

Application of Problem Based Learning Model Helps Students Work Sheets to Improve Activity and Learning Outcomes of Class IV Students on Elementary School Mathematics Learning

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1. Abstract

This research is undermined by a lack of student activity in learning activities and low learning outcomes. Teachers have not provided student-centred learning, used lecture methods, and have not used learning media. The aim of this research is to find out whether there is an improvement in the activity and learning outcomes of Mathematics students in the fourth grade of primary school using the Problem Based Learning model assisted by LKPD. This type of research is the Kemmis and Taggart model class of action that consists of planning, implementation, observation, and reflection. The subject in this study was a fourth-grade elementary school student of 22 students. Data collection techniques using observations, interviews, and documentation. Data analysis techniques use quantitative and qualitative descriptive. Study results showed student learning activity at cycle I was 66% and cycle II was 85%. Students in the first cycle achieved 89 per cent, and in the second cycle 92 per cent. Thus, it can be concluded that learning with

the Problem Based Learning model helps LKPD can improve student activity and learning outcomes on mathematics learning.

Keywords: learning outcomes, learning activity, Problem Based Learning

2. Introduction

Education is an effort to build and develop human personality both spiritually and physically. With education we can grow up because education can have a very positive impact on us, can give us skills, mental abilities, and so on. As stated in Sisdiknas (2003) education is a basic and planned effort to create a learning atmosphere and learning process so that the student actively develops his or her potential to possess spiritual powers of religion, self-control, personality, intelligence, noble morals, as well as skills, necessary to himself, society, and the country.

In an era of globalization like this, it demands a qualified human resource. Efforts to produce quality human resources must be supported by good and quality learning processes. The truth of learning is that the student learns, not the teacher. Therefore, teachers are required to be able to motivate students to be active and directly involved in the learning process (Sukirman dan Solikin, 2020). In this case, teachers need to take action that can enhance learning in classroom or Classroom Action Research (CAR). Classroom Action Research is a study conducted by teachers in a classroom where researchers are involved in learning activities in a school (Machali, et al., 2022).

Mathematical learning is a process of teaching learning that begins from simple concepts to higher concepts with the abilities and mindsets that students possess (Eismawati, et al., 2019). It is in line with Novera, et al. (2021) learning mathematics is a problem-solving skill in computation, equipping students with the ability to think logically, analytically, systematically and encouraging a sense of curiosity that can be used for life (Andani, et al., 2021). The goal of mathematics learning is to improve the

cognitive abilities of students, help students in solving problems, and improve the learning outcomes of students. Mathematics learning has always been a difficult and frightening subject for students. It is proved that the expected learning objectives have not yet been achieved, so in order to the desired learning goals, teachers and students must play an active role in the learning process. Therefore, teachers need to use a student-centric model. Problem Based Learning model is a learning model that presents contextual problems, develops understanding of topics, builds a problem framework for students to learn, collects and analyzes data, constructs arguments about problem solving, and works individually or collaboratively in problem-solving (Kuncoro, et al., 2021; Pramudya, 2019). Swiyadnya, et al. (2021) argues that the Problem Based Learning learning model is a problem-centric learning through discoveries that require a high level of intuitive ability in the intellectual cycle. So, the Problem Based Learning model is a learning model that presents a problem through discovery that requires high-level skills and student-centred learning (Wijayanti, et al. (2022). Rusmono in Janah, et al. (2019) revealed that this learning model has activities measures that include; 1) organizing students on the problem, 2) organizing the students to learn, 3) helping independent and group research, 4) developing and presenting the results of the work, and 5) analysing and evaluating the problem-solving process.

According to Naziah, et al. (2020) learning activity is the teaching learning process that students go through during the learning process to become interested and enthusiastic in learning. Success in teaching learning requires active, dynamic and enjoyable learning strategies and patterns that can stimulate student learning creativity. Saputra, et al. (2021) presented indicators of learning activity among them; 1) students perform tasks, 2) actively ask questions when not understood either ask teachers or friends, 3) participate in discussions, 4) participate to the resolution of a problem that is

being discussed in a particular subject, 5) contribute to the search for information to solve the problems that are being considered in a specific subject.

Mathematics learning problems also occurred in the scope of primary school, according to pre-research data through observation activities, interviews and document data such as learning outcomes of students of the fourth grade, obtained some problems in learning among them pupils less enthusiastic in learning mathematics, learning that gives questions, the lack of learning media that activates students engaged directly, and the conventional learning model.

