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THE EFFECTIVENESS OF USING PROBLEM BASED LEARNING MODEL TO IMPROVE STUDENTS PROBLEM SOLVING ABILITY AND LEARNING MOTIVATION

Mohammad Nafis Abdul Rouf[1*)] Timing Merawati[2)], Abdul Azis Masyhuri[3)], Nurul Hidayati[4)]

[1234]Universitas Negeri Surabaya, Indonesia

* email : 24040885002@mhs.unesa.ac.id (Corresponding Author)

Abstract

Problem solving ability and motivation of students in SMA Negeri 3 lamongan are still low so they need to be improved. Improving the problem solving ability and motivation of students can be done by applying the Problem Based Learning (PBL). The purpose of this research is to describe the improvement of problem solving ability and motivation of students to learn history after using the Problem Based Learning (PBL). The method used is the Embedded mixed method. The population of this study was all students of SMA Negeri 3 Lamongan grade X IPS in the Academic Year 202-2024 that consist of 12 classes with a randomized sample of 31 students. The research conducted produced some data; those are quantitative data (test results of problem solving abilitiy) and qualitative data (students' motivation questionnaires observation results). The results of the analysis show: (1) improvement in students' problem solving ability with Problem Based Learning (PBL) is better than students with conventional learning, (2) Students motivation in learning mathematics with Problem Based Learning (PBL) is better than students with conventional learning, (3) There is a very strong correlation between students' motivation to learn history and their problem solving ability.

Keywords: *Problem Based Learning, Learning Motivaton*

INTRODUCTION

One of the factors that influence the history learning system in the 2013 curriculum is the value system (Kemendikbud, 2014). Indicators that show the quality of education in Indonesia tends to be still low are the results of international assessments of students achievement, one of which is the results of TIMMS and PISA. For example, the low problem solving ability of Indonesian students can be seen from the results of the TIMSS (Trends in International Mathematics and Science Study) survey in 2011 placing Indonesia in 38th place out of 44 countries with a score of 386, below the standard score set at 500. This shows a decrease in the previous score in 2007 which was 394. PISA (Program for International Student Assessment) in 2012 ranked Indonesia 64th out of 65 countries that took part. In the survey, one of the cognitive indicators is problem solving.

According to Depdiknas (in Simamora, Sidabutar, & Surya, 2017), one of the learning objectives at school is to train thinking and reasoning pattems in drawing conclusions, develop the ability to solve problems, and develop the ability to provide information or communicate ideas either through oral written, pictures, graphs. maps, diagrams. etc.

Problem-based learning helps to show and clarify ways of thinking and the

richness of the cognitive structures and processes involved. PBL optimizes goals, needs, motivation, which directs a learning process that designs a wide range of problem-solving cognition. PBL innovations combine the use and access of e-learning, creative interdisciplinarity, mastery and individual skill development (Rusman, 2010).

Problem solving is an important component of learning. of learning. Problem solving is seen as a process to find a combination of a number of rules that can be applied in applied in an effort to overcome new situations (Wena, 2012). Learning motivation is one of the basic abilities that is very important for students and teachers to have in teaching and learning activities, especially in history. The learning process in the classroom can achieve its goals if students have good learning motivation. Students who have high learning motivation can be seen from the attitude of enthusiasm, tenacity, and concentration in participating in learning. Meanwhile, students who have low learning motivatn will be seen in an attitude that is easily bored, lethargic and lack of tenacity in facing difficulties. Thus, learning motivation needs to be applied and improved in students so that it can improve learning outcomes optimally. The importance of student learning motivation is also expressed by (Suprijono, 2009) that learning motivation is a driver of a person's actions that give the spirit of learning. direction, and persistence of behavior. According to (Uno, 2008), learning motivation is an encouragement contained in a person to try to make changes in behavior that are better in meeting their needs.

In the 2017 National Exam, many students complained about the form of questions that came out in the exam. These questions emphasize higher-level thinking processes, one of which is problem solving. Based on the experience of teachers at SMA Negeri 3 Lamongan where students often have difficulty in solving problems related to problem solving which can be seen from the average results of daily assessments such as Table 1 below.

