

Implementation of the Demonstration Method with Teaching Aids to Improve Mathematics Learning Outcomes at SD Negeri 02 Cantuk

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Abstract

The low mathematics learning outcomes of elementary school students are caused by monotonous learning and a lack of active student involvement. This study aims to improve students' mathematics learning outcomes through the application of demonstration methods accompanied by teaching aids at SDN 2 Cantuk. This study used the Classroom Action Research (CAR) method, implemented in two cycles. The subjects were 25 fourth-grade students at SDN 2 Cantuk. Data were collected through observation, learning achievement tests, documentation, and interviews. The results showed that the application of demonstration methods accompanied by teaching aids was able to improve students' mathematics learning outcomes. In pre-cycle, average value-The average score for students was 62 with a learning completion rate of 48%. In cycle I, the average score-The average score increased to 74 with a learning completion of 72%. Furthermore, in cycle II, the average score-The average student score increased to 86, with learning completion reaching 92%. Student activity and participation during learning also increased. Based on these research results, it can be concluded that the demonstration method accompanied by teaching aids is effective in improving elementary school students' mathematics learning outcomes.

Keywords

Teaching Aids; Mathematics Learning Outcomes; Demonstration Methods; PTK



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INTRODUCTION

Education plays a fundamental role in improving the quality of human resources because it not only functions as a medium for transferring knowledge but also contributes to the development of students' character, skills, attitudes, and critical thinking abilities. Through effective education, students are expected to optimize their potential and adapt to the rapid development of science and

technology. Therefore, the learning process in schools should be designed in a meaningful, interactive, and student-centered manner to achieve educational goals effectively. One of the important subjects in elementary education is mathematics because it supports the development of logical, analytical, systematic, and creative thinking skills that are essential in everyday life. Mathematics learning at the elementary school level is also intended to help students solve practical problems and build conceptual understanding from an early age. According to Supinah and A. D. Wibawa, appropriate learning strategies enable students to understand mathematical concepts meaningfully rather than merely memorizing formulas.

However, mathematics is still commonly perceived by elementary school students as a difficult and uninteresting subject. Many students experience anxiety and low confidence during mathematics lessons, which ultimately reduces their learning motivation and negatively affects their academic achievement. This condition is often caused by the dominance of teacher-centered learning approaches in which students passively receive information through lectures without actively participating in the learning process. In addition, teachers rarely utilize instructional media or teaching aids that can help students visualize abstract mathematical concepts more concretely. This situation is problematic because elementary school students are generally in the concrete operational stage of cognitive development, meaning that they learn more effectively through direct experiences, visual representations, and real objects. As a result, students tend to become passive, easily bored, and less motivated to engage in mathematics learning activities.

Initial observations conducted at SDN 2 Cantuk revealed that students' mathematics learning achievement remained relatively low. Out of 25 students, only 12 students (48%) achieved the Minimum Mastery Criteria (KKM), while the remaining 13 students failed to meet the expected standard. The average class score was also below the school's target. Furthermore, students' classroom participation during mathematics lessons was still unsatisfactory. Most students tended to listen passively to the teacher's explanation without actively asking questions, expressing opinions, or participating in discussions. Several students also appeared distracted, talked to their peers during the lesson, and showed signs of boredom. These findings indicate that the existing instructional approach has not successfully created an engaging and meaningful learning environment for students.

To overcome these problems, innovative learning methods that encourage active participation and facilitate concrete understanding of mathematical concepts are required. One alternative that can be implemented is the demonstration method

assisted by teaching aids. The demonstration method is a learning approach in which teachers directly demonstrate processes, procedures, or problem-solving steps so that students can observe and understand the material more clearly. Through demonstrations, students do not merely listen to explanations but also observe practical examples of mathematical problem-solving. The use of teaching aids further supports this process by helping students transform abstract concepts into concrete visual experiences. Consequently, the learning process becomes more interactive, engaging, and easier to understand.

Previous studies have demonstrated the effectiveness of demonstration methods and teaching aids in improving mathematics learning outcomes. Nur Khofifah and Fenny Kristin emphasized that the demonstration method can strengthen students' conceptual understanding and improve mathematics achievement in elementary schools. Similarly, Sukristin et al. found that the use of teaching aids positively influences students' mathematics learning achievement because it helps learners connect mathematical concepts with real-life objects and situations. Learning activities involving teaching aids are generally more interesting and enjoyable because students can directly see, touch, and practice the concepts being learned. Moreover, combining demonstration methods with teaching aids encourages students to participate more actively in classroom discussions, ask questions confidently, and solve problems independently. Increased participation and engagement contribute positively to students' conceptual understanding and overall learning achievement.

