

Increasing the Motivation of Learning Mathematics of Class IV Students using Problem-based Learning

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1. Abstract

Increasing Motivation to Learn Mathematics for Class IV Students Using a Learning Based Learning Model. This study aims to increase the learning motivation of fourth grade elementary school students in mathematics through a problem-based learning model. This type of research is Collaborative Classroom Action Research (PKK). The hypothesis in this study is that the application of the problem-based learning model can increase learning motivation and understanding in mathematics for fourth grade elementary school students. The subjects of this study were 28 students of grade IV elementary school . This research was conducted in 2 cycles. Each cycle consists of 2 meetings. The methods used in data collection are observation/observation, questionnaires, tests, interviews and documentation. The results of the study show that there is a significant influence on the learning motivation of students who use the PBL model rather than the conventional model. This can be seen from the average student motivation using the PBL model in the initial data collection showed a pre-cycle of 25%, an increase in the first cycle of 71.42 % , in the second cycle of 89.28%. That means there is an effect of using the PBL model on students' learning motivation in mathematics in grade 4 elementary school students.

Keywords : *problem based learning method , learning motivation, mathematics subject*

2. Introduction

Education has a very important role in life man. Education can influence development man in all aspects of personality and life. Education is business aware For prepare student through guidance, teaching, and learning activities for their role in the future coming . Education is process social Where a person develops abilities, attitudes, and forms of behavior behavior in the society in which a person is exposed to influenceslected and controlled environment (especially coming from the school) so that he can obtain or experience the development of abilities optimal social and individual abilities . (Agus Taufik, Praise Lestari Prianto, and Hera sustainable Mikarsa, 2007:1.2-1.3). Learning is a system consisting of various components that are closely related to one another. These various components include: objectives, materials, methods, and evaluation. In determining the model or method to be used in the learning process the teacher must pay attention to these four components. Permendikbud No 21 of 2016 concerning content standards for Mathematics in Elementary Schools explains that the purpose of the Mathematics subject is to develop a positive attitude in mathematics, namely being logical, critical, careful and thorough, honest, responsible, and the ability to work together, and not give up easily and despair in solve the problems encountered, as a form of implementation of habits in inquiry and exploration of Mathematics. The learning process is an activity that can be carried out by the teacher to students in providing subject matter. A teacher must also guide and educate students in the teaching and learning process at school, so that these students can really understand what has been explained by the teacher. Students must also be active in learning, students do not just sit quietly and listen, but students must also be active during the learning process.

Student motivation determines the success to be achieved by these students. Students with high learning motivation will be able to achieve high learning outcomes, and vice versa, students with low learning motivation will also tend to get low learning outcomes and will experience higher learning difficulties. Mathematics is learning that places more emphasis on students to think logically, systematically, critically, creatively and work together so that students will be able to develop skills in terms of solving various everyday problems. Mathematics subjects in elementary schools study numbers, geometry and measurement, as well as data processing. Under such conditions, it is necessary to make efforts to improve and develop their potential in student learning outcomes. In the learning process the teacher must use an effective learning model so that students are interested in learning and are active in learning and the learning process will be interesting. Through *the problem-based learning realistic learning model* students can find the concept of mathematical arithmetic operations through the real problems presented, in the *problem-based learning realistic learning model* learning is presented through problem-based learning needed to confront real world challenges, the ability to face everything new and existing complexities (Rusman, 2011: 229-230). The formulation of the research problem is whether there is a significant effect of the PBL model on motivation to learn Mathematics in 4th grade elementary school students. While this study aims to determine the significant effect of using the PBL model on motivation to learn Mathematics in 4th grade elementary school students.

Research conducted by (Tomas, 2020) shows the effect of using problem-based learning models on motivation to learn mathematics in grade 4 elementary school students. Next is research conducted by (Rizky Wahyuningtiyas, 2021) showing the use of *Problem*

based learning is very influential on students' learning motivation. The next relevant research is research (Ni Made Ayu Primadewi, 2022) creating problem-based learning-oriented animated video media on fraction material for fourth grade elementary school students. The formulation of the research problem is whether there is a significant effect of the PBL model on motivation to learn Mathematics in 4th grade elementary school students. While this study aims to determine the significant effect of using the PBL model on motivation to learn Mathematics in 4th grade elementary school students.