Table 1. Average Daily Ratings

Year of Study	Average	KKM	Presentation of Success Achieved KKM
2021 – 2022	60	75	55%
2022 – 2023	62	75	65%
2023 - 2024	61	75	60%

Source: Database of SMAN 3 Lamongan, 2024

In addition to the data provided above regarding the results of the National Examination which are quite low. Based on the results of interviews with students and teacher observations during learning activities, student learning motivation towards history subjects is also considered to be quite low. Students are less enthusiastic in learning activities in the classroom.

Students tend to be passive in the implementation of learning activities. Therefore, this research was conducted
As an effort to improve students' problem solving skills and interest in learning. Apart from that, in SMA Negeri 3 Lamongan research on history learning is still lacking in terms of quantity, which in tum makes it possible to improve the quality of history learning.
Good and Broophy (in Wena, 2012) define motivation as an energy that drives. directs.

and strengthens behavior. High and low student will affect motivation outcomes. Problem solving ability can history learning is still lacking in terms of quantity, which in tum makes it possible to improve the quality of history learning.

Good and Broophy (in Wena, 2012) define motivation as an energy that drives, directs, and strengthens behavior. High and low student motivation will affect learning outcomes. Problem solving ability can be seen as one of the learning processes and outcomes, so motivation will also affect students' problem solving ability. Therefore, it is necessary to have a driving factor from within the student and from outside to encourage motivation. One of the drivers from within students includes learning resilience. According to (Firmansyah & Mubarika, 2019) learning resilience is interrelated with learning motivation in students.

Some research in line with this (Suprihatin, 2015) states that the learning process will be successful when students have motivation in learning. Motivation can be interpreted as a person's strength that can lead to a level of willingness to carry out an activity. Willingness both originating from within the individual itself (intrinsic motivation) and from outside the individual (extrinsic motivation).

How strong the strong the motivation an individual has will determine the quality of the behavior he displays, both in the context of learning, working and in other lives.

Wena (2014), revealed that ideally a learning activity is not only focused on efforts to gain as much knowledge as possible, but also how to use the knowledge gained to deal with a new situation and solve problems. Therefore, the selection of a learning model that is in accordance with the material is very important, so the teacher must choose a model that is able to motivate his students and can also improve students' mathematical problem solving skills.

The low ability of students to solve problems and low motivation to leam can also be caused by the learning model that has been applied in schools. The learning model that is usually applied is a conventional learning model where the teacher is the center of learning resources for every leamin activity. In addition, the way teachers teach that has been done so far does not familiarize students in solving problems. Teachers more often give questions that are abstract not a problem solving in real life. These monotonous learning activities cause students to be less motivated to leam so that their learning outcomes are low.

One altemative learning model that can be used is Problem Based Learning (PBL) or problem-based learning (PBM). According to Tan in Rusman, (2013) in PBL students' thinking skills are truly optimized through a systematic group or team work process, so that students can empower, hone, test and develop their thinking skills continuously. In PBL learning begins with the provision of "problems" usually problems have a real-world context (Amir, 2010). Intani et al, (2016) in their research stated that problem solving and learning motivation of students who get PBL learning are better than students who get conventional learning. For this reason, the problem-based learning model is very appropriate if applied to improve problem solving skills, as well as to increase student learning motivation. In line with that, (Iswanto, 2016) in his research also stated that PBL learning can improve problem solving skills and can be used as an altemative in the implementation of history learning activities.

Olpado & Heryani, (2017) also stated that there is a correlation / relationship between learning motivation and students' problem solving skills using PBL learning. In addition to these two studies, Anggraini et al., (2013) from the results of their research stated that there was an interaction between the PBL learning model and learning motivation, both motivation driven from within students and from outside. In line with this. Sutrisno and (Siswanto, 2016) from the results of their research state that there is a significant influence between student learning motivation driven from within students and from outside on

student learning outcomes. Meanwhile, the purpose of this study is to describe the improvement of problem solving skills and student learning motivation after using the Problem Based Learning (PBL) learning model.

