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BOOSTING MATH SCORES IN ELEMENTARY SCHOOLS WITH THE INDEX CARD MATCH METHOD

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Abstract: Increasing student learning outcomes is greatly influenced by motivation in the learning concept. Teachers can achieve this by using appropriate learning methods. The aim of this research is to increase student motivation and learning outcomes in mathematics lessons. One of the efforts made by teachers to increase students' learning motivation in Mathematics subjects is by applying methods Index Card Match. This research used a Classroom Action Research (PTK) approach and involved 26 class II students at SDN Cijagra 04, Paseh District, consisting of 13 female students and 13 male students. The research was conducted in 2 cycles during the 2023-2024 academic year. If the subject's score in the first cycle has not reached the Minimum Completion Criteria (KKM) score, the research will continue in the second cycle. If all subjects achieve scores according to the KKM in the second cycle, the research is considered complete. After 2 cycles, student learning outcomes increased from 86.69 in cycle 1 to 100 in cycle 2. Data analysis used qualitative and quantitative approaches. The research conclusion shows that there is an increase in students' motivation and mathematics learning outcomes by implementing the Index Card Match method. Students also show enthusiasm, enthusiasm, activity, creativity and courage in expressing opinions. Student motivation towards learning material also increases, and student learning experiences become broader, which ultimately has an impact on improving learning outcomes. It is hoped that the results of this research can help teachers choose appropriate learning methods to achieve learning goals, especially in Mathematics subjects

Keywords: Learning outcomes, Mathematics, Index card Match method, motivation

Introduction

Education is a topic that continues to attract attention nowadays, and this is not surprising because everyone has an interest and involvement in the educational process. In our country, efforts are continuously made to improve the quality of the learning process in order to achieve quality graduates. Through education, it is hoped that they will be able to form individuals who are competent

in their respective fields.

According to Law number 20 of 2003 in Hamka & Tahir (2021), education is a deliberate and planned effort to create a learning environment and learning process that allows students to actively develop their potential, including religious spiritual strength, self-control, personality, intelligence, noble morals, and skills necessary for personal, community, nation and state interests. Robbins (2016) in stated that the basic literacy skills include reading, writing and arithmetic. Basic literacy skills are basic skills that focus on the basic abilities a person has. Some of these basic abilities include numeracy and listening skills.

In the world of education, basic knowledge of numeracy has been conveyed through mathematics learning (Giawa, 2021), but many students feel that mathematics is a complicated and difficult science (Nuraeni & Karlimah, 2023). According to Yuniantika (2018), children show interest in mathematics when they are just introduced to simple concepts, however, the higher their level of education, the more difficult the mathematics they learn, and the less interest they have. Apart from that, many children, even after studying mathematics at a basic level, still don't understand it well, many concepts are misunderstood.

Mathematics is often seen as a complex, complicated and confusing discipline for students. Therefore, mathematics is still considered a very difficult subject compared to other subjects (Perawati, 2021); (Andi Aryasti et al., 2023). Bahri et al. (2016) stated that although learning mathematics is considered important, in reality it is still considered difficult, complicated and scary by most students.

The results of pre-action observations show that class II students at SDN Cijagra 04 face challenges in learning mathematics. They have difficulty understanding the material presented by the teacher and tend to be reluctant to ask the teacher or classmates because they feel embarrassed. As a result, they experience difficulty in completing the exercises given by the teacher. Apart from that, teachers are also less innovative in creating various learning media.

The difficulties experienced by these students can be caused by the lack of attractiveness of the teaching strategies used by teachers, as well as the lack of teacher involvement in providing a variety of learning media (Amir, 2021); (Prabowo et al., 2020), teachers only explain the material and ask students to work on practice questions without reflecting on the students' level of understanding (Permatasari & Ahmad, 2022). This results in a lack of student interest in learning. The learning method used feels monotonous, so students feel bored when taking mathematics lessons. As a result, some students do not achieve the KKM score in the mathematics learning evaluation.

