two cycles. The implementation of each cycle follows the stages of planning, action, observation and reflection.

3.2 Material

The instruments in this research are observation sheets, interviews and documentation. The observation sheet serves to collect data on student activity during the learning process. Interviews are used to obtain data on early learning conditions. Documentation for documentation studies are photographs and videos that provide a concrete picture of the learning process by applying the Problem Based Learning model.

3.3 Data Collection and analysis

Data collection techniques are a strategic step in research to obtain data. (Kharis, 2019). Data collection techniques in this research are observation, interview and documentation techniques. Data analysis uses quantitative and qualitative descriptive analysis techniques. The data collected on the observation sheet of each activity from the implementation of the research cycle is calculated in the form of percentages. The percentage of student activity was measured by four criteria according to Prasetyo, & Abduh (2021) which are high (75%-100%), moderate (51-74%), low (25%-50%), and very low (0%-24%). Next, the data already analyzed is presented in the form of a sentence to see the trends that occur in learning activities.

3.4. Ethical Considerations

All research or research involves humans as research subjects. Based on this, in this research there are basic principles of research ethics, among others: the first is to respect people, in which case we must respect and appreciate students, which the student is the subject of research, the second is the benefit, in the study there is a benefit that for students to add a pleasant learning experience with the Problem Based Learning model that can improve student activity, and the third does not harm the research subject.

3.5. Limitations to the study

There are limitations that researchers have in terms of time, effort, and cost. This research is limited to an effort to enhance student activity through the application of the Problem Based Learning model to elementary school students. The language of this study is the student's activity in the learning process of mathematics.

4. Results and Discussion

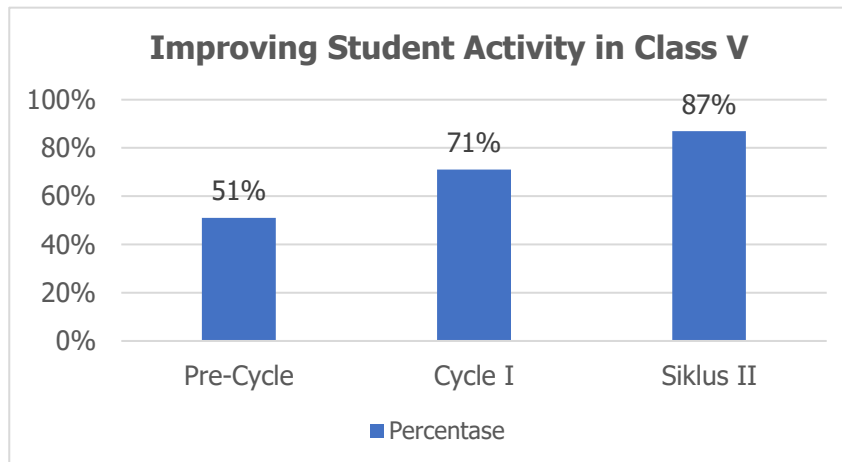
Collaborative Class Action Research (PTKK) consists of pre-cycle, cycle I and cycle II. Here are the data on the activity of students of class V in mathematics lesson load starting from the initial condition (pre-cycle), cycle I and cycle II students of grade V using the Problem Based Learning model.

Table of 1. Student Activity Data For Pre-cycle Cycle I, Cycle II

Indicators	Percentage		
	Pre-Cycle	Cycle I	Cycle II
Listen to the teacher's explanation	56%	72%	86%
Asking questions	44%	66%	80%
Answering questions	57%	77%	90%
Complete the task	54%	73%	87%
Conducting discussion	52%	72%	89%
Present the discussion results	48%	71%	88%
Average Student Activity	51%	71%	87%
Criteria	Low	Middle	High

