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# Implementation of Problem Based Learning Model to Improve Student Learning Outcomes in Mathematics Learning at MIs Nurul Huda Kecipir

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## ABSTRACT

This study aims to improve student learning outcomes in Islamic religious education learning by using problem based learning. This study is a classroom action research that uses four steps, namely planning, action, observation and reflection. The subjects of this study were students of elementary madrasahs. The data for this study were obtained using test and observation techniques. Tests are used to measure learning outcomes and observations are used to analyze teacher and student learning activities. The data analysis technique used in this study is descriptive statistics by comparing the results obtained with indicators of research success. The results of the study indicate that problem based learning can improve student learning outcomes in Islamic religious education learning. This can be seen from the increase in the percentage of student learning completion in each cycle with details of the pre-cycle 58.71%, the first cycle 76.39% and in the second cycle it increased to 90.66%. Thus, the use of problem based learning can be used as an alternative to improve student learning outcomes in Islamic religious education learning.

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## Introduction

Learning in the classroom, especially at the elementary level (SD/MI) really needs teacher skills in choosing, implementing the right learning methods and strategies so that the learning process becomes lively and not monotonous and not just coming, sitting, being quiet, and listening to the teacher's explanation, learning like this students will feel bored and tired if for hours they only listen to the teacher's explanation, and only interspersed with assignments given by the teacher. Conditions like this occur in most elementary schools (SD/MI) such as at MIS Nurul Huda Kecipir where most of the teachers only use conventional methods in carrying out learning activities such as using

lecture methods and assignments only, so that the learning process that occurs is not lively and monotonous.

The use of lecture methods that are carried out continuously and carried out in all subjects will have an impact on the results of the learning process, possibly less than optimal and can also reduce the childish nature that basically still likes to play, in addition, learning with conventional methods is feared to form a strong individualistic nature in students. Teachers have an important role in determining the quantity and quality of learning that is carried out. Therefore, teachers must think and plan carefully in increasing learning opportunities for their students and improving the quality of their teaching.

The results of a survey that has been conducted specifically on learning mathematics, the concept of addition and subtraction of whole numbers for class II students of MIS Nurul Huda Kecipir, obtained that out of 30 only 9 students got a score above 75 (complete score) and 21 students got a score below KKM (minimum completion criteria) this shows that the quality of mathematics learning so far is still very low, where the average value of the classical student formative test only reached 30%. This shows that so far the conventional learning methods (lectures and assignments) that have been carried out have not been effective and have not been successful and show that the level of mastery of the concept of addition and subtraction of whole numbers is still very low as shown by the achievement of learning outcomes so far.

With the gap between reality and expectations in the learning process, especially in the concept of addition and subtraction of whole numbers that have occurred in class II of MIS Nurul Huda Kecipir, an effort is needed to improve student learning outcomes, one of which is by changing the conventional learning model (lectures and assignments) to a model that is more focused on student abilities and is oriented towards solving problems. This method is called the Problem Based Learning (PBL) method.

The Problem Based Learning (PBL) learning model is a method of introducing students to a case that is related to the material being discussed. Then, students will be asked to find a solution to solve the case/problem. In addition, this method will improve the ability to participate in groups. The results of previous studies conducted by several researchers, including those conducted by Indah Suriyana (2014), showed that learning using the Problem Based Learning (PBL) model increased teacher performance and student learning outcomes. Furthermore, the results of the Edusentris study (2015) showed that there was an increase in student learning outcomes using the Problem Based Learning (PBL) model better than students who did not use the PBL learning model. Meanwhile, the results of research conducted by Ageng Prakoso Rubi (2015) showed that student learning activities and learning outcomes increased by implementing the Problem Based Learning (PBL) model. This learning is centered on students (student oriented). Students in the learning process have the opportunity to be active, both physically and mentally. Based on the results of the description above, the

researcher intends to present the results of improvements in the learning process of the concept of addition and subtraction of whole numbers for class II students of MIS Nurul Huda Kecipir in the 2022/2023 Academic Year, by conducting classroom action research (PTK) with the title: "Implementation of the Problem Based Learning (PBL) Model on the concept of Addition and Subtraction of Whole Numbers to improve the learning outcomes of class 2 students of Nurul Huda Kecipir in the 2022/2023 Academic Year"

