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Boosting Students' Math Performance through Contextual Teaching and Number Card Games

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Abstract

This study aims to improve the mathematics learning outcomes in addition and subtraction operations for second-grade students at Al Amal Mobile Elementary School through the application of a contextual learning model using number cards as media. The Classroom Action Research (CAR) method based on the Kemmis and McTaggart model was employed in three cycles, involving 18 students as research subjects. Data were collected through learning outcome tests, observations of teacher and student activities, and documentation. Initial observations indicated that only 27.78% of students achieved learning completeness with an average score of 52.22. After the implementation of the contextual learning model, the percentage of completeness increased to 44.44% in Cycle I (average score of 66.94), 72.22% in Cycle II (average score of 75.28), and reached 83.33% in Cycle III (average score of 86.95). This study concludes that the contextual learning model using number cards is effective in improving mathematics learning outcomes, active participation, and students' conceptual understanding.

Keywords: Contextual ,Learning Outcomes, Number Cards.

1 INTRODUCTION

Education has an important role in shaping quality human resources. Through education, students' potential can be developed to face various life challenges that are constantly changing. Based on Law Number 20 of 2003 concerning the National Education System, education is a conscious and planned effort to create a learning atmosphere so that students actively develop their potential, have spiritual strength, self-control, intelligence, and skills needed for themselves and society. Through a directed and meaningful educational process, it is hoped that students will be able to become intelligent, creative, and characterful individuals. Therefore, basic education has a very important role in building the foundation of students' thinking abilities and skills from an early age so that they are ready to face the increasingly rapid development of science and technology.

Mathematics is one of the basic subjects that has an important role in developing logical, analytical, and systematic thinking skills. Mathematics not only serves to hone numeracy skills, but also trains students in solving problems and making rational decisions. However, the mathematics learning outcomes of elementary school students are still relatively low, especially in addition and subtraction operation materials. Based on the results of observations at SDS Al Amal Mobile Elementary School, it is known that only 27.78% of students have reached the Minimum Completeness Criteria (KKM), while 72.22% of students have not completed it. This low learning outcome is caused by learning

that is still conventional and teacher-centered, where students only listen to explanations without actively engaging in learning activities. This condition causes students to become passive, lack enthusiasm, and have difficulty understanding mathematical concepts in depth.

Efforts to improve learning can be done by applying a contextual learning model (Contextual Teaching and Learning / CTL) that emphasizes the active involvement of students in relating the subject matter to real-life situations. According to Johnson (2008), CTL helps students build their own knowledge through direct experience so that learning becomes more meaningful. In addition to the learning model, the use of media also has an important role in helping students understand concepts concretely. One of the media that is interesting and in accordance with the characteristics of elementary school students is the number card media, because it is visual, concrete, and able to create a fun learning atmosphere (Wahyu, 2023). Therefore, this study aims to improve the mathematics learning outcomes of grade II students of SDS Al Amal Mobile Elementary School through the application of a contextual learning model using number card media. The application of this model is expected to foster student motivation, participation, and independent learning in understanding the concept of addition and subtraction operations.

2 RESEARCH METHODS

This study uses a Class Action Research (PTK) approach based on the model developed by Kemmis and McTaggart which includes four stages, namely planning, implementation of actions, observation, and reflection (Kemmis & McTaggart, 1988). This research was carried out at SDS Al Amal Mobile Elementary School East Jakarta in the even semester of the 2024/2025 school year. The research subjects consisted of 18 grade II students, namely 10 male students and 8 female students. The purpose of this study is to improve mathematics learning outcomes in addition and subtraction operation materials through the application of a contextual learning model (Contextual Teaching and Learning / CTL) with the help of number card media. The research was carried out in three cycles, where each cycle consisted of two meetings. Each cycle includes the stages of learning planning, implementation of actions, observation of the learning process, and reflection to determine improvements in the next cycle. In the planning stage, researchers and classroom teachers prepare Learning Implementation Plans (RPP), prepare number card media, and prepare observation instruments and learning outcome tests according to CTL principles. The implementation of actions is carried out by relating addition and subtraction materials to the context of students' daily lives. Teachers play the role of facilitators who encourage activeness, discussion, and problem-solving through concrete activities using number cards.

