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The Implementation of Problem Based Learning to Improve the Mathematics Passing Grade among Primary School Students in Central Java, Indonesia

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1. Abstract

This study was structured with the aim of improving thematic learning outcomes of mathematics subjects through a problem based learning (PBL) learning model for third grade students of SD Negeri 1 Kragilan,gantiwarno, Klaten for the 2021/2022 academic year. Learning outcomes are the abilities that students have after they receive their learning experiences. This type of research is Classroom Action Research (CAR). The design of this study uses the Kemmis and Mc. Taggart. This research was conducted in the even semester of the 2021/2022 academic year, namely in April. The subjects of this study were third grade students of SD Negeri 1 Kragilan which consisted of 13 students. The object of research is student learning outcomes. Data collection techniques using tests and observations were then analyzed using a quantitative descriptive approach.

The results showed an increase in student learning outcomes, namely in the first cycle of 68.07 (enough), then in the second cycle it increased to 87.30 (very good). This means an increase of 19.23%. Thus, the use of problem based learning (PBL) learning models in Mathematics can improve the learning outcomes of third grade students of SD Negeri 1 Kragilan.

Keywords: *Outcomes, Problem Based Learning, Mathematics*

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2. Introduction

Integrated thematic learning in elementary schools according to the demands of the 2013 Curriculum is a learning approach that integrates several lesson content in one lesson. Some content, for example SBDP, Indonesian and Mathematics are put together in the same theme and then presented in a complete learning that is related to each other.

In the 2013 Curriculum learning practices that the writer has been doing so far, the writer uses student books and teacher books. The author believes that the book is appropriate and good for use in class because it was published by the Ministry of Education and Culture. Apparently, in practice, the writer experienced several difficulties such as the material and assignments did not match the background of the students. Besides that, the writer still focuses on mastering cognitive knowledge which is more concerned with memorizing material. Thus the students' thinking processes are still at level C1 (remembering), understanding (C2), and C3 (application). Teachers almost never carry out learning that is oriented towards higher order thinking skills (HOTS). The author also rarely uses learning media. As a result, the learning atmosphere in the classroom is stiff and the children don't look cheerful.

Based on the results of observations made at SD Negeri 1 Kragilan with class teachers, 60% of students in class III SD Negeri 1 Kragilan did not meet the KKM in learning Mathematics. Observation results with several students obtained information that (a) students were lazy to take part in learning that was mostly carried out by the teacher by means of lectures (b) apart from lectures, the method that was always used by the teacher was assignments. Some students admit that they are bored with tasks that are only theoretical in nature, they just have to copy from the textbook.

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To face the Industrial Revolution 4.0 era, students must be equipped with higher order thinking skills. One of the HOTS-oriented learning models and suggested in the implementation of the 2013 Curriculum is the Problem Based Learning (PBL) learning model. PBL is a learning model that uses a variety of thinking skills from students individually and in groups as well as the real environment to solve problems so that they are meaningful, relevant, and contextual (Tan Onn Seng, 2000). In PBL students are required to be able to use higher thinking skills, especially problem solving abilities. In PBL, the teacher acts as a guide on the side rather than a sage on the stage. This emphasizes the importance of learning aids in the early stages of learning. Students identify what they know and what they do not based on information from textbooks or other sources of information.

3. Methods

3.1. Participants and context

The research model used in this study is the Kemmis and MC Taggart models in Kusumah (2009: 20-21). The research that has been carried out by researchers uses two cycles, that is, if it has been completed with cycle one and the researcher already knows the location of the successes and obstacles, the researcher designs a second cycle, the method and stages are the same as the previous cycle.

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3.2. Material

The model put forward by Kemmis and MC Taggart consists of four components, namely planning, implementing, observing and reflecting. According to Sukardi (2012: 212-213) classroom action research generally consists of four important steps which are described as follows.

