

The Application of the Problem Based Learning Learning Model in Improving the Skill of Solving Set Story Problems in Grade VII Students at SMP PGRI Padarincang

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Abstract: This study aims to help grade VII students at SMP PGRI Padarincang on various independent learning skills and skills in overcoming problems in solving set story problems. To overcome this problem, a more varied learning strategy is needed, namely using learning models. Problem Based Learning (PBL). using qualitative methods, this type of research is phenomenology (data collection) and problem study research (postes). The subjects in this study were students of grade VII of SMP PGRI Padarincang for the 2021/2022 academic year, totaling 6 students selected by Purposive Sampling, from the results of the study, it was found that in the first stage of Polya it was 66.67%, while the interview results at this stage received a percentage of 77.7%. We can see from the presentation that the interview results are more significant than the test results. So we can conclude that the mathematical problem solving ability of class VII students of PGRI Padarincang Junior High School is classified as low.

Keywords: Collection, Problem Based Learning, Polya Problem Solving.

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A. INTRODUCTION

Education is one of the factors that determine the quality of human resources. The government makes various efforts to improve the quality of education through curriculum improvement. The learning process applied to the 2013 curriculum is student-centered active learning. Implementing the 2013 curriculum is needed to run optimally to improve the quality of education, especially in mathematics subjects. Mathematics is one of the crucial sciences to learn because it conveys many benefits including creating problem-solving skills, forming character, helping to learn other knowledge, and producing a logical mindset. Mathematics learning is also essential in everyday life and serves various disciplines, both exact sciences and social sciences. The thinking process in mathematics learning includes 5 primary standard competencies: problem solving, reasoning, connection, communication, and representation. One ability still a concern in learning mathematics is the ability to solve problems.

Problem solving ability is the ability of a student to use his thinking process to solve problems through collecting information, analyzing information, compiling various other ways of solving, and choosing the most effective problem solving. This ability is part of the mathematics curriculum which is very important, because in the learning process and its

completion, students may gain experience using the knowledge and skills they already have to be applied to routine problem solving.

Problem solving is the competence shown by students in understanding and determining solving strategies to resolve a conflict. Although considered very important, problem solving activities are still claimed to be complex material in mathematics, as well as experienced by grade VII students at SMP PGRI Padarincang, most students at SMP PGRI Padarincang find it difficult when faced with using problem solving, especially in mathematics learning. It can be seen that students tend to be passive and teachers always convey information directly, in the sense that students only get and apply formulas without understanding where the source is and why they use the formula.

Learning models are ways or presentation techniques used by teachers in the learning process to achieve learning objectives. Problem-based learning is an example of learning that presents contextual problems to stimulate students to learn. PBL (Problem Based Learning) is a learning model, where students from the beginning are faced with a problem and then followed by a student-centered information search process. In the process of applying examples of Problem Based Learning oriented to character education in learning activities will run well and creatively, if the teacher encourages and motivates students to gain experience by doing activities that allow them to find mathematical concepts and principles for themselves and form knowledge and skills, a character building process occurs in students.

To overcome these problems, a more varied learning strategy is needed. One alternative that can be the choice of teachers in the learning process is the effectiveness of using the learning model. The learning model model should be relevant and support the achievement of learning objectives, one of the alternatives that can be the teacher's choice in the learning process means the effectiveness of using learning examples. Learning models should be relevant and support the achievement of learning objectives. Clear learning objectives will clarify the teaching and learning process in the sense of situations and conditions that must be made in the teaching and learning process. One example of learning that can improve students' mathematical problem solving skills is the Problem Based Learning (PBL) model. Using the Problem Based Learning (PBL) model is a pedagogical approach that challenges students to solve concrete world conflicts individually and in groups. Learning using the Problem Based Learning (PBL) model is based on the principle that problems can be used as a starting point to receive new knowledge. The problems presented in learning are needed to increase students' motivation to understand the concepts given.

Problems related to using mathematics in everyday life are generally expressed in story problems. Rahardjo and Waluyati (Yuwono et al., 2018) said that story problems are required to solve problems through their ability to master, design, and solve the story problem. However, the fact shows that solving problems in story problems is part of the difficulties often experienced by students, especially mathematics (Nurhayati, 2013). Meanwhile, Tumardi (Supriyanto, 2020) stated that the complex material for students to understand is a matter of story in Indonesia and other countries. This matter can be observed from students' mistakes when solving story problems. So, strategies are needed on solving mathematical conflicts about story problems. One of the materials in mathematics, various students

experience difficulties in solving problems, namely in the set material. Set material is contained in the grade VII SMP/MTs curriculum, which has varying difficulty levels, especially in the type of story questions. Education plays a pivotal role in shaping individuals' characters and abilities to tackle various challenges in the future. One crucial aspect of education is the development of problem-solving skills, particularly in mathematics. Mathematics not only requires an understanding of concepts but also the ability to apply those concepts in real-world situations.

