ICTL
International Conference on Technopedagogy and Local Wisdom
https://conference.unikama.ac.id/index.php/event/ICTL2025
Vol. 1, Januari 2025

Improving Mathematics Learning Outcomes on the Area of Plane Figures Among Fifth Grade Students at SD Negeri 2 Kasri Through the Implementation of the Discovery Learning Method

Anifatur Riza Umami
Primary Teacher Education Study Program, Faculty of Education
PGRI Kanjuruhan University Malang
Malang, Indonesia
rizaanifatur@gmail.com

***Abstract*— This Classroom Action Research aims to improve mathematics learning outcomes on the topic of *Area of Plane Figures* through the implementation of the Discovery Learning method among fifth-grade students at SD Negeri 2 Kasri. The background of this study is the low learning outcomes, where only 3 out of 17 students (18%) scored above the Minimum Competency Assessment (≥75) prior to the intervention. The main cause of this low achievement was the use of conventional teaching methods that did not actively engage students. The research was conducted in two cycles, following the steps of the Discovery Learning method: stimulation, problem identification, data collection, data processing, verification, and drawing conclusions. The results showed a significant improvement in student achievement. The number of students scoring ≥75 increased to 8 in Cycle I and 15 in Cycle II. Thus, the application of the Discovery Learning method proved effective in enhancing students' understanding and learning outcomes on the given topic.**

Keywords*— *Discovery Learning, learning outcomes, mathematics, area of plane figures, active learning, SD Negeri 2 Kasri

I. INTRODUCTION

Mathematics is one of the fundamental subjects that plays a crucial role in developing students' logical, systematic, and analytical thinking skills. Through mathematics education, students are encouraged to understand patterns, structures, and the relationships between concepts that support the development of life skills in everyday life (Suryanto, 2017). One important topic in elementary school mathematics is the Area of Plane Figures, which serves as the foundation for understanding further concepts in geometry. Mastery of this topic is not only important in an academic context but also supports students' visualization and spatial reasoning skills (Purwanto, 2020). Unfortunately, in practice, this topic is often perceived as difficult by students due to the lack of concrete experiences in the learning process. Therefore, there is a need for a teaching approach that can actively involve students and encourage them to discover concepts through direct learning experiences.

The issue of low mathematics learning outcomes continues to be a concern in various primary education institutions, including at SD Negeri 2 Kasri. Based on the initial evaluation, out of 17 fifth-grade students, only 3 students (about 12%) achieved scores ≥75, in accordance with the Minimum Competency Assessment (AKM) standards, while 14 other students (about 78%) had not yet fully understood the material on the area of plane figures. This condition reflects a weak understanding of basic mathematical concepts among the majority of students. This is in line with Sudjana's (2019) statement that low student achievement may be caused by a lack of conceptual understanding, low learning motivation, and inappropriate teaching methods. Furthermore, a study by Kurniasih and Sani (2017) shows that students' mathematics learning outcomes tend to be low when the learning process does not involve students' active participation in constructing their own knowledge. Therefore, there is a need for an innovative teaching method that can address these issues and encourage active student engagement in the learning process.

The low mathematics learning outcomes of fifth-grade students at SD Negeri 2 Kasri in the area of plane figures are influenced by various interconnected factors. One of the main factors is the lack of active student involvement in the learning

process, where students tend to be passive and only receive information without being involved in the exploration of concepts. This is exacerbated by the use of conventional teaching methods such as lectures, which position the teacher as the central source of information and limit students' opportunities to think critically. Furthermore, the limited use of concrete learning media makes it difficult for students to understand abstract concepts such as the area of plane figures. According to Sanjaya (2020), learning that focuses solely on lectures tends to make students bored quickly and not engage actively, which negatively affects their ability to absorb the material. A similar study by Wulandari (2020) also emphasized that the use of concrete media can significantly enhance students' understanding and learning motivation. Therefore, changing the teaching approach has become an urgent need in efforts to improve the quality of mathematics learning outcomes.

