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THE INFLUENCE OF THE POWER OF TWO METHOD IN MATHEMATICS LEARNING ON INCREASING STUDENT ACTIVITY

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Abstract. Mathematics learning aims to enhance problem-solving skills encompassing problem comprehension, method creation, execution, and result analysis. It covers numbers, geometry, calculations, and data processing. Low achievement in mathematics stems from inadequate understanding and reliance on arithmetic as a tool. Student disinterest further hampers learning. Although students may solve problems correctly, they often struggle to explain their reasoning, as observed in a class III student at SD Negeri 1 Pucangan. Student engagement is crucial in gauging learning motivation. Cooperative learning, particularly the power of two methods, fosters student collaboration, facilitating better comprehension. This approach enhances learning quality, promoting active and creative participation. Implementing the power of two cooperative learning models in class III at SD N 1 Pucangan improved student activity, shifting from adequate to good. The method's effectiveness in enhancing mathematics learning quality is evident through increased student engagement and activity levels.

Keywords: Mathematics Learning, The Power of Two, Student Activities

Abstrak. Pembelajaran matematika bertujuan untuk meningkatkan keterampilan pemecahan masalah yang mencakup pemahaman masalah, penciptaan metode, pelaksanaan, dan analisis hasil. Ini mencakup angka, geometri, perhitungan, dan pengolahan data. Rendahnya prestasi dalam matematika berasal dari pemahaman yang tidak memadai dan ketergantungan pada aritmatika sebagai alat. Ketidakminatan siswa juga menghambat pembelajaran. Meskipun siswa dapat menyelesaikan masalah dengan benar, mereka sering kesulitan menjelaskan pemikiran mereka, seperti yang diamati pada siswa kelas III di SD Negeri 1 Pucangan. Keterlibatan siswa sangat penting dalam mengukur motivasi belajar. Pembelajaran kooperatif, khususnya metode *power of two*, mendorong kolaborasi antara siswa, memfasilitasi pemahaman yang lebih baik. Pendekatan ini meningkatkan kualitas pembelajaran, mendorong partisipasi aktif dan kreatif. Implementasi model pembelajaran kooperatif power of two di kelas III di SD N 1 Pucangan menghasilkan peningkatan aktivitas siswa, berpindah dari cukup menjadi baik. Efektivitas metode ini dalam meningkatkan kualitas pembelajaran matematika terbukti melalui peningkatan keterlibatan siswa dan tingkat aktivitas.

Kata Kunci: Pembelajaran Matematika, *The Power of Two*, Aktivitas Siswa

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INTRODUCTION

One part of education is the learning process. Teachers and students as students are involved during the learning process. During the learning process, the teacher plays an important role (Inah, 2015). The teacher's role is to involve students in learning, not just

providing knowledge so that they are not passive recipients of information but active participants who can expand their knowledge according to their study field. As a result, teachers need to be aware of the topics they will teach and be able to choose appropriate learning strategies (Buchari, 2018). Mathematics learning is primarily aimed at improving problem-solving abilities, including understanding problems, creating mathematical methods, completing methods, and analyzing results (Noor & Norlaila, 2014). Numbers, geometry, calculations, and data processing are all included in the scope of learning mathematics. Calculation is a fundamental mathematical idea directly connected to how humans function daily (Fatra, 2017).

Based on observations made by researchers, the implementation of class III mathematics learning at SD N 1 Pucangan is still not optimal. Low mathematics learning achievement is caused by students' low understanding of mathematics learning, which is too influenced by the assumption that arithmetic is a ready-to-use instrument. Thematic learning, which connects scientific disciplines by combining them into theme networks, has not been used in class III learning, where teachers deliver lessons independently. Next, the teacher's information is transferred to the child's mind, which is still received passively and naively. Students, in general, are not interested in mathematics lessons. Sometimes, students answer a problem correctly but cannot explain why(Yuniati, 2012). Students are familiar with formulas but do not know where they come from or why they are used. This happens because students cannot articulate ideas and explanations for their answers during the learning process. Therefore, they are less accustomed to expressing ideas or reasons for their answers (Wiranti, 2021).