METHOD

The research method used in this study is the Embedded Mixed Method, which is a research method that combines the use of quantitative research methods and qualitative research methods together (Sugiyono, 2013). This research uses learning with the Problem Based Learning learning model and the ability measured is problem solving ability and its relationship with student learning motivation.
The research design used in this study is pretest-postest control group design or with group design, then choosing two homogeneous classes in terms of their academic ability. The first class did Problem Based Learning (experimental class) and the class with conventional learning (control class) this design can
can be described as follows: (Ruseffendi, 2005)

O	X	O
O		O

Description
X: *Problem Based Learning*
O: Pretes and Postest of problem solving skills

This research was conducted at SMA Negeri 3 Lamongan with a population of all SMA Negeri 3 Lamongan class X students in the 2024/2025 school year consisting of 12 classes with a total of 456 students, The sample in this study was detemned randomly, namely random research. This was done because the students of SMA Negeri 3 Lamongan were considered a homogeneous population. The experimental class and control class were chosen based on the consideration of the history teacher at the school. The samples selected in this study were class X-1 as the experimental class and class X-2 as the control class.
The research conducted produced several data, namely in the form of quantitative data in the form of test results of problem solving ability and qualitative data in the form of questionnaire results of achievement motivation to leam student history and observation results. The problem solving ability test was analyzed using the N-gain formula and then statistically tested with the mean difference test, for the motivation questionnaire only the average of each class was seen, and to find the relationship between learning motivation and problem solving achievement. a correlation test was conducted.

RESULT AND DISCUSSION

The research resulted in five data, including quantitative data in the form of problem solving ability test results and qualitative data in the form of student achievement motivation questionnaire results for both PBL learning and conventional learning as well as observation results for PBL learning.

Normality test of pretest data of problem solving ability using Shapiro-Wilk test on SPSS for both classes, both experimental and control classes. The significance values of the experimental class and the control class were 0.577 and 0.643, respectively. Both significance values are greater than 0.05 so that H 0 is accepted, meaning that the pretest data of the experimental and control classes are normally distributed.

The next step is to test the homogeneity of variance, to test the homogeneity of variance the Levene test is used.

Because the significance value obtained is 0.86 0.05 then HO is accepted, so the two classes are homogeneous.

Analysis of post-test data on problem solving skills after the research. Similar to the previous pretest data analysis, the normality test used the Shapiro-Wilk test on SPSS for both classes, both experimental and control classes. The significance values of the experimental and control classes were 0.969 and 0.790, respectively. The significance value of both is greater than 0.05 so that H 0 is accepted, meaning that the post-test data in the experimental and control classes are normally distributed.

The next step is to test the homogeneity of variance, to test the homogeneity of variance the Levene test is used. Because the significance value obtained is 0.095>0.05 then H O is accepted, so the two classes are homogeneous.

Test of Difference (N-gain) Data on Problem Solving Ability of PBL and Conventional Learning

Based on the results of the prerequisite test of data analysis of the two groups, it is known that the PBL class and the conventional class have samples that are normally distributed and the two groups have the same variance, which that the two groups homogeneous. so the requirement to test the difference between the two averages (N-gain) of problem solving ability of the two groups can be done. Based on the predetermined criteria if the significance 0.001 <0.05, then HO is rejected, which means that the average problem solving ability of students in PBL class is higher than the average problem solving ability of students in conventional class. That means. the increase in students' problem solving ability with Problem Based Learning (PBL) is better than students with conventional learning.

