



The Effectiveness of the Problem Based Learning Model on Elementary School Students' Mathematics Learning Outcomes

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Abstract: This research aims to improve student learning outcomes in mathematics learning by implementing a problem-based learning model. This research is experimental research. The research design used is one group design. The sample for this research was class VI MIN 3 West Aceh students. The data in this research was collected using observation and test techniques. The data obtained was then analyzed using descriptive statistical techniques and t-test. The results of the research show that the problem-based learning model has a significant impact on student learning outcomes in class VI mathematics at SD Islam Negeri 3 Aceh Barat. This is proven by the t-test results which show that the significance value is <0.005 , which means there is a difference between before and after treatment. Based on these results, it can be concluded that the problem-based learning model can be used as a model that can overcome the problem of low student mathematics learning outcomes at elementary school level.

Keywords: problem based learning, learning outcomes, mathematics, elementary school student.

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INTRODUCTION

The world of education, especially in Madrasah Ibtidaiyah, is the basis of a consistent formal education process (Silvia et al., 2023). To respond to developments in science and technology, the quality of education in elementary schools must be improved (Nurliza et al., 2024). One way to achieve increased results in the learning process is to improve the quality of learning (Dasopang et al., 2023; Lubis, 2019; Putra et al., 2023; Siraj et al., 2023). This can be achieved by teachers who use innovative learning approaches by putting students at the center of learning and giving them opportunities to learn.

Basically, the development of elementary school age students is at the concrete operational stage, according to Peaget in Nyimas Aisyah et al. (2007: 14). This has an impact on students' difficulty understanding abstract concepts (Kimianti & Prasetyo, 2019; Lubis et al., 2022). Students at the preoperational stage do not understand conservation laws, so they will not understand the concept of large addition when taught (Lubis, 2023; Lubis & Lubis, 2024). Students at the concrete operations stage understand

conservation laws, but they cannot think deductively, so they will not be able to understand mathematical proofs. This means that the mathematics learning approach must be appropriate to the child's cognitive development and level of thinking (Lubis & Dasopang, 2020). As a result, it is hoped that mathematics learning in elementary schools will be more enjoyable and effective. In elementary school, the goal of teaching mathematics is for students to have knowledge.

Facts in the field show that many mathematics subjects fail to achieve a completion score of 70 based on the Minimum Completeness Criteria (KKM) MIN 3 West Aceh. The results of individual tests carried out after classical mathematics learning which is usually carried out so far show that 34 students have progress in completing learning outcomes: 35.3% (12 students) are considered good, 64.7% (22 students) are considered poor or below the standard value considered unfavorable. In addition, mathematics is considered difficult because most teachers deliver lessons in a way that is not up to standard.

The results above indicate that mathematics learning must be improved to improve the quality of educational outcomes. Therefore, researchers want to improve the mathematics learning outcomes of class VI MIN 3 West Aceh students in the 2023/2024 school year by solving the problem of dividing two whole numbers. Considering how important mathematics and its problems are, this effort should begin by improving the teacher's learning process by offering a learning approach with a learning concept that encourages teachers to connect the material taught with students' real-world situations. In addition, this approach also encourages students to make connections between what they know and what they are learning

One learning model that can be created and used to make students the center of learning is the application of the Problem Based Learning model. The problem based learning model is a learning approach that confronts students with practical problems or learning that begins with giving a problem and has a context with the real world (Mustofa & Hidayah, 2020). The scope of this research problem is limited to the use of the problem based learning model in an effort to improve learning outcomes in Mathematics Learning on Number Elements in Integer Counting Operation material, so the formulation of the problem in this research is whether the Problem Based Learning model can improve the mathematics learning outcomes of class VI MIN 3 students West Aceh. In accordance with the problem formulation described above, the aim of this research is to determine the improvement in mathematics learning outcomes through the Problem Based Learning model in class VI MIN 3 West Aceh students.

METHODS

This type of research is pre-experimental research involving one class as an experimental class with the aim of finding out the effectiveness of mathematics learning through the application of the Problem Based Learning (PBL) Model in class VI MIN 3 West Aceh students. The design in this research is one group Pretest-Posttest (The One Group Pretest Posttest Design) which is included in pre-experimental research.

The population of this study was all students in class VI/A MIN 3 Aceh. Sampling in this study used "saturated sampling", namely a sample determination technique when all members of the population are used as samples and given treatment, namely using a problem based learning model. Therefore, the sample for this study was all students in class VI/A MIN 3 West Aceh.