## Methods

This research is a type of Classroom Action Research (CAR). Daryanto (2011:1) states that CAR is basically a real activity carried out by teachers in order to improve the quality of learning in their classes. Classroom action research is an observation of learning activities in the form of an action, which is deliberately presented and occurs in a class simultaneously. The procedures and steps of the research follow the basic principles that apply in action research. In detail, the stages in the action research design begin with planning, implementing actions, observing, and reflecting on each cycle and so on until the expected improvement is achieved. CAR starts from the action planning stage after problems are found in learning by identifying the occurrence of problems in the class, followed by implementing actions, observing, and reflecting. The approach used in this study is a qualitative approach, namely describing the actual problems in the field, then reflecting and analyzing them based on supporting theories and continuing with implementing actions in the field. The qualitative approach in this study was used to explore and obtain a clear picture of the classroom situation and student behavior during the learning process.

This study consists of two variables, namely process variables and outcome variables. The process variable in this study is the teacher's ability to use the Problem Based Learning (PBL) learning model. This variable is measured using a structured observation instrument. The observation results were assessed by triangulation participants, namely the head of the madrasah, colleagues as partner researchers, and supervising lecturers. The outcome variable in this study is student learning outcomes. This variable is measured using a knowledge test assessment instrument. Measurement of process variables and outcome variables is carried out in each cycle of actions implemented and used as a reflection for improvement in the next cycle.

The data collection technique used in this study is the test and non-test technique, namely written tests and observations. A written test is a test that is carried out in writing, both questions and answers. Written tests can be in the form of descriptions (essays/subjective) or objective (objective tests). Essay tests are in the form of questions that require students to answer in the form of describing, explaining, discussing, comparing, giving reasons, and other similar forms according to the demands of the question. While objective tests can be in the form of true or false questions, multiple choices, matching, or short answers (fill in the blanks). Observation is the process of

collecting data in research where researchers or observers see the research situation directly. This technique is used by researchers to find out student learning outcomes during learning activities by implementing the Problem Based Learning (PBL) learning model. In addition, researchers observe the student learning process in the form of activeness and answer results when given questions. Documentation is the collection of data from research activities in the form of photos or videos of learning activity results. The data obtained by researchers from this documentation can complement and even strengthen the data from the results of observations and tests conducted.

## Result

In the implementation of this classroom action research, it consists of 3 cycles, and each cycle has 4 stages, namely planning, implementing actions, observation, and reflection. The implementation of cycle 1 research was carried out on Tuesday, September 20, 2022 using the Problem Based Learning (PBL) model in learning Theme 1 Subtheme 3 Learning 1 mathematics learning content on the addition of whole numbers. Planning is the first step taken in research. The activities carried out are: a) Researchers prepare teaching materials on the topic of adding hundreds of numbers; b) Researchers prepare Learning Implementation Plans (RPP); c) Researchers prepare facilities and supporting facilities needed in the learning process; d) Researchers prepare LKPD as material for student discussion; e) Researchers prepare learning instruments, student activity observation sheets about the learning process; f) Researchers prepare evaluation question sheets in the form of formative tests to determine the improvement in student learning outcomes. In this implementation stage, it is the implementation step of the planning stage. The things that will be implemented are the delivery of materials and assessments of the activities carried out by educators and students, whether the activities carried out are in accordance with what was previously planned. The implementation of this action was carried out by the researcher after understanding the previously prepared planning. The objectives to be achieved from delivering this material using learning video media are so that students can more easily understand the lesson material and be more active in learning.

At this observation stage, an observation was carried out related to the implementation of the learning process using the Problem Based Learning (PBL) model. The actions and plans that have been prepared must be truly implemented and observed in order to improve mathematics learning outcomes. This observation is emphasized and focused on the active learning process, as well as the activities carried out by students in their learning. The aspects observed include: Activities in this cycle last for 2 hours of learning (2x30 minutes). There are 5 points observed in the student observation sheet used by the researcher according to the syntax in the PBL learning model, namely student orientation to problems, organizing students, guiding individual and group investigations, developing and presenting work results, and analyzing and

evaluating the problem solving process. The results of student observations obtained a value of 44 or 68.75% and are included in the sufficient category.

Observation of teachers is intended to determine the suitability of teachers in implementing learning steps by applying the Problem Based Learning learning model. In this case, the researcher used 16 assessment points contained in the teacher observation sheet with a value range between 1-4. The number of values obtained in cycle 1 activities from teacher activities with a total score of 46 or 71.9% with a good category. This data was taken to determine how much teacher activity is in implementing learning by applying the Problem Based Learning (PBL) learning model.