In mathematics learning in class II at SDN Cijagra 04, second semester of the 2023/2024 academic year, material about flat shapes is still taught using the lecture method without the support of learning media, students become passive in receiving the material without fully understanding it, which results in low learning achievement. From the evaluation of 26 students, only 38% or 10 students met the Minimum Completeness Criteria (KKM) 70. Observations showed that there were problems in mathematics learning, such as low student mastery and understanding of the material, lack of student interest in learning, learning approaches that tended to be abstract and unclear meaning, as well as lack of use of inappropriate learning models, methods or media by teachers.

It is necessary to immediately address the problems faced by second grade students so that they can feel interested, motivated, and have a positive attitude towards learning mathematics and can actively participate in the learning process, so that their learning outcomes can improve. One step to overcome this problem is to choose an appropriate learning method so that it can increase student motivation and learning outcomes in mathematics (Permatasari & Ahmad, 2022). One way is to apply learning methods index card match.

Learning methods Index Card Match is an exciting approach used to review previously studied material (Giawa, 2021); (Rahmawati & Holis, 2022). However, this method can also be used to teach new material on the condition that students are given the task of studying the topic that will be taught previously, so that when they attend class, they already have a basic understanding of the material (Hamka & Tahir, 2021).

In this learning method, students are invited to understand and master concepts by looking for index cards which consist of two parts, namely question cards and answer cards. Each student has the opportunity to draw one card. They are asked to look for pairs of the cards they take, where the student who has the question card looks for the student who has the answer card, and vice versa. With the game element in this learning method, it is hoped that students will not feel bored when learning mathematics.

Each learning method has advantages and disadvantages, including the Index Card Match learning method. According to Amir et al. (2021), the advantages of learning methods Index Card Match includes: 1) Increasing joy in the teaching and learning process, 2) Making lesson material more interesting for students, 3) Creating an active and enjoyable learning atmosphere. Students' enthusiasm for finding card pairs provides its own motivation so that the class becomes more dynamic, and 4) Improves student learning outcomes to reach the level of learning completion. However, there are several disadvantages to this method, including: 1) It takes quite a long time for students to complete the assignment, 2) It takes a long time to prepare, and 3) Teachers must provide more time for implementation.

Silberman (2006:250) in Nuraeni & Karlimah (2023) states that learning methods Index Card Match is one of the instructional techniques of active learning which includes various repetition methods. One effective way to ensure that learning remains in your mind is to take the time to review the material you have studied. Material that is reviewed by students tends to stick in their memory up to five times more than material that is not reviewed. Learning methods Index Card Match can also be considered as an alternative option that is more suited to the diverse learning characteristics of students.

Many researchers have demonstrated the effectiveness of this learning method Index Card Match in improving the process and outcomes of mathematics learning. Among other things, research conducted by Nuraeni & Karlimah (2023), concluded that the application of learning methods Index Card Match can improve the process and outcomes of mathematics learning. Research conducted by Yuniantika (2018) also shows that the use of methods Index Card Match can improve students' understanding of mathematical concepts. Apart from that, research by Yuniantika (2018) concluded that there was an increase in students' mathematical problem solving abilities by using the Index Card Match type Active Learning learning model.

By referring to the previous explanation, the researcher plans to conduct classroom action research at SDN Cijagra 04 on class II students with the title: "Application of the Method Index Card Match in Mathematics Learning for Elementary School Students" with the aim of the research being to evaluate student learning outcomes in understanding material about plane shapes in mathematics lessons in class II at SDN Cijagra 04, second semester of the 2023/2024 academic year.

Methods

This learning improvement research was carried out over two cycles in the even semester of the 2023/2024 academic year. Pre-cycle activities will start on April 26 2024. Meanwhile, the initial cycle will take place on April 29 2024, while the second cycle will take place on May 14 2024.

