

A CLASSROOM ACTION RESEARCH ON STRIMLINING THE MATHEMATICS LEARNING OUTCOMESTHROUGH THE APPLYING OF PROBLEM BASED LEARNING FOR ELEMENTARY SCHOOL STUDENTS

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Abstract

This study aims to measure the strimlining of the application of the Problem Based Learning in intensifying the students' mathematics learning outcomes at the elementary school level. This research was conducted at SD Negeri Jatinom, Klaten Regency, Indonesia. The subjects of this research were 28 students of sixth grader students of SD Negeri Jatinom, Klaten Regency, Indonesia. To achieve the objectives of this research, the research method applied was classroom action research which consists of planning, actuating, observing, and reflecting activities. The data collection technique ran under the individual test which was carried out in the form of the written exam. The instrument designed in this research was multiple choice question which consisting of 4 options. The results of this study indicated that: (1) The average of students' learning outcomes in the first cycle of mathematics was 53.57 by the passing rate of 57.15%. (2) The average of students' learning outcomes in the second cycle was 87.5 by the passing grade of 100%. (3). The increasing of the students' mathematics learning outcomes from first cycle to second cycle was 33.93%. So, the application of the Problem Based Learning was very effective for intensifying students' mathematics learning outcomes at the elementary school level.

Key words: Problem Based Learning, Strimlining, Applying, Learning Process

INTRODUCTION

The level of effectiveness and creativity of learning activities which implemented by teachers in the classroom is the most influenced of the students' learning outcomes. Khovivah et al., (2021) stated that learning activities are very important processes and are the core of the overall educational process in which there is an interaction relationship between teachers and students. Teachers as the main component in education have an important role to strive for a learning process that can improve student learning outcomes from those who are not good to be better, and from better to be the best. So that the learning process can provide improvements to student learning outcomes. The main factors which influence the learning process to take place effectively are the level of teachers' professional competence (Siri et al., 2020), the suitability of the learning media used by teacher (Irawan et al., 2019 and Soimah 2018), teaching and learning methods which applied by teachers in the learning process (Salsabila & Puspitasari, 2020). Other factors which proven to affect the learning process and learning outcomes are the level of students' interest in participating in learning, students' motivation, and students' learning styles based on their characteristics (Marlina & Sholehun, 2021 and Anggraini et al., 2020).

One of the subjects that should be mastered by students in elementary school is mathematics. Mastery of the basics of mathematics is an indicator of the success of students taking elementary school education. This opinion is confirmed by Andri et al., (2020) and Asrianti & Puswati (2020) that the success of students participating in learning in elementary schools is being able to master basic skills such as numeracy skills, listening, reading, speaking, writing, and planting national character. Rismawati & Erni (2021) state that learning mathematics in elementary schools is taught to understand simple concepts to complex concepts to achieve deep mathematical understanding. This is emphasized by Hutagaol (2019) that in the process of learning mathematics, the aspect of understanding a concept is something that really needs to be mastered by students. Rismawati & Erni (2021) emphasize that if the basic concepts of learning mathematics are accepted by elementary school students, it will be difficult to improve again, especially if it has been applied in solving problems in answering questions. So that this condition results in students' interest and perception seeing mathematics as a difficult subject (Melinda et al., 2021).

Based on observation result at SD Negeri Jatinom, it was found that there were many students who had low motivation in participating in the learning process, especially mathematics. Students have motivation, but the motivation is not to understand what is being learned but only to fulfill learning tasks so as not to be punished (Ambros et al., 2021). Previous research revealed that the factor that made students unmotivated was that the learning process designed by the teacher had not been able to actively involve students in learning (Khovivah, 2021). This problem arose because teachers were still dominant in using approaches, models, methods or learning

strategies which was not in accordance with the character of students. This finding was in line with Wibowo (2017) who revealed that teachers tend to use the lecture and assignment learning methods in the classroom. Teachers have not designed interactive learning materials either in direct learning or online. The level of teachers' creativity still not optimal in the learning process in the classroom in teaching mathematics subject. The problems described above caused by the impact of Covid-19 which has forced all learning to shift from face-to-face learning to online learning. The Covid-19 pandemic has triggered an emergency in the provision of education on an unprecedented scale in the world, especially in Indonesia (Reuge et al., 2021., Minardi et al., 2020, and Kaffenberger, 2021).