In this implementation stage, it is the implementation step of the planning stage. The things that will be implemented are the delivery of materials and assessment of the activities carried out by educators and students, whether the activities carried out are in accordance with what was previously planned. The implementation of this action is carried out by researchers after understanding the previously prepared planning. The objectives to be achieved from the delivery of this material using learning video media are so that students can more easily understand the lesson material and be more active in learning. At this observation stage, an observation is carried out related to the implementation of the learning process using the Problem Based Learning (PBL) model. The actions and plans that have been prepared must be truly implemented and observed in order to improve mathematics learning outcomes. This observation is emphasized and focused on the active learning process, as well as the activities carried out by students in their learning. The aspects observed include: a) Student Observation Results. Activities in this cycle last for 2 learning hours (2x30 minutes). There are 5 points observed in the student observation sheet used by the researcher according to the syntax in the PBL learning model, namely student orientation to the problem, organizing students, guiding individual and group investigations, developing and presenting work results, and analyzing and evaluating the problem solving process. The results of student observations obtained a value of 53 or 82.8% and are included in the Good category; b) Teacher observation results. Observations of teachers are intended to determine the suitability of teachers in implementing learning steps by applying the Problem Based Learning learning model. In this case, the researcher used 16 assessment points contained in the teacher observation sheet with a value range between 1-4. The number of values obtained in cycle II activities from teacher activities with a total score of 53 or 82.8% with a Good category. This data was taken to determine how much teacher activity is in implementing learning by applying the Problem Based Learning (PBL) learning model; c) Student Learning Outcomes in Cycle II. Based on the analysis of the results of the learning evaluation in cycle II, the following data were obtained: out of 30 students in class 2, 23 students obtained scores above / equal to the KKM score determined by the Madrasah, namely 75 (Complete), while 7 students obtained scores below KKM (Not Complete).

Based on the picture above, it is shown that the learning outcomes of class 2 students of MIS Nurul Huda Kecipir in the 2022/2023 Academic Year have not reached the classical completion rate of 85% or more and there are still some students who have not reached the KKM score. From the results of the analysis of the learning evaluation scores in cycle II above, there are 76.7% of students who have completed the KKM and 23.3% of students who have not completed the KKM. Based on the PTK Research Success Indicator, it can be concluded that the success indicator has not been achieved, so it is necessary to pay attention and make improvements in the next cycle. After conducting observations or observations of the classroom action research that has been carried out, the next step is to reflect. In this reflection activity, activities are carried out which include analyzing, understanding, and making conclusions about the course of the learning process. From the results of the analysis of learning evaluation and student activities, it can be concluded that the learning activities in cycle II have not achieved the success indicators. This is because there are still obstacles/problems that occur in cycle II.

At this observation stage, an observation is carried out related to the implementation of the learning process using the Problem Based Learning (PBL) model. The actions and plans that have been prepared must be truly implemented and observed in order to improve mathematics learning outcomes. This observation is emphasized and focused on the active learning process, as well as the activities carried out by students in their learning. The aspects observed include. Activities in this cycle last for 2 learning hours (2x30 minutes). There are 5 points observed in the student observation sheet used by the researcher in accordance with the syntax in the PBL learning model, namely student orientation to problems, organizing students, guiding individual and group investigations, developing and presenting work results, and analyzing and evaluating the problem solving process. The results of student observations obtained a value of 60 or 93.8% and are included in the Very Good category. Data was obtained during the learning process using the Problem Based Learning (PBL) learning model. Observations of teachers are intended to determine the suitability of teachers in implementing learning steps by applying the Problem Based Learning learning model. In this case, the researcher used 16 assessment points contained in the teacher observation sheet with a value range between 1-4. The total value obtained in cycle III activities from teacher activities with a total score of 61 or 95.3% with the Very Good category. This data was taken to determine how much teacher activity is in implementing learning by applying the Problem Based Learning (PBL) learning model. Based on the analysis of the results of the learning evaluation in cycle II, the following data were obtained: out of 30 students in class 2, 23 students obtained scores above / equal to the KKM value determined by the Madrasah, namely 75 (Complete), while 7 students obtained scores below KKM (Not Complete). Based on the picture above, it is shown that the learning outcomes of class 2 students of MIS Nurul

Huda Kecipir for the 2022/2023 Academic Year in cycle III have reached a classical completeness figure of more than or equal to 85%. From the results of the analysis of the learning evaluation values in cycle III above, there are 93.3% of students who have completed KKM and 6.7% of students have not completed KKM. Based on the PTK Research Success Indicators, it can be concluded that the success indicators have been achieved, so that the research can be stopped at cycle III.

