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Efforts to Improve Learning Activities and Learning Outcomes of Mathematics Integer Materials Through the Application of the PBL Learning Model in Grade VI Elementary School Students

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Abstract
The learning activities of Grade VI students at SD Negeri 2 Tri Eka Buana in mathematics are lacking and tend to be very passive. This can be seen from the absence of students' responses when asked questions, many students seem not interested in working on the questions given and there are still many students who are indifferent. The purpose of carrying out this PTK is to find out whether the application of PBL is able to improve learning activities and student learning outcomes. This research is a PTK type which involves one class. This research was conducted in two cycles where each cycle has the same activity stages, namely Planning, Implementation, Observation and Reflection. The subjects of this study were class VI students in the odd semester of the 2022/2023 school year with a total of 21 students consisting of 7 boys and 14 girls. The classical completeness criterion in mathematics is 65%. Data collection techniques used: (1) Observation sheets of student activity when giving action through observation. (2) Data on students' mathematics learning outcomes were obtained from the learning outcomes test cycle 1 and cycle 2 after being given treatment. The results of this study show that: (1) There was an increase in students' learning activities in the mathematics learning process in cycle 1. Student activity increased by 62.5% in cycle 2 to 70% included in the active category. (2) Student learning outcomes have increased, where cycle 1 reaches 61.9% or 15 students can achieve learning mastery at moderate criteria and in cycle 2 it increases to 76.2% or 18 students achieve learning mastery with high criteria . So it can be concluded that the application of the PBL model is able to increase learning activities and learning outcomes of students in mathematics class VI SD.
Keywords: *Learning activities, learning outcomes, PBL*

INTRODUCTION

In the learning process in the classroom, it will not always be able to run according to the plan made by the teacher. There are times when various problems will arise in the learning process that can hinder the learning process. The problems in learning can come from both students, teachers, learning resources, and the environment. This happened in the mathematics learning process at SD Negeri 2 Tri Eka Buana in grade VI semester I negative integer material which is very lacking and tends to be very passive. This can be seen from the absence of student responses when given questions, many students seem not interested in working on the questions given and there are still many students who are ignorant. When teachers ask about how far their understanding of the material has been mastered, many students who are just silent do not respond, and if given questions or problems they have not been able to solve them.

Dimyati and Mudjiono stated that learning outcomes are the result of the relationship between teaching and learning. According to the teacher's view, the teaching act is completed with a final test to see the learning results. According to the student's view, the learning outcome is the completion of learning and the end of the learning process.[1] Meanwhile, Hamalik stated that learning outcomes are the level of understanding of the material that has been achieved by students in undergoing the learning process in accordance with the learning objectives that have been determined.[2] Meanwhile, Winkel stated that learning outcomes are evidence of the success that has been achieved by students.[3]

Hamzah stated that Mathematics is a science that reviews numbers and their estimates, studies pattern relationships, regarding quantity and magnitude, shapes and structures, discusses numerical problems, sets of systems, means of thinking, structures and tools.[4] Meanwhile, Freudenthal in Wijaya mentioned that Mathematics is a human activity. Mathematics is a process that is developed in the form of students' minds, and Mathematics is a student's experience which is then constructed into a mathematization process.[5]

Looking at the results of the evaluation of Class VI students of SD Negeri 2 Tri Eka Buana for the 2022/2023 school year on integer material with an average score of 50.37 and only 33.33% or only 7 students who completed their studies. This value is very far from the SKBM set at SD Negeri 2 Tri Eka Buana, which is 65%. In order to improve learning activities and student learning outcomes, it is necessary to improve learning methods but still adjust to other learning components.

The learning model that is compatible with the Sub Subject of Integer discussion is the PBL model. The PBL model is expected to be applied in schools to maximize learning activities and students' mathematics learning outcomes. In the PBL model, students' abilities are really optimized through a cooperative or group process, so that students can

[1] Dimyati, Mudjiono. 2013. Learning and learning. Jakarta: Rineka Cipta
[2] Hamalik, Oemar. 2014. Curriculum and Learning. Jakarta: Bumi Aksara
[3] W.S. Winkel. 2009. Educational Psychology and Learning Evaluation. Jakarta: Gramedia.
[4] Hamzah et al. 2014. Mathematics Learning Planning and Strategies. Jakarta: PT. King Grafindo Persada.
[5] Wijaya, Ariyadi. 2012. Realistic Mathematics Education: An Alternative Approach to Mathematics Learning. Yogyakarta: Graha Ilmu

deceive, hone, test and develop their potential in a sustainable manner.