Observations are carried out systematically during learning activities to assess teacher and student activities. Observation instruments are used to observe aspects of student involvement, motivation, and cooperation in the learning process, as well as teachers' ability to manage classrooms and use learning media. Reflection is carried out at the end of each cycle between researchers and teachers to review the success of the action, identify obstacles, and devise necessary improvement steps. Data collection techniques include observation, learning outcome tests, and documentation. Qualitative data was obtained from the results of observations and field notes, while quantitative data was obtained from the results of student tests in each cycle. Data analysis was carried out with qualitative and quantitative descriptive approaches, where quantitative data was analyzed by calculating the average score and percentage of learning completeness, while qualitative data was analyzed through reduction, presentation, and conclusion drawing (Miles & Huberman, 1994). The criteria for the success of the action were determined based on the increase in the average score of learning outcomes and the number of students who achieved the Minimum Completeness Criteria (KKM) of 70. Through this approach, it is

hoped that the mathematics learning process will be more active, meaningful, and able to increase students' understanding of the concept of addition and subtraction operations.

3 RESULT AND DISCUSSION

This classroom action research was carried out at SDS Al Amal Mobile Elementary School East Jakarta in the even semester of the 2024/2025 school year. The research subjects consisted of 18 grade II students. The research was conducted in three cycles using the Kemmis and McTaggart models which included the stages of planning, implementation of actions, observation, and reflection. The focus of this research is to improve mathematics learning outcomes in addition and subtraction operation materials through the application of a contextual learning model (Contextual Teaching and Learning / CTL) using number card media.

3.1 Sub Results

This research was carried out at SDS Al Amal Mobile Elementary School Pondok Rangon East Jakarta in the even semester of the 2024/2025 school year. The research subjects consisted of 18 grade II students, consisting of 10 male students and 8 female students. This study uses the Kemmis and McTaggart model Class Action Research (PTK) method which is carried out in three cycles. Each cycle consists of four stages, namely planning, implementation of actions, observation, and reflection. The main objective of this study is to improve students' mathematics learning outcomes in addition and subtraction operation materials through the application of a contextual learning model (Contextual Teaching and Learning / CTL) using number card media.

Before the action is taken, the researcher carries out an initial test (pre-action) to find out the student's initial ability. Based on the results of the pretest, the average score of students only reached 52.22 with a learning completeness rate of 27.78% (5 students out of 18 students achieved KKM). Most students have difficulty understanding the concepts of addition and subtraction because learning is still teacher-centric and abstract. The previous learning process only used lecture methods and practice questions without actively involving students, so that students looked passive and easily bored. This condition is the basis for researchers to make improvements through the application of a contextual learning model assisted by number card media.

In cycle I, the researcher began to apply a contextual learning model. The teacher tries to relate the material of addition and subtraction operations to the students' daily lives, for example through activities to count the number of objects around the class. In addition, number card media is used so that students can learn more concretely and visually. The test results at the end of the first cycle showed an increase in the average score to 66.94 with a completeness rate of 44.44% or as many as 8 students out of 18 students who achieved KKM. Although the results improved compared to the pre-action, there were still some students who were less active and did not fully understand the concept of counting operations. Based on the results of the reflection, teachers and researchers agreed that improvements need to be made in the management of study groups and the provision of instruction so that students are more focused and motivated.

Improvements were made in the second cycle by adding a variety of learning activities using number cards and increasing interaction between students. Teachers engage students in counting games and provide more opportunities to work together in small groups. As a result, in cycle II there was a more significant increase with an average score of 75.28 and a learning completeness rate of 72.22% or 13 students completed out of 18 students. This improvement shows that the contextual learning model with number card media is increasingly effective in helping students understand addition and subtraction material. Students began to show a higher enthusiasm for learning, actively discuss, and dare to express their opinions during learning activities.

