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Research Article

Implementation of the PBL Model Using PowerPoint Media to Improve Mathematics Learning Outcomes of First Grade Students at SD IT Riadaturrohman

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Abstract: This study aims to improve student learning outcomes through the implementation of the Problem Based Learning (PBL) model assisted by PowerPoint media in Mathematics for Grade I students at SD IT Riyadhoturrohman. The research employs Classroom Action Research (CAR) conducted in two cycles. Each cycle consists of three meetings, following the stages of planning, implementation, observation, and reflection. The research subjects were 16 students from Grade I of SD IT Riyadhoturrohman. The Problem Based Learning model was chosen because it encouraged students to be actively involved in learning through solving contextual problems, while PowerPoint media was used to help visualize the mathematical concepts being taught. The results showed an improvement in students' learning outcomes from the pre-action stage to Cycle I, and a further increase in Cycle II. Additionally, students demonstrated improved participation, conceptual understanding, and teamwork skills. Thus, the implementation of the Problem Based Learning model assisted by PowerPoint media proved to be effective in improving the mathematics learning outcomes of Grade I students at SD IT Riyadhoturrohman.

Keywords: Problem Based Learning; Powerpoint; Learning Outcomes; Mathematics; Elementary School

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1. Background

Education is a fundamental element in human life, serving as the primary foundation for individual development and the advancement of civilization. Education not only shapes knowledge (cognitive), but also shapes attitudes (affective) and skills (psychomotor), making it a driving force that propels humans toward a better future. As an inseparable process of life, education equips each individual with the skills to face challenges and build a brighter and more humane future (Sadia et al., 2022).

Based on the history of the Indonesian nation, education is one of the most central aspects in realizing the ideals of enlightening the nation's life. Various efforts have been made by the nation's founders to provide access and equal education for all Indonesian people. This is stated in the Constitution of the Republic of Indonesia, Article 31 paragraph 1, which states "Every citizen has the right to education." Then this article is continued by the following paragraph, namely Article 31 paragraph 2, which states that "Every citizen is obliged to attend basic education and the government is obliged to finance it." The statement above explains that education is both a right and an obligation for citizens and an obligation for the government to take care of all its financing. Efforts to realize good and structured education in Indonesia were then continued in Law (UU) Number 20 of 2003 concerning national education as stated in the (UUD, 1945):

"National education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals and the skills needed by themselves, society, nation and state."

This, in national and state life, education has been systematically and in detail regulated as a central aspect in developing the character of the Indonesian nation. Therefore, education requires contributions from all stakeholders, especially the government, which provides and guarantees quality education for all Indonesian citizens.

In an effort to realize a much better and higher-quality education in Indonesia for all citizens, one effort is to implement increasingly diverse learning models tailored to the cultural characteristics and personalities of students. Increasing innovation in learning models is crucial in efforts to educate the nation. The growing number of models provides opportunities for educators to understand the characteristics of the students they teach. Through these models, educators can also refine previous models to maximize their effectiveness, thus sustaining innovations in learning.

One of the learning models widely used in the teaching and learning process is *problem-based learning*. This model is based on a series of problems encountered in a work environment, with the goal of solving these problems. Through this model, students are expected to be able to play an active role in solving the problems they face. The *problem-based learning model* prioritizes student independence in the learning process, so students are naturally taught to solve problems on their own to the maximum (Akhmad et al., 2023).

This model is very appealing because classroom learning is less rigid, thanks to two-way communication between teachers and students. The teacher's role in lecturing is reduced, shifting to engaging discussions between teachers and students, as well as between students. All students can play an active role in addressing any problems, and the teacher's role here is more of a guide and advisor. The subject most actively using this model is mathematics (Khasanah, 2023).

Mathematics is a compulsory subject for every student. Therefore, learning mathematics should be a fun experience so that students can better understand concepts. In this regard, the role of educators is crucial, as the models and approaches used will directly impact the effectiveness of the learning process. As classroom managers, educators are required to choose learning models that are not only active and creative, but also innovative, effective, and engaging for students (Fauzia, 2018).

Elementary mathematics education plays a fundamental role in developing a strong conceptual understanding and problem-solving skills. Specifically, mathematics instruction in first grade of elementary school focuses on introducing basic concepts in a fun and easy-to-understand way for young children. The primary goal is to build a foundation of basic skills in counting, number recognition, and understanding mathematical concepts through a variety of concrete and engaging activities. With the right model, students can not only better understand mathematics but also develop self-confidence in facing future academic challenges (Syahputri, 2018).