According to Farida. S in Syarifudin that PBL is a learning model that allows students to solve practicum problems that can increase students' curiosity and motivation. The PBL model is also a place for students to be able to maximize their critical thinking skills and higher thinking skills.[6] Meanwhile, according to Marlina, PBL is a type of active learning that can make students determine and recognize their ability to solve problems, and carry out team discussions to work on problems in life.[7] According to Vitasari, the Problem-Based Learning model is a learning based on constructivism that emphasizes more skills in solving problems and building students' mentality so that they can think critically in understanding problems and solving the problems they face.[8]

Learning with the PBL Model during learning activities students will work together in groups, so that there will be interaction between teachers, students and learning media when learning activities take place and most of the activities that occur in learning are carried out by students, here the teacher only plays a role as a facilitator and motivator for students. So that during solving the problems they face, the concept of material is instilled by the students themselves. When learning with the PBL model takes place, students find solutions to all problems given by the teacher using the available learning media. Therefore, creativity and independence from students are needed.[9]

In certain materials, problem-solving efforts are very efficiently applied, for example in environmental materials, various natural and social phenomena that occur on earth become major problems for human survival due to imbalances in environmental conditions. For example, land clearing for residential purposes indirectly damages the existence of forests as a deviation of clean water reserves. Until now, teachers have not been able to explain to students about such matters, so PTK was developed as an effort to solve problems that are considered serious and need special handling. The description of the change in students' attitudes while participating in mathematics lessons with the PBL learning model is inseparable from discussing the attention, seriousness, motivation, and activeness of students.

Based on the above explanation, it can be concluded that the application of PBL learning during learning can motivate students and interaction in learning will make student learning outcomes increase. It can even be possible with PBL, students will get maximum learning results. Based on the above explanation, the problems studied in this study are: (1) Can the implementation of PBL maximize mathematics learning activities in grade VI of SD Negeri 2 Tri Eka Buana in the first semester of the 2022/2023 Academic Year? (2) Is the implementation of PBL able to increase the learning outcomes of mathematics in grade VI of SD Negeri 2 Tri Eka Buana in the first semester of the 2022/2023 Academic Year?.

The objectives of the implementation of this PTK are (1) To find out whether the implementation of PBL can maximize mathematics learning activities in grade VI of SD Negeri 2 Tri Eka Buana in the first semester of the 2022/2023 Academic Year? (2) To

[6] Syarifudin, Hendra. 2021. Journal of Mathematics and Science Education, (Online), Vol.9, No.1
[7] Marlina Utaya and Yuliati, L. 2017. Journal of Education, (online), Vol.2, No.11
[8] Vitasari, Rizka. 2016. Journal of Education (Online), Vol.4, No.3
[9] Fauzia, Hadith. 2018. Journal of Elementary School Teacher Education (Online), Vol.7, No.1,

find out whether the implementation of PBL is able to increase the learning outcomes of mathematics in grade VI of SD Negeri 2 Tri Eka Buana in the first semester of the 2022/2023 Academic Year?.

METHOD

This research is a type of classroom action research (PTK), which is carried out in several stages. According to Rochiati in Arista, PTK is a reflective research by carrying out actions that can improve and maximize practices in the classroom.[10] Cycle 1 and cycle 2 scenarios in the PBL model can be seen in the figure below:

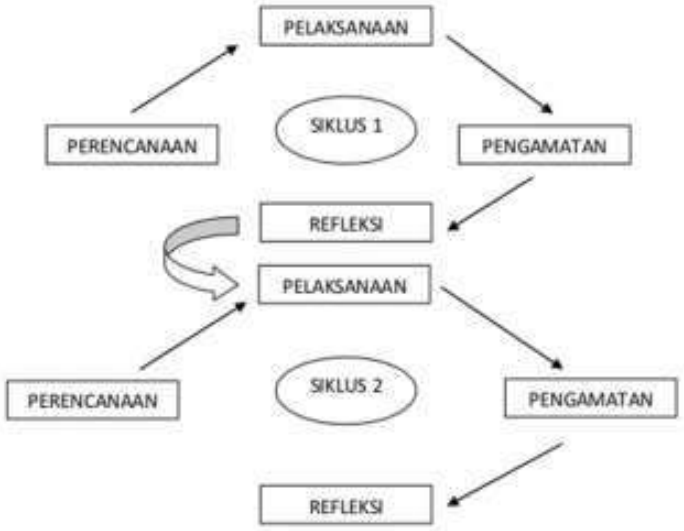

Figure 1. Classroom Action Research Cycle

In the implementation of the current Classroom Action Research program, the researcher takes a location at the place where the researcher teaches, namely at SD Negeri 2 Tri Eka Buana, the odd semester of the 2022/2023 Academic Year, which is carried out in 2 cycles. The researcher is currently teaching in class VI Semester I of the 2022/2023 Academic Year with a total of 21 students, consisting of 7 boys and 7 girls.

