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Implementation of Problem Based Learning Model to Improve the Activity of Class III Students in Mathematics Learning in Elementary Schools

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1. Abstract

This research is undermined by the lack of student activity in the process of learning Mathematics. This is because the learning process of Mathematics is not yet student-centred, teachers use lecture methods and have not used learning media. The aim of this study is to find out how to improve the activity of students of the third grade in learning Mathematics in primary school through the Problem Based Learning model. This type of research is Collaborative Class Action Research (CCR) using the Kemmis and Mc Taggart model that consists of planning, implementation, observation, and reflection. The subject of the study was a third-grade elementary school student of 22 students with details of 9 male students and 13 female students. Data collection techniques using observation and documentation. Data analysis techniques use qualitative data analysis and quantitative data analytics. The results of this study showed student activity in pre-cycle at 51%, in cycle I at 70% and cycle II at 83%. Thus, it can be concluded that the application of the Problem Based Learning model can improve student activity in mathematics learning.
Keywords: Problem Based Learning, Mathematics, Student Activity

2. Introduction

Education is a very important aspect of advancing a nation because it can improve the quality of human resources. The Law No. 20 of 2003 on the National Education

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System states that education is a conscious and planned endeavour to create a learning atmosphere and learning process so that students actively develop their potential to have the spiritual strength of religion, self-control, personality, intelligence, noble morality, as well as the skills required of themselves, society, nation and country.

Education in elementary school teaches some lessons to master, one of them is mathematics. Mathematics is one of the areas of study that has an important role in education taught at all levels of education from elementary school to college. (Eismawati, Koeswanti, Radia, 2019). According to Kuswanti Wiwin in (Siswanti, Harjono, 2019) learning Mathematics in elementary school is the process of learning teaching to gain an understanding of concepts, facts, operating principles in order to be able to implement everyday life well. Novera, dkk (2021) Learning Mathematics is a problem-solving skill in computing, equipping students with the ability to think logically, analytically, systematically and encouraging a sense of curiosity that can be used for life. Further, according to Andani, Pranata, Hamdu (2021) the goal of learning Mathematics is to improve students' cognitive abilities, help students in solving problems, and improve student learning outcomes. Mathematics learning is still impressed with difficult and frightening learning for students. This leads to not achieving the desired learning objective. To the goal of learning Mathematics, teachers can create learning that enables students to actively form, discover, and develop their knowledge. Bruner in (Hermawan, Aisyah, 2019) revealed that in learning Mathematics students must find themselves a variety of knowledge they need. That way the lessons learned will be more meaningful.

However, in practice learning Mathematics is often not fully in line with expectations. Based on the observations carried out in the third grade of primary school found the problem that in learning Mathematics is not yet oriented to the student but still dominated by the teacher. In the learning process students are not actively involved. This is seen when the learning process most students have not dared to ask, answer questions, and the activity in the classroom is limited to reading books, working on the exercises given by the teacher, and working on matters in front of the class. Besides, in the learning process in the classroom teachers use the lecture method and have not yet used the learning media. This makes students uninterested in studying mathematics and tend to be passive as learning proceeds.

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In relation to the problem, teachers need to create fun learning and keep students active in learning. The student's activity in the learning process is an essential element for the success of learning processes. (Kanza, Lesmono, Widodo, 2020). Pramudya, Kristin, Anugraheni (2019) explains that one of the assessments of the learning process is to see to what extent the student's activity in following learning process. According to Naziah, in 2020, active learning is the teaching learning process that students go through during the learning process to be interested and enthusiastic in learning. Therefore, it is important for students to play an active role in the learning process. One of the efforts that teachers can make to improve student activity in the learning process is by applying a Problem Based Learning learning model. According to Termini in (Yunitasari, Hardini, 2021) the problem-based learning model is a learning model that begins with problems that occur in real life, in which students learn according to sub-themes. According to Sukma & Novelni (2015) the Problem Based Learning model consists of five stages: 1) student orientation on the problem, 2) organizing students to be ready to learn, 3) guiding individual or group research, 4) developing and presenting the results of the work, and 5) analysing and evaluating the problem-solving process.