Although several previous studies have examined demonstration methods and teaching aids separately, limited research has specifically investigated the integration of demonstration methods with teaching aids in improving mathematics learning outcomes and student participation in the context of SDN 2 Cantuk. Therefore, this study aims to analyze the application of the demonstration method assisted by teaching aids to improve mathematics learning outcomes among fourth-grade students at SDN 2 Cantuk. This research is expected to contribute both theoretically and practically to the development of innovative mathematics learning strategies in elementary schools, particularly in increasing students' learning achievement, classroom participation, and motivation during the learning process.

METHODS

This study employed a Classroom Action Research (CAR) design to improve the quality of mathematics learning through the implementation of the demonstration method assisted by teaching aids. Classroom Action Research is a

reflective research approach conducted collaboratively by teachers and researchers to solve classroom learning problems systematically and continuously. According to Suharsimi Arikunto, CAR aims to improve teaching practices and student learning outcomes through planned actions implemented in repetitive cycles. This research design was selected because it was relevant to the classroom problem identified during preliminary observation, namely the low mathematics learning achievement and limited student participation in classroom activities.

The research was conducted at SDN 2 Cantuk during the second semester of the 2025/2026 academic year. The participants of this study were 25 fourth-grade students consisting of 13 male students and 12 female students. The research focused on the implementation of the demonstration method accompanied by teaching aids in mathematics learning. The study was conducted in two action cycles, and each cycle consisted of four stages: planning, action, observation, and reflection. The cyclical process enabled the researcher and classroom teacher to evaluate weaknesses identified in each cycle and make continuous improvements in the following cycle.

In the planning stage, the researcher collaborated with the classroom teacher to prepare learning instruments and instructional materials required during the research process. These included lesson plans, teaching modules, mathematics teaching aids, observation sheets, interview guidelines, evaluation tests, and supporting instructional media. The teaching aids were designed to help students understand mathematical concepts concretely and interactively. In the action stage, the teacher implemented the demonstration method by directly demonstrating mathematical problem-solving procedures using the prepared teaching aids. Students were encouraged to observe, practice, and actively participate in using the teaching aids during classroom activities. This approach was expected to help students better understand abstract mathematical concepts through direct and meaningful learning experiences.

During the observation stage, the researcher monitored both teacher and student activities throughout the learning process. Several aspects were observed, including students' attention to the teacher's explanations, participation in asking and answering questions, collaboration with peers, confidence in using teaching aids, and involvement in solving mathematical problems. Observation data were recorded systematically using structured observation sheets to ensure consistency during data collection. After each cycle was completed, reflection activities were conducted collaboratively between the researcher and the classroom teacher to evaluate the strengths and weaknesses of the implemented learning process. The reflection results

were then used as the basis for improving instructional strategies in the next cycle.

Data collection in this study employed four techniques, namely observation, learning achievement tests, interviews, and documentation. Observation was conducted to identify student engagement and classroom interaction during the implementation of the demonstration method. Learning achievement tests were administered at the end of each cycle to measure students' understanding of mathematics concepts and determine the improvement of learning outcomes. Interviews with teachers and students were conducted to obtain additional information regarding students' responses, difficulties, and experiences during the learning process. Documentation techniques were used to support the research findings through photographs of classroom activities, students' score lists, and other relevant documents.

The research instruments consisted of observation sheets, evaluation tests, interview guidelines, and documentation records. Observation sheets were used to record student participation and teacher performance during classroom learning activities. Evaluation tests were designed to assess students' mastery of the mathematics material taught in each cycle. Interview guidelines were prepared to ensure that data collection from teachers and students remained focused on the implementation of the demonstration method and the use of teaching aids. To improve data validity and reliability, the researcher applied triangulation techniques by comparing findings obtained from observations, interviews, tests, and documentation.

The collected data were analyzed using both quantitative and qualitative approaches. Quantitative analysis was used to calculate students' average scores and the percentage of learning mastery in each cycle. Learning mastery was determined based on the number of students who achieved the Minimum Mastery Criteria (KKM) established by the school. Meanwhile, qualitative analysis was used to describe students' learning activities, participation, motivation, and enthusiasm during the mathematics learning process. The indicators of research success were determined based on improvements in both student learning outcomes and classroom participation. The study was considered successful if at least 80% of students achieved the Minimum Mastery Criteria and demonstrated increased learning activity during the implementation of the demonstration method assisted by teaching aids.

FINDINGS AND DISCUSSION

Results and Discussion

Pre Cycle

In the pre-cycle stage, mathematics learning still uses the lecture method without the use of visual aids. Student learning outcomes remain low, with most students failing to achieve the Minimum Competency (KKM).