In cycle III, researchers and teachers made improvements to the learning steps that had been implemented previously. Teachers add variety to the game using number cards and reinforce students' reflection activities at the end of learning. All students are actively involved in class activities, both individually and in groups. The test results in cycle III showed a significant increase with an average score of 86.95 and learning completeness reached 83.33% or 15 students out of 18 students who managed to achieve KKM. Based on the observation results, students seemed more enthusiastic in learning, working together with their group mates, and showing a better understanding of addition and subtraction operations. The learning process went smoothly, the classroom atmosphere became more lively, and students easier to understand the material delivered by the teacher.

Overall, the results of the study showed an increase in students' mathematics learning outcomes from pre-action to cycle III. The average score of students increased from 52.22 in the pre-action to 66.94 in the first cycle, then increased again to 75.28 in the second cycle, and reached 86.95 in the third cycle. The percentage of learning completeness also increased from 27.78% in pre-action to 44.44% in cycle I, 72.22% in cycle II, and 83.33% in cycle III. This data shows that the application of a contextual learning model using number card media is able to improve student learning outcomes gradually and consistently in each cycle. actively discuss, work together, and be able to solve story problems better.

3.2 Sub Discussion

The discussion of the results of this study aims to analyze the effectiveness of the application of a contextual learning model using number card media in improving mathematics learning outcomes of addition and subtraction operations in grade II students of SDs Al Amal Mobile Elementary School. The learning process is carried out in stages in three cycles, starting from the pre-action stage as an overview of the initial condition of students to the implementation of actions in each cycle.

In the pre-action stage, student learning outcomes were very low, with only 27.78% of students achieving completeness. A low average score (52.22) indicates that previously applied conventional teaching methods are not effective in encouraging student understanding and participation. This is reinforced by observations that show a lack of response and student infocus.

Entering the first cycle, after the implementation of the contextual learning model with number card media, there was an increase in completeness to 44.44% and an average score of 66.94. This improvement shows that the new approach is starting to have a positive impact. However, there are still many students who have not achieved KKTP, and observations show that the role of teachers and student involvement in groups still needs to be optimized. The analysis of the question items also indicates that students still have difficulty with story questions that involve the context of daily life, indicating the need for further direction so that students can think more applicatively and critically.

In cycle II, strategy improvements are made based on reflections in cycle I, such as adding the role of students in groups and using more relevant number card media. The results were very significant, with a completeness of 72.22% and an average score of 75.28. This improvement proves that adjustments to learning methods and media based on reflection in the previous cycle have a real positive impact. Students begin to show a better understanding of the material and critical thinking skills. Observation of teacher and student activities also showed a significant improvement, indicating that the strategies implemented were successful in increasing engagement and collaboration.

The peak of success was achieved in cycle III, where student completeness jumped to 83.33% and the average score reached 86.95. This figure has exceeded the criteria for research success (≥ 75% of students achieve a score of ≥ 70). Observations in this cycle also showed a significant increase in teacher and student activities, where teachers became more proficient in facilitating and students became more active, collaborative, and confident. It confirms that contextual learning models, when implemented gradually and

consistently with the right media support, are capable of creating a dynamic and effective learning environment.

3.3 Table

To illustrate the development of learning outcomes from pre-action to cycle III, the following recapitulation table is presented:

Table 1. Recapitulation of Student Learning Outcomes

No	Ketuntasan	Pra Tindakan	Siklus I	Siklus II	Siklus III
1	Tuntas	5 Siswa (27,78%)	8 Siswa (44,44%)	13 Siswa (72,22%	15 Siswa (83,33%)
2	Tidak Tuntas	13 Siswa (72,22%)	10 Siswa (55,56%)	8 Siswa (27,78%)	3 Siswa (16,67%)

The table shows the gradual increase from cycle to cycle. The increase in the average score from 52.22 to 86.95 and the increase in completeness from 27.78% to 83.33% prove the effectiveness of the measures given.