Correlation Test of Problem Solving Ability and Student Motivation

To determine whether or not there is a correlation between Problem Solving ability and student Learning Motivation, it is calculated using Spearman's Rho with a significance level of 0.05. Descriptive statistics from the calculation of the mean, standard deviation, maximum value, minimum value and kurtosis of problem solving ability can be seen in Table 2 The hypothesis is formulated in the form of a statistical hypothesis as follows:
H0 : $\rho = 0$
Ha: $\rho = 0$

Pearson's Product Moment correlation test in the experimental
Pearson's Product Moment correlation test in the experimental class was calculated with the help of IBM SPSS Statistics 20.0 software. Decision making is done by comparing the probability value (Sig value) with the value ofa (0.05).
The test criteria (Uyanto, 2009) are as follows:
HO is accepted if the significance value (Sig) > 0.05
HO is rejected if the significance value (Sig) <0,05
HO: there is no correlation between problem-solving ability and student learning motivation
Ha: There is a correlation between problem-solving skills and students' learning motation.

The results of data analysis on PBL learning data show that sig = 0.84,

meaning that there is a correlation between problem solving ability and learning motivation of students who get PBL learning. Meanwhile, the results of data analysis on Conventional learning data show that sig = 0.045, meaning that there is no correlation between problem solving ability and learning motivation of students who get conventional learning.

The results of the two analyses are different because these two lessons have different characteristics. PBL learning provides new knowledge to students through problems so that students are challenged to leam it. Therefore, student groups with high learning motivation will get high learning outcomes if given PBL treatment. Meanwhile, in the conventional learning process, the teacher plays a full role in the learning process. The teacher lectures the material, gives examples of problems as well as the steps to solve the problem. Furthermore, the teacher provides a variety of exercises where students answer based on directions from the teacher. In the conventional learning process, teachers are more as well as the steps to solve the problem. Furthermore, the teacher provides a variety of exercises where students answer based on directions from the teacher. In the conventional learning process, teachers are more active than students, so students who have low learning motivation. This is in line with research conducted by Subaru Utama Olpado and Heryani and Olpado (2017) that there is a relationship between problem solving ability and student learning motivation.

Analysis of Observation Sheet Results

Teacher Activity Observation Sheet on Problem Based Learning model and Conventional learning model

Observers on the observation sheet of teacher activities that obtained PBL learning were history teachers who observed at each meeting. The observation results will be percented (%) at each meeting. The following is a summary of teacher activity during the learning process for 6 meetings in experimental and conventional classes. At the first meeting, namely at the beginning of the study, it was the lowest activity with a percentage of 76%, this was because the researcher was applying the model for the first time and students were not familiar with the learning model provided. At the beginning of learning, the teacher provides an overview and learning objectives that will be delivered at the meeting with the PBL learning model. After students understand then the teacher conducts learning using PBL. In the second meeting, teacher activity increased, this was marked by an increase in percentage to 80%, but was still constrained by adjustments. Because students are not used to using learning models. At the time of teaching, the teacher carried out every step in the procedure of the steps of the PBL learning model.

In the third meeting, teacher activity increased, this was marked by an increase in percentage to 84%, the teacher was able to adapt to students. In the learning process, the role of the teacher greatly decreased, meaning that learning with the PBL model was increasingly understood by students because they were used to it even though it was not yet complete. The students look more comfortable when learning takes place.

In the fourth meeting, teacher activity increased, this was marked by an increase in percentage to 88% and 92% of students were used to using the learning model. At the time of learning the teacher carried out every step in the procedure of the steps of the PBL learning model, when they encountered difficulties they did not always ask the teacher, they began to deduce, the teacher only supervised the learning.

In the sixth meeting, teacher activity increased, this was marked by an increase in percentage to 96%, this is because the PBL learning model has been accustomed to being accepted by students. During learning, students actively expressed their opinions, discussed, and worked on the problems given. The teacher only provokes students' attention to the results of the PBL learning model class presentation. The following table shows the results of the calculation of teacher activity, which in this case is the researcher himself, implementing it almost went well. This is indicated by the average percentage of teacher activity implementation reaching 86% in the good category.

