

REACH MATHEMATICAL CONNECTION ABILITY BY PROBLEM POSING APPROACH

Nurlissolihah¹, Indri Lastriyani², Rosalina Rolina³

^{1,3} IKIP Siliwangi, Cimahi

² STKIP PGRI, Sukabumi

¹nurlis.guruhebat@gmail.com, ²Indie1506@gmail.com, ³maezarou@gmail.com

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Abstract

This study aims to examine the mathematical connection ability of students between the learning using *problem posing* and the scientific approach. The method used in this study is an experimental method with a pretest-posttest control group design involving two groups and random sampling is taken at the beginning, at the beginning and end of learning the two classes are given a test. The population in this study were junior high school students in Bandung, while the sample consisted of two classes chosen randomly. One class is given learning *problem posing* and the other class is given a scientific approach. The instrument used is a set of 5 test questions describing mathematical connection ability, then the score data is analyzed with descriptive and inferential statistics using *SPSS Statistics 21*. Based on the results of the study, it was concluded that the achievement abilities of students' mathematical connection between learning using *problem posing* was better than students who used a scientific approach.

Keywords: mathematical connection, *problem posing*, scientific

Abstrak

Penelitian ini bertujuan untuk menelaah kemampuan koneksi matematik siswa antara yang pembelajarannya menggunakan *problem posing* dan pendekatan saintifik. Metode yang digunakan dalam penelitian ini adalah metode eksperimen dengan disain kelompok kontrol pretes-postes yang melibatkan dua kelompok dan pengambilan sampel dilakukan secara acak kelas, pada awal dan akhir pembelajaran kedua kelas diberi tes. Populasi dalam penelitian ini adalah siswa SMP di Bandung, sedangkan sampelnya terdiri dari dua kelas yang dipilih secara acak. Satu kelas diberikan pembelajaran dengan *problem posing* dan kelas lain diberi pendekatan saintifik. Instrumen yang digunakan adalah satu set bentuk tes uraian kemampuan koneksi matematik sebanyak 5 soal, kemudian data skor dianalisis dengan statistik deskriptif dan inferensial menggunakan bantuan *SPSS Statistics 21*. Berdasarkan hasil penelitian, disimpulkan bahwa pencapaian kemampuan koneksi matematik siswa antara yang pembelajarannya menggunakan *problem posing* lebih baik dari siswa yang menggunakan pendekatan saintifik.

Kata Kunci: koneksi matematik, *problem posing*, saintifik

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INTRODUCTION

Mathematics learning requires active interaction between educators and students, with the aim that students can receive knowledge, master knowledge, have skills and skills. One of the goals of mathematics education according to Minister of National Education Regulation No. 22 of 2006 is to explain the relationship between concepts and apply concepts or algorithms, flexibly, accurately, efficiently, and precisely, in solving problems and having an attitude of

respecting the usefulness of mathematics in life, namely having curiosity, attention, and interest in learning mathematics, and tenacity and confidence in problem solving. Students are expected to be able to associate mathematics with other sciences as well as in everyday life, so that mathematics learning will be more meaningful. Therefore, according to Merdian, A., Sari, V. T. A. dan Sugandi, A. I. (2018) the importance of the role of mathematics subjects, students should be able to follow the process of learning mathematics well so that it is easy to accept mathematics learning.

The ability of mathematical connections is the ability of students to find and use interrelationships between topics to solve problems in mathematics, other subjects or in everyday life. NCTM (2000) argues that mathematical connections are one of the five standards of basic mathematical abilities that students must have from elementary to secondary level. This mathematical connection aims to help the formation of students by seeing mathematics as an integrated part of the real world and recognizing the relevance and benefits of mathematics both inside and outside of school. dividing connections into two general types, namely: *modeling connection* and *mathematical connection*. *Modeling connection* is a relationship between problem situations that arise in the real world or in other disciplines with mathematical representations, while *mathematical connection* is the relationship between two equivalent representations and between the completion processes of each representation. Hendriana, H., Ujang, R.S., Sumarmo (2014) revealed that mathematical connections help students in creating mathematical models that illustrate the relationships of concepts, data, and situations. Wahyudin (2012) presents three indicators developed in mathematical connections, namely:

1. Recognizing and using relationships between mathematical ideas;
2. Understand how mathematical ideas are interconnected and base on one another to produce coherent wholeness;
3. Recognize and apply mathematics in contexts outside mathematics;

Furthermore, Sumarmo (2012) describes several indicators of mathematical connection capabilities including: (1) understanding the relationship between various representations of mathematical concepts and procedures; (2) looking for relationships between various representations of concepts, processes, or mathematical procedures; (3) Understanding between mathematical topics; (4) applying mathematics in other fields or in everyday life; (5) looking for the relationship of one other procedure in an equivalent representation; (6) applying relationships between mathematical topics and between mathematics topics and topics outside mathematics.

