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IMPLEMENTING THE PROJECT-BASED LEARNING MODEL TO IMPROVE STUDENT LEARNING OUTCOMES AT SMPN 01 SUKOWONO

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ABSTRACT
This study was conducted to examine student learning outcomes as indicators of learning achievement through preliminary interviews conducted at SMPN 01 Sukowono, Jember Regency. The findings revealed that teachers still predominantly applied teacher-centered instructional approaches, resulting in low student engagement, boredom, and limited understanding of the learning material, which consequently affected students' mathematics achievement, particularly on the topic of three-dimensional geometric shapes with flat surfaces during the 2023/2024 academic year. This study aimed to determine the improvement in the learning outcomes of 25 students in Class VIII D through the implementation of the Project-Based Learning (PjBL) model. The research employed Classroom Action Research (CAR) using observation, tests, and documentation as data collection techniques. Data analysis focused on students' achievement of the Minimum Mastery Criteria (KKM). The results demonstrated a significant improvement in student learning outcomes. In Cycle I, the classical mastery level reached 72%, with 18 students achieving mastery learning. In Cycle II, the mastery level increased to 100%, with all 25 students meeting the KKM standard. Therefore, the implementation of the PjBL model was proven effective in improving students' mathematics learning outcomes by encouraging active participation, collaborative learning, and deeper conceptual understanding.

INTRODUCTION

Mathematics is a scientific discipline characterized by axiomatic deductive reasoning involving abstract and hierarchical concepts. It is a compulsory subject taught at all educational levels to develop students' logical, analytical, systematic, and critical thinking skills (Mulyati & Evendi, 2020). According to Nuraeni et al. (2020), mathematics is a study of forms, relationships, ways of thinking, art, and logical tools related to patterns, measurements, and concepts. The objectives of mathematics learning at the secondary education level, as regulated in the Ministry of Education and Culture policy (Zakiah et al., 2019), include developing logical, critical, and creative attitudes, curiosity, self-confidence, communication skills, and open-minded and objective attitudes through learning interactions.

Despite the important role of mathematics in daily life and scientific development, students' interest in learning mathematics is often low because the subject is perceived as boring, difficult, and dominated by formulas (Mulyati & Evendi, 2020); Herwandi, & Habiba Ulfahyana. (2023). Consequently, students' learning outcomes tend to be low. Learning outcomes are defined as academic achievement, behavioral patterns, values, understanding, attitudes, appreciation, and skills obtained through the learning process (Somayana, 2020; Nurul Audie, 2019), encompassing cognitive, affective, and psychomotor aspects.

Based on preliminary observations and interviews conducted at SMPN 01 Sukowono, Jember Regency, teachers still applied teacher-centered learning approaches, causing students to become passive, bored, less motivated, and unable to fully understand the learning material. As a result, students' learning achievement remained low. To address this issue, an engaging learning model such as Project-Based Learning (PjBL) is needed. PjBL utilizes real-world problems as the starting point for acquiring knowledge through concrete activities (Nida Winarti et al., 2022). This model encourages students to actively use their skills and knowledge to achieve competencies, provides opportunities for independent thinking, and employs projects as learning media (Fahrezi et al., 2020; Magdalena & Maria Pawe, 2023).

The advantages of PjBL include increasing student activity in solving complex projects, enhancing collaboration, communication skills, and resource management abilities, as well as providing authentic learning experiences in a more enjoyable learning environment that facilitates students' understanding and retention of concepts (Apriany et al., 2020). Previous studies have also supported the effectiveness of PjBL. Emputri et al. (2019) reported that PjBL improved learning outcomes through active discussions and assignments. Kristiyanto (2020) demonstrated improvements in critical thinking skills and mathematics learning outcomes compared to conventional learning models. Furthermore, Fetra Bonita Sari and Risda Amini (2020) found that PjBL was effective in teaching three-dimensional geometric shapes.

METHODS

This study employed Classroom Action Research (CAR). The research aimed to improve the learning outcomes of Class VIII D students at SMPN 01 Sukowono through the implementation of the Project-Based Learning model. The participants consisted of 25 students. The research procedure followed the Classroom Action Research model proposed by Arikunto (2013:17), which consists of four stages in each cycle: planning, implementation, observation, and reflection. The planning stage included several activities, namely determining learning objectives, preparing lesson plans (RPP), designing student worksheets (LKPD), developing observation sheets, preparing project activities, and constructing end-of-cycle test instruments. The formula used to determine classical learning mastery was as follows:

$P = \frac{n}{N}$ x 100% (Lisdyadana et al., 2021)

Where:
(P) = Percentage of classical learning mastery
(n) = Number of students obtaining scores ≥ 70 out of a maximum score of 100
(N) = Total number of students

The indicators of success were determined using the following criteria: 1) In Cycle I, a minimum of 75% of students must achieve the Minimum Mastery Criteria (KKM) score of 70 out of 100, 2) In Cycle II, a minimum of 85% of students must achieve the Minimum Mastery Criteria (KKM) score of 70 out of 100, and 3) Students were categorized as achieving mastery learning if they obtained a minimum score of 70 out of 100.