From the problem there is a solution to solve it is with the learning model Problem Based Learning assisted LKPD to improve the activity and learning outcomes of students of the fourth grade of primary school. This is in line with the results of a study (Swiyadnya, et al., 2021) entitled "The Effectiveness of Problem Based Learning Model Helping LKPD Against Mathematical Load Learning Outcomes" showing that there was an average increase in learning outcomes in cycle I was 68.21 and increased at cycle II to 79.64. Students' absorption rate in cycle I was 68.21% and increased in the second cycle to 79.64% and the student's learning rate in the first cycle was 64% and grew at cycle II to 82%.

From the above description it is necessary to conduct collaborative class action research using the Problem Based Learning learning model on mathematics learning. For that, the researchers chose the title of the study on "Application of Problem Based Learning Learning Model Helps LKPD To Improve the Activity and Learning Outcomes of Grade IV Elementary School Students.

3. Methods

3.1. Participants and context

This research uses a qualitative method of a kind of Collaborative Class Action Research. This study uses a model from Kemmis and Mc Taggart that consists of four stages, namely: planning, action, observation and reflection (Machali, et al., 2022). The subject of this study was a fourth grade elementary school student, with a total of 22 students. This collaborative class action research was conducted in two cycles. The execution of each cycle follows the stages of planning, action, observation and reflection.

3.2. Material

The instruments in this research are observation sheets, interviews, documentation, and tests. The observation sheet serves to evaluate student activity during the learning process. The next is an interview to obtain data on the initial condition of the pupils. Documentation for documentation studies are photographs and videos that provide a concrete overview of the learning process by applying the Problem Based Learning model. Tests are used to determine the learning outcome of students.

3.3. Data Collection and analysis

Data collection techniques are ways that researchers can use to obtain data. As for the data-gathering techniques in this study, observations, interviews, documentation, and tests. Data analysis uses quantitative and qualitative descriptive data analysis techniques. Data collected on each observation activity from the implementation of the research cycle is analyzed descriptively using percentage techniques to see trends occurring in the learning activity.

3.4. Ethical Considerations

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

3.5. Limitations to the Study

There are limitations that researchers have in terms of time, energy, and cost. The research focuses on the application of the Problem Based Learning model that helps LKPD to improve the activity and learning outcomes of fourth-grade students in elementary school mathematics learning.

4. Results and Discussion

Collaborative Class Action Research consists of pre-action, cycle I and cycle II. The following are data on the activity and learning outcomes of Mathematics students starting from the initial condition (pre-school), cycle I and cycle II students of grade IV using the learning model Problem Based Learning.

Table 1. Increased Activity of Students Pre-Cycle, Cycle 1 and Cycle II

	Pre-cycle	Cycle I	Cycle II
Average	60,22	78,18	90,68
Category	Cukup	Baik	Sangat baik

Based on the above table of increased student activity during pre-cycle, cycle I, and cycle II, average activity increased. At the time of pre-cycle (before action) the average activity was only 60.22 or was in the category sufficient, after the implementation of cycle I the average student activity increased to 78.18 or is in the good category but the results obtained in cycle 1 are not in line with the indicators of achievement as they are still experiencing some constraints i.e. there are still students who do not pay attention to the teacher in explaining the material, lack of student communication in the discussion of the task group given by the teacher, and still many students appear hesitant in answering questions and asking questions. In order to improve student learning activity in order to meet the criteria of success, improvements were made in the second cycle. On the second cycle, the average student activity was 90,68 or was in a very good category.

Table 2. Cycle I and II Learning Activity Comparison

No	Indicator	Cycle Score Number I	Cycle Score Number II	Cycle Results I	Cycle Results II
1	Doing your job	76	85	86,36	96, 59
2	Asking a question	47	70	53,40	79, 54
3	Conducting discussion	70	80	79,54	90, 90
4	Trying to find and solve problems	70	79	79,54	89, 77
5	Presenting results	81	85	92,04	96, 59
Average student activity				78,18	90,68

Based on the table above, it is known that the first aspect to pay attention is working tasks. At the implementation of the first cycle, 86.36% of the students who worked on the assignment had reached the criteria set. At the meeting of the second cycle, that's 96.59%. So there's a 10.23% increase from cycle I and cycle II. The second aspect is asking questions. In the first cycle, 53.40% of the students who dare to ask questions have not reached the criteria set. In the second cycle, 79.54 per cent have reached the criteria set. So there's an increase from cycles I and II of 26.14%. The third aspect is to have a discussion. In the first cycle, students can discuss 79.54% of the criteria already met. At the implementation of cycle II, that is, 90.90% have reached the specified kiteria. So there's an increase from cycle I and cycle II of 11.36%. The fourth aspect is to find and solve problems. In the first cycle, students who tried to find and solve problems reached 79.54 per cent of the criteria set but not the maximum. In the second cycle, 89.77% had reached the set criteria. So there's a 10.23% increase from cycles I and II. The fifth aspect is the presentation of results. In the first cycle, students who presented results reached 92,04% already met the criteria. Maximum in cycle II was 96.59%, so there was an increase in cycles I and II of 4.55%.