Table 2 Calculation Result of Teacher Observation Sheet of Problem Based Learning (PBL) Model

Meeting	**1**	**2**	**3**	**4**	**5**	**6**	**Average**
Total Observation Score	38	40	42	44	46	48	43
Presentation of Observation Results	76	80	84	88	92	96	86
Category	Good	Good	Good	Good	Good	Good	Good

Source: observation result, 2024

It can be seen in table 2, that the observation of teacher activities from each meeting has increased towards teacher activities in learning. Based on the average recap of the teacher observation sheet, it is categorized as good. This means that the control class is less able to be independent when the learning process takes place, they always have to be guided by the teacher if there is something they cannot understand and when there are questions that they consider difficult they immediately ask the teacher, not classmates. This causes activities in conventional classes to still not run optimally.

The teacher activity observation sheet was used to observe teacher activity during the learning process. The results of observations of teacher activities with conventional learning models during the learning process were analyzed in the form of Table 3.

Table 3. Calculation Results of Teacher Observation Sheet Conventional Learning Model

Meeting	**1**	**2**	**3**	**4**	**5**	**6**	**Average**
Total Observation Score	34	36	38	40	42	44	39
Presentation of Observartion Results	68	72	76	80	84	88	78
Category	Enough	Enough	Good	Good	Good	Good	Good

Source: observation result, 2024

Analysis of Interview Results

The support the quantitative data that has been analyzed in this study, qualitative data from interviews is very influential in supporting quantitative results data.

Table 4. Student interview of Problem Based Learning

No.	Question	Answer		
		S1	**S2**	**S3**
1	What do you think about learning history?	I think learning history quite fun and easy to understand	I think it's fun and easy - it's easy.	Good learning is understandable and easy to learn
2	What do you think of the teacher who teaches history in your usual class?	The teacher is good, not boring how to teach is also good	Doesn't make me boring	The teacher is kind, polite, the way he teaches can be understood
3	What kind of learning do you think is easy to understand?	Learning that invites students who are active in learning	Learning to ask each other questions	Learning in a unique way and ati mainstream but easy to understand
4	What do you think about conventional learning model?	In my opinion, it is not enough, because it does not	It's good mom	I enjoy conventional learning but I need to have a friend for it understand it
5	Do you enjoy working on difficult problems by yourself?	I prefer to learn together when I meet difficult problems.	Of course happy	Not really, although I am often alone but I have close friends
6	Do you enjoy learning problems that are not routine?	Not bad mom	A lot of longing	It’s good that I have friends to work with
7	Do you enjoy problem-solving story problems and increase your motivation to learn?	Happy	I prefer to be to the point	Yes, because it develops the brain’s ability to think
8	Do you agree if the learning model implemented using PBL?	Happy	Agree	Not bad but I want to interact with friends
9	Do you enjoy using PBL problems?	Happy	Happy	Not bad because it’s more focused but you still need friends to ask questions.
10	Would you prefer it if PBL improved?	Happy	Increased	Could be, but better with friends

Source:interview results, 2024.

From Table 4 of the results of this interview, the researcher can conclude that some students like group and ordinary learning, so that these students will not have difficulty understanding in learning with conventional learning

models. By discussing students better understand the material provided as a result can improve problem solving skills and learning motivation and this learning model makes students more independent. This is directly proportional to the results of quantitative data analysis of inferential statistics. These results strengthen the findings of Prasetya et al., (2023) and Hidayati et al (2019) which stated that the PBL learning model is able to improve learning outcomes and creative thinking abilities

CONCLUSION

Based on the results of data processing and findings obtained in this study, several conclusions are as follows:

1. The improvement of students' problem solving ability with Problem Based Learning (PBL) is better than students with conventional learning.
2. History learning motivation of students with Problem Based Learning is better than students with conventional learning.
3. There is a very strong relationship between achievement motivation to leam history and the achievement of students' problem-solving skills.

Based on the results of the study, PBL learning can be an alterative model that can improve students' problem solving skills and learning motivation. That is because, PBL Learning prioritizes how students solve problems by using their knowledge. Apart from that, PBL Learning can develop experience on their knowledge and students' awareness of various problems in everyday life that are experienced and can increase students' interest in history.

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