Based on initial observations conducted in the first grade of SD IT Riadhoturrohan during mathematics lessons, it was found that the learning environment tended to be passive. Students simply sat, listened, and took notes as presented by the teacher without any interaction or active involvement in the learning process. As a result, students' understanding of the material was low. Analysis of student learning scores revealed differences in learning outcomes among students.

Of the 16 students who participated in the evaluation, only 4, or approximately 25%, achieved scores above the Learning Objective Completion Criteria (KKTP). Meanwhile, 12 other students, equivalent to 75%, failed to meet the established passing standards. This indicates that the majority of students still face difficulties in achieving the expected competencies, necessitating further efforts to improve the effectiveness of learning and mentoring strategies for them. This reflects students' low ability to model and interpret

mathematical concepts in depth. Furthermore, limitations in identifying and writing mathematical problems also impacted the low achievement of student learning outcomes.

Learning outcomes reflect the extent to which students have met learning objectives and mastered the expected knowledge, skills, and understanding. These achievements can be measured through various approaches, such as exams, assignments, projects, observations, and portfolios. Beyond simply achieving academic grades, learning outcomes reflect the depth of understanding of concepts, mastered skills, and the ability to apply knowledge in different contexts. Affective aspects such as attitudes and values related to the material are also included in the dimensions of learning outcomes. Therefore, the learning process ideally leads to the development of comprehensive understanding and skills relevant to student development. To achieve maximum learning outcomes, active involvement from both parties, namely educators and students, is required. The educator's role is not limited to delivering material, but also as a facilitator who supports and guides students' learning process. Meanwhile, students are required to be proactive in participating in the learning process so that learning targets can be achieved effectively (Pramestika, 2020).

Previous research conducted by (Khasanah, 2023), stated that the application of *Problem-Based Learning* (PBL) has a positive impact on improving student learning outcomes. PBL can improve conceptual understanding and learning outcomes by increasing student active engagement in the learning process. Furthermore, this model also helps students develop critical thinking and problem-solving skills, which are essential skills in learning. Therefore, the use of PBL can be an effective strategy for improving the quality of learning.

Based on the results of previous research, the application of the *Problem-Based model Problem-Based Learning* (PBL) has been proven to improve student learning outcomes. However, several limitations remain in previous research that need to be addressed and further developed. One of the main problems still identified is the large number of lower-grade students who experience difficulty in achieving the Learning Objective Completion Criteria (KKTP), particularly in mathematics. This issue motivated researchers to conduct new research with innovations that better suit the needs of lower-grade students. In this study, researchers will use PowerPoint as a medium. As a learning tool to improve student learning outcomes, PowerPoint is used to present material in a more visual and interactive way, helping students better understand the concepts being taught.

The main focus of this research is mathematics learning in lower grades, where students are still in the early stages of learning basic concepts such as numbers, arithmetic operations, and simple geometric shapes. The material used in this research is arithmetic operations, which will be supported by the use of PowerPoint to enhance student understanding and motivation.

As a step to improve the learning process, this study will utilize Classroom Action Research (CAR). In this study, the Problem-Based Learning (PBL) model will be implemented with the aid of PowerPoint media to create a more interactive and effective learning environment. This model not only focuses on understanding basic concepts but also trains students to think critically and solve problems independently. Through the implementation of this model, it is expected that the learning outcomes of first-grade students in mathematics at SD IT Riadhoturrohman will experience significant improvements.

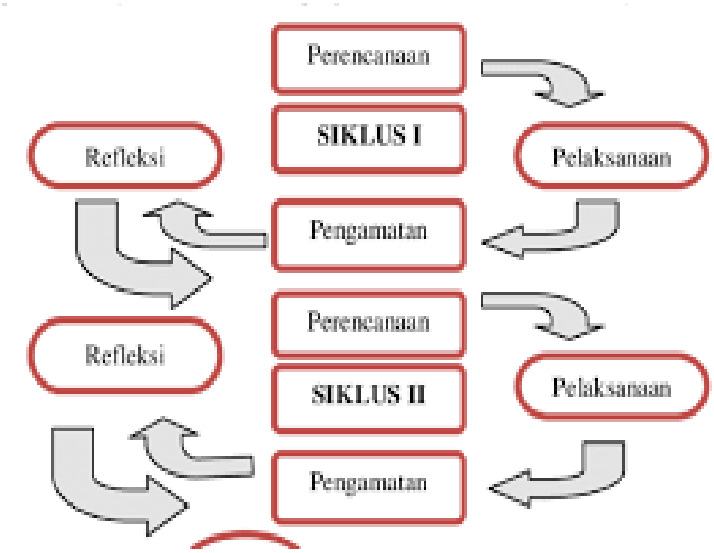
2. Research methods

The research location is at Riadhoturrohman Integrated Islamic Elementary School which is an educational unit at the elementary level which is an institution or institution of Integrated Islamic education foundation located in Aek Galoga, Pidoli Lombang, Panyabungan City District, Mandailing Natal Regency, Postal Code 22919. Learning hours are carried out in the morning in a week the learning process for 5 days at Riadhoturrohman IT Elementary School was established in 2019, Riadhoturrohman IT

