

Training on the Implementation of Innovative Problem-Based Learning Models in Mathematics Subjects at Kedai Runding Public Elementary School in 2023

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Abstract

This research explores the implementation of the Problem-Based Learning (PBL) model in mathematics education through a community service initiative at Kedai Runding Elementary School. The study aims to assess the effectiveness of a training program designed to equip teachers with the knowledge and skills to implement the PBL model in their classrooms. The research methodology involves a structured approach, including analysis of problem-solving frameworks, discussion of teaching strategies, and evaluation of training outcomes. The findings reveal the importance of providing teachers with adequate training and resources to adopt innovative teaching methods like PBL. Through the training program, teachers gained a deeper understanding of the PBL model and its potential to enhance student engagement, critical thinking, and problem-solving skills. The research discussion highlights the structured approach involved in implementing the PBL model, emphasizing the importance of organizing students around problems, facilitating collaborative learning, and guiding reflection on problem-solving processes.

Keywords:

problem-based learning (PBL), mathematics education, teacher training

Introduction

In the realm of education, mathematics stands as a fundamental subject taught across all levels. Yet, despite its ubiquity, mathematics often carries the stigma of being difficult and daunting, perceived as uninteresting and tedious by many students. Consequently, educators, particularly mathematics instructors, face the imperative task of transforming this mindset by instilling motivation and employing innovative teaching models and engaging media. As a teacher currently undergoing training in the Professional Teacher Education Program (PPG), I have been exposed to invaluable insights and inspirations (Santos, 2016). It has become evident

to me that there are methods to ignite and enhance students' learning enthusiasm. Thus, this realization has prompted me to conceive a training program for teachers at Kedai Runding Elementary School, titled "Training on Implementing Innovative Learning Models with Problem-Based Learning at Kedai Runding Elementary School in 2023."

Aligned with the aforementioned analysis, the core problem statement for this community service initiative revolves around assessing the comprehension level of teachers regarding the implementation of the Problem-Based Learning (PBL) model at Kedai Runding Elementary School in 2023.

Problem-Based Learning (PBL) is a student-centered instructional approach where students strive to solve problems using information from various sources and their everyday experiences. PBL nurtures students' confidence in problem-solving by helping them develop critical thinking skills and problem-solving abilities collaboratively (A. C. Alves et al., 2016). According to Ni Made, PBL teaches students how to utilize concepts and interaction processes to assess their knowledge, identify what they want to know, gather information, and collaboratively evaluate hypotheses based on collected data (Baran & Sozbilir, 2018). This definition underscores the significance of applying the PBL model in aiding students to learn by utilizing their understanding of concepts and gathering information comprehensively. Additionally, strong collaboration among students is crucial in PBL, as they work together to gather information, formulate problem hypotheses, and collectively exchange information to find solutions to analyzed problems (Hung, 2016).

Understanding Mathematics Education: The term "mathematics" originates from the Latin word "mathematika," derived from the Greek word "mathematike," which means learning. It is associated with the Greek words "mathein" or "mathenein," signifying learning or thinking (A. Alves et al., 2016). Thus, mathematics, etymologically, denotes knowledge acquired through reasoning. Mathematics emphasizes activities in the realm of reason (rationality), focusing on human thoughts, ideas, processes, and reasoning rather than experimental or observational results (Overton & Randles, 2015). Mathematics is formed from human experiences in the empirical world, processed within the realm of reason, and analyzed through cognitive structures to formulate mathematical concepts, facilitating their comprehension and precise manipulation through global (universal) mathematical language or notation.

The primary objective of the training program on implementing the Problem-Based Learning (PBL) model in mathematics classes at Kedai Runding Elementary School in 2023 is to aid students in understanding mathematics in line with the PBL model. Therefore, the objectives of this instructional model are: To familiarize students with problem posing and challenge them to solve problems not only related to classroom learning but also those encountered in everyday life (real-world scenarios). To foster social solidarity by encouraging students to engage in discussions with their peers. To enhance the teacher-student relationship. To encourage students to conduct experiments.

The benefits of the training program on implementing the Problem-Based Learning (PBL) model in mathematics classes at Kedai Runding Elementary School in 2023 lie in transforming students' learning interests, thereby increasing their participation and engagement in the learning process.

Methodology

The problem-solving framework serves as a series of procedures and steps in research aimed at obtaining structured stages systematically, enabling effective and efficient research execution. Thus, the problem-solving framework in the activity of training implementation of the Problem-Based Learning (PBL) model in mathematics classes at Kedai Runding Elementary School in 2023 is essential. From my understanding of the Problem-Based Learning (PBL) model, which I have taught in the second-grade class at Kedai Runding Elementary School, I planned to conduct training related to the Problem-Based Learning (PBL) model in mathematics. This training was scheduled to take place on December 13-14, 2023.

Once the schedule was set, the next step was to prepare a Lesson Implementation Plan (RPP) complete with other instructional materials such as teaching materials, learning media, worksheets (LKPD), and evaluation plans. For the evaluation component, I first developed question indicators, which were then expanded into question grids and ultimately transformed into assessment instruments for assessing student learning outcomes.