1. Action planning (planning)

Action planning (planning) is a series of planned actions that can improve things that have happened and observed before. In preparing the action plan, it must emphasize the characteristics of a strategy that is able to answer the challenges or problems that arise so that the action plan must be forward-oriented.

The things that are arranged in the action plan include those related to learning approaches, learning methods, learning techniques or strategies, learning media, learning materials and so on. This Action Planning is almost the same as the preparation that needs to be done when going to carry out teaching and learning activities.

2. Implementation of Action (acting)

Implementation of the action is the application of the action that has been planned which can include learning strategies, teaching materials, and so on. The implementation of the action needs to be carried out in a controlled and thorough manner and is carried out with care, because it is a practical activity that is planned and assisted or refers to a rational and measurable plan.

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3. Observation

Observation or observation is an act of documenting the implications of the action given to the research subject. Observations can be carried out by researchers alone or by collaborating. At the time of observation, the researcher recorded all the events or things that happened during the study.

Observation or observation needs to be done carefully to overcome the limitations of the actions taken by researchers. Good observation is observation that is flexible and open in observing things that happen in research.

4. Reflection

The fourth step in classroom action research is reflection. Reflection is a means used to review the actions that have been carried out by researchers on research subjects that have been recorded through observation or observation. In the reflection activity the researcher tries to find a logical line of thought to solve problems and obstacles that arise in planning and action. The results of reflection activities can give rise to the possibility that this will happen to the research subject, for example being terminated, modified or continued to the next level.

The four stages in action research according to Arikunto (2012: 20-21) are elements to form a cycle. A cycle is one round of successive activities, which returns to the previous step. The length of time needed for one cycle adjusts to the material being carried out in a certain way.

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3.3. Data Collection and analysis

Data is a collection of facts about a phenomenon, either in the form of numbers (numbers) or in the form of categories, such as: happy, unhappy, good, bad, successful, failed, high, low, which can be processed into information. Information is the result of data processing that can be used for various purposes. There are 4 data collection techniques carried out by researchers, namely:

1. Interview

Data collection techniques used by researchers besides using observation can use interview guidelines. According to Zainal Arifin in 2012. The interview is an activity carried out to obtain information directly by asking questions to the source face to face and the activity is carried out orally. Interviews were used to obtain more in-depth data on matters directly related to research such as the application of certain problem-based learning.

Interviews in this PTK were carried out to collect various data regarding improving student learning outcomes in Mathematics using the Problem Based Learning (PBL) Learning Model. Interviews were conducted before and after the action. Sources of data from interviews were teachers who taught and students of SD Negeri 1 Kragilan which were determined based on the results of the pre-test, namely the three students had different abilities, one student with high ability, one student with medium ability, and one student with low ability. As a supporter in the interview process the researcher uses a number of questions from the problem formulation and theoretical studies that have been prepared by the researcher.

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2. Observation

Observation is an effort made by PTK implementers to record all events and activities that occur while the corrective action is taking place using assistive devices or not. The observation was carried out in class III SD Negeri 1 Kragilan. Observers observe the learning process carried out by researchers.

Observers observe the learning process and collect data about everything students do during the learning process. Observations were made to observe the activities of students and teachers during the learning process using student observation sheets and teacher observation sheets. The observation sheet model used is a type of rating scale. The rating scale is a scale that uses scale answers with a score of 1, 2, 3, and 4. The rating scale is used because it has the advantage of being more accurate and detailed. The data obtained is in the form of numerical data then interpreted in words.

3. Documentation

Another data collection technique used is documentation. According to Arikunto "documentation, from the origin of the word document, which means written things. The researcher uses this technique to obtain data on the number of students, records, school archives, lesson plans, data on grades, attendance lists, books, documents, and so on that are needed during the learning process for third grade students of public elementary schools. 1 Kragilan.