One strategic solution to address the low learning outcomes of students in the area of plane figures is the implementation of the Discovery Learning method. This method emphasizes the importance of active student involvement in the learning process through exploration, observation, and independent discovery of the concepts being studied. With this approach, students are not just passively receiving information, but are encouraged to construct their own knowledge through direct experience, making their understanding deeper and more meaningful. Bruner (in Dahar, 2011) states that learning through discovery allows students to better understand concepts because they find the meaning of the material themselves. In line with this, a study by Mulya (2020) shows that the application of this model significantly improves student learning outcomes, especially in material that requires an understanding of geometric concepts. Therefore, the Discovery Learning method is considered effective in improving the quality of mathematics learning, particularly in the area of plane figures in elementary schools.

Based on the background mentioned above, the objectives of this research are: (1) To describe the implementation of the Discovery Learning method as an effort to improve learning outcomes in Mathematics on the topic of Area of Plane Figures for fifth-grade students at SD Negeri 2 Kasri; and (2) To identify the improvement in learning outcomes in Mathematics on the topic of Area of Plane Figures for fifth-grade students at SD Negeri 2 Kasri through the application of the Discovery Learning method. Through this research, it is expected that the application of the Discovery Learning method will not only improve students' learning outcomes quantitatively, but also foster students' independent learning, curiosity, and critical thinking skills in understanding mathematical concepts in a more meaningful and enjoyable way. Furthermore, the results of this research are also expected to serve as a reference for teachers and education practitioners in designing more effective and student-centered learning, particularly in mathematics education at the elementary school level.

II. METHOD

This research uses a qualitative approach with the type of Classroom Action Research (CAR), which aims to improve mathematics learning outcomes on the topic of area of plane figures through the application of the Discovery Learning method. The CAR model used refers to the model by Kemmis and McTaggart, which consists of four cycle stages: planning, action, observation, and reflection (Arikunto, 2020). This research was conducted in two cycles, with each cycle consisting of one meeting in the fifth-grade class at SD Negeri 2 Kasri, which has a total of 17 students.

The data sources in this research are the results of observations on student learning activities and the evaluation results in the form of daily test scores that measure the mastery of the concept of the area of plane figures. Data collection techniques include observation, learning outcome tests, and documentation. Observation is used to determine student involvement in the learning process during the application of the Discovery Learning method. Tests are used to measure the improvement of student learning outcomes after each cycle of action. Documentation is conducted to record the learning process and store evidence of the improvement in student achievement.

The instruments used in this research include an observation sheet for student and teacher activities, as well as an evaluation test to assess students' understanding. Data are analyzed both qualitatively and quantitatively. Qualitative analysis is used to describe the process of implementing the Discovery Learning method, while quantitative analysis is used to calculate the percentage of improvement in student learning outcomes in each cycle. The criteria for the success of the actions are determined based on the indicator that at least 85% of students achieve a minimum AKM score of ≥ 75, as outlined in the assessment-based learning guidelines by the Ministry of Education and Culture (Guidelines for AKM and its Implications in Learning, Ministry of Education and Culture, 2020).

III. RESULTS AND DISCUSSION

The application of the Discovery Learning method for fifth-grade students at SD Negeri 2 Kasri was conducted gradually, following the learning syntax proposed by Bruner, which includes: stimulation, problem identification, data collection, data processing, verification, and drawing conclusions (Sanjaya, 2016). In the stimulation phase, the teacher begins the lesson with triggering questions that stimulate students' curiosity, such as “What is the difference between the area of a square and the area of a triangle?” This phase aims to build students' readiness for active learning. Next, students are asked to identify problems, with the guidance of the teacher, and formulate questions related to the topic. In the data collection phase, students are divided into small groups and provided with tools such as grid paper, scissors, and rulers. They explore various plane figures and attempt to calculate their areas concretely. This phase is in line with Hosnan’s (2014) view, which states that discovery learning encourages students to build concepts through direct experience (Scientific Approach for Curriculum 2013).

