USE OF PROBLEM BASED LEARNING MODELS TO IMPROVE STUDENT LEARNING OUTCOMES AT SD NEGERI 1 BUMIRATU

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Abstract: This research activity is based on low mathematics learning outcomes. There were only 8 students who completed the KKM score, namely 65 out of 20 students. The aim of this research is to see the increase in students' grades at SD Negeri 1 Bumiratu. The type of research used is Classroom Action Research, in this research there are 2 cycles, each cycle has four stages, namely planning, action, observation and reflection. The model applied to improve student learning outcomes in this research is the Problem Based Learning model. The Problem Based Learning model is a learning model that encourages students to know how to learn and work together in groups to find solutions to problems in the real world. Data collection techniques used are quantitative and qualitative in the form of observations and tests. From the results of this research it can be said that the use of the Problem Based Learning model can improve student learning outcomes. This can be seen from the results of the student's learning completion percentage, which was initially only 40% in cycle 1, which rose to 80% and in cycle 2 it rose again to 100%. The percentage of student learning completion increased from pre-cycle to cycle 1, namely 9.5%, then from cycle 1 to cycle 2, namely 4.5%.

Introduction

Education is a forum that discusses issues regarding the stages of implementation which initially direct a person to culture. The cultural process of improving a person's quality and dignity throughout life, which takes place in the family, school and community. Meanwhile, the quality of education is the ability of the education system, both in terms of management and the stages of education itself, which is effectively oriented towards adding value to input factors (classroom size, teachers, textbooks, situational learning and curriculum, school management, family) to obtain maximum possible results (Azmi et al., 2022).

Elementary school is the initial phase of school education which provides the basis for the formation of the human person as a citizen. This educational institution should be able to equip

its students with various values, attitudes, as well as basic abilities and skills that are strong enough as a foundation for completing education at the next level. Mathematics comes from the word " Mathema " in Greek which means "science" or "learning" and from the word " Mahematikos " which means "like to learn" (Havil, J 2012). According to Susanton (2013: 185) mathematics is a part of science that is able to improve the ability to think and express opinions and then provide input to solve problems in everyday life and within the scope of work, as well as providing support in developing science and technology.

Learning outcomes are certain abilities achieved by students who participate in the learning process and include cognitive, affective and psychomotor abilities. In the elementary school phase there are five main subjects, namely, mathematics, Indonesian, natural sciences, social sciences and citizenship education. Each subject has its own characteristics. Likewise with the delivery process, teachers must have a learning model that is able to follow each characteristic of each subject. It is important to apply mathematics learning from an early age so that children are able to solve problems in everyday life related to counting. Mathematics must be applied since learning in elementary school so that students can continue the mathematics learning process in secondary school. It is important for a teacher to pay attention to the students who will be involved in the mathematics learning process. A student characteristic that is very important for a teacher to pay attention to is the student's cognitive development.

In reality, currently the conditions for mathematics learning are not yet fully in line with the characteristics of mathematics at SD Negeri 1 Bumiratu, obstacles are still found in the mathematics learning process as evidenced by the large number of students who have not reached the Minimum Completion Criteria (KKM). The KKM for class 1 mathematics subjects consists of 20 students, namely 65.

Table 1

Student Learning Outcomes

Mark	KKM	The Number Of Students	Presentation
≤65	65	12	60 %
≥65	65	8	40%
Amount		**20**	**100%**

From observations, researchers also found that the factors causing low student learning outcomes in addition and subtraction material were seen during the implementation of teaching and learning activities, namely; students do not understand and are serious about paying attention to the teacher's explanation. Students are more busy with their own activities, students look bored in the learning process and students tend to be passive in the learning process. Seeing these problems, of course, in carrying out learning activities, systematic steps are needed. One of them is that teachers can choose and present effective learning strategies and approaches. To overcome this problem, researchers are interested in using the Problem Based Learning learning model to increase student learning outcomes.

Methods

The type of research used in this research is Classroom Action Research which aims to improve Mathematics learning outcomes which are carried out in cycles. According to Suyadi (2012: 3) Classroom Action Research (PTK) comes from English, namely Classroom Action Research , which means Action Research (Research with Action). Meanwhile, according to Arikunto in (Suyadi 2012: 13) PTK consists of three words, namely research, action and class. Based on the opinions of these experts, it can be concluded that Classroom Action Research is research carried out in the classroom through self-reflection with the aim of improving learning activities in the classroom so that it is hoped that this action can improve student learning outcomes. The PTK design consists of planning , implementation (Acting), observation (Observation) and reflection (Reflection).

