

The Impact of Electronic Mind Map as Part of Learning

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ABSTRACT

As technology become commonplace in the world of education, it is important to always increase the knowledge of how these technologies can have an impact on students' learning ability. This study aimed to determine the impact of the use of mind mapping application on learning achievement. The method used is a quasi-experiment research, using design non-equivalent control group design. This study used two groups of the experiment group and the control group. The experiment group was treated using a mind map and the untreated control group. Data were collected before and after the learning. The results of research that the mean scores learning outcomes experiment group was higher than the control group

Keywords: *Electronic mind map, media of learning, achievement of learning.*

1. INTRODUCTION

The 21st century is an era where everything is digitalized. Education 4.0 is a response to the needs of the industrial revolution to 4.0 where humans and technology are aligned to enable new possibilities [1]. Stimulate students' abilities through a variety of groundbreaking learning that encourages students to think creatively and critically is one attempt in the era of revolution 4.0. One of them by applying the concept of mind mapping in learning. Mind map is an active learning strategy that participate in improving memory, generating creative ideas, using parts of the brain and regulates how to read to help get information [2].

There are two types of mind map, (a) Traditional Mind Maps drawn manually by using paper and pen on the board. (b) Electronic Mind Maps that apply the same steps through using computer software that that automatically generate flow branches of idea derived from central one [3].

Based on the results of preliminary observations made by research of the 90 students of social studies and science, obtained information that as many as 86 students (96%) expressed the blackboard as the medium most frequently used in the learning economy. 4 students (4%) chose other media use images, sound recordings, and direct experience. Other findings from the observation that the media is a favorite student who ranks first is a video, then the image, and the third is the internet. From these data seen the gap between the most frequently used media with media teacher's favorite student.

Based on these problems, researcher tried to use a mind map of the inserted electronic wide range of attractive images to improve student achievement.

Some of researches are agree that the electronic mind maps have a positive impact on student achievement [4-7]. Based on statistically, the results is significant difference between the mean scores of control and experiment group in the reading comprehension post-test in favor of the experiment group [8]. The electronic mind map a significant effect in improving English grammar in the first middle school in Jeddah, Saudi Arabia [9]. E-mapping is a potentially powerful assessment tool. It allowed instructors to glimpse into their students' thinking processes and to gain insight into their students, analytical and synthesis skills. Ralston and Cook (2007) whose study aimed to find out the impact of electronic mind map in the organizing students' idea and the way are displayed. Their study showed that electronic mind map increased students 'concentration in organizing ideas and displaying information clearly [10].

Based on that's explanation, the researcher make use of electronic mind map that contains text and images related to learning. Students are expected to be easier to understand the lesson with the help of electronic mind map. This study measured the impact of the use of electronic mind maps in student learning achievement. The hypothesis that there is a positive impact on the use of electronic mind map on student achievement.

2. METHODS

This research in the process uses a quantitative approach with quasi-experiment design. Samples divided into experiment group were given experiment treatment electronic mind map and control group with no treatment electronic mind map. The design of the study is a group pretest-posttest design (nonequivalent control group design) as showed in Table 1.

Table 1 Nonequivalent Control Group Design

O1 experiment pretest	X treatment	O2 experiment posttest
O3 control pretest		O4 control posttest

2.1 Participants

The population in this study are first eleventh grade social study and second eleventh grade social study in one of Senior High School in Banjarmasin, Indonesia for the academic year 2018/2019. The study sample as many as 54 students from both of classes.

2.2 Research Instrument

The instrument used in this study is an achievement test with multiple-choice models. The test is given in the form of questions relating to the material being taught to students as many as 20 items. The test was performed twice, before treatment (pretest) and after treatment (posttest) with the same test, in order to determine changes in students' mastery of concepts before and after treatment is applied.

2.3 Validating the Achievement Test

In this study, conducted twice a validity test is an empirical test instruments and test validity Expert Judgment. Empirical tests carried out on 93 students' instruments and test expert judgment by giving the test to economists, the results are some questions changed.

2.4 Establishing Reliability

To measure the reliability of the test, the researcher using Anatest 4.0 concluded that the test instrument is included into the category of high reliability with a score of 0.70.

2.5 Test Normality

The normality test of the experiment and the control group is 0.071 with significance level of 0.05. It can be concluded normal research data.

2.6 Maintaining the Integrity of the Specifications

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3. RESULTS AND DISCUSSION

3.1 Description of research data

The achievement test was applied to control and experiment class, so the comparison results obtained mean scores of four meetings in each class in the form of the highest value, lowest value, mean scores overall test results and the pass rate based on school criteria. Determination of the minimum

pass mark guided by the standard of senior high school in Banjarmasin especially for Economics subject. The pass mark is 70. For more details can be seen at the graph 1.