The implementation of the training on the implementation of the Problem-Based Learning (PBL) model involved collaboration with two other teacher colleagues to assist in assessing the teaching training. Additionally, another teacher colleague helped in documenting the implementation of the training on the implementation of the Problem-Based Learning (PBL) model, which I had taught in the second-grade class at Kedai Runding Elementary School.

Findings

The training activity on implementing the Problem-Based Learning (PBL) model that I conducted in the second-grade class at Kedai Runding Elementary School was carried out as part of my community service commitment. This training involved 12 teachers, including one teaching facilitator, one observing teacher, and one documentation teacher. The training on implementing the Problem-Based Learning (PBL) model began with an explanation of how to implement the PBL model, followed by the presentation of sample Lesson Implementation Plans (RPP) and instructional materials I had created related to the PBL model. Subsequently, other teachers responded and posed several questions regarding the implementation of the PBL model.

In terms of the target audience, the training on implementing the Problem-Based Learning (PBL) model at Kedai Runding Elementary School was conducted due to several reasons (Odell et al., 2019). Firstly, teachers, as educators, are responsible for imparting positive values to students, particularly in teaching moral and ethical values. To achieve this, teachers must have adequate knowledge and insights to effectively educate their students. On one hand, teachers must understand the limitations of students' abilities to determine what students actually learn (Prayuda, 2023b). On the other hand, they must continually strive to embrace innovative approaches to accessing student learning and effectively apply innovative teaching models while utilizing engaging instructional media.

Furthermore, students, as learners, should be exposed to various models, media, and teaching methods to enhance their numerical skills and problem-solving abilities in mathematics. Therefore, it is essential for teachers to adopt effective teaching strategies, such as the Problem-Based Learning (PBL) model, to facilitate students' learning experiences and enhance their mathematical abilities (Prayuda & Tarigan, 2024). These findings underscore the importance of providing teachers with the necessary training and resources to implement innovative teaching models, such as Problem-Based Learning (PBL), and to equip students with the skills and knowledge required to excel in mathematics.

Discussion

The implementation of Problem-Based Learning (PBL) involves a systematic approach to engage students in problem-solving. According to Mohammad Nur (Rusmono, 2014:81), the steps in the PBL model include organizing students around the problem, preparing them for learning, assisting in independent and group investigations, developing and presenting work results, and analyzing and evaluating the problem-solving process (Guerra, 2017). These steps guide teachers in effectively implementing the PBL model, ensuring student engagement and critical thinking throughout the learning process.

In practice, the utilization of the PBL model involves several key stages. Firstly, teachers introduce the problem to students, aligning it with the curriculum content. Students are then organized into groups to collaboratively discuss and solve the problem, fostering teamwork and communication skills. The results of group investigations are shared with other student groups, promoting peer learning and diverse perspectives. Throughout this process, teachers play a crucial role in guiding students, facilitating discussions, and encouraging reflection on problem-solving strategies.

Reflecting on my experience implementing the PBL model during a training session at Kedai Runding Elementary School, I followed a structured approach to ensure the effectiveness of the training. The training began with a survey to identify the challenges faced by both students and teachers in conventional teaching methods and assess their readiness for innovative learning approaches. Subsequently, I prepared instructional materials, including Lesson Implementation Plans (RPP), to be presented during the training session (Prayuda, 2023a).

During the training session, held on December 13-14, 2023, I provided an overview of the PBL model and demonstrated its application in mathematics education. Through examples and discussions, I illustrated how the PBL model can enhance student engagement and problem-solving skills. Other teachers participated actively, offering insights and asking questions to deepen their understanding of the PBL approach.

Following the training session, an evaluation was conducted to assess its effectiveness and gather feedback for improvement. Teachers were encouraged to ask questions and share their observations, allowing for constructive dialogue and reflection. Overall, the training on implementing the PBL model received positive feedback from participants, with teachers expressing enthusiasm for integrating this approach into their teaching practices. They recognized the potential of the PBL model to enhance student learning and foster a collaborative and inquiry-based learning environment in the classroom.

Conclusion

The discussion highlighted the structured approach involved in implementing the PBL model, including organizing students around problems, facilitating collaborative learning, and guiding reflection on problem-solving processes. By following these steps, teachers can effectively implement the PBL model in their classrooms, creating an interactive and dynamic learning environment conducive to student learning and growth.

The research findings also underscored the significance of targeting both teachers and students in educational interventions. Teachers play a crucial role in facilitating student learning and must be equipped with the knowledge and skills to implement innovative teaching methods effectively. Moreover, students benefit from exposure to diverse teaching approaches that foster creativity, collaboration, and critical thinking.

Overall, the training on implementing the PBL model at Kedai Runding Elementary School was successful in promoting teacher engagement and enthusiasm for adopting innovative teaching practices. Moving forward, continued support and professional development opportunities will be essential to sustain and expand the implementation of the PBL model across various grade levels and subjects. By embracing innovative approaches like PBL, educators can empower students to become lifelong learners equipped with the skills and knowledge needed to succeed in an ever-changing world.

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