The following are the steps in this research, namely:

1. Planning

   At this stage the researcher provides an explanation of what, why, where, when, and how the research was conducted. Research should be carried out collaboratively, so as to reduce the element of subjectivity. Because in this research there are self-observation activities, namely when applying approaches, models or learning methods as an effort to solve problems during research practice. In this activity, researchers also need to explain preparations for carrying out research such as: learning implementation plans, observation instruments for student learning processes and instruments for observing learning activities.

2. Implementation

   This stage takes the form of implementation activities or implementation of action planning in the class which is the subject of the research. In this implementation activity, the teacher must adhere to the plans that have been prepared. What needs to be remembered in learning practice before research is that it should not be artificial which causes learning to become stiff. And collaborators are advised to carry out observations as they are according to the learning conditions carried out by the researcher. This is important considering that action research aims to improve the learning process.

3. Observation

   At this stage there are two activities observed, namely student learning activities and learning activities. Observations of the student learning process can be carried out by implementing teachers (researchers) while carrying out learning. Meanwhile, learning observations certainly cannot be carried out by the implementing teacher (researcher) alone. For this reason, the research teacher (implementer) must ask for help from colleagues to make observations, colleagues make observations based on the instruments that have been prepared by the researcher. The results of the collaborators' observations will later be useful or used by researchers as reflection material to improve subsequent learning

4. Reflection

   This reflection activity is carried out when the collaborator has finished observing the researcher while carrying out the lesson, then faces the researcher to discuss the results of the observation. This is the essence of action research, namely, when collaborators tell researchers about things they feel have gone well and what parts have not. The results of the

reflection can be used as consideration for designing activities (next cycle). So in essence, reflection activities are evaluation, analysis, meaning, explanation, conclusion and identification of follow-up actions in planning the next cycle.

5. These four stages are elements to form a cycle, namely one round of consecutive activities, from the design preparation stage to reflection which is none other than evaluation. If it is connected to the form of action, then what is meant by the form of action is the cycle. So the form of action research is never a single activity, but always in the form of a series of activities that will return to the origin, namely in the form of a cycle.

Data analysis is useful for determining the increase in student learning outcomes after implementing the Problem Based Learning learning model in mathematics subjects including addition and subtraction. This can be known from student data in the form of grades or scores obtained from the results of tests taken by students in each cycle provided that the Minimum Completeness Criteria (KKM) limit set at the school is met, namely reaching 65. Thus, if the results When learning mathematics, students in class 1 have reached the specified KKM, so this research was declared successful. The type of data used in this research is quantitative and qualitative in the form of tests and observations.

The following table of student learning outcomes scores can be seen below. Table 3.2

Results of Class 1 Mathematics Learning Completeness at SD Negeri 1 Bumiratu

Table 2

Table of Student Learning Outcome Values

No	Mark	KKM
1	Y≥65	Complete
2	Y<65	Not finished yet

Result and Disscusion

Research Result

1. Before Learning Improvement

The implementation of pre-cycle activities in this research was carried out by collecting data related to learning strategies, methods and learning media used in learning activities. The learning method used during pre-cycle learning activities is the lecture method. What happens when the learning process is ongoing is that students are not active in learning, interactions during teaching and learning activities only occur in one direction. This causes many students not to understand the learning material which then results in low student learning scores, of the 20 students who obtained complete learning results, only 8 students or 40% and 12 students or 60% were incomplete. Things that show failure in learning after the researcher reflects, it turns out that failure is caused by the following things;

a. The learning model used is not in accordance with student characteristics

b. Learning still focuses on the teacher

c. Students feel bored because the learning process is less interesting so it does not increase students' interest in learning.

