

The Implementation Of The Problem-Based Learning (Pbl) Model To Improve Mathematics Learning Outcomes Of Fifth-Grade Students At Uptd Sd Negeri 312, Wajo Regency

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Abstract

The objective of this study is to determine the improvement and process of students' learning outcomes through the implementation of the Problem-Based Learning (PBL) model on the topic of area of plane figures. A qualitative approach was employed using the Classroom Action Research (CAR) method. The research involved one classroom teacher and 16 fifth-grade students—9 boys and 7 girls—during the 2024/2025 academic year at UPTD SD Negeri 312, Wajo Regency. Data collection techniques included observation, testing, and documentation. The research was carried out in two cycles, each consisting of two meetings that covered planning, implementation, observation, and reflection. Observation results of the teacher and students' learning processes in both cycles showed a good category. The number of students who successfully completed the test increased from 10 in Cycle I to 13 in Cycle II. It can be concluded that the implementation of the Problem-Based Learning (PBL) model in mathematics lessons can improve both the learning process and learning outcomes of fifth-grade students at UPTD SD Negeri 312 Cinnong Tabi, Wajo Regency.

Keywords: Problem-Based Learning, Learning Outcomes, Mathematics



INTRODUCTION

This study began with an initial interview and observation conducted by the researcher in coordination with the principal of UPTD SD Negeri 312 Cinnong Tabi, Wajo Regency, to obtain permission for conducting Classroom Action Research (CAR). The researcher then interviewed and observed the fifth-grade homeroom teacher to explore the mathematics teaching practices in the classroom. An analysis of formative evaluation results indicated that students' mathematics learning outcomes had not yet met the established Minimum Mastery Criteria (KKTP), which is set at 75, and were considered low. The formative assessment showed that only 7 students (43.75%) met the mastery criteria, while the majority, 9 students (56.25%), did not meet the standard. Furthermore, the learning process tended to make students feel bored and less engaged.

The low learning outcomes may be influenced by two main factors: teacher-related and student-related. Teacher-related factors include insufficient orientation towards problem-solving activities, limited opportunities for students to engage in critical thinking, and excessive teacher control over the learning process. On the other hand, student-related factors include low engagement, lack of competence in solving problems collaboratively, and low confidence in expressing ideas in front of the class. If these conditions persist without an appropriate solution, they could continue to negatively impact students' learning outcomes.

Based on the observations, the researcher conducted a Classroom Action Research (CAR) at UPTD SD Negeri 312 Cinnong Tabi, Wajo Regency, with the objective of improving both the learning process and learning outcomes in mathematics for fifth-grade students by implementing the Problem-Based Learning (PBL) model. The study was organized into two cycles, each consisting of four stages: planning, action, observation, and reflection. Each cycle covered two learning sessions, with a duration of two periods per session (2 x 35 minutes).

In the first cycle, the observation of both the teacher and students' learning process showed a "good" category and met the success criteria. However, the results of the formative evaluation were still in the "fair" category, with a percentage of 62.5%. This was due to students' lack of active participation, low seriousness in solving problems collaboratively, and lack of confidence in presenting their group discussion results. The study continued to the second cycle, with improvements made by optimizing the PBL model steps and enhancing students' learning motivation. After these improvements, the second cycle showed a significant increase in both the learning process and teacher performance, with both categorized as "good," and a corresponding increase in students' formative evaluation results. In the second cycle, the students' performance reached the "good" category with a percentage of 81.25%. These findings indicate a significant



improvement in students' mathematics learning outcomes on the topic of area of plane figures through the implementation of the Problem-Based Learning (PBL) model in the fifth grade.

Problem Based Learning (PBL) Model

The Problem Based Learning (PBL) model is defined as a learning model that empowers learners to actively engage in the learning process, enabling them to construct knowledge independently. In line with Suginem (2021), PBL is viewed as a learning strategy that places learners at the center and stimulates their active involvement throughout the learning process. Active participation of learners in exploration, investigation, problem-solving, and self-evaluation activities is believed to naturally foster learning motivation. Furthermore, according to Siswanti & Richardus (2023), the PBL model is a learning model that empowers learners to dissect problems and relate them to their personal experiences. This process aims to nurture and sharpen students' critical thinking skills in formulating effective solutions to the problems they face.

The Problem Based Learning (PBL) model is recognized as an effective approach to improving learning outcomes, critical thinking skills, and analytical abilities through problem-solving. Marsinah et al. (2019) assert that PBL is a powerful strategy to stimulate the development of students' thinking and analytical skills, encouraging them to actively participate and develop critical thinking. Moreover, Susanto (2020:58) emphasizes that "Problem Based Learning is a learning approach that presents contextual problems to stimulate learners to learn."