This research was conducted at SDN Cijagra 04, Paseh District, Bandung Regency. The research was conducted using Classroom Action Research (PTK). PTK is a research method carried out by teachers in their own classroom environment with the aim of improving their performance so as to improve student learning outcomes. According to Wardhani (2016), Classroom Action Research (CAR) involves teacher self-reflection and is carried out through a series of cycles consisting of four stages: planning, implementing actions, observing, and reflecting. The planning stage is an essential first step in every CAR activity.

The plan that has been prepared will be a guide in implementing actions. To ensure the quality of the actions carried out, observations need to be made. If observations are made during the action process, reflection will be carried out after the action is completed, where the researcher reflects back on what has been done and its impact on the student learning process. These four stages form one

cycle, so that if the first cycle does not go according to the initial plan, the cycle will be repeated in the second cycle and so on. The flow of research procedures is explained in Figure 1.

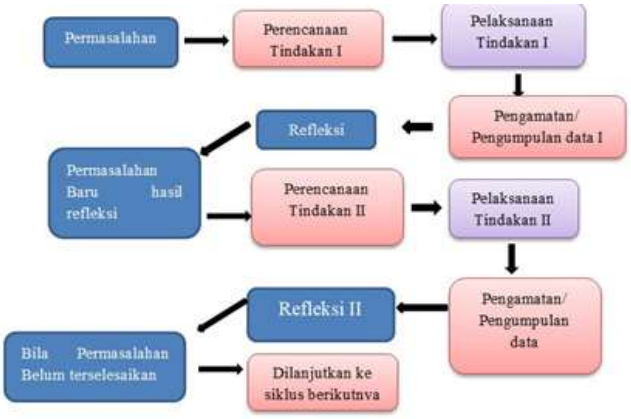


Figure 1. Design of research procedures

The subjects of this research were class II students at SDN Cijagra 04, Paseh District, Bandung Regency, in the 2023/2024 academic year, totaling 26 students. They were evenly split, with 50% males (13 students) and 50% females (13 students). The characteristics of students at SDN Cijagra 04 include liking to play, being active, liking to learn in groups, and preferring to learn directly by feeling or doing. Students at this school show a variety of individual differences in various aspects and areas, including in intelligence, cognitive and language abilities, as well as personality and physical development. They also received education at home. During the pre-cycle stage, students show a lack of motivation and interest in following lessons. Communication with teachers is also minimal, resulting in a lack of conduciveness in the classroom atmosphere because students have difficulty concentrating.

Research data was obtained from the results of observations and tests carried out in each cycle. Next, the data was analyzed quantitatively descriptively. The learning outcomes evaluated include cognitive aspects, obtained from written evaluation tests. Data sources come from students and researchers, with data obtained through pretests, post-tests, evaluation questions, and descriptive formative tests. The analysis process involves steps such as applying the scores obtained, calculating the cumulative score, determining the class average, and calculating percentages. Learning outcome data is analyzed using formulas that refer to the opinion of Arikunto (2006).

a. To determine the final value of student learning outcomes

$$N = \frac{SP}{SM} x100\%$$

SP = acquisition score
SM = maximum score

b. Determine the class average

$$NR = \frac{\sum NA}{SN}$$

NA = final value
SN = number of students

c. Mastery learning

$$P = \frac{\sum \text{Ketuntasan Siswa}}{\sum \text{Siswa}} x100\%$$

The success of this research will be marked by the achievement of the students' overall score in cycle II which has reached or exceeded the specified Minimum Completeness Criteria (KKM)