The problems above indicate that in order to achieve good mathematics learning outcomes, need to apply a learning model which in accordance with the student's character and also the character of the material. For this reason, the authors chose the Problem Based Learning to be applied with the aim of improving mathematics learning outcomes for sixth grade students at SD Negeri Jatinom, Klaten Regency. Problem Based Learning can be interpreted as a learning model that is preceded by problems found in an activity to collect and integrate new knowledge developed by students independently (Alper Aslan, 2021 and Seibert, 2020). With the Problem Based Learning, teaching and learning activities in the learning process itself are targeted to take place naturally in the form of student activities to improve problem solving skills and student independence attitudes, so that students can formulate, complete and interpret mathematics in various situations and contexts (Anjelina Putri et al., 2018., Safithri et al., 2021., and Saputro&Rayahu, 2020). Learning activities begin by giving various problems according to the learning material, then carrying out problem identification activities, students join study groups to conduct discussions in order to equalize perceptions of the problems that have been identified, then develop a series of problem solving based on the results of the discussion and the objectives to be achieved at the end of the learning activities (Ariyanti& Kristin, 2021).

Previous empirical studies have shown that the application of the Problem Based Learning could improve the learning outcomes of elementary school students. The results of Hendriana's research (2018) shown that the application of the Problem Based Learning to students with auditory learning styles has an influence on learning outcomes with an effect size of 0.32 with the criteria for the size of the effect size being in the medium category. The results of the research above are in line with the results of research conducted by Aji &Mediatati (2021) where the results of the study indicate an increase in students' learning outcomes and students' thinking skills. The Problem Based Learning besides being proven to be able to improve students' learning outcomes, it is can also increase students' activity in learning and build collaboration among students in solving the problems posed (Marwati et al., 2020., Irwan&Mansurdi, 2020. , Astuti et al., 2021., &Junaedi, 2021).

According to Alper Aslan (2021) the problem based learning is defined as a learning model which is preceded by problems found in an activity to collect and integrate new knowledge developed by students independently. The Problem Based Learning is targeted to take place naturally in the form of student activities to improve the students' problem solving skills and independence attitudes, so that students can formulate, complete and interpret mathematics in various situations and contexts (Anjelina Putri et al. , 2018., Safithri et al., 2021., and Saputro & Rayahu, 2020). Furthermore, Ariyanti & Kristin (2021) learning activities in Problem Based Learning begin by giving various problems according to the learning material, then carrying out problem identification activities, students join study groups to set the discussions in order to equalize perceptions of problems which have been identified, then arrange a series of problem solving based on the results of the discussion and the objectives to be achieved at the end of the lesson.

Rusman (2013) explains that the characteristics of Problem Based Learning are problems being a starting point in learning, problems raised are problems that exist in the real world that are not structured, problems require multiple perspectives, problems, challenge the knowledge possessed by students, attitudes, and competencies which then require the identification of learning needs and new areas of learning. Learning self-direction is the main thing, the use of various sources of knowledge, their use, and evaluation of information sources is an essential process in the learning process is collaborative, communication, and cooperative. The development of inquiry and problem solving skills is as important as mastering the content of knowledge to find a solution to a problem. The openness of the learning process includes the synthesis and integration of a learning process. The learning process involves evaluating and reviewing student experiences and the learning process.

According to Arends (1997) describes the special characteristics of Problem Based Learning (PBL) there are five things, namely: driving question or problems, interdisciplinary focus, authentic investigation, producing of artifacts and exhibit, and collaboration. Driving question or problems. First, Problem Based Learning (PBL) is more about organizing lessons around questions or problems that are socially important or meaningful personally rather than organizing on certain academic principles. Problem Based Learning is addressed to real situations, which avoid simple answers, in which there are various solutions with various interests. Second, interdisciplinary focus. Problem

Based Learning (PBL) is selected on problems that involve several disciplines. Examples of pollution problems due to the use of fertilizers by farmers will involve biology, economics, social, tourism and government.