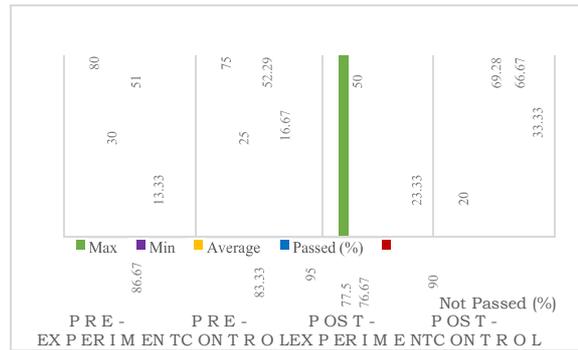


Figure 1 Mean Scores of Test

From the graph 1 known pretest value is highest in the experiment class is 80, while the control class of 75. The lowest value there is 25 while the control class experiment in class 30. However, the mean scores value of the overall pretest control class is 52.29 means higher when compared with the mean scores pretest experiment.

At posttest note the highest value in the experiment class of 95, while the control class 90. The minimum value is 50 while control class is 20. The mean scores pretest overall experiment class is 77.50 and 69.28 the control class. This proves that the mean scores value in the experiment class that uses the electronic mind maps better than the control class. Based on the pass mark criteria, the value of the experiment class pretest that 13.33% passed and 86.67% not passed. It is not much different from the control class that is 16.67% passed and 83.33% not passed. From these result it is known that the mean scores initial capability control class is better than the experiment class.

After the experiment class is given treatment with electronic mind maps, the pass rate posttest experiment class increased to 76.67% while Disqualified be 23.33%. In the control class the pass rate also increased to 66.67% disqualified 33.33%. Even though the result increased, but isn't fulfill the criteria of pass rate. The conclusion is the pass rate mean scores of experiment class higher than the control class.

3.2 Hypothesis Test Results

The hypothesis tested in this study where: (1) there where a significant difference test between students' were given treatment and without treatment (2) the impact of electronic mind maps is positive. The analysis in this research use Independent Sample t-Test. The processed data in this research from the difference between the pretest posttest value on experiment and control groups. Results of independent sample t-test to determine the difference in

mean scores outcomes after treated between control and experiment groups. Here is a description of the research data.

Table 2 Summary of Results

	Group	N	Mean scores
difference	Experiment	30	26.50
	Control	24	17.29

Based on Table 2, the mean scores value of learning outcomes with the experiment group of 30 students is 26.50, while the mean scores value of learning outcomes with a control group of 24 students was 17.29. It can be seen that the results of the experiment grade students was higher than

the control class. It can be concluded the electronic mind map has positive impact to increase learning achievement. To determine the level of significance of these differences can be seen in the Table 3.

Table 3 Independent Sample T-Test

		Mean scores Levene test for Varian				
		F	Sig.	t	df	Significance level
difference	Equal variances assumed	1,059	0,308	2,710	52	0.009
	Equal variances not assumed			2,795	51.865	0.007

Based on the results on the Table 3, the significance of Levene test of $0.308 > 0.05$, it means that the variance of data between the experiment group and control group is homogeneous or equal at the level ≥ 0.05 . Due to the homogeneous, then use the table equal variances assumed to interpret the results of the independent sample t-test. T value obtained was 2,710, which means a greater than t table of 1.674 at the level ≥ 0.05 . The 0.009 significance level was significant at ≤ 0.05 , meaning that on mean scores there is a difference significant between experiment group and control group. It can be concluded that there are significant learning media use electronic mind maps on learning achievement.

3.3 Discussion

This discussion outlines the findings of research on the impact of media use electronic mind maps on student achievement. Based on the results of data analysis findings mean there is a difference between the experiment and control group. The results of the analysis of student achievement in control group is categorized less because the mean scores value of the students have not reached the minimum pass rate criteria. This is because the process of learning to use the media board, so that students are difficult to understand the concepts of the lessons when compared to using electronic mind maps. The test results independent t test shows that there electronic mind maps media influence on student achievement, in other words the media electronic mind maps provides contribution achievement significantly to student learning.

This is consistent with research which revealed that the use of instructional media during teaching/learning can be enhanced to enable acquisition of taught and learnt the

knowledge, attitude, and skill in an understandable way [11].

In line with the results of the study, using electronic mind maps can increase students' understanding. Electronic mind maps link the texts' idea withdraw, colors and tangible objects, which concentrates information in students' minds [4]. In addition the use of mind maps is consistent with the constructivist theory which describes knowledge as an activity that is constructed by the learner. The treatment, namely the students' self-generated computerized mind mapping has affected their achievement in reading comprehension [12]. This enhancement in the subjects' reading achievement is consistent with their attitudes in the survey as the items of the educational benefits of computerized mind mapping and the item of enjoyment scored the highest responses.

4. CONCLUSION

Based on the results of the study, it can be concluded that there are differences in the cognitive achievement of students in the cognitive field in Economics. This can be seen from the results of the independent t test with a t results of 2.710 and t table of 1.674 (t results > t table). In addition, it can be seen that the average posttest of the experimental class is 77.5 with the highest score of 95 and the lowest value of 50, while the average posttest of the control class is 69.28 with the highest score of 90 and the lowest grade of 20. , 67% and the control class 66.67%. This shows that electronic mind map media has a positive effect on student achievement in the experimental class. From the results of Flander's Interaction Analysis Category, it can be seen that the proportion of students speaking the experimental class is higher at 40.98% when compared to the control class of 35.97%. This proves that electronic mind map media can

influence student initiative and response in the learning process.

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