Based on the above student activity data table, it is known that there is an increase in the percentage of each cycle on the six student activity indicators. On the indicator listen to the teacher's explanation, in the pre-cycle stage the activity of new students reached 51%, while cycle I reached 71%, and cycle II has already been able to reach 87%. Thus, it can be seen that the activity of students from pre-cycle to cycle I increased by 20% from Cycle I to Cycle II by 16%. On the second indicator, which is to ask questions obtained data, the percentage of student activity in the pre-new cycle reached 44%, cycle I reached 66% and cycle II could reach 80%. It can be seen an increase from pre-cycle to cycle I of 22% from Cycle I to Cycle II of 14%. Furthermore, on the third indicator, namely answering the question obtained data, the percentage of student activity in the pre-cycle was only 57%, while cycle I reached 77% and cycle II was able to reach 90%. The study showed an increase in student activity from pre-cycle to cycle I by 20% from cycles I to cycles II by 13%. Further on the fourth indicator of completion of tasks obtained data percent on pre-cycle student activity only reached 54%, while cycle I was 73% and cycle II was 87%. Thus, it can be seen an increase from pre-cycle to cycle I by 22% from cycles I to cycles II by 14%. On the fifth indicator, which is to discuss the data obtained, the percentage of student activity in the pre-cycle reached only 52%, while cycle I reached 72% and cycle II reached 89%. It can be seen an increase in student activity from pre-cycle to cycle I by 20% from Cycle I to Cycle II by 17%. As for the sixth indicator, which represents the results of discussions obtained data, the percentage of student activity in the pre-new cycle reached 48%, while cycle I reached 71% and cycle II already reached 88%. This resulted in an increase from pre-cycle to cycle I of 23% from Cycle I to Cycle II of 17%. Data on increased student activity in pre-cycle, cycle I and cycle II can be seen in the diagram below.

Based on the results of data analysis in Table 1, it can be seen that the average student activity in the pre-cycle reached 51% of those belonging to the low category. As for the 1st cycle, the average student activity already reached 71% of inclusion in the medium category. Further on the 2nd cycle, the average student activity already reached 87% including the highest category.



Picture of 1. Diagram of increased student activity

Picture 1 is a diagram that shows the increased activity of V-class students. In this study, student activity was measured through six indicators according to Sudjana (Lestari, 2020) namely: 1) pay attention to the teacher's explanation; 2) ask questions; 3) answer questions; 4) complete tasks; 5) conduct discussions; 6) present the results of discussions. As for the achievement of the desired criteria, the percentage is above 75%.

At the pre-cyclical stage or not using the PBL model, the percentage of student activity was very low at just 51%. These numbers are in the low criteria. This is because in the teaching activity of the teacher as a facilitator still gives less space to the student to play an active role during the learning process. Then in the first phase of the cycle there was an increase with an average percentage of 71%. The figures indicate the occurrence of a rather significant increase from the precycle to the first cycle. This increasing factor is the use of the Problem Based Learning model (PBL). Although there has been an increase from the precyclical stage, such access still does not meet the desired criteria and requires an advanced cycle. The researchers used a student performance criterion of 75%. Mulyasa (Vitasari, 2013) argues that in terms of the process of learning and competence formation is said to be successful and quality when the whole or at least most 75% of the students are actively involved. The desired criterion is to a percentage above 75%. This is because of the student activity in the I cycle there

is still one indicator that has not been achieved: the indicator asking questions. After reflection and improvement, the researchers applied PBL model learning to cycle II. The learning process carried out on Cycle II runs well with the enthusiasm of students who are passionate about learning. Apparently an increase of 16% was a rather significant increase from the original 71% to 87%. In this Cycle II, each indicator in student learning activity improved in each student, although there are some students who have not yet experienced significant changes after completing the study in Cycle 2. Most students are already able to meet the overall determined learning activity indicators.

The activity of V-class students on learning mathematics through the application of the Problem Based Learning model has reached the expected criteria. Based on the data, the Problem Based Learning (PBL) model is effectively applied to improve student activity because students are given a problem and then analyze it to find solutions so that students can play an active role in the learning process.

5. Conclusion

Based on the results of research actions that have been carried out in Class V Elementary School, it can be concluded that the application of Problem Based Learning learning model on mathematical learning can improve student activity. The average percentage of student learning activity on the pre-cycle is 51%. On Cycle I, the average percentage of student activity was 71%. Further on the second cycle, the average percentage of student activity was 87%. Student learning activity increased from pre-cycle to cycle I by 20%. The activity of students from cycle I to cycle II increased by 16%.

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