

Application of the PBL Model Assisted by Time Board Media to Increase Motivation to Learn Mathematics in Elementary Schools

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1. Abstract

Mathematics is a subject that is often considered difficult for students. This is due to the low motivation of students to study Mathematics. The low motivation to learn is influenced by several factors including, namely, less varied learning models and learning is still teacher-centered. The purpose of this study was to increase the motivation to learn mathematics in grade II elementary school students in the material of time measurement using the PBL model assisted by time board media. This research is a classroom action research conducted in 5 meetings, 1 pre-action, and 4 meetings which are divided into two cycles. This research model consists of 4 stages, namely planning, action, observation, and reflection. The research subjects were class II students, totaling 29 people. Data collection techniques using observation and documentation. Data analysis was performed using quantitative and qualitative analysis. The results showed that the application of the PBL model assisted by time board media can increase motivation to learn mathematics. Where in the pre-action the percentage of learning motivation was 39.81% in the low category, in the first cycle it increased to the percentage of 60.83% in the medium category, and in the second cycle, it was 79.33% in the high category. This research can be said to be successful because it has met the completeness criteria of more than 75%.

Keywords: *learning motivation, mathematics, PBL, time board*

2. Introduction

Mathematics is an important subject because in everyday life it is closely related to the application of mathematics. Mathematics subjects are knowledge or knowledge of logic and numerical problems (Rohmawati, 2019). In line with Rahmalia (2021) that mathematical logic intelligence is an important thing to improve because it can influence other intelligence. Mathematics has an important role in various disciplines. However, in reality, students feel lazy and are not interested in learning this knowledge, because they think that mathematics is a difficult subject (Andraeni, 2021). According to Suwarsono (in Andraeni, 2021), Mathematics is considered difficult for students to learn and understand and many obtain unsatisfactory learning outcomes. This is because students do not understand the basic concepts of mathematics and students tend to be passive. This problem is due to the low motivation of students learning in mathematics.

Learning motivation is an encouragement that comes from within students to do something seriously so that they can achieve what is expected (Sugianto in Wahyuningtyas, 2021). When children have high learning motivation, there will be encouragement and enthusiasm from within to continue learning without any coercion from others. Wina Sanjaya (in Arifin, 2021) says that motivation in the learning process is a very important dynamic aspect. High learning motivation will have an impact on improving learning outcomes.

Based on observations made in class II during the mathematics learning process, a problem was found, namely the lack of student learning motivation. When the teacher is explaining, students tend not to pay attention, only a few students respond to questions from the teacher. The learning process is still teacher-centered, so students are more passive. Students' mathematics learning outcomes are less than optimal, there are still

many students who score below the KKM. According to Suari (2018) learning can be said to be optimal when the teacher not only explains the material, but students must be more active in finding out and building their own knowledge. The learning model used is less varied and does not focus on student activity. The learning media used is still limited to white boards. This makes students less interested in paying attention to the teacher's explanation and results in low student learning motivation. Therefore, a learning model is needed that can increase students' learning motivation in learning mathematics, one of which is by using the Problem Based Learning (PBL) model.

Problem Based Learning (PBL) is a learning model that confronts students with a problem so students can develop higher-order thinking skills and problem-solving skills (Harapit, 2018). The use of the PBL model in the learning process will make students actively involved and learning activities are more student-centered. The teacher acts as a facilitator and motivator who provides direction and guidance during the learning process. This PBL model can increase student motivation and curiosity. As educators, teachers need to choose the right model to convey a concept to students. According to Fauzia (2018) the key to learning mathematics is a good understanding of concepts. With a lack of students' understanding of the material presented, it causes learning outcomes to be not optimal and do not achieve learning mastery (Kamarianto, 2018).

The application of the problem based learning (PBL) model with concrete media can be an effort to increase motivation to learn mathematics. One of the math material that is considered difficult is the unit of time. The unit of time is an important concept in mathematics and everyday life (Kusriani, 2023). Learning media that can be used to convey this material and help students more easily understand the material is by applying time board media. Time board media is a learning media whose form and use resembles

a wall clock. (Rohmawati, 2019). Timeboard media can help in explaining time counting, concretizing how to calculate time and is expected to be able to create active and fun learning according to the goals to be achieved. According to Bahtiar (2019) the use of the PBL model assisted by timeboard media in learning can give students the opportunity to actively participate in solving real problems.