3.4 Picture

To illustrate the development of learning outcomes from pre-action to cycle III, the following recapitulation table is presented:

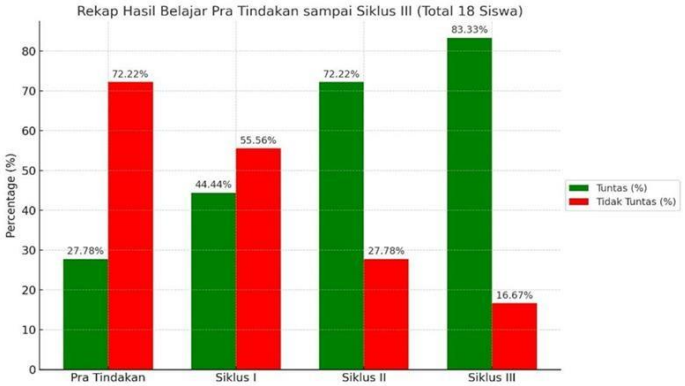

Figure 1. Recapitulation of Pre-Action Learning Outcomes Until Cycle 3

The image shows a consistent and linear pattern of improvement in each cycle. The graph rose sharply from pre-action to cycle III, showing that the learning interventions carried out succeeded in significantly improving learning outcomes.

This improvement in learning outcomes is in line with Johnson's (2007) theory which states that contextual learning emphasizes the relationship between the subject matter and the student's real-life context, so that learning becomes more meaningful. In addition, Nur and Wahyuni (2016) emphasized that the CTL model is able to increase learning motivation and learning outcomes because it encourages active student involvement. This finding is also in line with research by Lestari and Prabowo (2022) who stated that number card media can increase the understanding and interest in learning mathematics of elementary school students.

Through contextual learning, students learn by observing, questioning, trying, reasoning, and communicating their learning outcomes. Teachers play the role of facilitators, not information centers. This condition fosters learning independence, increases confidence, and develops students' critical thinking skills. With the use of number card media, mathematical concepts that were originally abstract became more concrete and easy to understand by students.

Overall, the results of this study prove that the contextual learning model assisted by the number card media not only improves student learning outcomes in the cognitive domain, but also develops affective and psychomotor aspects. Students become more active, enthusiastic, and courageous in participating during learning. Therefore, this approach can be recommended as one of the effective and fun learning alternatives for elementary school students, especially in mathematics subjects. Yudha, C. B. (2018), In this case, learning outcomes can be used as a benchmark for learning success.

4 CONCLUSION

Based on the results of classroom action research that has been carried out for three cycles, it can be concluded that the application of the contextual learning model using number card media has proven to be very effective in improving mathematics learning outcomes in the addition and subtraction operation material of grade II students of SDS Al Amal Mobile Elementary School. This increase is shown by significant data on learning outcomes from cycle I to cycle III. In the first cycle, the average student score only reached 66.94 with a completeness rate of 44.44%. After improvements were made through a more interactive and interesting contextual learning model in cycle II, student learning outcomes increased significantly with an average score of 75.28 and a completeness rate of 72.22%. Furthermore, in cycle III, the average student score reached 86.95 with an excellent level of completeness, which was 83.33%, which means that it has passed the set classical completeness limit.

In addition to improving learning outcomes, students' active involvement in the process of group discussions, collaboration, and participation in learning also experienced a significant increase. Students show higher enthusiasm and courage in expressing opinions, which reflects their improved critical thinking and communication skills. This shows that contextual learning models are not only effective in improving cognitive learning outcomes, but also encourage students to be more active, creative, and confident in the learning process. Thus, the application of contextual learning models using number card media gradually and continuously can significantly improve mathematics learning outcomes of grade II students, as well as encourage active student involvement in a more fun and meaningful learning process.

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