Table 1. Pre-Cycle Student Learning Outcomes

No	Description	Results
1.	Number of Students	25%
2.	Average value	62%
3.	Students Complete	12%
4.	Completion Percentage	48%

Based on table 1, it is known that the average student score only reached 62% with a learning completion percentage of 48%.

Cycle I

In cycle I, the teacher began implementing the demonstration method using simple teaching aids in mathematics learning. Students appeared more active and began to be enthusiastic about participating in the learning process.

Table 2. Student Learning Outcomes in Cycle I

No	Information	Results
1.	Number of Students	25%
2.	Average value	74%
3.	Students Complete	18%
4.	Completion Percentage	72%

Based on table 2, it is known that student learning outcomes have increased. The average student score increased to 74% with a learning completion percentage of 72%.

Cycle II

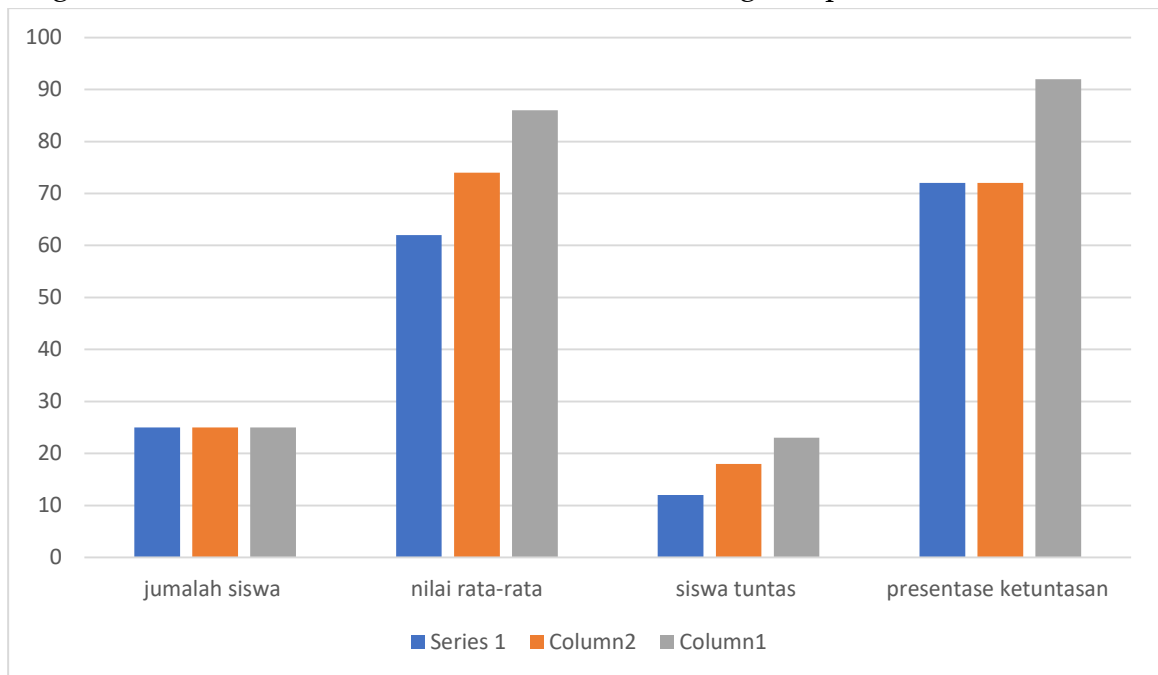
In cycle II, improvements were made to learning based on the results of reflection in cycle I. The teacher gave students more opportunities to use teaching aids directly.

Table 3. Student Learning Outcomes in Cycle II

No	Information	Results
1.	Number of Students	25%
2.	Average value	86%

3.	Students Complete	23%
4.	Completion Percentage	92%

Table 3 shows that student learning outcomes have significantly improved. The average student score increased to 86%, with a learning completion rate of 92%.



Graph 1. Comparison of Student Learning Outcomes Pre-Cycle, Cycle I and II

Information:

- ❖ The number of students is the same, 25 students
- ❖ The average score increased from 62% to 86%
- ❖ Students completed increased from 12% to 23%
- ❖ The completion percentage increased from 48% to 92%

Based on the comparative graph of student learning achievement in the pre-cycle phase, cycle I, and cycle II, there appears to be a significant increase in mathematics learning outcomes after the implementation of the demonstration method with the aid of teaching aids. In the pre-cycle phase, the average student score was still low, namely 62, with a learning completion level of 48.% or only 12 students completed the program. After the intervention in cycle I, the average score increased to 74, with learning completion reaching 72.% or 18 students completed the task. This improvement indicates that the use of the demonstration method is beginning to make it easier for students to understand the mathematics material better. In cycle II, student learning outcomes again increased significantly, with an

average score reaching 86 and a completion percentage of 92.% or 23 students have achieved the Minimum Competency (KKM). This finding proves that the application of the demonstration method accompanied by teaching aids can improve student understanding, activeness, and learning achievement in mathematics.

