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Powerpoint Assisted Problem Posing versus STAD Model: A Comparison Study in Improving Mathematical Connection Ability

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Abstract: Powerpoint assisted problem posing versus STAD model: A comparison study in improving mathematical connection ability. **Objectives:** The purpose of this study were to determine the differences and the effectivity between Powerpoint Assisted Problem Posing and Student Team Achievement Divisions (STAD) on mathematical connection ability. **Methods:** The population of this study were 289 students of SMPN 1 Talang year of 2017/2018 class VII semester II. Data of mathematical connection ability were collected by using documentation, tests and observations. **Findings:** There were significant differences in mathematical connection ability between Powerpoint Assisted Problem Posing and the STAD model (t_{calc}=5.287 > t_{table}=1.960). **Conclusions:** Powerpoint Assisted Problem Posing Model is more effective than STAD model (t_{calc}=5.287 > t_{table}=1.645 and sig. 0.000) in improving mathematical connection ability.

Keyword: Powerpoint-assisted problem posing, STAD model, mathematical connection ability.

Abstrak: Model problem posing berbantuan powerpoint dan model STAD: Studi perbandingan dalam meningkatkan keterampilan koneksi matematis. ***Tujuan:*** *Mengetahui perbedaan dan efektivitas antara model Powerpoint berbantuan Problem Posing dan model pembelajaran STAD terhadap kemampuan koneksi matematis.* ***Metode:*** *Populasi penelitian ini adalah 289 peserta didik kelas VII semester II SMP Negeri 1 Talang tahun ajaran 2017/2018.* ***Temuan:*** *Terdapat perbedaan kemampuan koneksi matematis yang diajar menggunakan model pembelajaran Problem Posing berbantuan Powerpoint dengan model pembelajaran STAD (t_{calc}=5.287>t_{table}=1.960).* ***Kesimpulan:*** *Model pembelajaran Problem Posing berbantuan Powerpoint lebih efektif dibandingkan model pembelajaran STAD dalam meningkatkan kemampuan koneksi matematis.*

Kata Kunci: *Model problem posing berbantuan powerpoint, model STAD, keterampilan koneksi matematis.*

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INTRODUCTION

Mathematical connection ability is a prerequisite for students to be able to master other igher abilities (NCTM, 2000; BNSP, 2006). This is reinforced by Anita, 2014; Tripathi, 2009; and Stylianides & Stylianides, 2007, which states that the initial stage of ability that must be mastered by students is the ability to connect concepts mathematically in learning. In the end this shows that if the students' mathematical connection ability is high, students are able to work on the questions easily.

In addition, the selection of learning models and the use of learning media play a significant role in improving student learning outcomes. One of the most widely known learning media among the public is by using Microsoft Powerpoint software (Vernadakis et al., 2011; Keengwe & Onchwari, 2009). In the learning process it has the advantage of being able to insert learning videos related to social arithmetic material, namely videos about banking and trade, because in Microsoft PowerPoint there are hyperlink facilities that are rarely used. So it is expected that the use of Microsoft PowerPoint learning media will bring freshness and variety to students and provide opportunities for teachers to meet face to face and observe students.

Based on the results of the observation, learning in SMP N 1 Talang uses the 2013 curriculum and the learning model used is a learning model that is in accordance with the 2013 curriculum, one of which is STAD. From the observations obtained, there were only 11% of grade VII students who were able to surpass the KKM, which was scored more than or equal to 75 in the End of Odd Semester 2017/2018. To overcome this problem, the problem posing learning model can be an alternative because problem posing is a model of assigning assignments to questions which essentially asks students to ask questions or problems. Problem posing has advantages including educating students to think critically, learn to analyze, and be able to know differences of opinion between students. In addition, based on the results of a study conducted by Herawati (2010), it was found that students' ability to understand mathematical concepts in the class that had problem posing learning was better than students in conventional learning classes. Research shows that the STAD type cooperative learning model with problem solving methods produces better performance than conventional learning as well as STAD type cooperative learning models without problem solving methods (Utami, 2012). While, according to Shoimin (2014) problem posing is another form of problem solving. This problem solving ability also turns out to be influenced by initial abilities (Nur & Palobo, 2017). Whereas according to research from Guvercdn (2014) states that problem posing learning used in the experimental class has a positive impact on students' conceptual development.