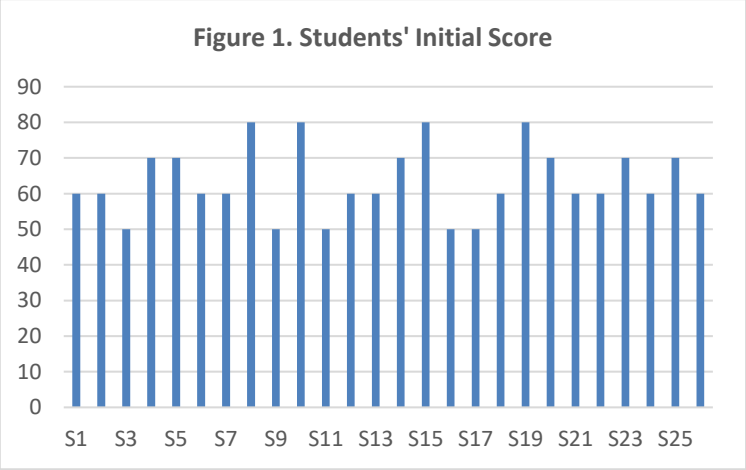
score, namely 70. Based on these criteria, the conclusion is drawn that a score equal to or greater than 70 is considered complete. while an assessment of less than 70 is considered as not meeting completion standards. Evaluation of the affective aspect includes the attitudes of students and teachers in the learning process, with data obtained through observation sheets. Aspects of teacher attitudes observed include classroom management skills and use of learning facilities, ability to improve the learning process, skills in managing interactions in the classroom, formation of positive attitudes in students, and demonstration of specific skills in mathematics subjects. Meanwhile, for student attitudes, things observed include the level of attention to explanations, active questioning, participation in group discussions, recording conclusions, problem solving, as well as interest and positive attitudes. The participation percentage is calculated based on the observation sheet for each learning session.

Psychomotoric learning outcomes include students' skills in making flat figures. In this study, researchers determined that the learning process was considered successful if all students obtained learning outcomes that reached or exceeded the KKM, namely 70, with a classical completion level of more than or equal to 100%. Apart from that, observations of teacher abilities must be rated at least in the good category, as well as observations of student behaviour.

Results and Discussion

Description of Student Abilities in Pre-Cycle

The information gathered during the pre-cycle period becomes the basis for subsequent steps. The initial test is used as a marker to assess students' initial abilities. in understanding mathematical material about flat shapes, so they can identify potential difficulties they may experience. Pre-cycle also plays a role in uncovering learning problems in class, with the aim of increasing student learning achievement. Student learning outcomes for the pre-cycle period are presented in Figure 1.



From data collected from the pre-cycle period, it was found that 16 students, or around 62%, succeeded in achieving scores that exceeded the KKM, while 10 students, or around 38%, still obtained scores below the KKM. At the pre-cycle stage, the mathematics learning approach is generally carried out through lecture methods and question and answer sessions. The teacher provides an explanation of the material to students, then asks questions orally regarding the material. Most of the learning time is spent listening to explanations from the teacher. As long as the teacher provides explanations, there are variations in students' attitudes; there are those who focus on listening, there are those who sometimes listen but sometimes interact with friends, and there are also those who occasionally leave the classroom with permission. When the question-and-answer session started, some students were active in answering, while other students were less active, just shouting along. Most students feel unhappy during mathematics learning. They feel bored because they only listen to the teacher's explanation and answer questions, and then work on the evaluation sheet. Apart from that, students also feel less happy because they are rarely asked to actively participate in mathematics

learning.

The results of the evaluation of student learning achievement at the pre-cycle stage show that effectiveness in delivering the material is not optimal, which is reflected in several students who still scored below the KKM at that stage.

Description of Student Abilities in Cycle I

Implementation of Cycle I was carried out in one session on April 26 2024. The initial stage of implementing the method Index Card Match This involves students listening to explanations from the teacher regarding the objectives of the method and learning to be carried out. The teacher explains the steps that need to be followed and the rules that must be obeyed, while giving students the opportunity to ask questions if there is something they do not understand. Next, the teacher provides additional explanations about mathematical material about flat shapes with the aim of increasing students' enthusiasm for learning.

From the results of observations, the teacher has made preparations for implementing learning by preparing a plan, including announcing learning objectives, preparing media in the form of cards containing flat material, providing encouragement, and organizing the class to create a dynamic learning atmosphere. At the core of the lesson, the teacher explains material about flat shapes and demonstrates the Index Card Match method.

