

Increasing Interest and Learning Outcomes in Mathematics using PBL with Cards in Grade 3 Elementary School

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1. Abstract

One of the subjects in education is mathematics. Mathematics is the science of reasoning that underlies almost all aspects of human life and the universe. In studying mathematics, one of the things that cannot be missed is interest in learning. Interest in learning will affect math learning outcomes. In addition to interest, methods and models also affect the success of learning. This study aims to determine the increase in interest and learning outcomes in mathematics by applying the problem-based learning model assisted by card media. The subjects of this study were third grade students with a total of 22 students. This research is classified as collaborative classroom action research with the design of the Kemmis and Mc. Tagart model. The research stages consist of four stages, namely planning, action, observation, and reflection. Data collection techniques using questionnaires, learning outcomes, and documentation. The results showed an increase in student interest and learning outcomes. In the pre-action learning interest category very high 2, high 5, medium 10, low 5. Learning outcomes show there are still 64% of students who need to learn, only 36% have passed the minimum completeness criteria. In cycle I, learning interest was very high 4, high 9, medium 9. Learning outcomes in cycle I showed that 73% had passed and 27% still needed to study again. At the second cycle stage, the learning interest showed very high 8, high 9, and medium 5. The learning outcomes in cycle II showed 14% needed to study again and 86% had passed. From the above research, it is concluded that students' interest and learning outcomes have increased from pre-action to cycle I and increased again in cycle II. This research is expected to add scientific insight for teachers, schools, and other

researchers in implementing the PBL model assisted by cards to increase student interest and learning outcomes.

Keywords: Learning interest, Problem-based learning, math, card media, learning outcomes.

2. Introduction

Education is one of the important aspects in an effort to achieve certain goals. Education plays a crucial role in the development and progress of a society. Education plays an important role in improving an individual's standard of living. By having access to quality education, a person can gain the knowledge, skills and insights needed to face the challenges of life. This is in line with the definition of education according to Law Number 2 of 2003 concerning the National Education system chapter 1 article 1, Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, personality, intelligence, noble character, and skills needed by themselves. Education also opens doors of opportunity to get a better job and achieve a successful career. In addition, education helps improve social awareness and mental health, helps reduce poverty levels, and teaches values that promote a meaningful and ethical life.

Education must be able to cover various layers of society, from the lowest to the top, and also from various ages in order to keep up with social change and development. (Hasbullah, 2015). The importance of education for the development of society and the nation cannot be ignored. Education plays a key role in preparing the younger generation to become productive, creative and responsible members of society. By having educated citizens, a country can create quality human resources to face various challenges in the fields of economy, technology and science. Education also plays a role in shaping awareness of human rights, democracy and tolerance,

which are the foundation for an inclusive and harmonious society. Thus, investment in education is a long-term investment that has a positive impact on the social, economic and political development of a country.

Every citizen is expected to participate in carrying out education. Currently, the government provides opportunities for every citizen to participate in the highest level of education. This is in line with the government's mandate in Government Regulation No. 47 of 2008 concerning compulsory education which is the embodiment of efforts to implement the 9-year compulsory education program.

Learning is an activity carried out by a teacher to be able to develop thinking creativity that can improve students' thinking skills in constructing knowledge as an effort to improve good mastery of the subject matter with a model so that they can carry out learning activities actively, effectively, innovatively and efficiently and with optimal results. (Nurdyansyah & Fahyuni, 2016). Learning is also the foundation for the progress of society and civilization. Innovation and discovery occur through exploration and research driven by the desire to understand the world better.

According to (Djamaluddin & Wardana, 2019) Learning is a process of interaction that occurs between students and educators who are learning resources in a learning environment. In the professional sphere, continuous learning is one of the keys to being able to face technological advances and increasingly fierce competition. Skills acquired through learning enable one to adapt to the ever-changing environment and new job demands. Education also helps promote social awareness and values, strengthens awareness of global issues, and encourages collaboration to achieve common goals. By encouraging an inclusive and innovative culture of learning, we can create a knowledgeable, skilled and sensitized society, capable of facing future challenges with confidence and determination.

Based on the results of observations and interviews conducted in the field, it is known that learning has not been as expected. Interest and learning outcomes in mathematics in class III still need to be improved. The learning model used has not been varied. Students are still focused on the teacher. Action is needed to make learning *student centered*.

