



## PROBLEM BASED LEARNING MODEL ON THE ABILITY OF STUDENT MATHEMATICAL CONNECTIONS

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### ABSTRACT

Mathematics is one of the subjects that are interrelated, both in mathematics and outside mathematics. So the ability is important mathematical connections controlled by the learner. Learning model that can improve students' mathematical connection that is the model of Problem Based Learning (PBL). Based on this background, the purpose of this study is to determine the activity of students in learning by using the PBL model, knowing the increase in students' mathematical connection capabilities on each indicator and overall, knowing the increase in students' mathematical connection capability significantly, knowing the individual and classical completeness of the ability of students' mathematical connections, determine a student's response to the application of PBL models. The method used in this study is the experimental method the population of all class X SMAN 1 Astanajapura academic year 2014/2015. The sampling technique used technique purposive sampling The results showed that (1) An increase in the activity of students using the PBL model (2) An increase in the ability to connect mathematical students on each indicator and overall (3) An increase in the ability to connect significantly with the value  $t_{counted} > t_{table}$  or  $t_{22,65} > t_{1,68}$  (4) the achievement of individual mastery with  $Z_{table} = 1.96$  and  $Z_{count} = 1,095$ , and classical completeness with  $t_{table} = 1.68$  and  $t_{counted} = 6,048$  (5) the existence of a positive response to learning PBL models. Based on the results obtained are expected research further research can use the PBL model transform and determine the increase math skills.

Keywords: Problem Based Learning, Student Mathematical Connections

### INTRODUCTION

Mathematics is one of the subjects that are interrelated, both in mathematics and outside mathematics. So that the learning activities are mathematical connection capabilities that must be mastered by the learner. Connection capability is defined as the relationship between the topics covered by other topics. The linkage here can inter topic in mathematics, mathematics linkages with other subjects, or connection with everyday life (Anggriani & Septian, 2019).

Without the connection, learners will be too much menghafal mathematical concepts related to each other only when the learner needs to be done is to identify the relevant general principles of knowledge. Indirectly learners will become aware of the usefulness and benefits of mathematics, when mathematical ideas every day connected to his experience, both inside and outside the school. This is in accordance with (Afgani, 2011)

which explained that, the ability to connect mathematics is one's ability to broaden the knowledge of students, with regard mathematics as a unified whole rather than as the subject matter is a stand-alone, so students will be aware of the usefulness and benefits of mathematics outside or within a school.

Based on interviews with teachers of mathematics in SMAN Astanajapura Cirebon, stated that the ability of students' mathematical connection remains a bottleneck and has not yet reached KKM applied. One of the causes of the obstacles that students' mathematical connection capability, learning model that is used sometimes does not correspond to the circumstances of learners. This is also supported by the observation of the test the ability of connection capabilities which can be seen from the test results prove that the matter of students mathematical connection capability is still low.

In an effort to link concepts in mathematics as well as to other topics, and apply mathematical concepts underlying the answer, one alternative that is chosen is the model of problem based learning (PBL), an outline of the PBL model is a model of learning that emphasizes the provision of the problem so as to train the participants learners to think critically, analyze and solve complex problems (Septian, 2017). The given problem is usually a problem related to everyday life. With the familiarity of learners in solving these problems, the expected ability of mathematical connections in mathematics will continue trained. So themodels problem based learning according to students' mathematical connection capability.

## RESEARCH METHODOLOGY

The research in this study is an experimental method to the study design is one group pretest-posttest design (Arikunto, 2010). According to (Triantno, 2011), the experimental method can be defined as a systematic method to build relationships that contain the phenomenon of cause and effect. The population in this study were all students of class X SMA Negeri 1 Astanajapura. The sampling technique was conducted with a purposive sample. The samples taken in this study is one class that X.6 class. design used in this study are as follows:

E:     O<sub>1</sub>     X     O<sub>2</sub>

Description:

E = Classtudied

X = The treatments in the experimental group that is learning by using the model of *problem-based learning*.

O<sub>1</sub> = the initial test or the value of the pretest (prior to treated learning)

O<sub>2</sub> = a final test or the value of post-test (after being treated learning)

Instrument penelitian used divided into two instruments of learning such as lesson plans and worksheets, as well as instrument data collectors such as test item the ability of students' mathematical connection that has been tested to determine validity, reliability, difficulty index, and distinguishing features. Then the student activity observation sheet to determine the activity of students to PBL and student response models to determine the students' response to the PBL model.

Data obtained from the implementation of penelitian then analyzed. For data processing is done in this study were (1) to analyze the activity of students in the learning process by using the PBL model; (2) examined the increase in the ability to connect to each indicator and overall the test gain; (3) test the connection capabilities significantly increase with significant test (4) to test students' mastery test results and test the proportion of the average; (5) to test the students' responses by using a questionnaire.

## RESULT AND DISCUSSION

Based on the analysis of the research that has outlined the following will explain some of the issues related to *Problem Based Learning* the ability of high school students' mathematical connections. Learning by using PBL models have a positive impact on student activity. This is evidenced by the average value of students who continue meningkatkan activity. For more details, here presented diagram the average value of student activity.