The next step involves distributing question cards and answer cards regarding plane figures to students, where each student receives one card containing the question and the other students receive one answer card. The teacher monitors student activities and provides guidance, if necessary, especially in searching for question cards or answers related to mathematical material about flat shapes.

After that, students who have received pairs of question cards and answer cards are asked to sit side by side and then come forward to read the question cards and answers. The teacher will correct wrong understanding and give students the opportunity to correct their answers through question and answer. The final activity of the method Index Card Match This is to conclude the material through a question-and-answer session with students, where the teacher will review the material that has been studied.

At cycle I stage, there were several shortcomings in implementing this method, including the lack of optimal conditions for delivering the material. Although the majority of students pay attention to the teacher when explaining and participate in the card game led by the teacher, there are still students who are not focused, so the class atmosphere becomes a bit noisy. Students' movements when looking for pairs of cards also felt irregular, and discussions between pairs of students did not meet expectations. Apart from that, the learning outcomes of students who achieve completeness are still lower than those of students who have not achieved it. Figure 2.

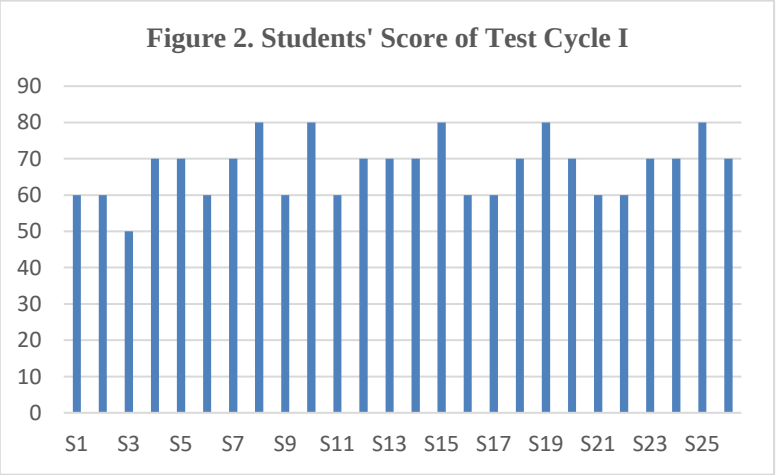


Figure 2. Students' Score of Test Cycle I

After implementing learning using the Index Card Match method, the results of observations in cycle I showed that as many as 16 out of 26 students achieved scores that met the KKM. This means

that around 62% of students have achieved completion. However, there are still around 38% of students, or 10 students, who have not achieved completion. With a class average of 67.7. There was an increase in completeness by 24% and an increase in the average class score of 4.23 when compared to the results in the pre-cycle.

Based on the data analysis that has been carried out, it is still visible that there are students who do not fully understand the material regarding flat shapes. Even though there has been an increase in learning outcomes from the previous cycle, there are still students who have not reached the level of learning completeness. Therefore, learning improvements need to be made in the next cycle to increase students' understanding in mathematics subjects, especially in recognizing and grouping flat shapes. Thus, teachers need to make adjustments to learning methods in the next cycle so that student learning outcomes can meet the predetermined mastery value.

Description of Student Abilities in Cycle II

Activities in Cycle II were carried out on Tuesday, May 14 2024. Learning in Cycle II also continued to use the Index Card Match. Activities in cycle II have the same stages as in cycle I, starting with prayer, apperception, and presentation of mathematical material regarding flat shapes. The method used in cycle II also continues to use the index card match method. Researchers chose the same subjects and materials, namely mathematics with flat shapes as material. The focus of the activities in Cycle II is on student learning outcomes through solving questions prepared by researchers, consisting of 10 questions which are divided into 5 picture matching questions and 5 fill-in questions.

