
INFLUENCE OF PROBLEM BASED LEARNING MODELS (PBL) TO PROBLEM-SOLVING ABILITY MATHEMATICAL

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ARTICLE INFO	ABSTRACT
Received: 05-04-2022	The problem of this research is the low ability of understanding mathematical concept student grade VIII. The purpose of this research is to determine if there is influence of Problem Based Learning (PBL) model to ability of understanding mathematical concept student grade VIII. The type of the research is a quasi-experimental research, with pretest-posttest control group design. This population is student of grade VIII MTs Swasta Al-Muttaqiin i, while the sample is consists of two classes that the total is 20 to each other. The data in this research used t test. Average test conceptual understanding ability of mathematical before and after learning there is an increase. From the t test analysis, obtained result that tcount greater that ttable so that Ha received and H0 refused, it means there is a significance influence between Problem Based Learning (PBL) model and conceptual understanding ability of mathematical student. Learning by using model Problem Based Learning (PBL) is the one alternative in increasing conceptual understanding of mathematical student abilities. Therefore it can be concluded that there is an influence of the Problem Based Learning (PBL) model to the ability of understanding mathematical concepts for grade VIII students.
Accepted: 09-04-2022	
Published: 20-04-2022	
Keywords: Adobe animate, informatics, learning media.	

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INTRODUCTION

Education has a very important role in carrying out skills life human, education could influence the development of Source Power Human (HR) in the whole aspect of personality and life (Susanti, 2014). Education as a business run by someone or other groups of people to become mature or reach a level life or more life high. Education in essence is a condition absolute for development source power man in towards a more future good. Through education could form capable humans build herself himself and their people.

Mathematics is the knowledge that has characteristic features special, one of them is reasoning in mathematics that is deductive the relevant axiomatic with abstract ideas, concepts, and symbols as well as arranged by hierarchical, so that in education and teaching mathematics need handling by special (Hamsiah, Masjudin, & Kurniawan, 2017). Mathematics as one knowledge the basics taught in institutions formal education is one of the part most important in effort Upgrade quality education, good in aspect the application nor aspect his reasoning (Misrawati & Suryana, 2022).

According to TIMSS (Trends in International Mathematics and Science Study), the survey international about performance mathematics published by the ministry of education and culture shows that Indonesia's ranking is still low (Rezki, 2019). The results of the 2015 TIMSS study, Indonesia is ranked 36th out of 49 participating countries (Harahap, 2019). Conditions that are not far different seen from results study conducted by PISA (Program for International Student Assessment). PISA 2015 results show that rating Indonesian education is still walk in place that is ranked 69th out of 72 participating countries with the average score is 386, while international average score which is 500 (Harahap, 2019). The results of the TIMSS and PISA studies above show that ability think level tall Indonesian students , especially in field mathematics still belong to low.

According to NCTM (Agustina, 2016) is low mark mathematics student reviewed of five aspects ability math that is ability solving problem math, communication math, reasoning math, understanding concept and connection math.

Importance mathematics could seen from objective eye lesson mathematics in education elementary and intermediate based on 2006 curriculum , namely as following : (1) Understanding draft math , explain linkages interconcept and apply draft or algorithm, by flexible , accurate , efficient , and precise, in solving problem, (2) Using reasoning on patterns and traits, doing manipulation mathematics in make generalization, compiling evidence, or explain ideas and statements math , (3) Solving problems that include ability understand problem , design method math, solve method and interpret the solution obtained, (4) Communicating idea with symbols, tables, diagrams, or other media for clarify state or probem, and (5) Have attitude value utility mathematics in life , that is have a desire know , care, and interest in learn mathematics, as well attitude tenacious and trusting self in solving problem.

Ability solving problem mathematics is one objective in learning math at level school medium first (junior high school) (Amam, 2017). However , based on results survey of Indonesia Mathematics and Science Teacher Education Project Japan International Cooperation Agency (IMSTEP-JICA) in 2000, obtained that in learning Junior high school mathematics in Indonesia is still concentrate on procedural and mechanistic matters as solving problem frequent math be delivered more character information, as well as student trained complete many question without deep understanding (Situmorang, Coesamin, & Gunowibowo, 2013).

Solution problem is demonstrated competence student in solve problem and in To do procedure (algorithm) flexible, accurate, efficient, and precise. because of that, understanding draft made one from three aspect evaluation in learning math. Indicator showing solving problem among others: (1) Orientation students on the problem; (2) Organizing student for study; (3) Guiding individual/ group experience; (4) develop and present results works ; (5) Analyze and evaluate the solving process problem.

Based on results observations made in class VIII of Al- Muttaqiin Private MTs, it is known that that learning mathematics still use method one direction, where student only made as object no subject. Until moment this , use method one direction still often used in the learning process . On understanding concept, teachers are required for more creative in find learning models so that students more active.