This is supported by the results of a study conducted by Nurrohim, Suyoto, Titi Anjarini (2022) entitled "Increasing Student Activity Through Problem Based Learning Model on the Lectures of PKN Class IV State Elementary School". The results of the study showed that there was an increase in student learning activity using the PBL model from cycle 1 to cycle 2. At cycle 1, the percentage of student activity was 63% and cycle 2 was 80%. Next, the percentage of completion of learning in cycle 1 is 70% and cycle 2 is 85%. In addition, supported by Santosa, Amelia, Sarwi (2022) research entitled "Improving IPA Activity and Learning Results with Learning Model Problem Bases Leaning (PBL) Class V State SD Sudimoro Teaching Year 2021/2022". Research results show that the Problem Based Learning model can improve student activity and learning outcomes. This is seen in pre-cycle student activity at 33.3%, cycle I at 67%, and cycle II at 75%. Study performance in pre-cycle was 69.25%, cycle I was 76.17%, and cycle II was 78.75%.

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Based on the above description, the researchers will conduct a study entitled "Application of Problem Based Learning Model to Improve the Activity of Class III Students on Mathematical Learning in Elementary Schools".

3. Methods

3.1. Participants and context

The type of research used in this study is Collaborative Class Action Research (PTKK). This study uses a model from Stephen Kemmis and Mc. Taggart, through two cycles in which each cycle consists of phases of planning, implementation, observation, and reflection. (Machali, 2022). The subject of the study was a third-grade elementary school student of 22 students with details of 9 male students and 13 female students.

3.2. Material

The instruments used by the researchers are observation sheets and documentation. This observation sheet is used to evaluate student activity during the learning process. This observation sheet consists of several indicators that contain some criteria for student activity. The observation sheet is filled in by giving a mark (√) to the criteria of the student's activity that appears in the student. Further documentation is used for the study of documentation in the form of photos and videos that provide a concrete overview of learning activities by applying the learning model Problem Based Learning.

3.3. Data Collection and analysis

Data collection techniques are the most important step in research, because the main purpose of research is to obtain data. (Ridwan in Prasetyo, Abduh, 2021). The data collection techniques used in this study are observation and documentation. This technique is used to collect data on the activity of elementary school students during the learning process using a Problem Based Learning learning model. (PBL). The data analysis techniques used in this study are qualitative and quantitative data analysis. The data collected through observations are calculated as a percentage and are divided into four criteria: high (75%-100%), middle (51-74%), low (25%-50%), and very low (0%-24%)

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(Prasetyo dan Abduh, 2021). Next, the data that has been processed is presented in the form of descriptive sentences.

3.4. Ethical Considerations

All research or research involves humans as the subject of research. Therefore, in this research there are basic principles of research ethics, among other things; first is respect for people, In this case we must respect and appreciate students as research subjects, second is the benefit, in these researches there are benefits that for students to add a pleasant learning experience in learning Mathematics through the Problem Based Learning model that can improve the activity of life, and third is not harm the subject of research.

3.5. Limitations to the Study

There are limitations that researchers have in terms of time, energy, and cost. The research is limited to the application of the Problem Based Learning model to enhance the activity of class III students in mathematics learning in elementary schools. The key to this research is the student's activity in the learning process of Mathematics.

4. Results and Discussion

This collaborative class action research consists of pre-cycle, cycle I and cycle II. The following are data on the activity of students of class III on learning Mathematics in pre-cycle, cycle I and cycle II students of grade III using the Problem Based Learning learning model.

Table 1. Student Activity Data for Pre-Cycle, Cycle I, and Cycle II

Indicator	Percentage Pre-Cycle	Percentage Cycle I	Percentage Cycle II
Listen attention to the teacher's explanation	53%	72%	82%
Asking a question	42%	64%	80%
Conducting discussion	55%	70%	85%

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Indicator	Percentage Pre-Cycle	Percentage Cycle I	Percentage Cycle II
Completing tasks	58%	74%	84%
Presenting work results	45%	71%	82%
Average student activity	**51%**	**70%**	**83%**
Criteria	**Low**	**Middle**	**High**

Based on the above table on student activity data on pre-cycle, cycle I and cycle II, it is known that the first indicator, namely listen attention to the teacher's explanation, obtained pre- cycle percentage data of 53%, cycle 1 of 72%, and Cycle II of 82%. So there's an increase from pre-cycle to cycle I of 19% and from cycle 1 to Cycle II of 10%. On the second indicator, asking questions, we obtained 42% pre-cycle percentage, 64% for cycle I, and 80% for Cycle II. So there's an increase from pre-cycle to cycle I of 22% and from cycles I to cycles II of 16%. In the third indicator, discussions were conducted, percentage were obtained on pre-cycle of 55%, cycle I of 70%, and cycle II of 85%. So there's an increase from pre-cycle to cycle I of 15% and from cycle 1 to Cycle II of 15%. On the fourth indicator, completion of tasks obtained percentage data on pre-cycle of 58%, cycle I of 74%, and cycle II of 84%. So there's an increase from pre-cycle to cycle I of 16% and from cycles I to cycles II of 10%. On the fifth indicator, which represents the results of the work, the percentage data was obtained at pre-cycle of 45%, cycle I of 71%, and cycle II of 82%. So there's an increase from pre-cycle to cycle I of 26% and from cycles I to cycles II of 11%. Data on increased student activity in pre-cycle, cycle I, and cycle II can be seen in the diagram below.