RESULTS AND DISCUSSION

This Classroom Action Research (CAR), which implemented the Project-Based Learning (PjBL) model on the topic of three-dimensional geometric shapes with flat surfaces (cubes and rectangular prisms) in Class VIII D of SMPN 01 Sukowono, successfully achieved its primary objective of improving student learning outcomes through collaborative and project-based learning approaches.

The study was conducted in two cycles, with each cycle consisting of two meetings, resulting in a total of four meetings. In Cycle I, the implementation of the Project-Based Learning model had not yet achieved the predetermined classical mastery criterion of ≥75%

based on the cycle test analysis. Therefore, learning in Cycle I was considered incomplete. A total of 18 students achieved mastery learning, representing 72% of the class, while 7 students (28%) did not meet the mastery criteria.

Mastery Achieved	Mastery Not Achieved
$P = \frac{n}{N} \times 100\%$	$P = \frac{n}{N} \times 100\%$
$P = \frac{18}{25} \times 100\%$	$P = \frac{7}{25} \times 100\%$
$= 72\%$	$= 28\%$

In Cycle II, students successfully achieved the expected learning mastery. All 25 students achieved mastery learning, resulting in a classical mastery percentage of 100%.

Mastery Achieved	Mastery Not Achieved
$P = \frac{n}{N} \times 100\%$	$P = \frac{n}{N} \times 100\%$
$P = \frac{25}{25} \times 100\%$	$P = \frac{0}{25} \times 100\%$
$= 100\%$	$= 0\%$

The percentage of student learning outcomes increased progressively from the pre-cycle stage to Cycle I and Cycle II.

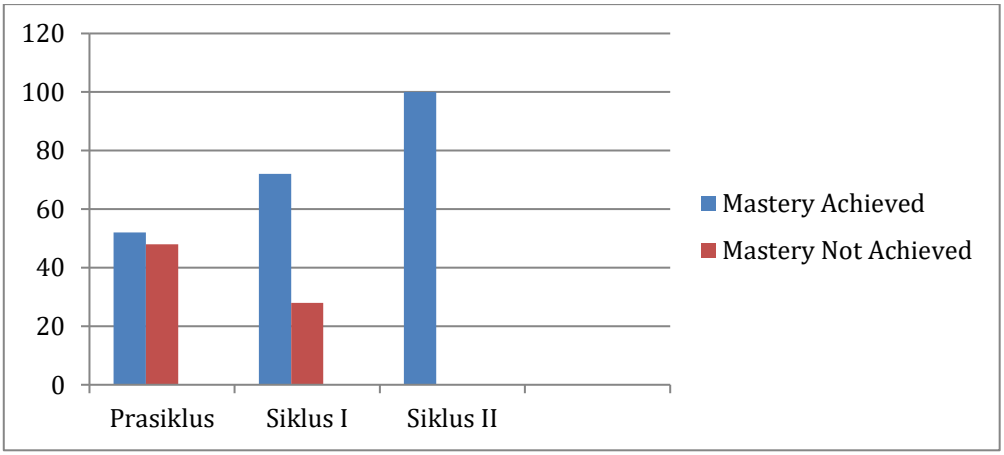

Figure 1. Percentage of Learning Mastery Achievement

During the pre-cycle stage, the percentage of students achieving mastery learning was 52%, which was categorized as low. In Cycle I, the percentage increased to 72%, categorized as sufficient, with 18 students achieving scores above the KKM. Furthermore, in Cycle II, the percentage increased significantly to 100%, categorized as very good, with all 25 students achieving scores above the KKM.

Based on the observation results from Cycles I and II, student learning outcomes increased by 28% through the implementation of the Project-Based Learning model. These findings indicate that PjBL effectively enhanced student engagement, collaboration, and conceptual understanding in mathematics learning.

CONCLUSION

Based on the results of this Classroom Action Research (CAR), the implementation of the Project-Based Learning (PjBL) model effectively improved student learning outcomes and demonstrated significant progress through students' active involvement in real-world project activities in Class VIII D of SMPN 01 Sukowono on the mathematics topic of three-dimensional geometric shapes with flat surfaces during the 2023/2024 academic year. This improvement was evidenced by the increase in classical mastery achievement. In Cycle I, 72% of students achieved the Minimum Mastery Criteria (KKM), with 18 out of 25 students meeting the required standard. In Cycle II, the percentage increased to 100%, with all 25 students successfully achieving mastery learning.

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