One proven effective model of learning to enhance mathematical problem-solving skills is Problem-Based Learning (PBL) (Hmelo-Silver, 2004). This learning model emphasizes active learning, where students are encouraged to think critically, collaborate, and solve real-world problems. However, the application of PBL in the context of solving set story problems among Grade VII students at SMP PGRI Padarincang has not been fully explored. Previous research has shown that PBL can significantly improve students' problem-solving abilities (e.g., Savery, 2006; Walker & Leary, 2009). Moreover, studies have highlighted the importance of contextualized learning experiences, such as solving story problems, in enhancing students' understanding and retention of mathematical concepts (Boaler, 1998; Verschaffel et al., 2009).

This article aims to explore the application of the Problem-Based Learning (PBL) model in improving the problem-solving skills of Grade VII students at SMP PGRI Padarincang, particularly in the context of solving set story problems. The discussion will encompass the variables relevant to the title of the article, as well as a review of previous research results pertinent to the discussed topic. Thus, this article seeks to provide a broader understanding of the effectiveness of PBL in enhancing mathematical problem-solving skills, specifically in the context of set story problems, and to strengthen the existing knowledge base.

B. METHOD

This research was conducted in Padarincang Village, Kp. Parigi, Padarincang District, Serang Regency. By using Qualitative methods. This type of research is phenomenology and case study research. This phenomenological research collects data through observation and analysis of students to discover students' ability to solve every problem in learning. The next type of research is case study research, which uses delivering postes to discover students' abilities and interests in learning mathematics, especially in the set material. The subjects in this study were students of grade VII of SMP PGRI Padarincang for the 2021/2022 academic year, totaling 6 students selected by Purposive Sampling, where these six subjects included 2 students with high abilities, 2 students with medium abilities, and 2 students with low abilities. Purposive sampling means a technique for taking samples determined through adjustments to the research objectives or with a consideration (Pratidiana, 2021), which uses daily values of mathematics. So based on the researcher's daily value, set the student as a subject can be seen through Table 1 below.

Table 1. Research Subject

No	Category	Subject	Name	Daily Value
1	Tall	S1	Mutmainah	85

		S2	Siraj Muhammad Jamil	82
2	Keep	S3	Rohmaeti	78
		S4	Dea Ananda	74
		S5	Miftahul Gani Rizky	64
3	Low	S6	Larasati	58

Analyzing data in qualitative research is carried out when data collection is used directly and after collecting the data. The process passed in carrying out data analysis is through compiling data sequentially, presenting it, selecting essential data, and compiling conclusions. Research data analysis was obtained through student answer sheets and transcripts of interviews that had been carried out, then analyzed using specifics to determine students' mathematical conflict resolution ability at SMP PGRI Padarincang. The results of the LBR analysis of the students' answers will be combined using the results of student interviews.

C. RESULTS AND DISCUSSION

1. Problem Solving Ability Test (KPM) Results

The following KPM test results can be seen through Table 2.

Table 2. Test result data on problem solving skills

Student ability categories	Subject	Value Score			Number of Scores
		Number 1	Number 2	Number 3	
Tall	S1	30	20	25	75
	S2	25	20	20	65
Keep	S3	19	20	23	62
	S4	18	17	23	58
Rendai	S5	13	18	18	49
	S6	13	15	17	45
Capability Standards		30	35	35	

From the results in Table 2, it is more detailed on the Achievement of Problem Solving Ability (KPM) based on the polya steps of the results of understanding the problem, making planning, implementing planning, relearning, then the results can be observed through table 3.

Table 3. KPM Achievement Data Based on Polya Steps

Capability Categories	Subject	Step Polya								
		Number 1			Number 2			Number 3		
		1	2	3	1	2	3	1	2	3

Tall	S1	√	√	√	√	√	X	√	√	X
	S2	√	√	X	√	X	X	√	X	X
Keep	S3	√	X	X	√	X	X	√	X	X
	S4	√	X	X	√	X	X	√	X	X
Low	S5	√	X	X	√	X	X	√	X	X
	S6	√	X	X	√	X	X	√	X	X

According to Table 3 it can be observed that S1 can complete 3 steps in numbers 1 and 2, steps in numbers 2 and 3, while in S2 can complete two steps in number 1 and one step in numbers 2 and 3, while for S3, S4, S5, and S6 they are only able to complete one step in each number. To see students' achievement in each test question, namely from each question there is a particular achievement value.