Based on the facts above, it shows that there is a correlation between the selection of learning models that are in accordance with students and the media that will be used to improve students' mathematical abilities, one of them is mathematical connection skills. Research on mathematical connection skills has been done by Rohmatullah, 2018; Kartikasari & Widjajanti, 2017; Hendriana et al, 2014; Rohendi, 2012. However, from all the research that has been done, no one has examined the learning model and learning media that are suitable for improving students' mathematical connection skills. Thus, further research is needed regarding the comparison of learning models that are suitable for improving students' mathematical connection skills, namely the Problem Posing Model assisted by Powerpoint and the STAD Model.

METHOD

This study uses a quantitative approach, and includes types of experimental research. The population of this experimental study was students of class VII of SMPN 1 Talang in 2017/ 2018 with a total of 289 students. After going through the sampling procedure using Cluster sampling, one trial class, one experimental class and one control class were obtained. Then the data was collected using documentation techniques to determine the pure UAS value of odd semester in students from the experimental class, control class, and trial class.

From these data, a prerequisite test before the study was carried out, namely sample equality. And continued by giving treatment to the experimental class and control class, namely experimental class learning using PowerPoint assisted Problem Posing learning models, and learning in the control class using the STAD learning model, where STAD is learning that is often used in SMPN 1 Talang. The selection of this design is because the researcher wants to know the difference in mathematical connection abilities between the experimental class and the control class, and not to determine the increase in the mathematical connection abilities of the two classes, thus this study does not use a pre-test. The UAS value is only data that will be processed in the research prerequisite test. The independent variables in this study are problem posing learning models and the dependent variable is mathematical connection ability. The instrument used is a test of mathematical connection ability consisting of 5 description questions.

Data collection techniques from this study are documentation, tests, and observations. From the documentation data collection techniques conducted at SMP 1 Talang, data obtained from the pure semester value of the odd semester of 2017/2018. Before conducting the research, the prerequisite test before the research is carried out, namely the normality test and homogeneity test. The normality test uses the Kolmogorov Smirnov test while the homogeneity test is done through the Levene Test which is analyzed using SPSS 16.0. From the test, the sample is normally distributed and homogeneous. Then the sample equality test was carried out using a one-way anava test which was analyzed by SPSS 16.0. From the results of one-way ANOVA obtained $f_{calc.}$ = 1.373 and f_{table}= 3.091. This shows 1.373 <3.091, so Ho is accepted. Then it can be concluded that the trial, experiment, and control classes have the same initial abilities.

The data analyzed in this study is the mathematical connection ability with the indicators used, namely (1) identifying the relationships of various representations of concepts and procedures, (2) identifying the relationship of one procedure with other procedures in equivalent representation, (3) applying mathematics in daily life day. The test has been tested, so that its validity and reliability are tested. The results of the trial test were then given to experimental class students and controls as a test of mathematical connection ability.

RESULT AND DISCUSSION

In this study the mathematical connection ability data were obtained from the ability test scores used to measure the mathematical connection ability of students taught using the problem posing model assisted by powerpoint and the STAD learning model on Social Artimetic material. Then the data is used in hypothesis testing to determine which learning model is more effective. Based on the test of mathematical connection ability performed, the results of the average experimental class were greater than the control class, which was 65.187 > 48.469. The median of the experimental class is 65.500 while the median of the

control class is 45. This shows the median of the experimental class is greater than the control class. The standard deviation of the experimental class is 13.625 greater than the standard deviation of the control class which is equal to 11.590.

The experimental class variance is 185.641, while the control class variance is 134.322. This shows the variance of the experimental class is greater than the variance of the control class. Variances can be used as a better class benchmark, so the experimental class's mathematical connection ability is more effective than the control class. From these data can be seen the highest value of the experimental class of 87 and the lowest value of 37, so that the range is 50. Whereas in the control class the highest value is 75 and the lowest value is 27, so the range is 48.

Then it can be seen also in the calculation of the variance coefficient. The experimental class coefficient of variance is 0.209, while the variance coefficient of the control class is 0.239. It can be concluded that the variance coefficient of the experimental class is smaller than the variance coefficient of the control class, so that the ability of the experimental class is more effective than the control class.