Because of the failure in learning, the researcher carried out learning in cycle 1

2. Cycle 1 Learning Improvement

Cycle 1 learning improvements are a continuation of pre-cycle learning improvements. In improving learning cycle 1 using Problem Based Learning. The results of the learning evaluation obtained were that out of 20 students, 16 students got a score of 65 or above or 80% of students had completed their studies. Meanwhile, 4 students or 20% of students have not finished studying. There was an average increase in learning improvement in cycle 1 compared to before improving learning cycle 1. The average value was from 60.75 to 70.25 or an increase of 4.5. The researcher reflects on the reasons for improving cycle 1 learning, namely;

a. Teachers do not provide enough opportunities for students which causes students to become passive

b. Low student motivation to learn

In the implementation of cycle 1 learning improvements, student learning outcomes were still low. After the researchers held discussions with colleagues and then provided guidance to supervisors, a solution was found that the use of the Problem Based Learning learning model needed to be packaged more interestingly so that students did not feel bored during the learning activities. This can be seen when the addition and subtraction learning activities use the Problem Based Learning learning model . Many students are still passive, only a few of the group members are active. Others are silent and seem unenthusiastic and lazy to learn. With there still being students who failed to achieve complete learning in cycle 1, the researchers felt it was still necessary to improve learning in cycle 2

3. Cycle 2 Learning Improvements

The cycle 2 improvement plan was prepared by emphasizing the use of an interesting Problem Based Learning learning model so that researchers obtained results in cycle 2 learning, namely that out of 20 students, all students had achieved learning mastery with a score of 65 and above, and an average score of 74.75. The improvement in learning in mathematics subjects regarding addition and subtraction is as follows;

a. Student activity in learning has increased well

b. The improvement in learning outcomes for grade 1 students at SD Negeri 1 Bumiratu in Mathematics is getting better

c. Students' interest in participating in learning is increasing.

The results obtained from improving learning can be known through the first and second cycles that have been carried out so that they can be expressed in the form of an assessment table. Seeing the results that have been obtained, the researcher did not improve cycle 3 learning in grade 1 mathematics subjects with addition and subtraction material at SD Negeri 1 Bumiratu.

The following table summarizes the learning outcomes from pre-cycle to cycle 2, namely:

Table 3

Recapitulation of Pre-Cycle to Cycle 2 Learning Results

No	Student Name	KKM	Mark		
			Precycle	Cycle 1	Cycle 2
1	Reiga Alindra	65	70	70	70
2	Alif Ali	65	75	75	75
3	Ardan Abdulloh	65	50	75	75
4	Rizal Alamsyah	65	80	80	80
5	Rio Ardillah	65	70	70	70
6	Abdul Hanif	65	55	75	75
7	Wildan Sharif	65	40	70	70
8	Yuyut Handika	65	50	80	80
9	Ahmad Bukhori	65	60	60	80
10	Fathan Araf	65	75	75	75
11	Wulan Ayu	65	60	60	75
12	Siti Aisyah	65	50	50	80
13	Mauren Putri	65	60	75	75
14	Yola Yolanda	65	70	70	70
15	Nur Afianti	65	60	80	80
16	Raya Nur Liya	65	55	55	75
17	Fina Saputri	65	70	70	70
18	Vienna Agustin	65	50	75	75
19	Raisya Nur Cahya	65	65	65	70
20	Sherly Amalia	65	50	75	75
Amount			**1,215**	**1,405**	**1,495**
Average			**60.75**	**70.25**	**74.75**