Third, authentic investigation. Problem Based Learning requires following authentic investigations, looking for real solutions to real problems. Students must analyze and formulate problems, develop hypotheses and make predictions, collect and analyze information, conduct experiments, draw conclusions. Fourth, producing of artifacts and exhibit. In Problem Based Learning students are required to compile a product in an artifact and exhibit that explains or shows the solution. Products can be reports, physical models, computer programs. This product was compiled by students to demonstrate to other students. Collaboration in problem based learning is characterized by working with other people, mostly in pairs or small groups, and the development of thinking skills and social skills.

RESEARCH METHOD

The research design used by the researcher is a class action research type of individual action research. According to Sugiyono (2018), action research is a scientific way to obtain data with the aim of finding new problems and actions that can be used to solve problems, improve or improve work situations. To obtain effective and efficient action, the action is tested through several cycles, until a consistent action is found that can improve the situation. Meanwhile, individual action research is research conducted individually on social situations on a small scale such as in organization, production, and class.

This research was conducted at Jatinom Elementary School, Klaten Regency, Indonesia in 2021-2022 Academic Year. The subjects of this study were sixth grader students of SD Negeri Jatinom, Klaten Regency, Indonesia with total of 28 students. The type of data in this study was quantitative data in ordinal form. Ordinal data is quantitative data in the form of rankings taken from measurement results (Sugiyono, 2019). The instrument used to collect data was student learning outcome test in the form of multiple choice consisting of four choices. Data were collected through written exam at Jatinom Elementary School, Klaten Regency, Indonesia. The data were analyzed descriptively to describe and explain the improvement of student learning outcomes based on the cycle. The method used to analyze the data from this research was descriptive method. For quantitative data, it was analyzed by finding the mean, median, mode, and presenting it in tabular form. The data were analyzed to explain the results of the actions given in each research cycle and to compare the results of the actions given between one cycle and another. The research procedure can be seen below:

1. Planning

At this stage the researcher develops the lesson plan in accordance with the provisions of the national curriculum policy at the elementary school level, namely a scientific and thematic-based learning plan. In developing problem based scientific and thematic learning plans, the writer consulted with other teachers and expert to create instruments and develop teaching materials. At the preparation stage, an agreement was made between the subject teachers. The design was carried out jointly between researchers who will take action with other teachers.

2. Actuating

The implementation stage of the action was carried out by learning in class VI SD Negeri Jatinom, Klaten Regency, Indonesia. At this stage, the researcher was active in taking action using the Problem Based Learning. This learning design has previously been carefully studied to be applied in the classroom according to the learning steps based on the syntax of the problem-based learning model. Learning scenarios are implemented effectively.

3. Observing

This stage actually runs concurrently with the implementation of learning. Observations were made when the action was running. At this stage the teacher who acts as researcher made observations and recorded all things which occurred during the implementation of the ongoing learning. This data collection was carried out using students' achievement tests, including the results of careful observations in the classroom from time to time and their impact on student learning processes and outcomes.

4. Reflecting

This stage was intended to thoroughly review the actions that have been taken, based on the data that has been collected, then evaluation was carried out in order to perfect the next action. Reflection in research includes analysis, synthesis, and assessment of the results of observations of the actions taken. If there were problems from the reflection process, a review process was carried out through the next cycle which included activities re-planning, re-action, and re-observation so that problems can be resolved.

RESEARCH RESULTS AND DISCUSSION

1. The First Cycle Result

In order to apply the Problem Based Learning in the first cycle, set study schedule for 4 meetings were held. Researchers made observations in the first cycle after the learning process using the Problem Based Learning \ was

completed in 4 meetings. The next step was that researcher give exams to students to measure student learning outcomes. The results of observations in first cycle can be seen in the following table below.

Table 1. Student Learning Outcomes of First Cycle

Criteria	Scores
Score Totally	2.060
Evarage	53.57
Highset Score	90
Lowest Score	50
Median	80
Modus	60
Number of Students Passing	16
Number of Students Not Passing	12
Passing Percentage	57.15%

2. The Second Cycle Result

In the second cycle, the learning process was carried out for 4 meetings. Researcher tried to improve the shortcomings and weaknesses which occurred when carrying out the process of giving action in the previous cycle. Some of the important steps carried out can be described as follows. Researcher made observations in second cycle after the learning process using the Problem Based Learning was completed in 4 meetings. The next step was the researcher gave exams to students to measure students' learning outcomes whether there was an increase or not. The results of observations in second cycle can be seen in the following table below.