Before conducting a hypothesis test, several prerequisite tests must be carried out on the distribution of data which includes the normality test for data on mathematical connection ability. Based on the normality test using SPSS 16.0 shows that in the Kolmogorov Smirnov test the experimental class significance value is 0.200, and the control class significance value is 0.069, while the value of á = 0.050. This shows that the significance value in the experimental class, and control is less than á so that Ho is accepted. It was concluded that the samples came from populations that were normally distributed.

While the homogeneity test using SPSS 16.0 shows that in the Levene Test, the results of Significance = 0.451 are obtained, whereas á = 0.05, this shows that 0.451> 0.05 so that Ho is accepted. So it can be concluded that the sample comes from a homogeneous population. In full the results of the analysis data are summarized in table 1.

Tabel 1. Data of the homogeneity test

		Levene's Test for Equality of Variances		***t-test for Equality of Means***						
		F	Sig.	T	df	Sig. (2-tailed)	*Mean Difference*	*Std. Error Difference*	*95% Confidence Interval of the Difference*	
									Lower	*Upper*
Skor	*Equal variances assumed*	.575	.451	5.287	62	.000	16.719	3.162	10.398	23.040
	Equal variances not assumed			5.287	60.445	.000	16.719	3.162	10.395	23.043

Based on the two-party t-test conducted using SPSS 16.0, it shows that t_{calc} = 5.287 and t_{table} = 1960. This shows that t_{calc} is greater than t_{table}, which is 5.287> 1.960, so Ho is rejected. Then it can be concluded that there are differences in mathematical connection skills taught using the PowerPoint-assisted Problem Posing learning model with the STAD learning model.

Based on the t-test of the right-hand one conducted using SPSS 16.0, it shows that t_{calc} = 5.287 and t_{table} = 1.645. This shows that t_{calc} is greater than t_{table}, so Ho is rejected. To strengthen it can be seen from the significance value obtained is 0.000, so 0.000 <0.050, Ho is rejected. Then it can be concluded that the PowerPoint assisted Problem Posing learning model is more effective than the STAD learning model for mathematical connection abilities.

The application of the problem posing learning model assisted by PowerPoint in the experimental class and the STAD learning model in the control class, shows that the mathematical connection ability of the two groups is significantly different. This is indicated by the results of the study stating that the problem posing learning model assisted by PowerPoint is better than the STAD learning model. In addition, based on the results of observations of experimental class students, using the problem posing learning model assisted by PowerPoint students became responsive, so the results obtained were also more satisfying. Learning in the experimental class can create an active, conducive and time-saving learning atmosphere because it is assisted with PowerPoint learning media. In observations also obtained indicators of mathematical connection ability that is mostly mastered by students is the first indicator, namely identifying the relationship of various mathematical concepts and procedures. This indicates that most students are able to identify the relationship between various mathematical concepts and procedures.

Based on the results of the testing of the first hypothesis, it was found that there were differences in the mathematical connection abilities of students who were taught by the PowerPoint-assisted Problem Posing learning model with the STAD learning model. As well as the results of testing the second hypothesis, it was found that the PowerPoint-assisted Problem Posing learning model was more effective than the STAD learning model for mathematical connection abilities.

These results are consistent with the results of a study from Widana (2013) which found that there were significant differences in mathematics learning outcomes between students who took part in learning using the problem posing method and students who followed conventional learning. In accordance with the opinion expressed by Rosli (2014) that the excess problem posing has broad potential benefits on students' mathematical achievements, problem solving skills, the level of problems faced and the attitudes of students towards mathematics. Another advantage of the problem posing learning model according to Shoimin (2014) is educating students to think critically by analyzing a problem, making students active and believing in themselves. This also happened to experimental class students who tended to actively ask questions, and be confident. In addition, the STAD learning model has advantages including students can achieve learning goals by helping each other, encouraging and motivating each other for the success of the group. However, the STAD learning model does not emphasize problem solving skills so that it does not direct students to think critically in analyzing a problem (Wijaya, 2016).

■ CONCLUSION

Based on the results of data analysis that has been done, it can be concluded that there are differences in mathematical connection skills taught using the problem-assisted problem posing learning model with the STAD learning model

(t_{calc} = 5.287> t_{table} = 1.960), and PowerPoint assisted Problem Posing learning models are more effective than models STAD learning (t_{calc} = 5.287> t_{table} = 1.645 and sig. 0.000) to mathematical connection ability.

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