Elementary School uses the Merdeka curriculum. Led by the principal named Yudi Ananda, M. Pd and the homeroom teacher for class I named Siti Fatimah, S.Pd. The research will be conducted in April 2025, adjusting to the academic calendar when Mathematics learning hours begin.

This research is a classroom action research. Classroom action research is a type of research that specifically examines actions used to improve the effectiveness and progress of learning (Fahmi Rojak, 2018). In this study, the researchers used the CAR model implemented by Kemmis and Mc Tanggert, which according to Panjaitan et al., 2022 is a further development of Kurt Lewin's model. The following is a series of each cycle in classroom action research (CAR) according to Kemmis and Mc Tanggert.

Figure 1. Classroom Action Research Cycle (Kemmis & Taggart, 1988)



3. Results and Discussion

Based on the research results contained in the data analysis, the learning outcomes of students and the results of observations of student activities are as follows:

The Problem-Based Learning (PBL) model is a teaching method that uses contextual problems as a catalyst for student learning activities. In mathematics education, these problems are related to real-life situations and require students to apply mathematical concepts to find solutions. According to Hmelo-Silver (2004) and adapted by Trianto (2009), the implementation of PBL follows several steps. First, educators present a contextual mathematical problem, such as calculating the amount of shopping money or determining the number of students in two playgroups, to orient the students toward the problem. Then, students are divided into small groups to discuss and analyze the problem. Next, students investigate the problem individually or in groups, exploring various strategies to solve the mathematical issue. Afterward, students present their solutions and methods to the class. Finally, educators and students reflect on the problem-solving process, evaluate the approaches used, and draw conclusions about the mathematical concepts involved.

An example of applying PBL in mathematics learning for Grade 1 students could be a problem such as: "In the park, there are 4 children playing on the swings and 5 children playing on the slide. How many children are playing in total?" To solve this, students are provided with a picture or story, discuss the problem with their peers, and employ

counting strategies, such as drawing, using concrete objects, or counting directly. They then present their results and reflect on their thought processes.

The benefits of implementing PBL in mathematics learning include enhancing students' understanding of concepts beyond mere memorization of formulas, helping students think systematically and reflectively, encouraging active participation in the learning process, and fostering curiosity and teamwork.Based on the results of initial observations conducted by researchers in class I Al-Fatiha SD IT Riyadhoturrohman, it was found that before the implementation of the action, the learning process implemented by the educator was still less effective in encouraging active student involvement. The learning approach used tended to be monotonous and less interesting, thus not providing enough space for students to be meaningfully involved in the process of discovering material concepts. The learning process took place one-way, dominated by the role of the teacher, which resulted in students becoming passive, less enthusiastic, and reluctant to express opinions. This situation had a direct impact on the low level of student activity and achievement of student learning outcomes, especially in Mathematics.

Given these conditions, improvements are needed in the learning process through the implementation of the *Problem-Based Learning* (PBL) model as a strategic alternative to increase student participation and understanding. The following presents a comparison of the results of the analysis of observations of student learning activities between the implementation of actions in Cycle I and Cycle II.

Table 1. Results of analysis of observations of student activities during the implementation of actions in cycles 1 and 2

Action	Cycle I		Cycle II	
	Average	%	Average	%
Student Activities	40	66.66%	57	95%

Based on table 1 Regarding the comparison of the analysis of the average observation score of student activities, it is known that there was an increase in student activity from cycle 1 and cycle II with the application of the *problem based learning model* with *power point media* . After implementing the cycle I action, the average student activity score reached 40 percentages of 66.66%. In cycle II, the average student activity score increased to 57 with a percentage of 95%. The increase in student learning outcomes from the pre-cycle stage to cycle II shows that the application of the Problem Based Learning model assisted by PowerPoint media can effectively improve the understanding and learning completeness of grade I students in the material of adding numbers up to 20.