3. Method

This type of research is Collaborative Classroom Action Research. In practice, the researchers collaborate with field supervisors, tutors, school principals, and class teachers. Classroom action research is a series of steps consisting of planning, action, observation, and reflection which continue to flow to produce a new cycle until the class action research is stopped (Azizah. et al, 2021: 18). This study uses the Kemmis and Mc Taggart PTK model introduced by Kurt Lewin which has four stages in each cycle, namely planning, acting, observing and reflecting.

3.1. Participants and context

The subjects involved in this study were fourth grade elementary school students in Yogyakarta enrolled in the 2022/2023 school year with a total of 28 students. Data collection techniques were carried out by describing the results of tests carried out directly to students to obtain data about students' learning motivation in mathematics. The test method is used to obtain data about the level of mastery of learning material before and after learning. The analysis technique went through two stages, namely 1) using descriptive

analysis techniques, namely the test results of the initial conditions, cycle I and cycle II, so that after comparing the results of cycle I and cycle II there were differences and improvements; and 2) using observation techniques with descriptive analysis based on the results of observation and reflection. Furthermore, the results of student learning before implementing the Realistic Problem Based Learning model were compared with the results after implementing the Realistic Problem Based Learning model to determine the progress of student learning motivation in mathematics. Based on this, this research is focused on increasing learning motivation in mathematics for fourth grade elementary school students using the Problem Based Learning learning model.

3.2. Material

Data collection techniques in this study were carried out by observation/observation, questionnaires, tests, interviews and documentation. Observations/Observations were made to observe the initial conditions of grade 4 students. Questionnaires were used to measure student motivation. Tests are used to measure mathematics learning outcomes. Interviews were conducted to collect data by direct communication with sources and documentation was used to obtain initial data prior to action. The data obtained were then analyzed using descriptive percentage techniques.

3.3. Data collection and analysis

Data collection techniques are the most strategic steps in research, because the main purpose of research is to obtain data. The data collection techniques taken include: observation techniques, used to collect data about activities during learning activities, the

next step is to use a questionnaire, which is given to students to fill out the questionnaire, this is used to collect data about the motivation to learn in participants educate.

In this study using data analysis techniques, namely descriptive qualitative and quantitative descriptive analysis techniques. The qualitative data analysis method is a way of analyzing data in the form of sentences (Agung, 2018; Wisada et al., 2019). This method is used to analyze data from interviews and product feasibility tests in the form of criticism and suggestions given by experts and students. The quantitative descriptive method is a way to process data in the form of numbers (Agung, 2018; Wisada et al., 2019).

3.4. Ethical Considerations

All research or research involves humans as research subjects. Based on this, in this study there are basic principles of research ethics, including: the first is respect for people, in this case we must respect and appreciate students, where these students are research subjects, then the second is benefits, in this research there are benefits for namely providing benefits to learning in schools, especially in mathematics, namely to increase motivation, the third is not endangering research subjects, in this study, not endangering research subjects because during teaching and learning activities carried out in the classroom, not outside class.

3.5. Study Limitations

There are limitations that are owned by researchers related to time, effort, and costs, this research is limited to increasing the motivation to learn mathematics in grade 4 students using problem based learning models.

4. Results and Discussion

Collaborative Classroom Action Research (PTKK) consists of pre-action, cycle I and cycle II. The results of research on increasing motivation to learn mathematics in grade 4 students using the problem-based learning model, can be described as follows:

4.1. Results

Before carrying out the research, the researcher made observations in the class first, especially in learning Mathematics. It is to find out how learning in the classroom. Based on the results of observations done, there are many students whose motivation to learn is lacking. This can be shown that students who have met the criteria for achieving learning objectives / minimum passing grade ≤ 73 , namely there are 7 students (25%). This can be seen from the number of students who get grades ≤ 73 and above. Meanwhile, there were 21 students (75%) who had not reached the learning objectives achievement criteria / minimum passing grade ≤ 73 . This can be seen from the number of students who get a score of 73 and below. So, it is necessary to carry out a learning action in order to increase the value of the fourth grade students' mathematics subject. Student learning activities, in the initial conditions where the implementation of learning carried out by the teacher still uses the lecture method or has not linked the material with the real world context of students, so student learning outcomes are still low. While the learning outcomes in the initial conditions of the number of students who have completed (fulfilling the minimum passing grade) or the classical average: 25%. These results are still below the classical completeness criteria set by the school, namely 80%. The low average score of students

who are still below the KKM and the low level of mastery of learning, the researcher applies the *problem based learning model*.