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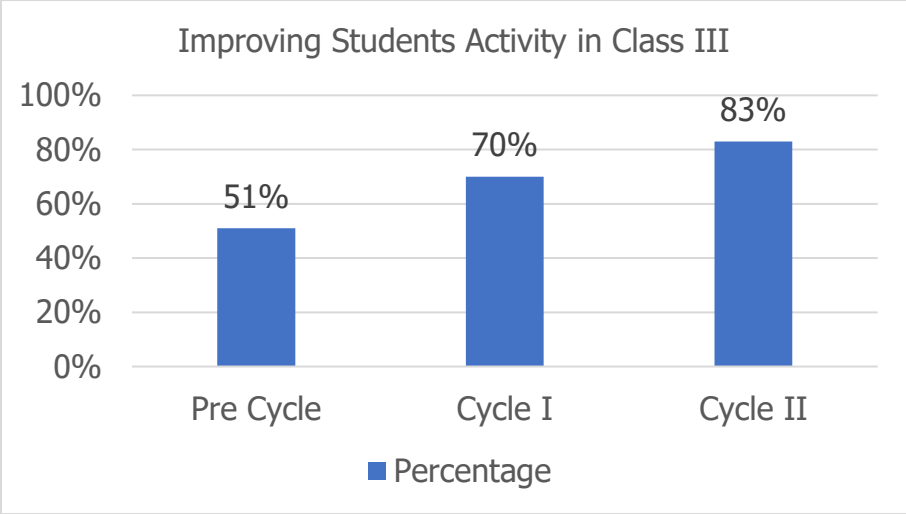

Picture 1. Diagram of Increased Students Activity

Based on the picture above on the increased activity data of class III students in pre-cycle, cycle I and cycle II, average student activity improved. In the pre-cycle phase, the average student activity was 51% or was at a low criterion, in cycle I the student activity was 70% or at a moderate criteria, and in the cycle II the student activity rate was 83% or was high.

In the pre-cycle stage or not using the PBL model, the data on student activity is very low because the percentage is 51% or is in the low criteria. This is because the learning process places the teacher as a facilitator but still gives less room to the student to play an active role during the process of learning. Then in the phase I of the cycle there was an improvement with an average percentage of 70% or within moderate criteria. This figure shows a fairly significant increase from pre-cycle to cycle I. This increasing factor is the use of the PBL model. Although there has been an improvement from the pre-cycle phase, that access has not yet met the desired criteria so requires an advanced cycle.

Reaching the desired criterion is reaching a percentage above 75%. After the implementation of cycle II there was an increase of 13% there was a rather significant increase of 70% to 83%, so the PBL model was effectively used to improve student

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activity because students were given a problem and then analyzed so that students could play an active role in the learning process.

Data from the study showed that there was an increase in the learning activity of students from pre-cycle, cycle I, and cycle II. It can be seen from the learning activity indicators. Most students are able to meet all the specified indicators. In this study the student's activity was measured through five indicators of activity: 1) paying attention to the teacher's explanations, 2) asking questions, 3) conducting discussions, 4) completing tasks, and 5) presenting the results of the work. (Sudjana dalam Hasanah, 2021).

Based on data from pre-cycle observations, the average student activity percentage of 51% indicates that the student activity is in the low criteria. Furthermore, after implementing learning using the Problem Based Learning model, the activity of third-grade students began to rise by a percentage of 70%, which indicates that the student's activity was within moderate criteria. However, student activity in cycle I is not maximum because of the five indicators there is one that is not achieved, which is the indicator of asking questions. After learning reflection and improvement, the researchers compile learning planning and implement advanced learning for cycle II. The learning process carried out on cycle II went well and students with enthusiasm students who are passionate in learning. The average student activity gained in the second cycle was 83%. This shows an average increase of 13% in student activity in cycles I and II. In this cycle II each indicator in student learning activity has improved in each student, although there are some students who still have not experienced significant changes after learning in the second cycle. Third grade students' activity in mathematics learning through the application of the Problem Based Learning model has reached the expected criteria of high.