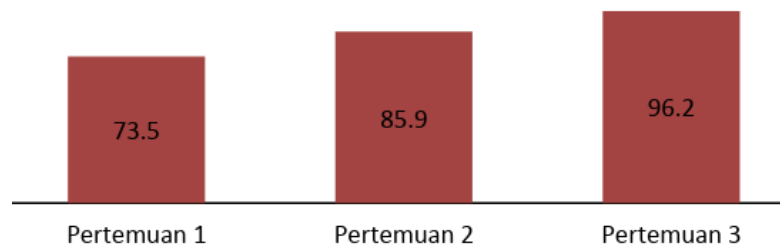


Figure 1. The Average Value of Student Activity

Based on Figure 1, shows that at the first meeting of the average activity of students obtain a value of 73.5 with sufficient criteria, while for the second meeting of obtaining a

value of 85.9 with good criteria, and for the last meeting obtain a value of 96.2 with the criteria very good.

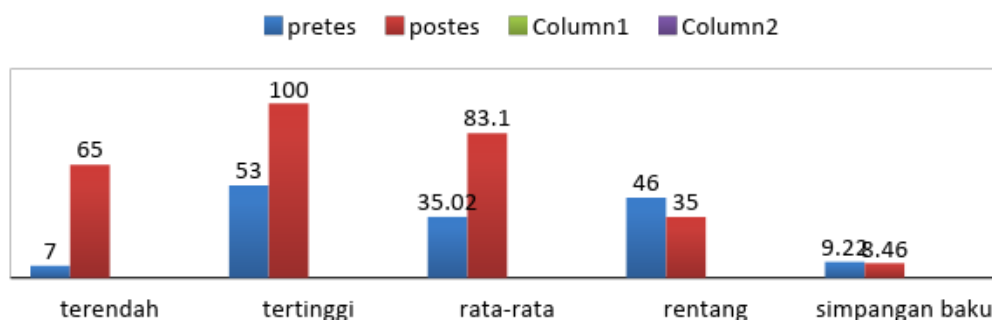


Figure 2. Average Increase of Between Pretest and Posttest

From the Figure 2 it can be seen that there is an average increase of between pretest and posttest. Once all the data is obtained then do the processing and analysis of data to determine the application of the PBL to increased connection capabilities.

Based on the results of the analysis carried out by using test gain on each indicator and overall, it appears that there is an increase in the ability of students' mathematical connections on each indicator and overall. It can be seen from the gain on the acquisition of the index indicator relationships between objects write mathematical concepts that derive the index gain of 0.69 with a moderate interpretation, to apply the indicators underlying mathematical concepts answers obtain the gain index of 0.81 to a high of interpretation, and for indicators write down the problems of everyday life in the form of a mathematical model obtained an index gain of 0.74 with high criteria. The mathematical connection capabilities seacara peningktan obtain indeks overall gain of 0.74 with high criteria. Thus PBL learning model can improve students' ability to connect to each indicator and overall.

The completeness of student learning outcomes after implementing the learning by using PBL models showed good results. This is consistent with the results of data analysis that explains that there are 33 students who achieve the KKM, so 33 students can be said to be completed individually. And for classical completeness amounted to 82.5% of the total number of students. So the classical completeness can be met from a predetermined is  $\geq 75\%$ .

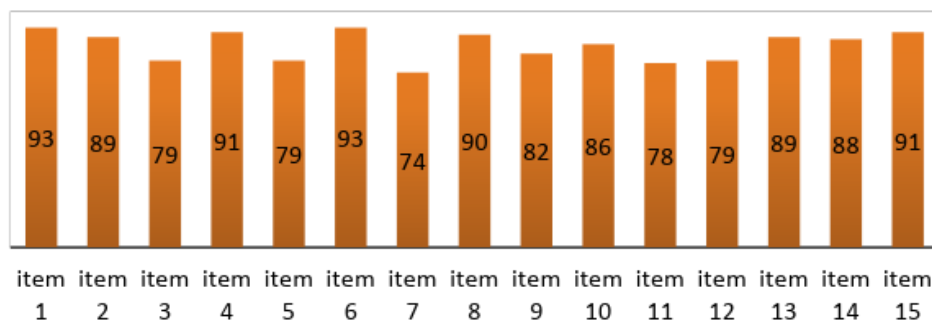


Figure 3. Students Response of The PBL Model

Based on the Figure 3, shows that students responded very well to the PBL model. It is evident from each of the answers given by the students in a positive statement that the statement number 3, 5, 7, 8, 10, 11, and 12 which shows the acquisition value with strong and very strong interpretation. Analyzes were also performed on the negative revelation that is the number 1, 2, 4, 6, 9, 13, 14, and 15 which shows the acquisition value with strong and very strong interpretation. Therefore, this proves that the students' response to learning PBL models give a positive response.

## CONCLUSION

Based on the result and discussion of the results of research conducted on X.6 grade students of SMA Negeri 1 Astanajapura, we can conclude several things related to learning mathematical model of Problem Based Learning.

Student activity during the learning with PBL excellent model, it is seen from the average value of the percentage increasing from the first meeting until the last meeting. Activities of students who stand out at the time of the PBL learning model that is, students are able to collaborate well during the discussions, so that students can share knowledge ilmu to build an idea or a concept in fraction a given problem.

There is an increased ability of students' mathematical connections on each indicator and overall. This is consistent with the results of data analysis using the gain test. For the first indicator analysis result is to write a mathematical concept relationships between objects with the criteria of being. The second indicator is to apply mathematical concepts that underlie answers with the high criteria. And for the third indicator is write problems of everyday life in the form of a mathematical model with the high criteria. The overall increase in the ability with the high criteria.

There is an increase in students' mathematical connection capabilities significantly, this is in accordance with the results of data analysis done before. Response X.6 grade

students of SMA Negeri 1 Astanajapura towards learning mathematics using PBL models on the subject of three very positive dimension means that students enjoy learning. It can be seen from the calculation student questionnaire is a positive repsonse.

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