The data collection techniques used in this research were observation, questionnaires and tests. Observation is used to observe student learning activities during learning using the problem based learning model. Furthermore, questionnaires are used to measure student responses when following the learning process using the problem based learning model. Meanwhile, tests are used to measure improvements in students' mathematics learning outcomes using the problem based learning model in mathematics

learning. The data obtained were analyzed using descriptive statistical techniques and t-test.

RESULTS

In this section, the author will describe the results obtained from research regarding improving student learning outcomes in the Sub-theme of My Obligations and Rights as a Citizen in class III MIN 3 West Aceh. Based on observations of learning outcomes in class III MIN 3 West Aceh before the research carried out in semester 1 of the 2022/2023 academic year, it showed that student learning outcomes were less than satisfactory. This can be seen from the mid-semester test data that has taken place, there are still many students' learning outcomes that are still below the KKM determined by the school for class III Mathematics, namely 70. The reason why Mathematics learning outcomes are still low is that teachers' strategies have not been maximized in attracting students' attention to learning. The learning carried out has not motivated students to be active in learning, and students have not actively participated in learning.

Based on the analysis of student learning outcomes through the use of the Problem Based Learning model in Mathematics learning in the problem solving material for integer arithmetic operations taught in class VI MIN 3 West Aceh, it shows that there is an increase for each cycle. From the average student learning outcomes in each cycle, namely in cycle I, namely 70.15 and cycle II, namely 84.41. Likewise with the percentage of student learning completeness, namely for cycle I it was 64.71% and for cycle II it was 91.17%.

Based on the results of research and analysis of data regarding teacher activity that has been obtained, it shows that the average Teacher Activity Level (TAG) during the use of the Problem Based Learning (PBL) model in problem solving material for integer arithmetic operations for each cycle starting from cycle I to cycle II has increased. This shows that there are improvement efforts made by teachers in using the Problem Based Learning (PBL) model in Mathematics learning on round month counting operation material taught in class VI MIN 3 West Aceh for each cycle.

The average level of teacher activity in cycle I was 3.47 and cycle II was 4.58, so that what was given to students really understood. These results are also supported by field notes during research or implementation of actions, that teachers in each learning process through the use of the Problem Based Learning (PBL) model for each cycle always try to create a conducive learning atmosphere, so that students are not afraid of participating in Mathematics learning..

The research results based on the teacher observer's assessment of student activity show an increase in student activity for each cycle. This is clearly visible from the results of the Student Activity Level (TAS) analysis. The average score for cycle I was 3.16 and the average TAS score for cycle II was 4.25. Likewise, the percentage of Student Activity Level (TAS) showed an increase, namely for cycle I with a value of 63.33% and for cycle II with a value of 85.00%. These results prove that in the learning process through the use of the Problem Based Learning (PBL) model in solving integer arithmetic operation problems, the teacher always tries to maximize student activity during learning.

DISCUSSION

The completeness of student learning is caused by the application of the problem based learning model. The problem based learning model allows students to solve various problems with the basic concepts provided. This is in accordance with the findings of Darwati & Purana (2021) which states that the aim of implementing the problem based learning model is to familiarize students with solving problems with the concepts that have been given. Furthermore, Amin et al. (2020) stated that the process of solving problems in learning that applies the problem based learning model will be able to help

students understand the teaching material easily because they have implemented it through problem solving.

The problem based learning model also increases learning activities. This is because students are actively involved in the learning process. Fatwa et al. (2023) in their findings stated that the application of the problem based learning model in learning allows students to be actively involved in the problem solving process. Furthermore, Dasopang et al. (2022) stated that student activity in the learning process will be directly proportional to the ease of achieving learning goals. In line with these findings, Mustofa & Hidayah (2020) stated that the problem based learning model is one solution that can solve the problem of low learning activity.

CONCLUSION

Based on the research results that have been obtained, it can be concluded that during the learning process using the Problem Based Learning (PBL) model on the material for solving problems with integer counting operations in class VI MIN 3 West Aceh. Judging from the results of the data analysis of student learning outcomes in cycle I, it was 64.71%, the percentage of student learning completeness in cycle II was 91.18%. Thus, the learning outcomes obtained by students were through the use of the Problem Based Learning (PBL) model in Mathematics learning in arithmetic operations. Integers taught in class III MIN 3 West Aceh have increased for each cycle, so they are complete. Not only did the results increase, student activity also appeared to increase so that students became more active.

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