## Discussion

After conducting classroom action research, namely by implementing the Problem Based Learning (PBL) model on the addition and subtraction of whole numbers material for grade 2 students of MIS Nurul Huda Kecipir in the 2022/2023 Academic Year, there was a significant increase in general. In cycle I, the number of students who completed classically only reached 36.7%, while the achievement of cognitive learning outcomes was 11 students who completed the KKM and 19 students did not complete the KKM. This may be because students are not yet accustomed to the learning steps of the newly implemented problem based learning (PBL) model, because so far the learning process has only used conventional methods so that students feel confused and find it difficult to adapt to the new learning model process. In Cycle II, the number of students who completed classically increased to 76.7% with the number of students who completed 23 students and 7 students who did not complete. This shows that providing action by implementing the problem based learning (PBL) model provides an opportunity for students to be directly involved in the learning problem-solving process. However, students are still less confident in question and answer interactions during the learning process, and are not yet accustomed to providing responses to the results of their friends' discussion group presentations. In cycle III, the number of students who completed classically increased significantly, reaching 93.3% with the number of students who completed the KKM reaching 28 students and 2 students who had not completed it. This shows that learning using the problem based learning (PBL) model can improve student learning outcomes. In general, the increase in classical completion, the number of students who completed and the number of students who did not complete each cycle can be seen in the following figure.

Based on the results of the data analysis, the increase in student activity in cycle I showed an average implementation of the steps of the problem based learning (PBL) model with a category of Sufficient with a value of 68.8%, while in cycles II and III respectively reached 82.8% and 93.7% with good and very good categories. This increase occurred because of improvements made to the learning media to make it more interesting for students and more interactive as well as providing motivation to students to be more active in learning activities. Based on the results of the analysis of teacher activity data in PBL learning models, it can be seen that there was an increase in results, namely in cycle I the achievement was only 71.9% (Good), in cycle II it reached 82.8%

(Good) and in cycle III it reached 95.3% (Very Good) this is due to improvements made to the shortcomings/problems that occurred in the previous cycle.

From the explanation above, it shows that the application of the problem based learning (PBL) model provides opportunities for students to be directly involved, active, independent, creative, think critically in discussions and the learning process and the formation of a real and systematic concept, so that learning activities achieve what has been set as the learning objectives and improve student learning outcomes. Therefore, it can be concluded that the application of the problem based learning (PBL) model can improve student learning outcomes in mathematics subjects, especially the material on arithmetic operations of whole numbers for grade 2 Nurul Huda Kecipir students.

The application of the Problem-Based Learning (PBL) model in the teaching of addition and subtraction of whole numbers plays a significant role in improving the learning outcomes of second-grade students at MI Nurul Huda Kecipir. This approach focuses on students actively engaging in solving real-world problems, which stimulates critical thinking and deepens their understanding of mathematical concepts. Problem-Based Learning encourages students to explore and discover solutions by themselves or in groups. In the context of addition and subtraction, students are not simply given formulas to memorize but are provided with problems that require them to apply their knowledge practically. This active participation helps students to relate abstract mathematical ideas to everyday situations.

The use of real-life problems in PBL makes learning more meaningful for students. At MI Nurul Huda Kecipir, scenarios like calculating the number of fruits collected, money spent or saved, or counting classroom objects, are used to create engaging mathematical problems. These familiar contexts help students grasp the concepts of addition and subtraction more easily. In the classroom, the teacher acts as a facilitator rather than a mere source of knowledge. This shift in role is essential in PBL. The teacher at MI Nurul Huda Kecipir guides students by providing support when necessary and encouraging them to find solutions through discussion and collaboration. This method fosters independence and confidence in learners.