Complete	8	16	20
Not Completed	12	4	0
Completion Percentage	40%	80%	100%

For more details on the increase in student learning outcomes from pre-cycle activities to cycle 2 improvement activities can be seen from the following graph;
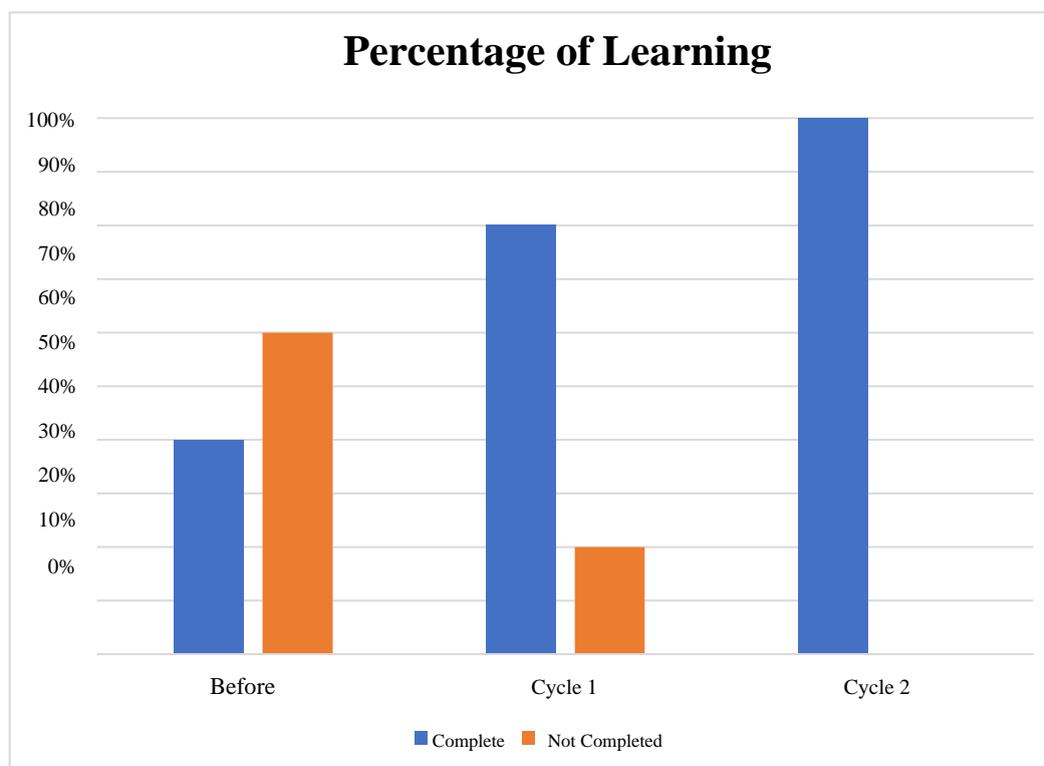
B. Discussion of Research Results

Teachers occupy a very important role in the world of education, because teachers are responsible for the personal formation of their students. From this great responsibility, teachers are required to increase their professionalism in carrying out the teaching and learning process so that the objectives of teaching are achieved as fully as possible. Mathematics is a subject that plays a very important role in the world of education. This is in line with the opinion (Mukrimatin et al., 2018: 68) that studying mathematics encourages us to learn critical, creative and active reasoning which is really needed by people in solving various problems (Maryati et al., 2024).

Conclusion

Based on the research and discussions that have been carried out, it can be concluded that the application of the Problem Based Learning learning model can improve the learning outcomes of grade 1 mathematics on addition and subtraction material at SD Negeri 1 Bumiratu. This is

shown by the students' average score in the pre-cycle of 60.75, then in cycle 1 it rose to 70.25, then in cycle 2 it rose again to 74.75. In the pre-cycle there were 8 students who completed while 12 had not yet completed, the percentage of completion was 40% of the 20 students in class 1 and the percentage of students who had not completed was greater, namely 60%. In cycle 1 there were 16 students who completed and 4 students who did not complete, the percentage of students completing was 80% and the percentage of students who did not complete was 20%. In cycle 2 all students achieved learning completeness, the percentage of completeness was 100%. Student learning outcomes have increased so it can be said that this research was successful.

Student learning outcomes are the output of the teaching and learning process. One of the problems in learning at school is the low student learning outcomes. This can be seen from the initial data on students' daily test scores which are still below the KKM. Many factors influence learning outcomes, one of which is the learning model. The Problem Based Learning Model is a cooperative learning model that requires students to be active and motivate students so that they can support and help each other in mastering the subject matter being studied. After the research was carried out, it turned out that the learning outcomes in classes that used the PBL learning model were 81.14 higher than in classes that used the conventional learning model, 76.98. Based on statistical tests, tcount is 2.4046 and ttable is 1.9893. Because the value of tcount > ttable (2.4046 > 1.9893) means that it can be concluded that Ho is rejected and Ha is accepted. From the analysis that has been carried out, it can be concluded that there is a significant difference between the economic social studies learning outcomes that use the PBL learning model and the conventional learning model for class X students at SMK Negeri 1 Patilaggio (Djonomiarjo, 2019).

So, the use of the Problem Based Learning (PBL) model can be effective in improving student learning outcomes in mathematics lessons. Here are some reasons why PBL is effective:

1. Active Student Involvement : PBL encourages students to be actively involved in the learning process. They not only receive information from the teacher, but must also be active in solving relevant and real mathematical problems. This can increase students' intrinsic motivation towards learning mathematics.