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4. Test

The test is a way to obtain data in measuring the ability of concrete research subjects. The data collection tool in PTK is in the form of a written test. The written test in this study was practice questions (10 items) in the form of 5 multiple choice questions and 5 essay questions in Mathematics class III material Types of angles. Assessment on student multiple choice gets a score of 5 if the answer is correct, and gets a score of 0 (zero) if the answer is wrong, while the assessment on student Essay gets a score of 5 if the answer is correct, and gets a score of 0 (zero) if the answer is wrong. After conducting classroom action research, this test was used to determine the increase in student learning outcomes.

4.1. Limitations to the Study

Assessment on student multiple choice gets a score of 5 if the answer is correct, and gets a score of 0 (zero) if the answer is wrong, while the assessment on student Essay gets a score of 5 if the answer is correct, and gets a score of 0 (zero) if the answer is wrong. After conducting classroom action research, this test was used to determine the increase in student learning outcomes.

5. Results and Discussion

Based on the results of learning activities by applying the Problem Based Learning (PBL) learning model for two cycles it can be carried out well and the teacher's activities in cycle I have increased according to the provisions of predetermined success indicators. The increase in the percentage of observations of teacher activity in cycle I was 73% and cycle

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II scored 91%. Increasing the percentage of observing student activity in cycle I gets a percentage of 75% and cycle II gets a percentage of 94%.

Based on the results of the study test by applying the problem based learning (PBL) learning model to the material Types of angles in the Mathematics subject, the researcher obtained data on improving student learning outcomes by conducting individual written tests from pre-cycle, cycle I to cycle II.

In cycle I the number of students who completed as many as 6 students while 7 students have not completed. The percentage of student learning completeness is 46% with an average value of 68.07. These results do not meet the completeness criteria that have been set, namely 70% and do not meet the criteria for an average score of 68, so they must be carried out in cycle II. Based on the first cycle that students on the material Types of angles are included in the sufficient category 46%.

Student learning outcomes from cycle I with a percentage of 46% increased by 34% to 80% in cycle II. In cycle II the percentage of completeness increased to 80% with details of 13 students completing and 2 students not completing.

Based on these data it can be said that there was a significant increase in learning outcomes from cycle I to cycle II in the material for the types of angles in Mathematics subjects by applying the problem based learning (PBL) learning model. The value that students have achieved the criteria and percentage of learning completeness that has been set on the indicator of success. The conclusion from the results of these data is that the application of the Problem Based Learning (PBL) learning model to the material Types of angles in the Mathematics subject can improve learning outcomes in class III students at SD Negeri 1 Kragilan.

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Based on the explanation above, this research is said to be successful and shows that the Problem Based Learning (PBL) learning model can improve learning outcomes so that students can achieve completeness criteria, especially in Mathematics material for the Mathematics subject for class III SD Negeri 1 Kragilan.

6. Conclusion

The application of the Problem Based Learning (PBL) learning model in improving student learning outcomes in Mathematics subject The types of angles in class III SD Negeri 1 Kragilan have increased in the learning process and are the right model to overcome these problems. This is evident from the results of the percentage of observations of teacher activity in cycle I reaching 73% (enough) experiencing an increase of 18% so that in cycle II it increased to 91% (very good). The increase in the percentage of observations of student activity in cycle I reached 75% (good) increased to 94% (very good) in cycle II. Based on this explanation, it can be concluded that the activities of teachers and students during the learning process have increased significantly.

Student learning outcomes increased after applying the Problem Based Learning (PBL) learning model for the subject matter of Mathematics Types of angles in class III SD Negeri 1 Kragilan. This is evident from the percentage of student learning completeness in pre-cycle getting an average of 58.46 (less than) with a mastery percentage of 23% (very poor), in cycle I got an average grade of one class reaching 68.07 (enough) with a mastery percentage of 46% (enough). Meanwhile, in cycle II, the average grade for one class reached 87.30 (very good) with a completeness percentage of 84% (good). Based on the data in cycle II, it can be said that the average value and percentage of students' mastery

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has increased. The average student score increased by 38% and the percentage of learning completeness increased by 24%.

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