Group work is an essential component of PBL. When students work together, they share ideas, learn from one another, and refine their thinking processes. In the second grade classroom, group activities involving math games or storytelling with numbers promote cooperation and peer learning, which enhances understanding and retention. Problem-Based Learning aligns with the developmental stage of second graders. At this age, students are naturally curious and eager to explore. By presenting mathematical operations as challenges or puzzles, PBL taps into their intrinsic motivation and keeps them engaged in the learning process.

Assessment in a PBL setting is more comprehensive. Instead of focusing solely on correct answers, teachers observe the problem-solving process, communication, and logical reasoning. At MI Nurul Huda Kecipir, this means students are evaluated on how

they approach a problem, the strategies they use, and how they explain their solutions. The integration of PBL has shown improvements in both academic performance and attitude toward mathematics. Students at MI Nurul Huda Kecipir demonstrate better problem-solving skills and a more positive outlook on learning when they are engaged in activities that challenge them intellectually and creatively.

Another benefit of PBL is that it supports differentiated instruction. Students learn at their own pace and according to their abilities. In the second-grade classroom, tasks can be tailored to meet the diverse needs of learners, ensuring that every student has the opportunity to succeed. The use of manipulatives and visual aids enhances the PBL experience. Tools like number lines, counters, and pictorial representations help students visualize the addition and subtraction processes. These resources make abstract concepts more concrete and understandable for young learners.

Reflective thinking is an important aspect of PBL. After solving a problem, students are encouraged to reflect on their methods and outcomes. This reflection helps solidify their learning and enables them to transfer knowledge to new situations. At MI Nurul Huda Kecipir, reflection is facilitated through group discussions and journals. PBL fosters a sense of ownership over learning. Students feel responsible for their success because they play an active role in the learning process. This empowerment increases their motivation and willingness to engage in challenging tasks.

The collaborative nature of PBL improves students' communication skills. As they explain their reasoning and listen to others, they learn to articulate their thoughts clearly. This not only benefits their mathematical thinking but also their overall academic development. Teacher training and preparation are crucial for successful PBL implementation. At MI Nurul Huda Kecipir, educators receive guidance on how to design effective problems, manage group dynamics, and assess student learning in a PBL environment.

The school environment also plays a role in supporting PBL. A classroom layout that encourages interaction, availability of learning materials, and a culture that values inquiry contribute to the success of the approach. MI Nurul Huda Kecipir provides a supportive setting that fosters active learning. Parental involvement is another factor that enhances the impact of PBL. When parents understand the benefits of this method and support their children at home, learning becomes a continuous process. MI Nurul Huda Kecipir engages parents through workshops and communication about classroom activities.

The implementation of PBL in addition and subtraction lessons has led to increased student engagement. Students are more enthusiastic about learning math because they see it as a fun and relevant subject. This change in attitude is a key indicator of long-term academic success. Challenges in PBL do exist, such as time constraints and varying student abilities. However, with careful planning and support, these challenges can be managed. Teachers at MI Nurul Huda Kecipir are committed to

overcoming obstacles to ensure effective learning experiences. In conclusion, Problem-Based Learning offers a dynamic and student-centered approach to teaching addition and subtraction of whole numbers. Its implementation at MI Nurul Huda Kecipir has resulted in improved academic outcomes and fostered a deeper love for mathematics among second graders. By continuously refining the approach, integrating supportive resources, and engaging all stakeholders, the school can ensure that PBL becomes a sustainable and impactful part of the educational experience, ultimately nurturing skilled and confident learners.

## Conclusion

Based on the results of learning activities that have been carried out with three cycles and the analysis that has been presented, it can be concluded that the application of the problem based learning (PBL) model can improve the learning outcomes of class 2 students of MIS Nurul Huda Kecipir in the 2022/2023 academic year on the material of addition and subtraction of whole numbers. This can be seen from the cognitive assessment of learning outcomes in cycles I, II and III. In cycle I, 11 students out of 30 students met the KKM completeness, while the number of students who did not complete the KKM was 19 students with a total classical completeness of only 36.7%. In cycle II, 23 students out of 30 students met the KKM completeness and 7 students had not completed the KKM with a classical completeness of 76.7%. In cycle III, the number of students who met the KKM completion was 28 students out of 30 students and the number of students who did not complete the KKM was 2 students with a classical completion achievement of 93.3%. Thus, the application of the problem based learning (PBL) model is considered successful in improving student learning outcomes in the addition and subtraction of whole numbers because it has achieved the established success indicators. So this research does not need to be continued to the next cycle.

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