THE EFFECT OF *PROBLEM SOLVING* LEARNING MODEL BASED *MIND MAP* TO THE STUDENT'S LEARNING OUTCOMES IN ELEVENTH GRADE OF CLASS IPS AT SMA MUHAMMADIYAH 2 SURABAYA

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Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh model pembelajaran *problem solving* berbasis *mindmap* terhadap hasil belajar siswa kelas XI IPS di SMA Muhammadiyah 2 Surabaya. Metode penelitian yang digunakan adalah kuantitatif. Desain penelitian menggunakan quasi eksperiment. Teknik pengumpulan data dengan observasi, rubrik penilaian lembar kerja, pretest, dan postest. Analisa data mengunakan uji independent sample t-test. Hasil penelitian menunjukkan bahwa: (1) penggunaan model pembelajaran *problem solving* berbasis *mindmap* mempengaruhi hasil belajar siswa berdasarkan hasil uji-t dengan nilai postest t hitung > t tabel atau 2,385 > 2,010, sehingga ada perbedaan hasil belajar antara kelas eksperimen dan kelas kontrol. (2) Model pembelajaran *problem solving* berbasis *mindmap* berpengaruh positif bagi nilai hasil belajar siswa, berdasarkan interval confidence menunjukkan nilai upper 5.416 > nilai lower 0,641, sehingga kelas eksperimen lebih baik dibandingkan dengan kelas control.

Kata kunci: problem solving, mindmap, hasil belajar

1. INTRODUCTION

Education is a consciously planned effort, which is useful for creating an active atmosphere in the atmosphere of learning and when the learning process occurs. This is contained in Law No. 20 of 2013. Education is beneficial for the potential development of students both in terms of spiritual strength, personality, intelligence, character, and skills that are useful for themselves, the community, the Nation, and the State *(Haris, 2014).* Learning is a process of thinking, whereas learning to think is the process of seeking and finding knowledge through interactions between individuals and the environment. The learning process should stimulate students to explore, elaborate, and be able to confirm something according to their own thought processes *(Faturrohman, 2017).*

Nowadays, the High school education must have reached a metacognitive level. Students have their own thinking style in understanding the material or solving a problem, so that each student's understanding is different. *Problem solving* is a model of learning by thinking to solve problems, and making decisions by searching for meaning, deepening, and overcoming challenges *(McGuinness & Bianchi, 2007)*. Understanding in solving problems according to Anderson in Harwanti & Agus's research (2019: 653) explains that *problem solving* will achieve the desired goals, based on the attitude aspects of positive thinking about the problem, positive thinking about how to solve the problem, and thinking systematically. The demand for understanding and meaning of systematic material to *support the problem solving* learning model, the researchers chose *a mind map*.

Students have their own thinking style in understanding the material or solving a problem. Geography subject material "Indonesia's Strategic Position as World Maritime Axis" is conceptual material and this material is classified as new material in eleventh grade students. Students' understanding and spatial analysis of Indonesia's strategic position as the world's maritime axis must be structured. Based on this background, the purpose of this study is to determine whether or not there is an influence of differences in learning outcomes between the experimental class and the control class and to determine the effect of the application of learning models on the learning outcomes of eleventh grade students in class IPS 1 and IPS 2 at SMA Muhammadiyah 2 Surabaya.

2. RESEARCH METHODS

This type of research is descriptive quantitative research. The research design used in this study is quasi experimental research *(quasi experimental design)*. This *quasi-experimental* design uses *non-equivalent control group design*, in which the experimental class and the control class are not randomly selected, but are both given a pretest and posttest, but only the experimental class is given treatment. The design of this study is used to determine classes that use *problem solving*

model based *mind map* and conventional class. The above design can be described as follows:

Experimental Class : O_1 X_1 O_2

Control Class : O_3 — O_4

Chart 1. The Overview of Experimental Research Designs (Sugiyono, 2015)

Noted:
O = Pretest and Posttest
X = Learning uses the learning model
- = Subject selected without random procedure

The design of this study is used to determine classes that use *problem solving* model based *mind map* and conventional class.

The instrument used to measure the variables of this study was in the form of *pretest* and *posttest* questions, after the student worksheets. Data collection techniques used are assessment rubrics to assess the results of the pretest, posttest, and student worksheets. Interviews with teachers were conducted before the research, observation sheet data were carried out during the learning process, and documentation of research activities. Based on the data obtained, after doing *the pretest* and determining the class, then the experimental class was given a student worksheet based on *problem solving* model based *mind map* and for the control class was given a student worksheet based *mind map* only. After completing the learning activity, students are then given a post-test problem. Based on the data collection, then analyzed using the t-test on SPSS 21.

3. RESULTS AND DISCUSSIONS

Based on the *pretest* and *posttest* results obtained, then the normality and homogeneity are tested first as the fulfillment of the t-test prerequisite test. T-test requirement is that the data must be normally distributed and homogeneous. Based on the *Kolmogorov-Smirnov* normality test on the students' *pretest* and *posttest* results, the results are obtained that all data are normally distributed, with a condition of significance value> 0.05, then the data is declared to be normally distributed. Based on table 1, the significance value of the experimental class is 0.177> 0.05 and the value of the experimental class is 0.521> 0.05, so both of them are declared to be normally distributed and can be continued with homogeneity tests.

Table 1. The Homogeneity Test Results for Both Classes

One-Sample Kolmogorov-Smirnov Test

			Experiment	Control
N			27	23
Normal Parameters[a,b]	Mean		91.85	75.61
	Std.		4.312	9.380
Most Extreme Differences	Absolute		.212	.170
	Positive		.097	.152
	Negative		-.212	-.170
Kolmogorov-Smirnov Z			1.100	.814
Asymp. Sig. (2-tailed)			.177	.521

a. Test distribution is Normal.

b. Calculated from data.