The selection of learning models that are in accordance with the student-centered approach has an important role in order to improve the effectiveness and efficiency of the learning process. This approach places students as the main focus in the learning process, understanding each individual's unique needs, interests and learning styles. By considering students' preferences, cognitive abilities, and developmental levels, the right learning model can increase students' engagement and motivation in learning. Peker (Rofiqoh, 2016) states that learning carried out in the classroom will certainly be influenced by various factors, not just one factor, it can be influenced by factors of student learning styles, anxiety, confidence, gender. By choosing a learning model that is in accordance with the student-centered approach, teachers can create an inclusive learning environment, foster interest and enthusiasm for learning, and help students achieve their potential optimally. One of the learning models that can make student-centered learning is *Problem Based Learning* (PBL). This is in line with the opinion of (Sani, 2015) This approach focuses on providing authentic challenges or problems to students, which allow students to develop an understanding of mathematics concepts, one of which is through the process of critical thinking, collaboration, and problem solving.

According to (Slameto, 2015) interest is a sense of preference and a strong sense of interest in a thing or activity, without anyone asking. Basically, interest has a link between oneself and something outside oneself that can be accepted. Therefore,

the stronger, closer and related, the higher the interest. High interest in learning, affects student learning outcomes. According to Guilford in (Karunia & Mokhammad, 2015) states that interest is an encouragement that comes from within students to learn something with full awareness. Interest not only provides personal enjoyment, but can be a source of innovation and development in various fields of life. When someone has an interest in something, they will tend to learn more about it, find out the latest innovations, and try to find solutions to existing challenges. A deep interest can also be the foundation of a successful and fulfilling career. When someone takes on a job that matches their interests, it no longer feels like a burden, but becomes a kind of calling that allows them to contribute to their full potential.

Mathematics is the science of reasoning that underlies almost all aspects of human life and the universe. At the primary school level, students study mathematics to develop the ability to think logically, analytically, systematically, critically, and creatively, as well as to improve their ability to work together. Mathematics is considered important because it can help students in finding the right solution to various problems faced (Ananda & Wandini, 2022). As a universal language, mathematics provides a framework for formulating, analyzing, and solving problems logically and systematically. (Susanto, 2016) math means the science of reasoning, so it can be said to be an exact science. Mathematics teaches us how to think critically, identify patterns, and formulate appropriate solutions based on evidence and deduction. Mathematics can also be interpreted as the science of the relationship between numbers and operational procedures used in solving problems regarding numbers (Hamzah & Muhlisraini, 2014). More than just counting and numbers, mathematics builds the foundation for modern science and technology, allows us to

explore the secrets of the universe through mathematical models, and creates advanced technologies such as computers and software.

Learning outcomes are the abilities obtained by a person after following the learning process ((Dimiyati & Mudjiono, 2015). Learning outcomes include the extent to which individuals have mastered the subject matter and their ability to apply that knowledge in various situations. An effective learning process allows a person to assimilate information well, understand concepts in depth, and develop relevant skills. Good learning outcomes are not only measured by numbers or grades, but also involve mastery of concepts, creativity in problem solving, critical thinking skills, and progress in personal development. Learning outcomes are an ability obtained by students after going through learning activities. As stated by UNESCO, there are four pillars of learning outcomes that education is expected to achieve, namely: learning to know, learning to be, learning to live together, and learning to do ((Putri & Ifrianti, 2017). Learning outcomes are also an evaluation tool for educational institutions and learning systems. By monitoring student learning outcomes, teachers and educational institutions can evaluate the effectiveness of the teaching methods used. Learning outcome data can help teachers identify areas for improvement in the learning process and adapt better approaches according to students' needs. In addition, learning outcomes also provide insights for educational institutions to make curriculum improvements and develop more effective programs.

Playful learning cards are an innovative and fun learning approach that has become popular in education. These learning cards serve as a tool to help remember important information, such as facts, concepts, or vocabulary, while involving an entertaining element of play. Lie in (Zahroul & Nur, 2014) A cooperative learning model that uses cards as learning media to interact with their group (partner) so that learning

becomes interesting and fun". The use of learning cards can include various types of games, such as memory games, flashcard games, or even board games that involve cards as the main element. This approach brings fun and passion to the learning process, making learning more interesting and effective. When playing, students tend to be more actively involved in learning, helping to improve information retention and strengthen positive associations with the subject matter. According to (Djamarah, Bahri, & Zain, 2010) Based on its type, picture card media is a type of visual media, namely media that only relies on the sense of sight and its presentation only displays still images. One of the main advantages of learning card media that can be while playing is its flexibility in various subjects and levels of education. In the field of mathematics, learning cards can be used for memorization exercises of multiplication tables, important formulas, or geometry concepts. The adaptability of learning cards also allows educators or parents to create customized cards according to students' needs and interests, providing a personalized and relevant learning experience.