Mathematics Learning Outcomes Learners

During the pre-cycle phase, many students were still unable to meet the Learning Objective Completion Criteria (KKTP) set by the school. Based on the assessment results for the 2024/2025 academic year on addition up to 20, 12 of the 16 students scored below the completion standard. Only four students successfully met the KKTP, resulting in a classical completion rate of only 25%. This indicates that the majority of students still experience difficulties in understanding the material being taught and that more effective learning interventions are needed to improve learning outcomes.

The evaluation results in cycle I showed an increase in scores compared to the pre-cycle. This was evident in the average student learning outcome score, which reached 77.5. Of the 16 students, 11 had achieved scores above the Learning Objective Completion Criteria (KKTP), while the other 5 students were still below the completion limit. The classical completion rate in this cycle was recorded at 68.7%. Although there was progress from the previous stage, this result still did not fully meet the established success indicators, both in terms of class average and classical completion. Therefore, further

action was needed in the form of implementing cycle II to further improve student learning outcomes.

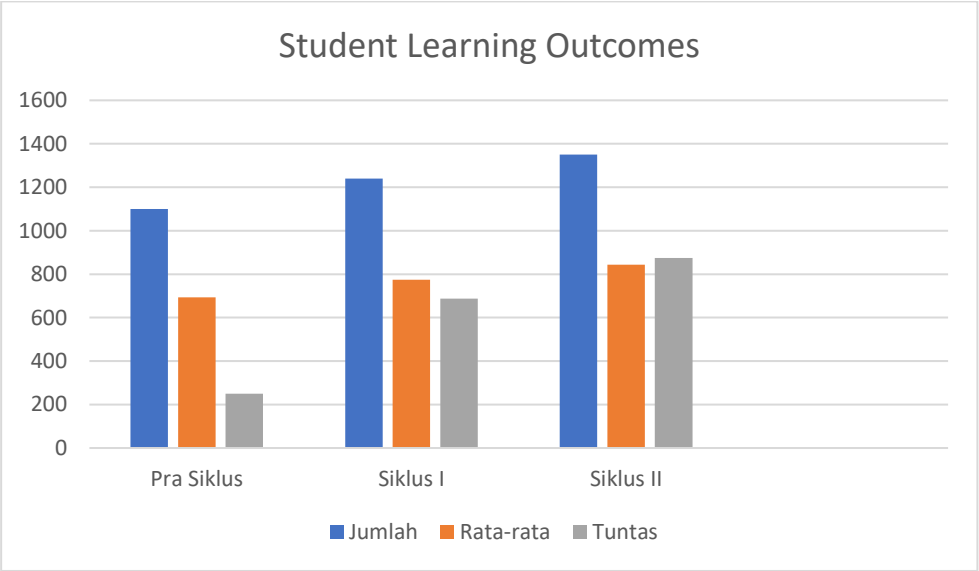
Evaluation in cycle II showed a significant increase compared to the pre-cycle and cycle I. The average value of student learning outcomes in this cycle reached 84.3. Of the total of 16 students, 14 students managed to achieve a score above the Learning Objective Completion Criteria (KKTP) set, which was 75, while only 2 students still did not achieve completeness. The classical completeness level increased to 87.5%, which means it has met the research success indicators, both in terms of the class average and the percentage of completeness. Thus, the implementation of cycle II can be declared effective in improving student learning outcomes.

To find out the increase in activity and average learning outcomes of students in Mathematics learning in cycle I and cycle II, please see the following table.

Table 2. Collection of Grade I Grade Scores of SD IT Riyadhoturrohman starting from the Initial Test, Cycle I and Cycle II

No	Student Name	Mark		
		Initial test	Cycle I	Cycle II
1	AL	90	90	100
2	AQ	80	80	90
3	PN	80	80	90
4	AR	80	80	90
5	NF	70	80	80
6	SS	60	70	80
7	HM	70	70	90
8	AR	70	80	90
9	A A	70	80	90
10	RA	70	80	80
11	AN	60	80	80
12	RD	60	80	90
13	NN	60	80	80
14	IR	60	70	80
15	NZ	60	70	70
16	IH	60	70	70
Amount		1100	1,240	1350
Average		69.3	77.5	84.3
Not Completed		75%	22.5%	12.5%
Completed		25%	68.7%	87.5%

From the table above, it can be concluded that learning Mathematics using the *problem based learning model* in the first grade of SD IT Riyadhoturrohman, students have successfully improved their learning outcomes. The initial test score averaged 69.3 with a classical completion rate of 25%. The first cycle achieved an average of 77.5 with a classical completion rate of 68.7%. Meanwhile, the second cycle achieved an average of 84.3, categorized as very high with a classical completion rate of 87.5%.