Based on the SPSS *levenge* test results to test homogeneity, obtained is 0.463 in table 3. The value is greater than the significance level of 0.05 or 5%, so it can be concluded that the *posttest* data results have the same or homogeneous variance values, and can be continued in the next test, the t-test. The following results of the t-test analysis using SPSS 21:

Table 1. The Average Results of Experiment Classes and Control Classes

Group Statistics

	Model	N	Mean	Std. Deviation	Std. Error Mean
Result	Experiment	27	91.85	4.312	.830
	Control	23	88.91	4.379	.913

The first result in the t-test analysis is the group statistics table. Based on the table above, it is known that the number of student learning outcomes in the experimental class was 27 students, then for the control class were 23 students. The mean or average value of students for the experimental class that is eleventh grade students in class IPS 1 is 91.85, while in the control class that is eleventh grade students in class IPS 2 has an average of 88.91. Based on the above data it can be concluded that there are differences in average student learning outcomes between the experimental class and the control class, then to prove the accuracy, then it can be seen in the second t-test results table below:

Table 2. The T-Test Results for Experiment Classes and Control Classes

Independent Samples 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
Result	Equal variances assumed	.548	.463	2.385	48	.021	2.939	1.232	.461	5.416
	Equal variances not assumed			2.382	46.506	.021	2.939	1.234	.456	5.422

The basis for the t-test decision above according to Sujarweni (2014: 99) is as follows:

1. H0 = if the value of t count> t table then H0 is rejected and H1 is accepted, meaning that there is a difference in the average student learning outcomes between the experimental class and the control class.
2. H1 = if the value of t arithmetic <t table then H0 is accepted and H1 is rejected, meaning that there is no difference in average student learning outcomes between the experimental class and the control class.

Based on the table above, in the *equality of means* (2tailed) section, a sig value of 0.021 <0.05, so based on the t-test decision making basis it can be concluded that there is a significant difference between the average student learning outcomes in the experimental class and the control class . The difference in the average value of student learning outcomes in the control class and experimental class is 0.461 to 5.416.

The difference is known, then it is necessary to know the comparison between t arithmetic with t table, here is the basis for making decisions to find the comparison according to Jonathan (2015: 152):

1. H0 = if the value of t count <t table then H0 is accepted and H1 is rejected, meaning that there is no difference in the average learning outcomes between the experimental class and the control class.
2. H1 = if the value of t count> t table then H0 is rejected and H1 is accepted, meaning that there are differences in learning outcomes between the experimental class students and the control class students.

Based on the results of the t-test in the above table, the calculated t value is 2.338. T table values are searched using the formula (α / 2); (df) equals (0.05 / 2); (48) = 0.025; 48, the t table value is 2.010, so it can be concluded that t count> t table or 2.338> 2.010. H0 is rejected while H1 is accepted, meaning that there are differences in learning outcomes between experimental class students and control class students.

Based on the overall t-test results significantly, that the use of *problem solving* learning model based *mind map* affects student learning outcomes, seen from the differences in learning outcomes between the experimental class and the control class. Based on the *confidence interval* shows the experimental class (upper) is better when compared to the control class, so it can be concluded that the application of *problem solving* learning model based *mind map* has a positive impact or is suitable for improving student learning outcomes in the material of Indonesia's strategic position as the world's maritime axis, when compared by using a *mind map* based conventional model.

The material on Indonesia's strategic position as the world's maritime axis, in the geography subjects of eleventh grade students is a new material and emphasizes aspects of the location of Indonesia, the boundaries of Indonesia, and the potential of the Indonesian sea, but behind its potential, there are also many topics of problems regarding the suboptimal use of the sea, natural resources and marine energy, island disputes and so on. Problem-based problems are very effective in increasing students' further understanding of a problem, and thinking about how to find a solution. This is in line with Flavell's statement in Simanjuntak's research (2014: 10) which states that learning through *problem solving* seeks awareness and control of the thought process to develop metacognition.

The results of the discussion or structure of student analysis in studying the phenomena on the worksheet, then illustrated the order of thought in *a mind map*. Based on the results of the t-test where the average learning outcomes of the experimental class are higher than the control class, proving that after understanding and providing a solution to a problem, can facilitate students in making a good *mind map*. This is in line with Mulyaningsih in Agustin's research (2018) *mind map* learning model can optimize the function of the left brain and right brain in helping individuals to understand problems quickly, because the thinking has been mapped.

4. CONCLUSION

Based on the results of the analysis and discussion in this study, the following conclusions can be drawn:

1. The *problem solving* learning model based *mind map* affects the differences in student learning outcomes based on the results of the t-test with posttest values t arithmetic> t table or 2,385> 2,010 or from a difference in the average value of learning outcomes between the experimental class 91.85 and the control class which is 88.91.
2. The *problem solving* learning model based *mind map* has a positive effect on students. The value of learning outcomes of the experimental class is better than the control class based on confidence intervals showing the upper value of 5.416> lower value of 0.641.

5. SUGGESTION

Based on the findings found in this study by researchers, then to improve the quality of the application of this learning model, several suggestions are proposed as follows:

1. Practically aimed at subsequent researchers, to further develop further research on the influence of motivation and value of skills on student learning outcomes with *problem solving* learning model based *mind map* or with other models, or on other conceptual geographic material at the same or different levels of education.

2. The subject teachers should be able to develop further about the material and practice questions in applying the *problem solving* and *mind map* learning model in class, or in accordance with the recommendations mentioned by the researchers above, if there is still no further research development.

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