Before learning begins, the researcher provides the student learning results in cycle I to each student so that they know their achievements and understand their abilities based on the grades obtained. After that, the teacher provides an explanation of the index card method and provides reinforcement of the steps that must be taken. The results of observations in cycle II activities showed that students appeared to be more enthusiastic in using card media because of their experience in the previous cycle of not fully understanding the steps for implementing this method. In the implementation of cycle II, students were actively involved and the learning atmosphere was more conducive compared to activities in the previous cycle. At the end of Cycle II learning, students were given questions to determine the improvement in their learning outcomes after implementing the method Index Card Match.

After calculating the students' tests, the results showed a significant increase. A total of 26 students have achieved the specified completion score, namely 70. This means that 100% of students have achieved completion. An increase also occurred in the average class value in cycle II. The complete results of Cycle II learning improvements are presented in Figure 3. Then, a comparison of the improvements in Pre-Cycle, Cycle I and Cycle II improvements is presented in Figure 4.

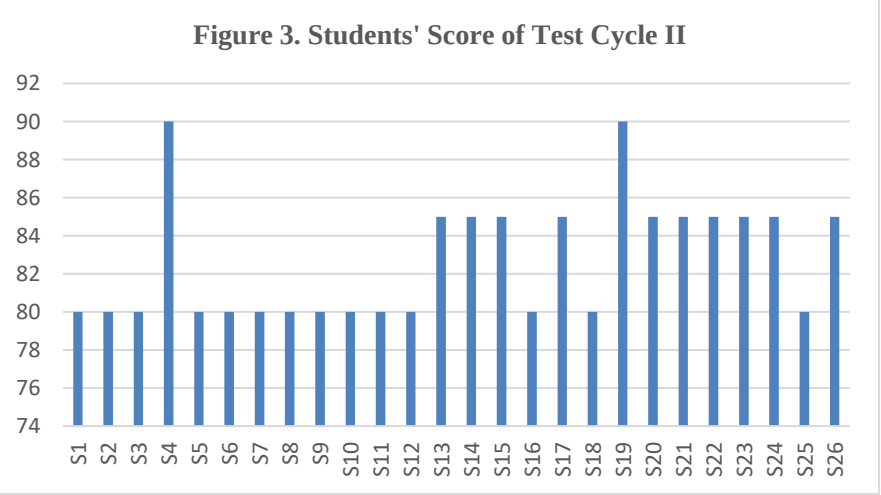
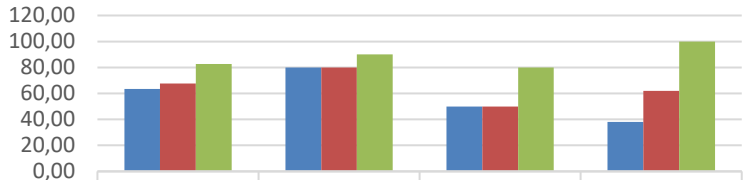


Figure 3 is a display of the results of learning improvements carried out in Cycle II. From the

picture, it can be seen that the number of participants involved was 26 students. And all students have achieved and/or exceeded the specified success indicators, namely obtaining a score equal to or above 70. This indicates that learning completeness has reached 100% and no student obtained a score below the minimum completeness criteria. Furthermore, in Figure 3, a comparison of the average scores, maximum scores, minimum scores, and percentage of learning completion for Pre-Cycle, Cycle I, and Cycle II is presented.

Figure 4. The Comparison of Students' Score of Pre-Cycle, Cycle I, and Cycle II



	Average	Max	Min	Completeness
Pra-Cycle	63,46	80	50	38
Cycle I	67,69	80	50	62
Cycle II	82,69	90	80	100

In Figure 4, it can be seen that there was an increase in the average score from Pre-Cycle to Cycle I of 63.46, with the class average score being 67.69 and increasing again to 82.69 in Cycle II. The highest score achieved is 80 in Pre-Cycle and Cycle I and 90 in Cycle II. Furthermore, the smallest value is 50 in Pre-Cycle and Cycle I and 80 in Cycle II. The number of students who achieved completion also increased, from 10 people or 38% in the pre-cycle to 16 people or 62% in cycle I, and increased to 26 people or 100% in cycle II.