This research will be carried out in at least two cycles, namely cycle 1 and cycle 2. Where each cycle is carried out 4 meetings with details of meetings 1, 2, and 3 of providing material and meeting 4 evaluation at the end of the cycle, where each cycle has the same stage of activities, namely Planning, Implementation, Observation and Reflection. At the planning stage, it is carried out by preparing lesson plans in accordance with the PBL model, preparing media, preparing student worksheets (LKPD), preparing evaluation tools, and compiling observation sheets. At the implementation stage, it is carried out in accordance with the RPP. Then at the observation stage, the teacher observes the course of the learning process while filling out an observation sheet to see the ability of students' activities during learning. At the end of each meeting, students are given a test to see how far the knowledge has been mastered. Finally, at the stage of teacher reflection, the assessment of the success or failure of teachers in teaching.

[10] Arista, Nining. 2017. Mathematics Education Study Program, University of Muhammadiyah Makassar.

Reflection can help to find out the shortcomings during the learning and then be used as a consideration to prepare an improvement plan for the next cycle.

The data collection technique in this study is by using observation data and test techniques. Students' activities can be measured by looking at observation sheets. The

$$\text{persentase} = \frac{\textit{skor yang diperoleh}}{\textit{skor maksimal}} \times 100$$

observation results were then analyzed in a qualitative descriptive manner using assessment techniques. The assessment criteria used in determining the success rate of the assessment refer to the technique of teragorization of learning activities according to Nurhadi in Arista using the following formula:[11]

Table. 1
Assessment of Student Learning Activities

Kategori	Interval
Tidak Aktif	< 25 persen
Kurang Aktif	25 persen ≤ x < 50 persen
Aktif	50 persen ≤ x < 75 persen
Sangat Aktif	≥ 75 persen

In this study, the data analysis used to determine the learning outcomes of mathematics was using quantitative descriptive analysis and the percentage value of the increase in learning outcomes from cycle 1 to cycle 2. In calculating the percentage of learning completeness classically, the researcher uses the following formula:

$$\text{Nilai perolehan siswa} = \frac{\textit{skor yang diperoleh}}{\textit{skor maksimal}} \times 100$$

Table 2.

[11] Arista, Nining. 2017. Mathematics Education Study Program, University of Muhammadiyah Makassar.

Classical Completeness of Student Learning Outcomes

Nilai Kategori	Kriteria
86-100	Sangat tinggi
76-85	Tinggi
60-75	Sedang
55-59	Rendah
<55	Sangat rendah

The indicator of the success of the implementation of PTK is if mathematics learning activities increase as seen based on the number of active students more than 60% and also if the mathematics learning results of students increase marked by the number of students who reach the standard of learning completeness ≥65%

RESULTS AND DISCUSSION

This research was conducted based on the initial condition that grade VI students of SD Negeri 2 Tri Eka Buana are still not active in learning and still lack the ability of students when working on integer counting operation problems. In detail, the ability to do integer counting operation problems is as follows: 33.33% of students (7 students) had results exceeding the KKM and 66.67% of students (14 students) had results below the KKM, with an average student score of 50.37. Based on the initial conditions above, then action was taken by applying the PBL learning model to improve learning activities and student learning outcomes in mathematics lessons of integer operation material.

a. Increasing Student Activities

The results of observations in cycle 1 show that learning activities through the PBL model in cycle 1 received a percentage score of 62.5% and were in the good category. In cycle 1, there are still several aspects that need to be improved, namely: (1) Some students are still not active in discussions (2) some students still do not dare to express their opinions. (3) Some students still do not dare to answer the questions asked by the teacher.

In cycle 2, the results of observations during learning showed that students' learning activities during the implementation of the PBL model increased in cycle 2 by obtaining a percentage score of 70% in the good category. This increase in activity is due to teachers using a learning model that is rarely used, by using a new learning model, students are also more interested in learning, so that student activity also increases. For the increase in the activities of students in grade VI of SD Negeri 2 Tri Eka Buana, you can see the table and diagram below:

Table 3.