Student activities during the teaching and learning process indicate students' desire to learn. Learning activities are all carried out in the interaction process (teacher and students) to achieve learning goals. The activity referred to here emphasizes students because an active learning situation is created with student activity in the learning process (Wibowo, 2016). Student activity in the learning process will lead to high interaction between teachers and students or the students themselves. This can result in a fresh and conducive classroom atmosphere where students can involve their abilities to the maximum extent possible. The activities that arise from students will also result in the formation of knowledge and skills, leading to increased achievement(Hapsari, 2017). Student activities in learning are receiving lessons given by the teacher. Apart from listening and taking notes, student activities in class include reading, paying attention to demonstration figures, asking questions, expressing opinions, discussing and solving problems, responding, remembering, feeling bored, being brave, etc.

On the other hand, based on the current reality, it indicates that students have varied ways of learning. Hence, teachers need to pay attention to these habits so they can assist students in learning optimally. Based on this issue, the researcher aims to formulate a relevant and easily understandable teaching method with alternative actions in the cooperative learning method, specifically the power of two types. Implementing this method in student learning will focus on collaborative work among students, making it easier for them to understand the presented material. The benefit of this research is to enhance the quality of mathematics learning, where students are more active, creative, and motivated in the learning process.(Arifin et al., 2020; Bintaro, 2018).

METHOD

This research is classroom action research (PTK). Classroom action research examines activities that are deliberately raised and occur in a class. In general, four stages are commonly followed in carrying out action research: planning, implementation, observation, and reflection. This classroom action research has four stages consisting of 2 or more cycles, which the researcher plans depending on the implementation; each stage is designed through stages: planning, action implementation, observation, and reflection(Susanti et al., 2015). The methods and stages are explained as follows in Figure 1.

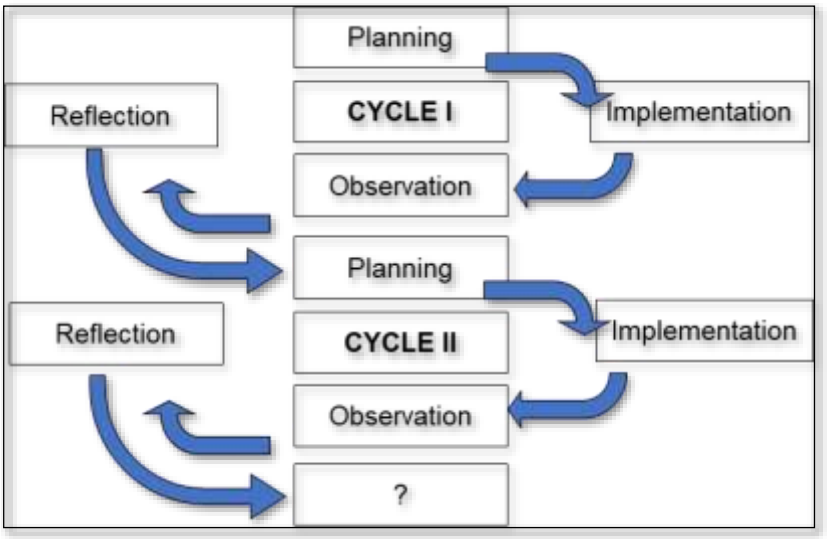

Figure 1. PTK stages

Planning

This planning stage includes the following:

- Examining mathematics learning material with essential competencies in calculating the

area of squares and rectangles and examining indicators

- Prepare lesson plans according to predetermined indicators and The Power of Two learning scenario
- Prepare teaching aids for learning
- Prepare evaluation tools in the form of written tests and student worksheets
- Prepare observation sheets to observe student activities.