2. Development of Critical Thinking Skills : PBL requires students to apply their mathematical knowledge to solve complex and contextual problems. This process helps in the development of critical thinking, analytical, and problem-solving skills, which are essential in understanding and applying mathematical concepts.

4. Collaborative Learning : PBL often involves cooperation between students in groups or teams. This collaboration can broaden their understanding by sharing ideas, thoughts and approaches in solving mathematical problems. It also teaches important social and teamwork skills .

5. Real Context and Relevance : PBL uses real problems or projects that are relevant to everyday life or other scientific disciplines. This helps students to see direct applications of the mathematical concepts they are learning, thereby increasing their understanding of the real-world uses of mathematics.

6. Motivation and Interest : By providing real and interesting mathematical challenges, PBL can increase students' learning motivation. They are more likely to be engaged and invested in learning mathematics because they see its relevance and importance in their lives.

7.   Holistic Evaluation : PBL focuses not only on mastery of mathematical concepts, but also on students' ability to apply their knowledge in varied and complex situations. This evaluation provides a more holistic picture of students' mathematical understanding and skills.

Thus, using the Problem Based Learning Model can be an effective strategy for improving student learning outcomes in mathematics lessons because it activates a deep, relevant and student-centered learning process

References

[1]   Arikunto,Suharsimi. (2015). Penelitian Tindakan Kelas. Jakarta, Bumi Aksara. Anggraeni,k.Anugraheni,I. (2019). Penerapan Model Problem Based Learning Untuk

[2]   Azmi, U., Rosadi, K. I., & Zebua, A. M. (2022). The Urgency Of Ihsan And Thinking Systemic In Increasing Motivation And Quality Of Education. Jurnal Ilmiah Teunuleh, 3(2), 83-92. https://doi.org/10.51612/teunuleh.v3i2.88

[3]   Djonomiarjo, T. (2020). Pengaruh model problem based learning terhadap hasil belajar. Aksara: Jurnal Ilmu Pendidikan Nonformal, 5(1), 39-46.

[4]   Eksmawati, E. Koeswanti,D. Radia, E.H. (2019). Peningkatan Hasil Belajar Matematika Melalui Model Problem Based Learning Siswa Kelas 4 SD. Jurnal Mercumatika,3(2),71 – 78.

[5]   Marisa, T. (2020). Penerapan model pembelajaran problem based learning untuk meningkatkan kemampuan berpikir kritis serta hasil belajar pada mata pelajaran matematika siswa kelas 5 sd negeri mangunsari 01. Jurnal Pendidikan Tembusai,4(1), 256 – 263

[6]   Maryati, T., Sujiono, S., Purnomo, D. T., Sudarto, S., Shadikah, A. A., Harto, S., & Rispatiningsih, D. M. (2024). Implementasi Model Pembelajaran Cooperative Learning Tipe Jigsaw dalam Meningkatkan Aktivitas dan Hasil Belajar Matematika. NUSRA : Jurnal Penelitian Dan Ilmu Pendidikan, 5(1), 270–283. https://doi.org/10.55681/nusra.v5i1.2134

[7]   Meningkatkan Hasil Belajar Dalam Pembelajaran Matematika di Sekolah Dasar. Jurnal Pendidikan Tembusai, 3(5), 1178-1183.

[8]   Pantiwati, Y. Restian,A. Husamah. Sumarsono,P. (2018). Belajar & Pembelajaran. Malang. UMM Press

[9]   Ramadianti,A, A. (2021). Efektifitas Model Pembelajaran Project Based Learning Terhadap Hasil Belajar Matematika Sekolah Dasar, Jurnal PRIMATIKA, 10(2), 94 – 95.

[10]   Rohman, N.S. (2021) Strategi Pembelajaran Matematika. Yogyakarta. UAD Press Siswanti,A.B. (2023). Problem Based Learning. Yogyakarta. Andi

[11]   Vebrianto, R., Susanti, R. Annisa., Nurhadi., Mutia ,D.A. Ningsih,A.S. (2021). Problem Based Learning. Riau.DOTPLUS Publisher.

[12]   Wardani.I. G.A.K. (2023). Pemantapan Kemampuan Profesional. Tangerang Selatan. Universitas Terbuka.

[13]   Yayuk, E. Worowirastri,D. Ekowati. Suwandayani. Istanti,B. Ulum,B. (2018). Pembelajaran Matematika Yang Menyenangkan. Malang. Universitas Muhamadiyah Malang.