5. Conclusion

Based on the results of the research, it can be concluded that the application of the learning model Problem Based Learning can improve the activity of class III students on learning Mathematics in elementary school. This is shown by the average student activity on pre-cycle at 51%, cycle I at 70%, and cycle II at 83%. The average learning

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activity of the student increased by 19% from pre-cycle to cycle I and 13% from Cycle I to Cycle II.

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7. References

Andani, M., Pranata, O.H., Hamdu, G. (2021). *Systematic Literature Review*: Model *Problem Based Learning* pada Pembelajaran Matematika Sekolah Dasar. *Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*. 8 (2).

Eismawati, E., Koeswanti, H.D., Radia, E.H. (2019). Peningkatan Hasil Belajar Matematika melalui Model Pembelajaran *Problem Based Learning* (PBL) Siswa Kelas 4 SD. *Jurnal Mercumatika*. 3 (2).

Hasanah, Z. (2021). Model Pembelajaran Kooperatif dalam Menumbuhkan Keaktifan Belajar Siswa. *Jurnal Studi Kemahasiswaan*. 1 (1).

Hermawan., Aisyah, I. (2019). Pembelajaran Setting Outdoor Mathematics terhadap Hasil Belajar Kognitif Siswa Kelas V SDN 2 Ciomas. *Jurnal Ilmiah Educater*. 1 (5).

Kanza, N.R.F., Lesmono, A.D., Widodo, H.M. (2020). Anlisis Keaktifan Belajar Siswa Menggunakan Model *Project Based Learning* dengan Pendekatan STEM pada

ISSN : 3025-020X

Pembelajaran Fisika Materi Elastisitas di Kelas XI MIPA 5 SMA Negeri 2 Jember. *Jurnal Pembelajaran Fisika*. 9 (2).

Machali, I. (2022). Bagaimana Melakukan Penelitian Tindakan Kelas Kolaboratif Bagi Guru?. *Indonesian Journal of Action Research*. 1 (2).

Naziah, T.S., Maula, H.L., & Sutisnawati, A. (2020). Analisis Keaktifan Belajar Siswa Selama Pembelajaran Daring Pada Masa Covid-19 di Sekolah Dasar. *Jurnal JPSD*. 7 (2).

Novera, E., Daharnis., Erita, Y., & Fauzan, A. (2021). Efektivitas Model Pembelajaran Kooperatif Tipe Course Review Horay dalam Peningkatan Aktivitas dan Hasil Belajar Matematika Siswa Sekolah Dasar. *Jurnal Basicedu*. 5 (6).

Nurrohim, N., Suyoto, S., Anjarini, T. (2022). Peningkatan Keaktifan Siswa Melalui Model Problem Based Learning pada Mata Pelajaran PKn Kelas IV Sekolah Dasar Negeri. *Journal of Primary Education.* 3 (1).

Pramudya, E., Kristin, F., Anugraheni, I. (2019). Peningkatan Keaktifan dan Hasil Belajar IPA pada Pembelajaran Tematik Menggunakan PBL. *Jurnal Kajian Penelitian dan Pendidikan dan Pengajaran*. 3 (2).

Prasetyo, A.D., Abduh, M. (2021). Peningkatan Keaktifan Belajar Melalui Model *Discovery Learning* di Sekolah Dasar. *Jurnal Basicedu*. 5 (2).

Santosa, A.W., Amelia, M.A., Sarwi, M. (2022). Peningkatan Keaktifan dan Hasil Belajar IPA dengan Model Pembelajaran *Problem Based Learning* (Pbl) Kelas V SD Negeri Sudimoro 2 Tahun Ajaran 2021/2022. *Jurnal Inovasi Keguruan dan Ilmu Pendidikan*. 2 (2).

Siswanti, R., Harjono, N. (2019). Penerapan Model Pembelajaran Problem Based Learning untuk Meningkatkan Keaktifan dan Hasil Belajar Matematika Siswa SD. *Jurnal Ilmiah Pendidikan Matematika*. 6 (1).

Sukma & Novelni (2015). Analisis Langkah-Langkah Model Problem Based Learning

ISSN : 3025-020X

Dalam Pembelajaran Tematik Terpadu Di Sekolah Dasar Menurut Pandangan Para Ahli. *Journal of Basic Education Studies*. 4(1).

Undang - Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional. 2003. Jakarta.

Yunitasari, I., Hardini, A.T.A. (2021). Penerapan Model PBL untuk Meningkatkan Keaktifan Peserta Didik dalam Pembelajaran Daring di Sekolah Dasar. *Jurnal Basicedu*. 5 (4).