The data collected is then processed by the students to discover patterns or formulas, such as the relationship between the sides and the area of a figure. After that, students verify by testing the formulas they have created on other problems and comparing the results. This process reinforces the concepts they have discovered. Finally, through the teacher's guidance, students draw a collective conclusion about the area formula for plane figures and are given practice problems as individual reinforcement.

The application of the Discovery Learning method has had a significant impact on improving student learning outcomes. Based on the evaluation results, in the pre-cycle condition, only 3 out of 17 students (17.6%) achieved a score ≥ 75 according to the AKM standard. The majority of students (82.4%) did not fully understand the concept of the area of plane figures. After the implementation of the action in Cycle I, the number of students who achieved the AKM score increased to 8 students (47.1%). This progress indicates that the approach, which emphasizes exploration and active involvement, began to influence students' understanding. Although not all students reached the target, reflection was conducted to improve the learning process in the next cycle. In Cycle II, learning outcomes improved significantly, with 15 out of 17 students (88.2%) successfully achieving the AKM score. The remaining two students did not reach the AKM standard, one of whom was identified as having special needs (difficulty with short-term memory in multiplication and addition), and the other tended to rush through the problems, leading to a lack of precision.

This improvement is in line with the findings of a study by Mulya (2020), which states that the implementation of Discovery Learning can enhance students' understanding of mathematical concepts because students are encouraged to actively search for and discover information on their own. Additionally, a study by Kartika (2024) shows that the use of concrete media in the Discovery Learning method clarifies abstract concepts such as geometry and increases students' motivation to learn.

The results of this study indicate that the Discovery Learning method is highly relevant for improving student learning outcomes, especially in conceptual mathematics learning, such as the area of plane figures. Through exploratory activities and direct experiences, students build their own knowledge. This is consistent with Bruner's constructivist theory, which states that knowledge becomes more meaningful when it is discovered (Sanjaya, 2016).

Learning becomes more meaningful because students do not merely receive information but undergo an active, analytical, and reflective thinking process. In addition, this method also increases student engagement, which was previously low due to the conventional lecture approach. This aligns with Djamarah's (2021) view that one of the causes of low learning outcomes is the minimal participation of students due to non-variative teaching methods. To provide a clearer picture of the improvement in student learning outcomes after the implementation of the Discovery Learning method, the following graph can be seen:

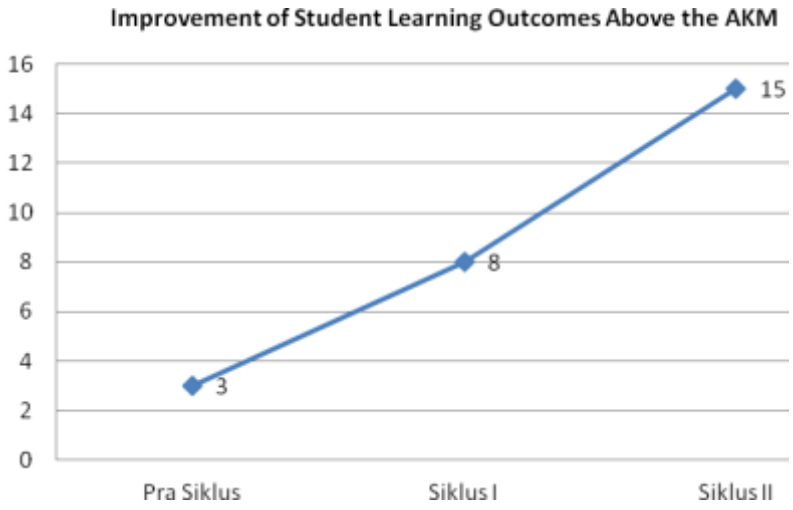

Figure 1. Student Learning Outcomes in Each Cycle

The graph illustrates the increase in the number of students who achieved a score ≥ 75 (AKM) in each learning cycle. The graph shows that as the cycles progressed, the number of students reaching the AKM score increased from 3 students in the pre-cycle, to 8 students in Cycle I, and 15 students in Cycle II. The graph also shows the total number of students (17) to provide a clear comparison.