Increasing Student Activities in Cycle 1 and Cycle 2

Siklus	Nilai	kategori
Siklus 1	62,5%	Aktif
Siklus 2	70%	Aktif

Sumber: Data Olahan

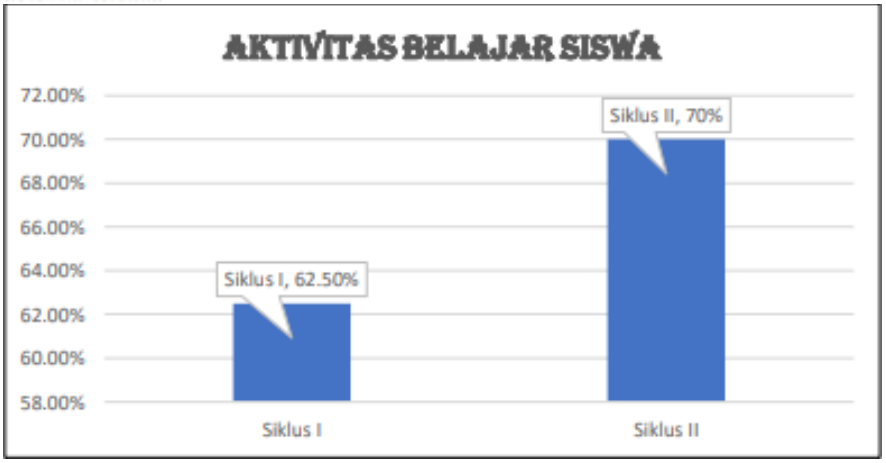

Figure 2. Diagram of Average Grade Students' Activity in Class VI

Based on Table 3 and Figure 2, it can be known that the value of student activities in learning the PBL model during 2 cycles, namely cycle 1 obtained a value of 62.5% of the active category while cycle 2 is 70% of the active category. The increase in activity obtained from cycle 1 to cycle 2 was 7.5%. This proves that the application of the PBL model can increase students' learning activities and make students enthusiastic about participating in learning and their learning motivation to be better.

b. Improving Student Learning Outcomes

In cycle 1, based on the results of the evaluation test conducted by students, it can be found that 13 (61.9%) students completed their studies, while 8 (38.09%) students did not complete their studies with an average score of 65.2. Based on the KKM set at SD Negeri 2 Tri Eka Buana, students are declared complete in learning if they get an individual completeness score of at least 62 and classically complete learning if 65% of students in class VI complete their studies. Based on these achievements, it can be concluded that the completeness of students' learning classically for cycle 1 has not been achieved. In cycle 1, students' ability to reason and work on story-based questions needs to be improved.

In Cycle 2, based on the results of the evaluation test conducted by students, it can be found that 76.25 students or 16 students have completed their studies, while 23.8% of students or 5 students still have not completed their studies, with an average score of 69.95. Based on the KKM set at SD Negeri 2 Tri Eka Buana, students are declared complete if they get an individual score of at least 62 and classical completeness if 65% of students in class VI complete their studies. Based on these achievements, it can be concluded that the classical completeness of students for cycle 2 has been achieved. For more detailed results, you can see the table and diagram

below:

Table 4.
Improving Student Learning Outcomes in Cycle 1 and Cycle 2

Siklus	Rata-rata Nilai	Ketuntasan Belajar	Kriteria
Pra Siklus	50,37	33,33%	Sangat Rendah
Siklus I	65,20	61,90%	Sedang
Siklus 2	69,95	76,20%	Tinggi

Sumber: Data Olahan

Figure 3. Diagram of Improving Student Learning Outcomes

Based on Table 4 and Figure 3 above, it can be seen that the percentage of students who completed in cycle 1 was 61.9% or 13 students and those who had not completed were 38.1% or 8 students. The percentage increase from pre-action to cycle 1 was from 33.33% to 61.9% with an average score of 65.2. The category of student completeness in classical learning is to reach 65%, so that the completeness of student learning classically in cycle 1 has not been achieved. Furthermore, in cycle 2, the percentage of students who completed was 76.2% or 16 students and those who had not completed 23.8% or 5 students, with an average score of 69.95. The increase in the percentage of students who completed from cycle 1 to cycle 2 was from 61.9% to 76.2%. The category of student completeness in classical learning is if it reaches 65%. Thus, the results of the students' learning test in cycle 2 are classically complete so that the research is not continued to the next cycle.

CONCLUSION

Based on the results of the study, it can be concluded that (1) Students' learning activities during learning using the PBL model in mathematics lessons on integer counting

operations, have increased, namely in cycle 1 reaching 62.5% and cycle 2 to 70% in the good category. (2) The learning outcomes of students using the PBL model in mathematics lessons of integer counting operations in grade VI were able to increase the learning outcomes of students with a percentage in cycle 1 reaching 61.9%, namely 13 students who achieved learning completeness with medium criteria and in cycle 2 increased to 76.2%, namely 16 students achieved learning completeness with high criteria.

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