Based on the theories described, it can be concluded that the Problem Based Learning (PBL) model centers on student activity and engagement in learning. This model provides opportunities for students to tackle challenging problems, promoting active participatory involvement in the learning process and enhancing cognitive abilities, especially in deep analytical thinking.

Objectives of the Problem Based Learning (PBL) Model

The Problem Based Learning (PBL) model is designed to facilitate students' conceptual understanding through problem-solving mechanisms while optimizing critical thinking capacity. As Kusuma (2020) states, implementing PBL effectively stimulates students' active engagement in the learning process, presents cognitive challenges, improves peer collaboration, and nurtures a sense of curiosity towards the learning material. According to research by Ariyanti (2017), the implementation of PBL aims to facilitate a comprehensive conceptual understanding of the learning substance. Furthermore, PBL utilizes problem-solving mechanisms as a learning model



intended to stimulate learners' critical thinking abilities.

The PBL model is designed to optimize critical thinking capacity, intellectual agility, and problem-solving skills in learners. In line with Hosnan's view (Julvi & Mansurdin, 2023), PBL implementation focuses on facilitating the development of thinking and problem-solving skills by strengthening intellectual thinking abilities. This process is expected to provide opportunities for learners to accumulate experience and significantly modify their behavior both quantitatively and qualitatively. Active engagement in the learning process positively impacts improved learning outcomes.

Based on the theories outlined, it can be concluded that the Problem Based Learning (PBL) model facilitates learners to develop collaborative skills, foster intellectual curiosity toward learning materials, and hone essential analytical thinking skills for problem-solving, which optimally enhances learning outcomes.

Steps in the Problem Based Learning (PBL) Model

The implementation of the steps in the Problem Based Learning (PBL) model is designed to facilitate active participation of learners in the learning process. According to Ardianti (2021), the PBL procedure includes:

1. Orienting learners to the problem;
2. The teacher guides learners to identify the problem;
3. The teacher encourages learners to collect information both individually and in groups;
4. The teacher assists learners in planning and preparing work relevant to the problem;
5. The teacher helps learners reflect on the investigation they have conducted and the processes they applied.

Eismawati et al. (2019) identify a series of steps that form the PBL model as follows:

1. Learners listen to the learning objectives;
2. Learners receive the problem;
3. Learners carry out the investigation stages;
4. Learners analyze the data;
5. Learners compile their findings;
6. Learners reflect on the investigation.

In a study by Nur (Susanto, 2022), the inherent stages of implementing PBL are described as:



- Organizing learners around the problem: The teacher explains the learning objectives to be explored, followed by questions to stimulate discussion and provides additional explanation related to the subject matter.
- Organizing learners for collaborative learning: To facilitate collaborative learning, the teacher organizes learners into heterogeneous groups of 3 to 4 students per group. Then, the teacher distributes formative assessment tools such as Group Worksheets (LKK) with instructions and offers structured guidance to encourage group discussion interaction.
- Guiding individual and group investigations: The teacher facilitates learners individually and in groups to obtain relevant information to find solutions to the presented problem, enabling learners to identify problem solutions independently or collaboratively.
- Developing and presenting learners' work: Each group is allocated specific time to present their work. Other groups actively participate by asking questions, which are then analyzed and feedback is given by the teacher on the presentations and interactions.
- Analyzing and evaluating the problem-solving process: The teacher evaluates the problem-solving mechanisms demonstrated by each group, facilitates question-and-answer sessions, and collaboratively summarizes the problem-solving process or explored learning material.

Advantages of the Problem Based Learning Model

An advantage is a distinctive strength possessed by an object. According to Sumantri (Tiyasrini, 2021), the PBL model has several identified advantages as follows:

1. Facilitates the development of learners' competencies in designing innovations through engineering and experimental design processes.
2. Develops learners' cognitive capacity in generating ideas and implementing them through innovative actions.
3. Enhances learners' ability to apply knowledge and skills to solve contextual problems relevant to real-world situations.
4. Fosters learners' ability to identify and assess investigative processes.
5. Develops learners' skills in analyzing data and providing assessments.
6. Encourages activation of learners' analytical and evaluative skills in facing and solving complex problems.
7. Enables designing actions aligned with real-life realities.



Yulianti & Indra (2019) show that the implementation of PBL reveals several advantages, including:

1. The application of problem-solving within the PBL structure positively influences understanding of learning content.
2. Problem-solving activities integrated systematically into the learning flow stimulate the development of learning outcomes through intellectual challenges and provide a sense of achievement and learning satisfaction.
3. PBL implementation significantly improves the level and quality of active learner involvement.
4. The model contributes to developing learners' understanding of contextual problems relevant to everyday experiences.
5. It facilitates independent knowledge construction and stimulates a sense of responsibility for personal learning processes.
6. The model supports learners in understanding that learning is part of the thinking process.