3. Methods

The subjects in conducting this research were third grade students in one of the elementary schools in the Special Region of Yogyakarta, totaling 22 students. The selection of the research subject is based on the results of observation. The research method that will be used is Classroom Action Research (PTK). This class action research is designed with a systematic problem. The results of this study are used as a basis for developing a work plan or action as an effort to overcome the problem.

In this study, researchers used two main instruments to collect data, namely questionnaires and tests. The questionnaire was used to measure the level of students' interest in learning, as well as to get their responses and perceptions of the Problem

Based Learning (PBL) learning model assisted by card media. Meanwhile, the test was used as a measurement tool to evaluate students' learning outcomes after participating in learning with the PBL method and card media. The combination of using questionnaires and tests in this study allows researchers to gain a more comprehensive understanding of the extent of the effectiveness of the PBL model assisted by card media in improving the interest and learning outcomes of grade III students.

The data techniques used in this research are quantitative and qualitative descriptive analysis techniques. The quantitative descriptive analysis technique was used to analyze the results of the student interest scale, while the observation results were analyzed using qualitative descriptive techniques.

The procedure that researchers use in carrying out this research is to use the design developed by Kemmis and Mc. Tagart, there are three steps, namely: 1) Planning, 2) Acting (action), 3) reflecting (reflection). (Muhidin & Kudus, 2022)

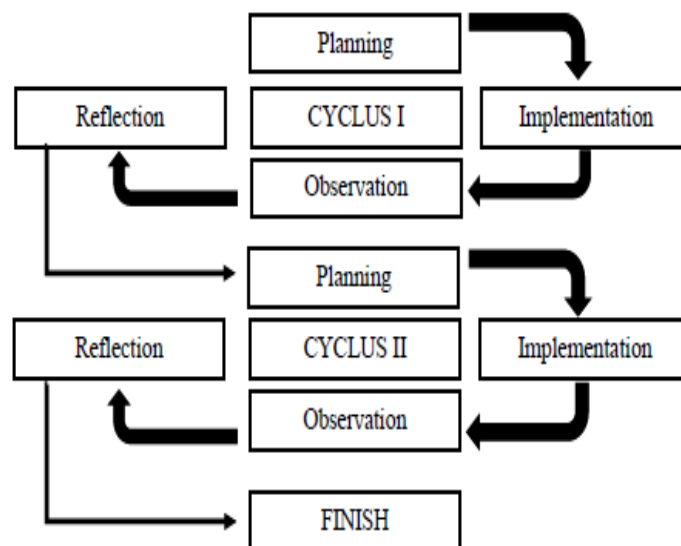


Figure 1 Research procedure

This study has several limitations that need to be recognized. First, this study was conducted in the second semester according to the educational calendar of the 2022/2023 school year, so time constraints are a factor that can limit the completeness and depth of data analysis. Second, there are limitations in personnel, where the number and availability of researchers or support personnel may affect the ability to make observations and interactions with students more intensively. Nevertheless, researchers will try to overcome these limitations and present the results of the study as accurately as possible in order to provide meaningful insights regarding the use of the Problem Based Learning (PBL) learning model assisted by card media in increasing the interest and learning outcomes of grade III students.

4. Results and Discussion

Pre-Action

The research conducted in Keals III was conducted in the second semester. The subjects of this research were 22 students.

Table 1 List of student names

Number	Name	Number	Name
1	FAR	12	KIL
2	FAH	13	LDN
3	GAKA	14	MS
4	HRW	15	MAAK
5	HM	16	MAZ
6	HZK	17	MAM
7	HKA	18	MAAP
8	IMS	19	MFAF
9	KFA	20	MKH

10	KMSP	21	MLNA
11	KNF	22	NRA

In this Pre-Action, the results of the student interest scale before being given Action can be presented as follows

Table 2 Pre-Action interest result table

No.	Category	Interval	Frequencies
1	Very High	69-80	2
2	High	57-68	5
3	Medium	45-56	10
4	Low	33-44	5
5	Very Low	20-32	0

Based on the table above, it can be seen that the interest in learning Mathematics of grade III students who are in the very low category is 0 or none, low category is 5 students, medium category is 10 students, high category is 5 students, and very high category is 2 students.



Figure 2 Pre-action learning outcomes

For learning outcomes in pre-cycle activities as described in the figure above, it can be seen that for the initial phase there are still few students who master the material. Only about 36% of students have succeeded, this means that there are still about 64% of students who need to study again. The average score obtained is 68.64.