From the diagram above, it can be concluded that student mastery is categorized as very high because all students have reached 87.5%. Based on this data, it can be seen that student learning outcomes have increased from the initial test, cycle I, and cycle II. This indicates that the use of the *problem-based learning model* can improve the Mathematics learning outcomes of first-grade students at SD IT Riyadhoturrohman.

Conclusion

Based on the results of the study using Classroom Action Research (CAR) by applying the *Problem Based Learning learning model* assisted by *PowerPoint media* in the Mathematics subject of addition up to 20 for grade I students of SD IT Riyadhoturrohman which was carried out in two cycles, it was concluded that the application of *Problem Based Learning* with *PowerPoint media* is a learning approach that combines problem-based learning methods with the use of visual media to improve student understanding and involvement. Student activities during the learning process also increased. Students became more active, enthusiastic, and involved in the problem-solving process presented through PowerPoint media. Group discussion and presentation activities also went well, showing that students were able to work together and think critically in learning.

The mathematics learning outcomes of first-grade students improved after the implementation of the Problem Based Learning model with PowerPoint as the medium. In cycle I, student learning completion was 68.7 % and increased to 87.5 % in cycle II. This indicates that learning with a *problem-based learning approach* with *PowerPoint as the medium* is very effective in improving learning outcomes.

Reference

Akhmad, MA, Mustari, M., Arif, TA, Fadollah, I., Sila, A., Studi, P., Guru, P., Dasar, S., & Makassar, UM (2023). Citra Bakti Scientific Journal of Education Implementation of Problem Based Learning Model in Improving Learning Outcomes. Citra Bakti Scientific Journal of Education, 10 (2), 341–355.

Anggrawan, A. (2019). Descriptive Analysis of Learning Outcomes of Face-to-Face and Online Learning According to Student Learning Styles. Journal MATRIX , 18 (2), 339–346.

Bagiono. (2017). Analysis of Difficulty Level and Discriminatory Power of Test Items of Radiography Level 1 Examination. Analysis of Difficulty Level and Discriminatory Power of Test Items Radiography Training Exam Level 1 , 16 , 1–12.

Dakhi, AS (2020). Improving student learning outcomes. Journal of Education and Development , 8 (2), 468–470.

Dewi, A., Sari, Dewi Rahma Eka, & Rosita, Ambar Wati. (2024). PBL Learning Model Assisted by Concrete Counting Media in Mathematics Learning to Improve Student Learning Outcomes. Scientific Journal Elementary Education , 09 (03).

Fahmi Rojak, M. (2018). Application of SAVI-Based TAI (Team Assisted Individualization) Cooperative Learning Model to Improve Student Learning Outcomes on Chemical Equilibrium Material for Class XI of SMAN Jogoroto Jombang. UNESA Journal of Chemical Education , 7 (3), 415–421.

Fauzia, HA (2018). Application of Problem Based Learning Model to Improve Elementary School Mathematics Learning Outcomes. Journal of Primary PGSD, University of Riau, 7 (1), 40–47. https://doi.org/10.56393/kognisi.v2i4.1354

Harsiwi, Ubi Budi, Arini, L., & Dyah, D. (2020). The Effect of Learning Using Interactive Learning Media on Student Learning Outcomes in Elementary Schools. Basicedu Journal, 4 (4), 1104–1113.

Khasanah, L. (2023). Improving Mathematics Learning Outcomes Through the Problem Based Learning (PBL) Model for First Grade Students of Lowokwaru 3 Elementary School, Malang. Islamic Religious Studies, 4 (2), 10.

Panjaitan, AC, Firdaus, MH, & Habibi, R. (2022). Interactive Learning Using Jamboard to Increase Motivation and Interest in Learning Mathematics. Journal Mathematics Education Sigma [JMES], 3 (1), 14–20. https://doi.org/10.30596/jmes.v3i1.9409

Pramestika, Adhi Linida. (2020). The effectiveness of using PowerPoint media on elementary school mathematics learning outcomes for plane and spatial shapes. Journal of Education and Counseling , 2 (1).

Sadia, H., Madani, M., & Muhajir. (2022). Naturalistic: Journal of Research, Education, and Learning Studies. Naturalistic: Journal of Research Studies and Education and Learning, 7 (1), 1349–1361.

Syahputri, N. (2018). Design of Mathematics Learning Media for Elementary School Grade 1 Using Demonstration Media. Kaputama Information System, 2 (1).