Besides that held studies preliminary to student class VIII MTs Negeri Binjai . Of the 20 students awarded test diagnostic beginning obtained results 23.5% who have understanding draft good math. While 17% have sufficient ability and 59.5% of students own ability solving problem low math.

Remember importance understanding draft for student so a teacher is required for more innovation in learning as find varied learning models with the right method for solving problem student increase . One of the learning models the is a Problem Based Learning (PBL) learning model .

According to Duch (Shoimin, 2021) Problem Based Learning (PBL) or Learning based on Problem (PBM) is a teaching model characterized by existence problem real as context for the participants educate study think critical and skill solve problem as well as get knowledge . According to Ratumanan (Trianto, 2009) teaching based on problem is effective approach for thought process

teaching level high . Learning this help student for processing information already _ so in his mind and compose knowledge they alone about the social world and its surroundings . Learning this suitable for develop knowledge base nor complex . According to Arends (Trianto, 2009) teaching based on problem is something approach learning where student work authentic problem with meaning for compile knowledge they own , develop inquiry and skills think level high, develop independence and trust self.

Based on study previous by (Hidayat & Nurrohmah, 2016) state that ability understanding draft mathematical students whose learning using the PBL model with the help of Geogebra software more tall than students who use learning models conventional .

Research conducted by (Novitasari, 2016) obtained results that ability understanding draft mathematical students who get learning with Interactive Multimedia Charm Education more good than achievement end ability understanding draft mathematical students who get learning method conventional.

In research conducted by (Zevika, 2012), et al obtained conclusion understanding draft mathematics students who follow learning with learning model cooperative Think Pair Share type with use map thought more good than ability understanding draft mathematics students who use with learning straight away.

Based on description above problems that will revealed is “ Is there is the effect of the Problem Based Learning (PBL) learning model on ability understanding draft mathematical student VIII grade ?”.

METHODS

Study this done on students class VIII. Population in study this is whole student class VIII, sample taken as much two class that is class VIIIA as the learning class using the learning model conventional and class VIIIB as the learning class using the Problem Based Learning learning model . The sampling technique used is simple random sampling. Type research used in study this is quasi-experimental. Research design used is a pretest-posttest control group design (Isnawan, 2020). Treatments given namely the Problem Based Learning learning model in the classroom experiment whereas class control by conventional. Tests used in study this is test written shaped description. The data analysis technique used the t-test (t-test) for know difference ability understanding concepts that use the Problem Based Learning learning model with the learning model conventional in class experiment and class control (Campbell & Stanley, 2015) .

RESULTS AND DISCUSSION

Study using the Problem Based Learning model in the classroom experiments and learning models conventional in class control . Before done research , second class the given pretest , the goal for know ability beginning student without influenced learning with using the Problem Based Learning learning model .

A. Pretest Value Data Class Experiments and Class Control

Pretest is question given test to student before given treatment learning . Based on result data pretest given in class experiments and in class control, can seen in table 1 below :

Table 1
Pretest Value Data Student Class Experiments and Class Control

Experiment		Control	
Amount Student	20	Amount Student	20
Average	52.1	Average	53.1
Standard Deviation	7.21	Standard Deviation	5.45
variance	51.99	variance	29.67

From the table above seen results calculation pretest in class experiment obtained mark variance 51.99, deviation default 7.21. While in class control obtained mark variance 29.67 and deviation default which is 5.45. Giving Result pretest obtained grade point average experiment 52.1 and results gift mark pretest in class control obtained the average value is 53.1.

Visually data dissemination capabilities _ understanding draft mathematical student class experiments using Problem Based Learning (PBL) and classroom learning models control that uses a learning model conventional could seen in bar chart difference mean value , deviation standard , and variance pretest class experiment and class control as following :

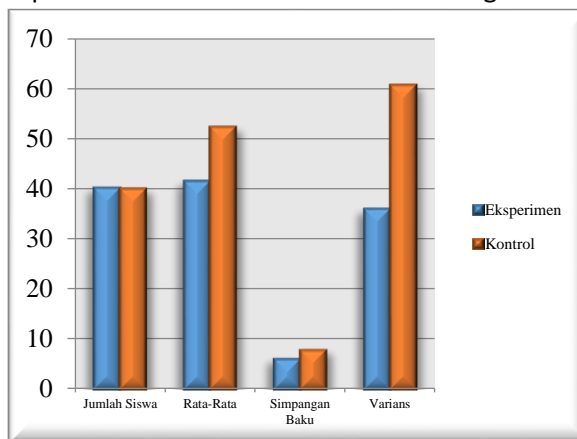


Figure 1

Differences in Mean Value, Standard Deviation , and Variance Pretest To Ability Understanding Draft Mathematical Students in Class Experiments and Class Control

Based on picture one result data pretest from second class is known that ability beginning understanding draft mathematical student from second class good class experiment nor class control are in the same category that is low . View from variance second class a little different , can is known that good class experiment nor class control own deployment ability understanding homogeneous concept . So, can concluded second class before given treatment are in the same condition .