Problem posing or problem submission is a form of approach in mathematics learning that emphasizes the formulation of problems or problems. This approach is an alternative learning that can develop mathematical abilities. The *problem posing* approach is a learning approach by means of the teacher presenting a series of questions that are problematic submission, question submission, question formation, construction of questions and questions generated by students. Silver, E.A., Cai (1996) argue that the term problem posing is used to refer to two senses, namely: 1) developing new problems and 2) reformulating the problems given.

Based on the understanding stated above, it is concluded that what is meant by problem posing is the submission of a problem or formulating a question about a given situation or task, either before, during or after solving the problem. The term "formulating a problem can also be interpreted as" formulating a question ". The term I use is more in reference to the term used in Curriculum and Evaluation Standards for School Mathematics which states "Investigation and formulating questions from problem situations" NCTM (2000).

METHOD

This research method is an experimental study with *pretest-posttest control group design*, namely the design of pretest-posttest control groups involving two groups and randomly taking samples. The research design is described as follows Ruseffendi (2005):

O X O

O O

Description:

O : Problem pretest = posttest question (mathematical connection ability problem)

X : Learning with approach *problem posing*

---- : Random sampling of the class

The population in this study were junior high school students in Cimahi City whose characteristics had low mathematical connection capabilities. The samples were taken from two classes of twelve class VII randomly according to class.

RESULTS AND DISCUSSION

Results

Table 1. Data of Research Results

Types of Tests	Class	Data Research Results		
		Mathematical Connection		
		N	Average	Simp. Baku
N-Gain	Experiment	30	0.69	0.17
	Control	30	0.56	0.16
Postes	Experiment	30	14.57	3.06
	Control	30	12.30	3.17

Table 1. Describe that the average achievement and increase in connection capability Mathematics in the class that gets learning with *problem posing* is higher than those who get scientific learning.

Table 2. ANOVA Test for 2 Paths
Tests of Between-Subjects Effects

Dependent Variable: Connection Postes						
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	220.717 ^a	5,	44.143	5.675		.000,344
Intercept	9543.131	1,	9543.131	1226.928		.000,958
Grade	91.791	1,	91.791	11.801		.001,179
Level	131.511,	2	65.755	8.454		.001,238
grade * level	14,220	2	7,110	, 914	, 407	, 033
Error	420,016	54	7,778			
Total	11468,000	60				
Corrected Total	640,733	59				

a. R Squared =, 344 (Adjusted R Squared =, 284)

Table 2. shows the significance value of 0.001 in the class group, while in the level of 0.001, and on the class and 0.407 level.

Discussion

Two-way ANOVA test shows that there are differences in the achievement of mathematical connection abilities because of the influence of learning, and the level of students' mathematical abilities. While learning interaction with the level of mathematical ability does

not give effect or differences in the achievement of students' mathematical connection abilities.

From the results of data processing it can be seen that learning with *problem posing* influences the students' mathematical connection ability. To achieve the mathematical connection ability is seen based on the learning method that learning that uses learning with *problem posing* in mathematics learning helps in the achievement of students' mathematical connection abilities. Whereas when viewed based on the level of mathematical ability that there is no significant difference between students' mathematical connection ability at a certain level of mathematical ability.

Brown, S.I., Walter (2005) stated that problem posing in mathematics learning has two cognitive stages, namely accepting and challenging. The receiving phase is an activity where the student accepts the task or problem that has been determined. While the challenging stage is an activity where students challenge assignments. Thus, what is meant by the problem posing approach in this study is an approach that emphasizes the formulation or submission of problems by students of the situation or task available. While the understanding of the problem in this study is a question or question. By creating or constructing problems or problems that can be solved, students always construct new understandings based on available information. The questions raised often trigger the formation of a stronger understanding of a person. Through the problem posing approach students can develop students' mathematical mindset such as logical and critical thinking. Furthermore, the development of problem posing in mathematics will improve problem solving abilities.

To increase the ability of mathematical connection is seen based on the learning method that learning that uses learning with *problem posing* in mathematics learning helps in improving students' mathematical connection abilities. Whereas when viewed based on the level of mathematical ability that there is no significant difference between students' mathematical connection ability at a certain level of mathematical ability.

CONCLUSION

Based on the research that has been done about mathematical connection ability using problem posing approach with scientific approach can be concluded that:

1. Achievement of students using problem posing approach through is better than scientific approach. 2. There is no difference in improving students mathematical connection ability using problem posing approach and scientific approach.

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