Cycle I

Based on research in cycle I, student scores in class III have increased compared to pre-action activities.

No.	Category	Interval	Frequencies
1	Very High	69-80	4
2	High	57-68	9
3	Medium	45-56	9
4	Low	33-44	0
5	Very Low	20-32	0

Table 3 Student interest results in cycle 1

Based on the table above, it can be seen that the interest in learning Mathematics of grade III students who are in the very low category is 0 or none, low category is 0 students, medium category is 9 students, high category is 9 students, and very high category is 4 students.



Figure 3 Student learning outcomes Cycle I

With regard to student learning outcomes, after completing cycle I, researchers distributed student math question sheets. This activity aims to determine the condition of students after being taught the material. Students fill in the answers on the questionnaire that has been prepared by being given the technicalities of filling it out

first. From the results of cycle 1, it has been seen that many students have succeeded in mastering the material. There were already 73% of students who managed to get scores above the minimum completeness criteria (KKM), but there were still around 27% of students who still needed to study again. The average score of cycle I was 78.41.

Cycle II

Cycle II was used to see the changes compared to cycle I. The results obtained in cycle II data are presented as follows:

No.	Category	Interval	Frequencies
1	Very High	69-80	8
2	High	57-68	9
3	Medium	45-56	5
4	Low	33-44	0
5	Very Low	20-32	0

Table 4 learning interest results cycle II

From the implementation of cycle II, the results are obtained as shown in the table above. It can be seen that the interest in learning mathematics of grade III students who are in the very low category is 0 or none, the low category is 0 students, the medium category is 5 students, the high category is 9 students, and the very high category is 8 students.

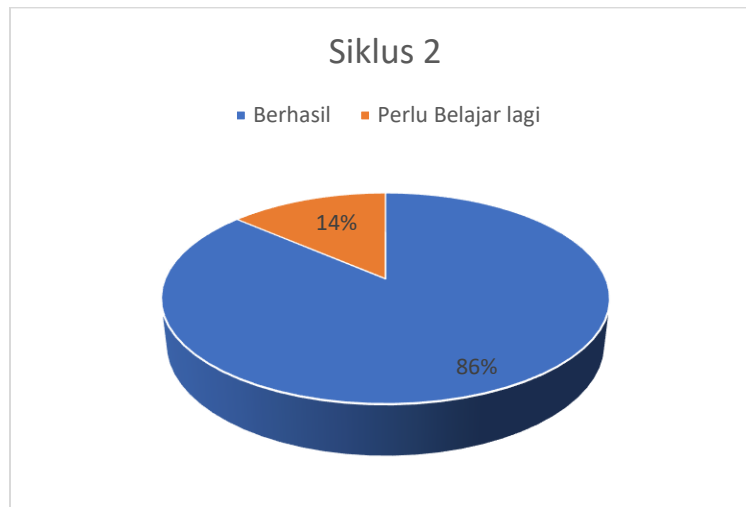


Figure 4 Student learning outcomes cycle 2

With regard to student learning outcomes, after completing cycle II, researchers distributed student math question sheets. This activity aims to determine the condition of students after being taught the material. Students fill in the answers on the questionnaire that has been prepared by being given the technicalities of filling it out first. From the results of cycle II, it has been seen that many students have managed to master the material. In cycle II, the presentation of students who successfully passed the minimum completeness criteria value was 86 percent, and only about 14% had to study again. The average score of cycle II was 84.32.

5. Conclusion

Based on the results of the research and discussion, it is found that the Problem Based Learning (PBL) learning model supported by card media has a positive impact on the interest and learning outcomes of third grade students. In this study, it is known that the use of PBL assisted by card media can significantly increase students' interest in learning. In addition, student learning outcomes also experienced a striking increase.

This shows that the PBL learning model with the utilization of card media is an effective approach to achieve optimal learning objectives in grade III students.

In addition to increasing interest in learning, improving student learning outcomes is also a positive implication of the application of the PBL model assisted by card media. In the pre-action stage, only 36% of students achieved satisfactory learning outcomes. However, after going through two learning cycles, there was an encouraging increase. Student learning outcomes increased rapidly, reaching 73% in cycle I, and even reaching 86% in cycle II. This data confirms that the learning method that adopts PBL and uses card media is able to have an overall positive impact on the teaching and learning process in class III. This positive implication is an encouragement to further integrate the PBL learning model and card media in the learning curriculum to achieve a better quality of education.

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