IV. CONCLUSION

The conclusions of this study are as follows: (1) The application of the Discovery Learning method as an effort to improve student learning outcomes in Mathematics on the topic of the Area of Plane Figures in Class V of SD Negeri 2 Kasri was carried

out by following the learning steps/syntax as follows: (a) Stimulation; (b) Problem Statement; (c) Data Collection; (d) Data Processing; (e) Verification; and (f) Generalization; and (2) Based on the student evaluation results from solving problems at the end of each learning cycle, there was an observable improvement in student learning outcomes. In the pre-cycle, only 3 students achieved scores above the AKM, but by Cycle I, the number increased to 8 students, and by Cycle II, 15 students achieved the AKM score.

Acknowledgment

I would like to express my gratitude to all parties who have provided support throughout the research process and the writing of this article, both in terms of physical and moral support. My thanks go to the lecturers at Universitas PGRI Kanjuruhan Malang, as well as to my fellow colleagues who have provided motivation. I also extend my deepest gratitude to my family and friends at SD Negeri 2 Kasri who have consistently provided encouragement. I hope that this research and article can contribute to the development of knowledge and educational practice.

References

[1] Arikunto, Suharsimi. (2010). Prosedur Penelitian Suatu Pendekatan Praktik. Jakarta: Rineka Cipta, 133
[2] Dahar. (2011). Teori-Teori Belajar. Jakarta: Erlangga, 112
[3] Djamarah. (2011). Strategi Belajar Mengajar. Jakarta: Rineka Cipta, 148
[4] Hosnan. (2014). Scientific Approach for Curriculum 2013, Jakarta: Ghalia Indonesia, 119
[5] Kartika, K., Ummah, M. K., & Rudini, M. (2024). Model Discovery Learning dengan Menggunakan Media Konkret dalam Meningkatkan Numerasi Siswa pada Pembelajaran Matematika di Sekolah Dasar. Jurnal Basicedu, 8(4), https://doi.org/10.31004/basicedu.v8i4.8364
[6] Kurniasih dan Sani. (2017). Jurnal EduHumaniora: Jurnal Pendidikan Dasar, 9(1), 109. https://doi.org/10.17509/eh.v9i2.7078.
[7] Mulya, A. P., Sasmiati, & Sugiman. (2020). Pengaruh Model Discovery Learning Terhadap Hasil Belajar Matematika Kelas V. Pedagogi: Jurnal Pendidikan Dasar, 7(2), https://jurnal.fkip.unila.ac.id/index.php/pgsd/article/view/16542/0
[8] Mulya, Annisa Putri; Sasmiati, Sasmiati; Sugiman, Sugiman. (2020). Pengaruh Model Discovery Learning Terhadap Hasil Belajar Matematika Kelas V. Pedagogi: Jurnal Pendidikan Dasar, 7(2), https://doi.org/10.23960/pedagogi.v6i14.16542
[9] Panduan AKM dan Implikasinya dalam Pembelajaran. (2020). Kemendikbud, 12
[10] Purwanto (2020). Pembelajaran Matematika SD Berbasis Kontekstual. Bandung: Alfabeta, 45
[11] Sanjaya, W. (2016). Strategi Pembelajaran: Berorientasi Standar Proses Pendidikan. Jakarta: Kencana
[12] Sanjaya, Wina. (2016). Strategi Pembelajaran: Berorientasi Standar Proses Pendidikan. Jakarta: Kencana, 212
[13] Sanjaya. (2010). Strategi Pembelajaran Berorientasi Standar Proses Pendidikan. Jakarta: Kencana Prenada Media Group, 104
[14] Suryanto. (2017). Strategi Pembelajaran Matematika. Yogyakarta: Graha Ilmu, 3
[15] Wulandari, Dwi Putri. (2020). Penerapan Media Konkret untuk Meningkatkan Pemahaman Konsep Matematika. Jurnal Ilmiah Pendidikan Dasar, 7(2), https://ejournal.upi.edu/index.php/eduhumaniora/article/view/2704/0