Based on the description above, researchers need to conduct research related to students' motivation towards mathematics. By using the problem based learning (PBL) model with the help of time board media in the learning process in class on the unit time material. Using models and media can make students more active and increase learning motivation. Therefore, research with the title "Application of the PBL Model Assisted by Timeboard Media to Increase Motivation to Learn Mathematics in Elementary Schools", is important to do.

3. Methods

The type of research used is Classroom Action Research with the Kemis and McTaggart models starting from planning, action, observation, and reflection. This research was conducted in class II of elementary schools from May to June 2023. The subjects of this research were class II students, totaling 29 students. Consists of 14 male students, and 15 female students. The object of this research is the motivation to learn mathematics using the PBL (Problem-Based Learning) model assisted by time board media.

Data collection techniques used in this study are observation and documentation. Data analysis in classroom action research contained two types of data collected by researchers, namely qualitative and quantitative data (Arikunto, 2015). Qualitative data was obtained from observations during the learning process. Quantitative data was

obtained through observation sheets of students' learning motivation. The hypothesis in this study is that the application of the PBL model assisted by time board media can increase the motivation to learn mathematics in grade II students. This indicator of success is marked by an increase in learning motivation reaching 75% of what students must achieve.

4. Results and Discussion

This research was conducted in 5 meetings, namely 1 pre-action meeting and 4 meetings which were divided into 2 cycles. Each cycle consists of several stages, namely, planning, action, observation, and reflection. In the second cycle, the stage that was carried out was a form of improvement from the implementation of learning in the previous cycle. From this study, the effort to improve is student learning motivation in mathematics subject matter per unit of time by using the PBL model assisted by time board media.

The results of observing the learning motivation of class II students while participating in class learning in the initial conditions before the action can be said to be still low. This data was obtained from research results which showed that student motivation was only 39.81%. From the learning process that has been done, researchers found various trends related to low student learning motivation. Where students do not pay attention to the teacher, do not respond when the teacher asks questions, do not dare to come forward, and feel objection when given assignments.

Following are the results of observing students' learning motivation in the learning process prior to action, which can be presented as follows:

Table 1. Results of Observation of Student Motivation in Pre Action

No	Indicator	Indicator Percentage
1.	There is desire and desire to succeed	40,74%
2.	There is encouragement and learning needs	42,59%
3.	There are hopes and aspirations for the future	38,88%
4.	Persevere in facing the task	37,03%
	Average	39,81%

Based on the data, the first indicator is the desire and desire to succeed, the percentage of which is 40.74%. The second indicator is the urge and need for learning at 42.59%. The indicator when there are hopes and aspirations for the future is 38.88%, and the last indicator is diligent in facing the task to get a percentage of 37.03%. The average student motivation in the pre-action obtained a percentage of 39.81% which can be categorized as low. In accordance with the achievement indicators of student motivation research according to Arikunto (2017), as follows:

Table 2. Student Motivation Research Achievement Indicators

Achievements	Criteria
75%-100%	High
51%-74%	Medium
25%-50%	Low
0%-24%	Very Low

After taking action using the problem based learning (PBL) model assisted by time board media in the learning process in class on time unit material, the researcher made observations related to student learning motivation using observation sheets that had been previously designed. The following is an explanation of the results of research on the learning motivation of class II students using the PBL model assisted by time board media. This research consists of observations on the learning process cycle I and cycle II.

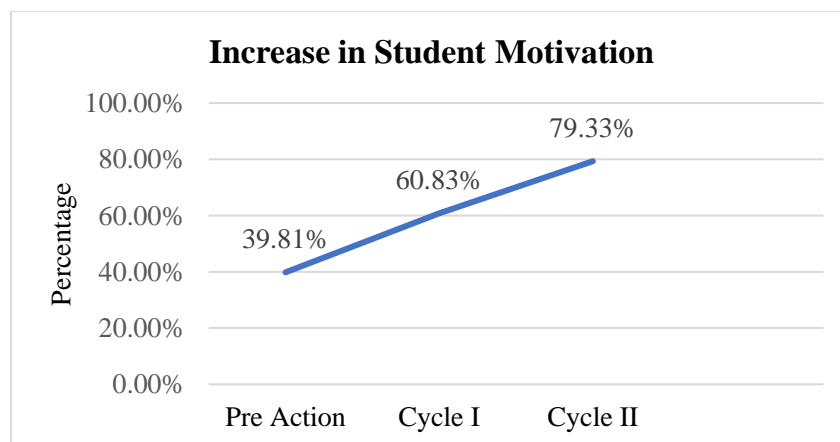
Table 3. Results of Observation of Student Motivation in Cycle I and Cycle II