B. Posttest Value Data Class Experiments and Class Control

Posttest is question given test to student after given treatment learning . Based on result data posttest given in class experiments and in class control, can seen in table 2 below :

Table 2. Posttest Value Data Student Class Experiments and Class Control

Experiment		Control	
Amount Student	20	Amount Student	20
Average	82.9	Average	78
Standard Deviation	3.08	Standard Deviation	2.67
variance	9.46	variance	7.16

From the table above seen results calculation posttest in class experiment obtained mark variance 9.46 and deviation default 3.08. While in class control obtained mark variance 7.16 and deviation default ie 2.67. Giving Result posttest obtained grade point average experiment 82.9 and results gift mark posttest in class control obtained the average value is 78.

Visually data dissemination capabilities solving problem mathematical student class experiments using Problem Based Learning (PBL) and classroom learning models control that uses

a learning model conventional could seen in bar chart difference mean value , deviation standard , and variance posttest class experiment and class control as following :

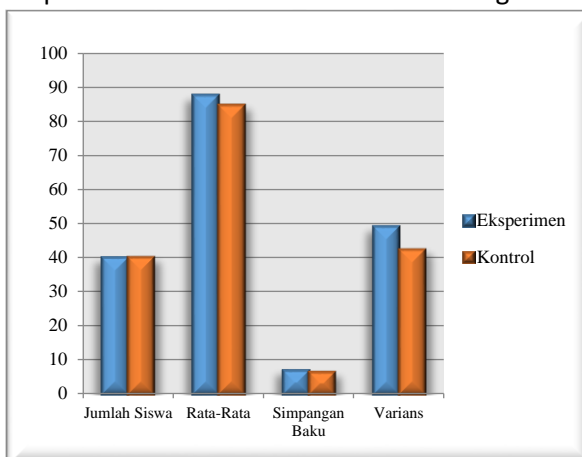


Figure 2. Differences in Mean Value, Standard Deviation , and Variance Posttest To Ability Understanding Draft Mathematical Students in Class Experiments and Class Control

Based on picture two could seen that there is difference enhancement results significant posttest Among class experiment and class control. This thing could seen from difference mean and variance posttest Among class experiment compared to class control. Where is class experiment given treatment in the form of learning with use Problem Based Learning (PBL) method shows more value tall compared class control that uses a learning model conventional.

C. Normality Test

Normality test used _ is the Chi Square test. Chi Square used for know does the data come from from population that is normally distributed or no , with provision that the data comes from population is normally distributed if fulfil criteria $\chi^2_{hitung} < \chi^2_{tabel}$ is measured at level significance and level trust certain . The proposed hypothesis and will tested in normality test this as following :

H0 : sample data originated from normally distributed population .

Ha : sample data originated from population that does not normally distributed .

Based on results normality test calculation could seen from table 3

Table 3 Recapitulation of Normality Test Calculation Results with Chi Square Test

Data	Pretest		Posttest	
Group	E	K	E	K
χ^2_{hitung}	0.0961	0.1038	0.1771	0.1500
χ^2_{tabel}	0.190	0.190	0.190	0.190
Conclusion	Accept H_0	Accept H_0	Accept H_0	Accept H_0
Note:	Normal	Normal	Normal	Normal

D. Homogeneity Test

Homogeneity test or similarity test two variance population done by Fisher's exact test. For criteria second data test sample is homogeneous iff $F_{count} < F_{table}$ on level 5% significance . Recapitulation results homogeneity test calculation could seen in table 4.

Table 4 Recapitulation of Homogeneity Test Calculation Results by Fisher's Test

Group Data	F_{hitung}	F_{tabel}	Conclusion
Experiment	1,725	2.165	Homogeneous
Control	1. 322	2.165	Homogeneous

E. Hypothesis Test

After the prerequisite test , then got that second class normally distributed and homogeneous . Test next done with t- test (t- test) with level significance =0.05, with level freedom $dk=n_1+n_2-2$. Obtained $t_{count} = 24.0379$ then the t compared with price t_{table} with $dk=n_1+n_2-2=20+20-2=38$, and level =0.05, then $t_{table} = 1,686$. So $t_{count} > t_{table}$ ($24.0379 > 1.686$) is obtained conclusion that H_0 is rejected and H_a accepted .

CONCLUSION

Based on results data processing and data analysis obtained conclusion that ability solving problem mathematical students whose learning using the Problem Based Learning (PBL) learning model more good than ability solving problem mathematical students whose learning using the learning model conventional .

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