The research results show that the method Index Card Match has been proven to be an effective method in improving student learning achievement in mathematics subjects matematika (Hamka & Tahir, 2021); (Sirait & Apriyani, 2020). This approach emphasizes students' active involvement in the learning process, which helps them to more deeply understand mathematical concepts. By working together to solve problems and construct concepts using index cards, students can develop interactive problem-solving skills. In this context, method Index Card Match not only functions as a teaching tool, but also as a means to build strong and relevant understanding for students (Rahmawati & Holis, 2022). In her research, Yuniantika (2018) found that the method Index Card Match helps increase students' interest in learning mathematics.

This research reveals that the use of methods Index Card Match significantly improve students' understanding of mathematical concepts (Amir, 2021); (S Poerwanti & S, 2020). The results of comprehension tests before and after intervention showed a stable increase in students' understanding of the material taught. This confirms that by being directly involved in learning activities, students have a greater opportunity to understand these concepts in depth. This finding is supported by research conducted by Nuraeni & Karlimah (2023) who found that the method Index Card Match proven effective in helping students understand mathematics subject matter.

In addition, method Index Card Match also plays a role in improving students' problem-solving skills. By solving problems together and using index cards as a tool, students learn to recognize patterns in math problems and develop effective strategies for solving them. This process not only deepens their understanding of these concepts, but also increases their confidence in dealing with complex mathematical problems.

In addition to improving understanding of concepts and problem-solving skills, application of methods Index Card Match can also increase student learning motivation. The interactive and student-focused approach allows them to feel an immediate sense of accomplishment when successfully

completing assigned tasks. This impact can increase students' interest in mathematics lessons and encourage them to be more actively involved in the learning process (Amir et al., 2021).

Overall, this study provides strong evidence that the use of the method Index Card Match effective in improving student learning outcomes in mathematics subjects. These findings have important implications for the development of innovative and effective mathematics teaching strategies in school settings. By providing opportunities for students to learn actively and collaborate, this method can create a learning environment that triggers and increases student motivation in gaining better understanding and mathematical skills.

Conclusion

The use of the Appropriate Index Card method has been proven successful as an approach to improving student learning outcomes in mathematics at the elementary school level. This research aims to explore the effectiveness of this method in the context of mathematics learning in elementary school. The research results show that the application of the method Index Card Match significantly improve students' conceptual understanding, problem solving skills, and learning motivation.

By implementing an approach that involves active participation and cooperation, methods Index Card Match provide opportunities for students to be directly involved in the learning process. In this case, students work together to solve problems and develop concepts using index cards, which helps them deepen their understanding of the mathematics material being taught. Comprehension test results show consistent improvements in students' understanding of these concepts.

Not only that, the use of methods Index Card Match also contributes to improving students' problem-solving skills. Through an interactive process in solving problems and by using the tools provided, students can hone their abilities in identifying patterns in mathematical problems and formulating effective strategies to solve them.

Apart from that, this approach also has a beneficial impact on student learning motivation. By experiencing direct success in completing the tasks given, students become more motivated to be actively involved in learning mathematics.

In general, the results of this research provide an important contribution to the development of innovative and effective mathematics teaching strategies at the elementary school level. Method Index Card Match offers an interesting and useful approach to improving student learning outcomes in mathematics, while creating a stimulating and motivating learning environment for students. Based on the research findings, the researchers recommended that teachers implement the method Index Card Match more effectively and understand the steps well so that learning runs more smoothly and students are more involved. Apart from that, teachers are also advised to continue collaborating with the school, including the principal and colleagues, to find solutions and support needed to implement the method. Index Card Match on an ongoing basis in the context of classroom action research.

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