CONCLUSION

Based on the results of classroom action research conducted at SDN 2 Cantuk, it can be concluded that the use of demonstration methods in conjunction with teaching aids significantly improved the mathematics learning achievement of fourth-grade students. This improvement was evident in the learning evaluations in each cycle, which showed gradual progress. In the pre-cycle phase, the average student score was only 62, with a learning completion percentage of 48.%, indicating that many students still have difficulty understanding the mathematics material being taught. After the demonstration method with teaching aids was implemented in Cycle I, student achievement began to improve. The average grade rose to 74, and the learning completion percentage reached 72.%. This indicates that the application of the method and teaching aids is starting to have a positive effect on student understanding. With the teacher demonstrating the steps-Through direct problem-solving steps using concrete teaching aids, students more easily master mathematical concepts. Although there was improvement in cycle I, some students still did not meet the Minimum Completion Criteria (KKM). Therefore, in cycle II, learning adjustments were made. The teacher provided more space for students to practice using teaching aids directly and strengthened interaction and guidance during the teaching and learning process. The results in cycle II showed very significant improvement. The average student score rose to 86, with a learning completion percentage of 92.%. These data indicate that the majority of students were able to understand the mathematics material well after the implementation of the demonstration method with teaching aids. This improvement in learning outcomes proves that choosing the right learning method significantly influences students' success in mastering the material. The demonstration method combined with the use of teaching aids not only improves learning achievement but can also strengthen student engagement and participation during the learning process. At the beginning of the lesson, students are usually passive and reluctant to ask questions or answer teacher questions. After the demonstration method is implemented, they become more active in participating in the learning, show higher enthusiasm, concentrate on the teacher's explanation, and are more confident in working on problems in front of the class. The use of teaching aids also makes mathematics learning more interesting

and enjoyable. Students not only hear the teacher's explanation verbally, but can also witness and directly apply the mathematical concepts being learned. Both of these things make it easier for students to understand material that was previously abstract into more concrete and easier to digest. As a result, the learning process becomes more meaningful for them. The demonstration method provides opportunities for students to gain knowledge through direct experience. Learning activities that include observation, scrutiny, and real-life experiments can strengthen students' memory and understanding of the material. Furthermore, the use of teaching aids can create a more interactive classroom atmosphere, thereby increasing student motivation in learning mathematics. The research findings conclude that the use of demonstration methods combined with teaching aids is effective in teaching mathematics at the elementary school level. This approach not only improves learning achievement but also increases student motivation, engagement, and participation during the learning process. Therefore, the demonstration method combined with teaching aids can be considered as an alternative learning strategy that teachers can implement in elementary school mathematics. This study also indicates that the success of the learning process does not solely depend on the content of the material, but is also influenced by the methods and media used by teachers. Therefore, teachers must adapt their teaching strategies to the characteristics of elementary school students so that they can more easily master the material. By implementing appropriate methods and media, the learning process can be more effective, interesting, and enjoyable.

Based on the findings of this study, several recommendations can be proposed to improve the quality of mathematics learning at the elementary school level. Teachers are encouraged to apply more innovative and student-centered learning methods, particularly the demonstration method assisted by teaching aids, because this approach has been proven to improve students' learning achievement, motivation, and classroom participation. Teachers are also expected to be more creative in selecting instructional media and teaching aids that are appropriate to the mathematics topics being taught so that abstract concepts can be understood more concretely by students. In addition, schools should support the implementation of innovative learning by providing adequate educational facilities, especially mathematics teaching aids, as well as organizing training programs and workshops to improve teachers' pedagogical competence and classroom management skills. Students are also expected to become more active, confident, and motivated in participating in mathematics learning activities through discussion, questioning, and

direct involvement in the use of teaching aids.

Furthermore, this study is expected to contribute to the development of more effective and meaningful mathematics learning practices in elementary schools. The implementation of demonstration methods combined with teaching aids can serve as an alternative instructional strategy to overcome low mathematics achievement and limited student participation in classroom learning. However, this study was limited to one class and a specific mathematics topic; therefore, future researchers are recommended to expand the scope of research by involving different educational levels, broader learning materials, or integrating demonstration methods with other innovative learning models. Through continuous development of interactive and engaging learning strategies, the quality of mathematics education at the elementary school level can be improved more significantly.

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