Based on the activity data of pupils in cycles I and II on the average table, the percentage of activity obtained by each indicator has reached the expected success criteria and there is an increase of 12.5%. Students can adapt to the Problem Based Learning model with the help of LKPD. The student's learning activity can be seen while doing tasks, asking questions, conducting discussions, trying to find and solve problems, and presenting results.

Data acquisition or comparison of learning outcomes of cycles I and II on the application of the Problem Based Learning model helps LKPD also at each cycle undergo

improvement. Here's a comparison of the learning results of cycle I and cycle II can be seen in the table.

Table 3. Comparison of Mathematical Learning Results Pre-Cycle, Cycle I, and Cycle II

Change	Indicator	Pre-Cycle	Cycle I	Cycle II
Study	Average Student Value	53,63	89,54	92
Outcomes	Percentage of Students Reaching KKM	27,27%	90,90%	95,45%

Based on the above table of learning results, the students obtained from each evaluation obtain an improved average. The increase can be seen from the initial condition with an average of 53.63 and there was an increase of 35.92 with a average of 89.54 on cycle I. The average also increased from cycle I from 89.54 to 92 in cycle II or increased by 2.46. In addition to the class average, the percentage of KKM earnings also increased. The percentage of obesity in the initial condition of 27.27% increased to 90.90 in cycle I or increased by 63.63%. The percentage of accuracy in cycle II is 95.45% which means an increase from cycle I of 4.55%.

Data from the study showed that there was an increase in student learning activity from pre-cycle, cycle I to cycle II. This is because most students are able to meet the criteria of the indicator of learning activity and complete tasks seriously. In the aspect of student activity, the observation evaluation criteria are measured by five indicators: 1) work on tasks; 2) asking questions; 3) conducting discussions; 4) trying to find and solve problems; and 5) presenting results. Based on the results of cycle I observations showed the average percentage of student learning activity of 78.18% showing student activity has begun to increase or category good, but not maximum because of the five indicators there is still one not achieved.

The learning process carried out at cycle II went well and enthusiastic students who are passionate in learning because there is an effort towards improving the reflection results of cycle I. The average increase in the learning activity of the pupils achieved in the second cycle was 90.68%. The average increase in learning activity in cycles I and II increased by 12.5%. In this cycle II each indicator in student learning activity improved in each student participant, although there are some students who still have not experienced any change after completing the study in the second cycle. The student's learning activity through the application of the Problem Based Learning model has helped LKPD to reach the expected criteria, which is very good.

It is also known after the implementation of the first cycle action the average learning outcome of the students of the fourth grade is 89.54. The result saw an increase of 35.45 points from the pre-cycle average to cycle I. In cycle II the learning process of mathematics materials data compilation forms diagrams of images and lines with power point media, concrete media, video, and games looking for data with imaged cubes. After completing the second cycle, the average student's learning outcome in mathematics was 92,04. This averages an increase of 2.5 points from the student's first-cycle learning output of 89.54. It shows that by applying a Problem Based Learning model, LKPD can improve the activity and learning outcomes of students in the fourth grade. Learning using Problem Based Learning can result in collaborative interactions between students and students as well as students and teachers. Such interactions can support the smooth learning process where students show high enthusiasm during the learning process. Teachers only facilitate students to actively undertake various activities in the learning process. This activity makes students more enthusiastic in paying attention to the teacher's explanations, generating the student's courage to ask questions, answer

questions, discuss in groups, record summaries of lessons, convey ideas or ideas, and present the results of group work.

5. Conclusion

Based on the research carried out it can be concluded that the problem based learning model with a syntax that focuses on the pupils, especially in arousing the enthusiasm of students in discussions can improve student activity and learning outcomes. The results of the study showed that there was an increase in the average activity and learning outcomes of classically performed students from pre-cycle actions to cycles I and II. Students' learning activity in cycle I was 66% and cycle II was 85%. Students in the first cycle achieved 89 per cent, and in the second cycle 92 per cent. From the results obtained on action cycle II can be said to have met the established criteria of success. Thus it can be concluded that the Problem Based Learning model helps LKPD can improve the activity and learning outcomes of Mathematics students in the fourth grade of primary school.

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