Based on research by Jannah et al. (Ayunda et al., 2023), the advantages of PBL include:

1. Learner competency development focuses on the ability to independently construct discoveries.
2. Develops higher-order thinking skills and implementation of innovative actions.
3. Learners can apply problem-solving strategies contextually to factual issues relevant to their experiences.
4. Emphasizes the ability to identify and evaluate problems.
5. Stimulates analytical development for solving problems faced by learners.
6. Problems presented are relevant to learners' real-life contexts.
7. Optimizes development of learner independence and responsibility for learning processes and outcomes.

In summary, based on the theories described, the PBL model's advantages include enhancing learners' understanding of the material, providing opportunities to identify problems making learning more contextually relevant, stimulating analytical reasoning abilities, and fostering responsibility and motivation to continue the learning process independently.



Disadvantages of the Problem Based Learning (PBL) Model

Disadvantages refer to the weaknesses possessed by an object or method. Regarding the implementation of the Problem Based Learning (PBL) model, several studies have identified the following drawbacks:

Dewi et al. (2020): Students may experience confusion when faced with difficult problems, which can lead to discomfort and decreased learning motivation. The PBL process requires significant time allocation to explore essential information sources to build a valid understanding that is acceptable to both teachers and peers.

Sitompul (2021):

1. The implementation of PBL shows limited applicability across all learning materials. This model is more suited to materials that focus on specific skills related to problem-solving.
2. Differences in students' characteristics within a classroom may cause challenges or issues in task allocation.

Dirgatama et al. (2018):

1. The suitability of learning materials for PBL is selective (not all materials fit).
2. PBL requires a significant amount of time during learning phases.
3. The success of PBL heavily depends on the teacher's competence in facilitating collaboration and active participation within student groups.

Summary of disadvantages:

The PBL model requires a longer learning process, demands teacher creativity to motivate students to actively engage and collaborate, and is not suitable for all learning materials.

Overview of Mathematics Learning

- Mathematics is a discipline that systematically studies logical reasoning related to structure, configuration, quantity, units of measurement, and conceptual abstraction.
- Mathematics is known as the "queen of sciences" or "mother of science," meaning it is the source of other scientific knowledge (Afsari et al., 2021).
- Mathematics learning has the potential to stimulate the development of more skilled, analytical, and innovative thinking patterns in students (Ekawati et al., 2019).
- Mathematics education encourages critical thinking in understanding learning materials. Active student involvement stimulates deeper participation through increased questioning, curiosity, and numeracy skills (Gusteti & Neviyarni, 2022).



- Designing mathematics learning should be based on diverse theoretical and methodological foundations that motivate active student participation and optimize conceptual understanding. Linking mathematics learning to daily life improves its significance and effectiveness (Fadilla et al., 2021).
- The goal of mathematics learning is to develop rational thinking abilities, including logical reasoning, analysis, higher-order thinking, evaluation, innovation, and effective collaboration (Zahrah, 2024).
- One key learning topic is plane shapes (flat shapes), which are two-dimensional figures bounded by straight or curved lines. Plane shapes form a foundational concept in elementary mathematics for calculating area and perimeter (Handayani, 2021; Lisnani & Sheilla, 2018; Wulandari, 2017).

Overview of Learning Outcomes

- Learning outcomes represent the level of achievement that students should master through learning activities. These outcomes are observable and measurable in the cognitive (knowledge), affective (attitudes), and psychomotor (skills) domains.
- According to Gagne (Istiqlal, 2018), learning outcomes are observable abilities possessed by individuals, covering knowledge, attitudes, and behaviors.
- Learning outcomes are the result of evaluation given after the learning process and mark changes in behavior (Nurrita, 2018).
- Effective and efficient measurement of learning outcomes allows for identifying student interests and competencies in specific disciplines.
- Learning outcomes serve as benchmarks to evaluate students' understanding of instructional materials, both within formal classroom settings and informal environments (Qorimah & Utama, 2022; Israwaty et al., 2022).

CONCLUSION

The implementation of the Problem Based Learning (PBL) model in mathematics learning for Grade V students at UPTD SD Negeri 312 Cinnong Tabi, Wajo Regency, can improve both the learning process and student outcomes. The steps in the PBL model include: 1. Orienting students to the problem. 2. Organizing students for learning. 3. Guiding individual and group investigations. 4. Developing and presenting student work 5. Analyzing and evaluating discussion results When these steps are properly and effectively implemented, both the learning process and outcomes



can improve.

Advantages of the PBL model:

1. Provides opportunities for students to solve their own problems
2. Enhances collaboration among peers
3. Reduces boredom in the classroom
4. Trains students to think critically

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