Implementation of Actions

Action implementation is a planned action scenario implemented in an actual situation. The implementation of this PTK is planned in three cycles. The first cycle is the basic competency of calculating basic subtractions, and the second is the basic competency of solving daily problems related to subtraction. The learning model uses The Power of Two methods. The Power of Two Learning Method is a learning method other than conventional learning. The Power of Two method is cooperative learning that strengthens the importance of synergistic relationships between group members. This learning method consists of 2 people so that cooperation and communication are better established. This learning also requires students to be more active in the teaching and learning process so that they do not feel bored because learning is more exciting and requires student participation in the lesson material.(Budiharti & Devi, 2016). This learning allows students to work alone and collaborate with others(Minanti, 2017). Learning the power of two is an activity carried out to increase collaborative learning and encourage the emergence of benefits from synergy because two people are certainly better than one. The procedure for this learning method is as follows:

- The teacher gives students one or more questions that require reflection and thought. For example: is there a reduction in purchasing goods? How do we determine return?
- The teacher asks students to answer the questions individually.
- After everyone has completed their answers, the teacher forms students into pairs and asks them to share their answers with the answers made by other friends.
- The teacher asks the pairs to create new answers to each question by correcting each individual's response.
- When all pairs have finished writing new answers, the teacher compares the answers from each pair to the other pairs.

Observation

Observation is observing the results of the impact of actions carried out or imposed on students. Observation is an observation activity that involves recording data, including the process and results of implementing actions. Observation activities are carried out collaboratively with the observing teacher to observe student activities during the learning process. Student activity observation forms are classified into (1) pay attention to the teacher's explanation, (2) enthusiastic in learning, (3) students actively ask questions, (4) students actively answer questions, (5) cooperation in groups, and (6) show work in groups.

Reflection

Reflection is an act of reviewing, seeing, and considering the results or impact of actions from various criteria. Reflection is analyzing data regarding processes, problems, and obstacles encountered in implementing actions. After reviewing the learning process, namely the activities of students and teachers, whether it has been effective by looking at the achievement of performance indicators in the first cycle, as well as reviewing deficiencies and making a list of problems that emerged in the first cycle, then making follow-up plans for the next cycle. Indicators of student activity in mathematics learning using the Power of Two type cooperative learning method increased with reasonable criteria, as follows:

Table 1. Qualitative descriptive average student activity score (Yulianti, 2018)

Average range of scores	Category
3.2≤ score ≤ 4	Very good
2.5 ≤ score < 3.2	Good
1.5 ≤ score < 2.5	Enough
R1≤ score < 1.5	Not enough

RESULTS AND DISCUSSION

In this classroom action research, researchers researched the learning process in 2 cycles. Below, the results of the research will be presented, which consist of the results of observations of teacher-student activities in the mathematics learning process using the power of two types of cooperative learning methods for class III students at SD N 1 Pucangan, Sadang District, Kebumen Regency. Based on Table 2 student activity obtained in pre-cycle, I had an average score of 2.0 with sufficient criteria, which means that students had not paid attention to the teacher's explanations and liked to play alone. There are still many students who are hesitant

about mathematics learning activities in class. This is proven to show the need for cooperative learning methods to increase student activity to get adequate learning results.

Table 2. Pre-cycle student activity data

No	Indicator	The number of students who obtained a score				Total score	Average
		1	2	3	4		
1	Pay attention to the teacher's explanation	4	5	1		17	1.7
2	Enthusiastic in learning.	5	3	2		17	1.7
3	Students actively ask questions.	2	3	4	1	24	2.4
4	Students actively answer questions.	4	4	2		18	1.8
5	Cooperation in groups.	1	6	3		22	2.2
6	Show work in groups.	3	5	2		19	1.9
	Amount					117	11.7
	Average					19.5	2.0
	Criteria					Enough	

Student activities in the mathematics learning process on the subject of subtraction through the power of two types of cooperative learning methods in cycle I include:

- Students pay attention to the teacher's explanation: based on the student activity table, an average score of 3.1 with good criteria was obtained. This average score was obtained from observations of the ten students who were research subjects. Activities to pay attention to the teacher's explanation include students focusing on the teacher's explanation, listening to the teacher's explanation in conducive classroom conditions, and asking the teacher about explanations they do not understand. In learning, many students pay attention to the teacher's explanations, although some still don't pay attention and like to play alone.
- Students are enthusiastic about learning: based on the student activity table, an average score of 2.4 was obtained with pretty good criteria. This average score was obtained from observations of the ten students who were the objects of research. Activities in this learning include students being interested in participating in the lesson, actively asking questions, and being enthusiastic about answering questions. From the results of observations, there are still some less enthusiastic children, and there are still students who play alone learning.
- Students actively ask questions: based on the student activity table, an average score of 2.8 with good criteria was obtained. The average score was obtained from observations of the ten students who were research subjects. In cycle I learning, students ask their friends more than the teacher. This is because students are still afraid to ask the teacher.