Tabel 1. the results of the assessment with learning carried out through the *problem-based learning model* in cycle I

Value Range	Category	Frequency	Mark	Percentage
86-100	VG	3	266	10.71%
76-85	Good	8	645	28.57%
73-75	Enough	9	665	32.14%
≤ 73	Not enough	8	508	28.57%
Amount		28	2084	100%
Average			74,42	
complete	≥	20		71.14%
Not Completed	≥	8		28.57%

Based on the data in table 1, the results of the assessment with learning carried out through the problem-based learning model in cycle I obtained an increase in the percentage to 71.14% from the original 25%, or as many as 20 students had achieved the learning objectives achievement criteria.

Tabel 2. Cycle II the percentage

Value Range	Category	Frequency	Mark	Percentage
86-100	VG	12	1071	42.85%
76-85	Good	9	728	32.14%
73-75	Enough	4	300	14.28%
≤ 73	Not enough	3	210	10.71%
Amount		28	2309	100%
Average			82.46	
complete	≥	25		89.28%
Not Completed	≥	3		10.71%

In cycle II the percentage again increased from cycle I, namely 86.28% which was originally 71.14%, or as many as 25 students had achieved the learning objectives achievement criteria.

4.2 Discussion

Cycle I

4.2.1 Action Planning Stage

Planning is prepared according to the problem to be overcome, namely increasing learning motivation in grade IV mathematics through problem-based learning models. At this stage the actions taken during the research were: a) Developing a learning implementation plan (Teaching Module) that is in accordance with the material and using the problem-based learning model, b) preparing learning media, c) preparing student worksheets, d) making a rubric appropriate assessment.

4.2.2 Action Implementation Stage

At the action stage of cycle I, the learning process is carried out in the classroom using a plan that has been prepared using a problem-based learning model which has the following steps: student orientation to problems, organizing students for learning, guiding individual and group investigations, developing and presenting the work, as well as analyze and evaluate the problem-solving process.

4.2.3 Observation Stage

Observing the entire series of activities carried out in cycle I, and noting matters that need more attention.

4.2.4 Reflection Stage

After the action treatment in cycle I, the resulting reflection activities are: a) students become more prepared in carrying out learning, b) through discussion activities, students exchange ideas with other students and exchange ideas in the process of solving problems, c) the learning process with using the *problem based learning model* has increased the percentage of pre-cycles.

Cycle II

4.2.1 Action Planning Stage

Planning is prepared according to the problem to be overcome, namely increasing fourth grade learning motivation through *problem-based learning models*. At this stage the actions taken during the research are: a) Develop a learning implementation plan (Teaching Module) that is in accordance with the material and use the learning model, b) prepare learning media, c) prepare student worksheets, d) make an appropriate assessment rubric.

4.2.2 Action Implementation Stage

In the action stage of cycle II, the learning process is carried out in the classroom using a plan that has been prepared using a *problem-based learning model* which has

the following steps: student orientation to problems, organizing students for learning, guiding individual and group investigations, developing and presenting the work, as well as analyze and evaluate the problem-solving process.

4.2.3 Observation Stage

Observing the entire series of activities carried out in cycle II, and noting matters that need more attention.

4.2.4 Reflection Phase

After the action treatment in cycle II which is an improvement from cycle I, the resulting reflection activities are: a) students become more understanding of learning because they use realistic or real problems related to student life, b) through discussion activities, students exchange ideas with students who others and exchange ideas in the process of solving arithmetic operations problems, c) the learning process using a problem based learning realistic model has increased in percentage from cycle I.

Based on the results of data acquisition from cycle I and cycle II, it can be concluded that the application of the *problem based learning model* can increase learning motivation in mathematics subjects in class IV students . This can be seen from the increase in the percentage starting from the pre-cycle that students who have met the learning objectives achievement criteria, namely 25%, increased to 71.14% in cycles, in cycle II it increased again to 89.28%.

5. Conclusion

Based on the analysis of the research results, it can be concluded that the problem-based learning model can increase the motivation to learn mathematics in grade IV elementary school students. This can be seen from the completeness of student learning outcomes in cycle II which reached 89.28 %, and student responses to the application of the problem based learning model were very good. Suggestions that can be given are that in learning activities the teacher can apply the problem based learning model as an alternative in teaching mathematics to increase students' motivation to learn mathematics.

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