Table 2. Student Learning Outcomes of Second Cycle

Criteria	Scores
Score Totally	2.450
Evarage	87.5
Highset Score	100
Lowest Score	70
Median	80
Modus	80
Number of Students Passing	28
Number of Students Not Passing	0
Passing Percentage	100%

3. Discussions

Empirically the application of the Problem Based Learning was proven to be able to improve mathematics learning outcomes for sixth grader students at SD Negeri Jatinom, Klaten Regency, Indonesia. This can be seen from the increase in students' mathematics learning outcomes from first cycle to second cycle of 33.93%. In the first cycle, students' mathematics learning outcomes have not reached the standard of completeness set because the implementation of the Problem Based Learning has not been optimally implemented. Students' mathematics learning outcomes in the first cycle were shown by an average score of 53.57 with a passing grade of 57.15%. This learning result has increased after giving re-treatment in the second cycle of 87.5 with a passing grade of 100%. This learning outcome increased because the learning design which was based on the steps of the Problem Based Learning was increasingly refined based on the deficiencies in the first cycle stage. The researcher analyzed the students' weaknesses in the mathematics learning process based on the results of observations and reflections on the previous teaching material. Next, made improvements to the mathematics learning process in the second cycle.

After applying the steps of the Problem Based Learning, students' mathematics learning outcomes have increased in each cycles. Ariyanti & Kristin (2021) suggested that the steps of Problem Based Learning began with giving students problems. In this step students in the class are guided by the teacher to focus on the core learning problems that will be discussed. Students easily understand what learning materials and learning targets must be achieved. This activity provides an opportunity for students to find the most appropriate way to identify problems and formulate ways to solve problems. This is in line with Safithri et al., (2021) and Saputro & Rayahu (2020) which explain that the problem-based learning model takes place naturally in the form of students' activities to improve problem-solving skills and student independence attitudes, both studying in groups and individually.

The main characteristic of the application of the Problem Based Learning is a learning model which is designed based on problems and students in groups find patterns and techniques to solve learning problems. In

learning group, students can work together to find solutions. Through discussion in study groups, students can formulate, complete and interpret mathematics in various situations and contexts (Anjelina Putri et al., 2018 and Marwati et al., 2020). Through this learning, students in groups can relate learning materials to real conditions in everyday life to understand the proportion of problems that are being solved together. This activity can improve collaboration, complete understanding, students' critical thinking skills, self-confidence, and feel happy in participating in the mathematics learning process in the classroom. Previous research has also shown that learning group can encourage students to be more critical and able to build knowledge independently after successfully solving problems given by the teacher (Febrita&Harni, 2020 and Junaedi, 2021).

CONCLUSSIONS

Based on the results of the research and discussion above, the results of this study can be concluded that:

1. The application of problem-based learning models can improve mathematics learning outcomes of sixth grader students at SD Negeri Jatinom, Klaten Regency, Indonesia.
2. The average mathematics learning outcomes of sixth grader students at SD Negeri Jatinom, Klaten Regency, Indonesia, in the first cycle was 53.57 by the passing rate of 57.15%
3. The average mathematics learning outcomes of sixth grader students at SD Negeri Jatinom, Klaten Regency, Indonesia, in the second cycle was 87.5 by the passing grade of 100%.
4. The increase in mathematics learning outcomes of sixth grader students at SD Negeri Jatinom, Klaten Regency, Indonesia, from first cycle to second cycle was 33.93%.
5. The explanation of these results proves that the Problem Based Learning was very effectively applied in the learning process to improve students' learning outcomes in mathematics subjects.

SUGGESTIONS

Based on the results of the research and the conclusions above, the recommended suggestions are as follows:

1. For mathematics teachers at the elementary school level, considering that this model has been proven to be effective in improving student achievement, it is recommended that they try to apply the Problem Based Learning in the learning process carried out.
2. Other researchers, although this research has been able to prove the main effect of the Problem Based Learning in improving learning achievement, it is certain that in this study there are still things that have not been perfectly done, therefore it is recommended to other researchers who are interested in researching the topic and the parts that have not been studied.
3. For education developers, to improve teacher creativity and professionalism, further research is needed to verify the data from this research so that the conclusions obtained are able to provide the validity of the overall use of the model.

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