- Students actively answer questions: based on the student activity table, an average score of 2.2 was obtained with fairly good criteria. The average score was obtained from observations of the ten students who were research subjects. In this lesson, many students dared to answer questions from teachers and friends even though the answers given were not correct.
- Cooperation in groups: based on the student activity table, an average score of 2.9 with good criteria was obtained. This average score was obtained from observations of the ten students who were research subjects. In learning, students can work together in groups well, although there are still children who are indifferent and play alone during learning. This is because the number in the group is small, namely only two people, which allows students to exchange opinions in discussion activities. However, there are still students who like to play alone.
- Show work in groups: based on the student activity table, an average score of 2.6 with good criteria was obtained. This average score was obtained from observations of the ten students who were research subjects. In learning, students can work well together in groups. In learning, students are able to perform work in groups well. If one of the students does not understand the problem the other student is working on, explain it.

The results of observations of student activities can be seen in the table 3. Based on the results of observations or observations in the table above obtained during the learning process in cycle I using the power of two learning methods, the average total score was 26.67, and the average score was 2.7 with good score criteria.

Table 3. Cycle I student activity data

No	Indicator	The number of students who obtained a score				Total score	Average
		1	2	3	4		
1.	Pay attention to the teacher's explanation.			9	1	31	3.1
2	Enthusiastic in learning.	1	4	5		24	2,4
3	Students actively ask questions.		4	4	2	28	2.8
4	Students actively answer questions.	2	4	4		22	2,2
5.	Cooperation in groups.		1	9		29	2.9
6.	Show work in groups.		4	6		26	2.6
Amount						160	16
Average						26.67	2.7
Criteria						Good	

Student activities in the mathematics learning process on the subject of solving everyday problems related to squares and rectangles through the power of two types of cooperative learning methods in cycle II include:

- Students pay attention to the teacher's explanation: based on the student activity table, an average score of 3.0 with good criteria was obtained. This average score was obtained from observations of the ten students who were research subjects. Activities to pay attention to the teacher's explanation include students focusing on the teacher's explanation, listening to the teacher's explanation in conducive classroom conditions, and asking the teacher about explanations they do not understand. In learning, many students pay attention to the teacher's explanations, although some still don't pay attention and like to play alone.
- Students are enthusiastic about learning: based on the student activity table, an average score of 2.9 with good criteria was obtained. This average score was obtained from observations of the ten students who were the objects of research. Activities in this learning include students being interested in participating in the lesson, actively asking questions, and being enthusiastic about answering questions. In learning, students are enthusiastic and active in answering questions from the teacher even though there is a star award. However, having a star award can encourage and motivate students to learn and dare to express opinions.
- Students actively ask questions: based on the student activity table, an average score of 2.8 with good criteria was obtained. The average score was obtained from observations of the ten students who were research subjects. The third cycle of learning was already better than the previous cycle; students had started to ask the teacher and express opinions, although they still felt a little afraid.
- Students actively answer questions: based on the student activity table, an average score of 2.9 with good criteria was obtained. The average score was obtained from observations of the ten students who were research subjects. In this lesson, many students dared to answer questions from teachers and friends even though the answers were incorrect.
- Cooperation in groups: based on the student activity table, an average score of 2.9 with good criteria was obtained. This average score was obtained from observations of the ten students who were research subjects. In learning, students can work well together in groups. In cycle III learning was better than the previous cycle. Students can discuss well and express their opinions to each other.
- Show work in groups: based on the student activity table, an average score of 2.8 with good criteria was obtained. This average score was obtained from observations of the ten students

who were research subjects. In learning, students can work well together in groups. In learning, students are able to perform work in groups well. If one of the students does not understand the problem the other student is working on, explain it.