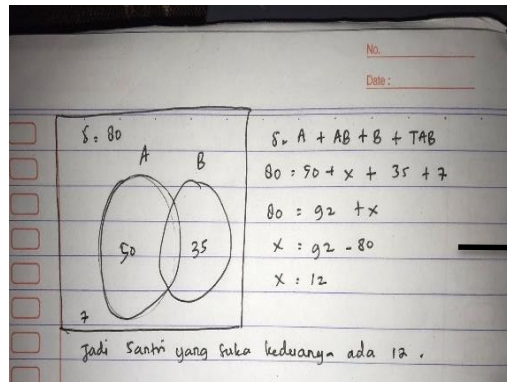
2. Interview Results

The interview was conducted after the students completed the KPM test questions. The results of the interview achievement in the Polya step can be reviewed in Table 4 as follows:

Table 4. KPM achievement data based on interview results in Polya step

Capability Categories	Subject	Step Polya									
		Number 1			Number 2			Number 3			
		1	2	3	1	2	3	1	2	3	
Tall	S1	√	√	√	√	√	√	√	√	√	√
	S2	√	√	√	√	√	√	√	√	√	√
Keep	S3	√	√	√	√	√	√	√	√	√	√
	S4	√	√	√	√	√	X	√	√	X	
Low	S5	√	X	X	√	X	X	√	X	X	
	S6	√	X	X	√	X	X	√	X	X	

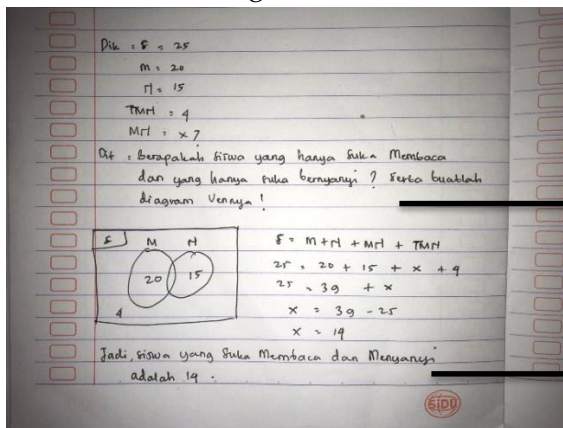
In Table 4 we can see, that students use high categories and can solve problems in number 1, but only S1, S2, and S3 can solve using polya steps, S4 can only solve problems in number 1. Meanwhile, students in the low category cannot resolve conflicts using the polya step. The following is a discussion of each step of Polya from the test results and interview results to students. Based on tables 3 and 4 only S1 can solve the problem, but in table 3 S1, S2 and S3 can understand the problem using the Polyya step in the interview data, students can mention the meaning in the question. As for students in the low category, only a few can solve problems both in table 3 and table 4. We can see this according to the test results and the results of interviews with students as follows;



Elements that are known and asked but do not explain

Figure 1. S6 Answer to KPM No. 1 test quest

Seen in the picture there are no known and questioned elements. Researcher is "Do you understand and understand the meaning of question number 1 is? Explain!"; S6 is "Looking for those who like both, that is, it is known that there are 80 in total, students who like Arabic 50, those who like English 35, and those who do not like both 7". Data collection using comparing written test results and interviews then S3, S4 and S5 in question number 3 the mistake made is not understanding what is asked in the question so that errors occur due to the final answer. However, students who have these mistakes when interviewed can understand the meaning of the problem. We can also see this in picture 2 and the interview results as follows: Problem is in a class there are 25 students, 20 students like to read, 15 students like to sing and 4 students do not like to read and sing. How to find children who enjoy both and what are the students who only like to read and who only like to sing? Moreover, make a ven diagram!



Elements to be asked

Final results

Figure 2. S2 Answer to KPM Test Question No. 3

Researcher is "Do you understand and understand what question number 2 means? Explain!"; S1 is "Yes, understand, question no. 2 was told to find those who like to sing and read, it is known that the number of students is 25, those who like to read 20, those who like to sing 15 and those who are not happy with both 4". We can see in tables 3 and 4, that only S1 can solve and understand what is meant in the problem. However, S2, S3 and S4 can only explain what is meant in the problem. We can see again in Table 3 and Table 4 the achievement of students in completing the Polya step, that in the first stage of Polya it got a percentage of 66.67%, while the interview results at this stage got a percentage of 77.7%. We can see based

on the results of the presentation that the result of the interview is greater than the test results, the conclusion is that students are capable in the first stage of the origin of Polya theory, where students can elaborate answers but at the time of writing students are not able, this is also because students do not get treatment from the teacher in terms of writing completion. Students can be said to be able to understand the problem if the student understands what is known and what is asked in the question in the form of formulas, symbols, or simple terms.

D. CONCLUSIONS AND SUGGESTIONS

From the results of data research at the level of problem-solving ability according to the achievement of the polya step, students with high and medium categories can solve problems in the story set problem. Then students with low ability find that students have not been able to solve problems in the set of story problems. After analyzing based on the test results and the interview is an interview result more significant than the test results. So we can conclude that the ability to solve mathematical problems of class VII students of PGRI Padarincang Junior High School is classified as low. The factor causing students' low problem-solving ability in solving story problems in the set material is the lack of understanding of how to solve story problems in the set material. Students lack concentration on solving problems.

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