No	Indicator	Motivation Percentage	
		Cycle I	Cycle II
1.	There is desire and desire to succeed	65,72%	86,01%
2.	There is encouragement and learning needs	50,82%	81,32%
3.	There are hopes and aspirations for the future	60,16%	81,44%
4.	Persevere in facing the task	66,61%	68,56%
	Average	60,83%	79,33%

The results of using the PBL model assisted by time board media showed an increase in student motivation in cycle I and cycle II. Based on the results of observations in the first cycle, it shows that in the first indicator, there is a desire and a desire to succeed, the percentage is 65.72%. The second indicator is the urge and need for learning at 50.82%. The indicator when there are hopes and aspirations for the future is 60.16%, and the last indicator is diligent in facing the task to get a percentage of 66.61%. The average student motivation in cycle I obtained a percentage of 60.83% which can be categorized as moderate.

Based on the results of observations in cycle II, it shows that in the first indicator, there is a desire and desire to succeed, the percentage is 86.01%. The second indicator is the urge and need for learning at 81.32%. The indicator when there are hopes and aspirations for the future is 81.44%, and the last indicator is diligent in facing the task to get a percentage of 68.56%. The average student motivation in cycle II obtained a percentage of 79.33% which can be categorized as high.

Figure 1. Increasing Student Motivation



Based on the graph, it can be said that the average value of student motivation has been completed because it has achieved a minimum completeness score of ≥ 75 . All the data presented above is the result of the actions that have been implemented. The results of the study prove that the use of the PBL model assisted by timeboard media can increase the motivation to learn mathematics in grade II students. This research ends in cycle II. Because, during learning in cycle II students have shown high learning motivation. This is shown by the activeness of students during the learning process. Students are very enthusiastic when asked to come forward, dare to ask questions, actively respond to questions from the teacher, do assignments from the teacher with pleasure, and learning outcomes from working on evaluation questions also increase. The activeness of students when learning will affect motivation from within (Sa'diyah in Kinanthi, 2022).

Learning motivation is closely related to the achievement of learning outcomes. When student learning motivation is high, the learning outcomes obtained are also high. Vice versa, if students have low learning motivation, their learning outcomes are also low and less than optimal. This is because high learning motivation will encourage students to continue learning and have high curiosity.

Table 4. Student Learning Outcomes

No	Students Name	Score		
		Pre Action	Cycle I	Cycle II
1.	AA	40	45	65
2.	AA	75	90	95
3.	AD	30	40	55
4.	AN	50	50	90
5.	AP	40	45	60
6.	BA	65	85	90
7.	CS	60	55	90
8.	CH	60	60	95
9.	DI	65	75	100
10.	DF	80	75	80
11.	EF	50	55	60
12.	FP	80	95	95
13.	IZ	50	60	60
14.	I	60	75	90
15.	JA	65	90	100
16.	JS	75	80	65
17.	KA	75	85	85
18.	MQ	50	55	100
19.	MA	80	70	95
20.	MG	70	35	100
21.	MZ	60	55	60

22. NH	75	90	95
23. OA	90	80	95
24. QR	40	50	70
25. SA	70	80	95
26. SC	70	70	100
27. SN	65	85	100
28. SA	70	70	100
29. VL	60	55	70
Average	62,75	67,41	84,65

The list of learning outcomes above is obtained from the results of working on evaluation questions at the end of learning. Based on these data it can be seen that the use of the PBL model assisted by timeboard media also has a significant effect on learning outcomes. High student learning motivation makes learning outcomes increase. Before the pre-action obtained an average value of 62.75, in the first cycle 67.41, and the second cycle 84.65. In the pre-action, there were still many students who scored below the KKM with a total of 17 students. While in the first cycle, there were 13 students and in the second cycle there were 7 students.

5. Conclusion

Based on the results of classroom action research, it can be concluded that the application of the Problem-Based Learning (PBL) model assisted by time board media can increase the motivation to learn mathematics in grade II elementary school students. The increase can be seen in the percentage of observations of students' learning motivation during the learning process. Starting at the time of pre-action, cycle I, and cycle II. The

results showed that the presentation of students' learning motivation in the pre-action was 39.81% in the low category. Whereas in cycle 1 it was 60.83% in the medium category, and in cycle II it experienced an increase of 79.33% in the high category. The average student motivation increased by 14% from cycle I to cycle II. With this, it can be concluded that the use of the PBL model assisted by time board media can increase the motivation to learn mathematics in class II elementary school students.

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