Based on the results of observations of student activities can be seen in Table. Based on the results of observations or observations in the table above obtained during the learning process in cycle III using the power of two learning methods, the average score was 29, and the average score was 2.9 with good score criteria.

Table 4. Cycle II student activity data

No	Indicator	The number of students who obtained a score				Total score	Average
		1	2	3	4		
1.	Pay attention to the teacher's explanation.		1	8	1	30	3.0
2	Enthusiastic in learning.		3	5	2	29	2.9
3	Students actively ask questions.		4	4	2	28	2.8
4	Students actively answer questions.		3	5	2	29	2.9
5.	Cooperation in groups.		2	7	1	29	2.9
6.	Show work in groups.		4	4	2	28	2.8
	Amount					173	17.3
	Average					29	2.9
	Average					Good	

Data on implementing mathematics learning through the power of the two cooperative methods mentioned above shows that student activity and student learning outcomes increased in cycle II. Because the average student activity score in the pre-cycle was 2.0, cycle I was 2.7, and cycle II was 2.9, there was an increase. This shows that there has been an increase in student activity.

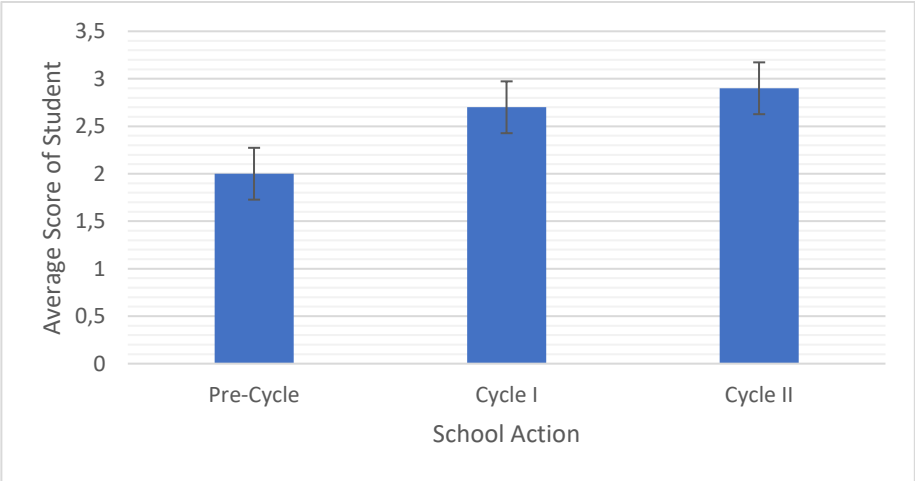

Figure 2. Average student activity score for each class action

Through the power of the two types of cooperative learning models, the learning process provides opportunities for students to actively participate in learning, thereby encouraging students to be active, brave, enthusiastic, and motivated to learn. In the power of two types of cooperative learning, students do not have to memorize the material presented, but cooperation is emphasized, where students exchange ideas to solve a problem. The power of two types of cooperative learning activity takes the form of a group discussion activity in pairs. The power of two learning strategies: Part of cooperative learning is learning in small groups by fostering maximum cooperation through learning activities by friends and two people to achieve basic competencies. With discussion activities, students can work together and exchange opinions. That way, learning can run effectively and be more enjoyable. The teacher's role in learning is as a professional educator with the main task of educating, teaching, and guiding students.

CONCLUSION

There has been an increase in student activity based on the results of research and discussion regarding the application of the power of the two-type cooperative learning model to improve the quality of mathematics learning for class III students at SD N 1 Pucangan. The average student activity score in the pre-cycle is 2.0, with sufficient criteria. The average student activity score in cycle I was 2.7, which meets good criteria, and the average student activity score in cycle II was 2.9, which meets good criteria. There was a change in the student activity category from fair to good.

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