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### The Effect of Learning with The Mindmapping Method Using Imindmap towards Student's Analytical Ability

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#### ABSTRACT

This article aims to describe the difference of student's analytical ability after applying learning with the mindmapping method using the iMindmap application. The type of this research is pre-experiment with one group pretest posttest design method. The number of research samples is 15 students of Physics Education Universitas Lambung Mangkurat. The data collection technique was using pretest and posttest. The aspects measured in seeing the students' analytical ability are matching, classifying, error analysis, generalizing, and specifying. Data were analyzed using paired t-test. The results of the t-test analysis obtained the value t = -6,510 with sig (2-tailed) = 0,000 which is smaller than the significance level of 0.05. The conclusion is that there is a difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application.

Keywords: mindmapping, iMindmap, analytical ability

#### **INTRODUCTION**

One of the subjects in the physics education study program is "Telaah\_Fisika Sekolah Menengah III". The aim of "Telaah\_Fisika Sekolah Menengah III" courses is that students are able to have various learning competencies, competency achievement strategies, and characteristics of third's Class High School Physics teaching materials, as well as being able to answer/resolve various questions and problems about the teaching material. Physics learning of high school, there are two things related to physics that are inseparable, namely physics as a product (in the form of facts, concepts, principles, laws, and theories) and physics as a process. Therefore Physics lessons are lessons that teach various knowledge that can develop reasoning skills, analysis so that almost all problems related to nature can be understood (Sinulingga & Munte, 2012).

The analytical ability must be trained by students by lecturers through the lecture process (Dewantara, 2018).

Analytical ability is part of Bloom's taxonomy which is the level four cognitive domain (Krathwohl, 2002). This ability is related to the ability to divide matter into smaller parts, so that the organizational structure can be understood. The structure will later be collected into a system so that it forms a new pattern or structure based on various information or facts (Pardjono & Wardaya, 2009). The indicators of analytical ability include: matching, classifying, analisis errors, generalizing, dan specifying (Teodorescu, Bennhold, Feldman, & Medsker, 2013). Matching is an activity of identifying similarities and differences and the relationship between the components of the problem in physical matter (Dewantara, 2015). Classifying is an activity of identifying superordinate and subordinate categories where knowledge of physics related to problems can be arranged. Teodorescu et al. (2013) has explained that analyzing errors is based on awareness of assessing the validity of knowledge based on explicit criteria and identifying errors in reasoning that have been presented. Teodorescu et al. (2013) also explained that generalization involves focusing on specific pieces of information observation without making or assumptions, looking for patterns or connections in information, and making general statements that explain patterns or connections. Specifying is generating the latest application capabilities or the logical consequences of available physical knowledge.

Students' analytical ability need to be trained and improved with the appropriate method. One method that can be used is mind mapping. Mindmapping is a mapping that explains the relationship of concepts to one another related to information processing (Resti, 2015). Another opinion suggests that Mindmapping optimizes the brain as a whole, and in accordance with the characteristics of physical matter (Efi et al., 2016). Mindmapping helps in activating and exploring thinking skills (Hairani et al., 2016; Jariyah & Harahap, 2018). Another advantage of mindmapping besides making it easier for the brain to understand and absorb information is to accommodate various perspectives on information (Efi et al., 2016). Thus, the use of mindmapping in learning is expected to improve students' analytical ability.

Making mindmapping is now growing rapidly. Making mindmapping is not only limited to using stationery, but also available various software and online sites to create mind maps. One software application that can be used is iMindmap. The iMindMap application helps someone to make mind mapping easier, faster and more interesting (Arliyah & Ismono, 2015). This application was developed using the Mindmapping method or mind mapping which is commonly used for brainstorming, organizing, creative thinking, and the design and planning of various things. The application of the mindmapping method using the iMindmap application will be tested for its effect on student analytical ability. This article aims to describe whether or not there is a difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application.

## **METHODS**

The type of this research is preexperiment with one group pretest posttest design method. In this method, a research group is carried out pre-test  $(0_1)$  before being given treatment (X) and then post-test  $(0_2)$ .

## $0_1 \ge 0_2$

The study was conducted on Physics Education Universitas Lambung Mangkurat student's who took the "Telaah\_Fisika Sekolah Menengah III" course in 2018. The total sample was 15 students. The data collection technique is to use pretest and posttest to determine the students' analytical ability before and after applying learning with the mindmapping method using the iMindmap application. The indicator of students' analytical ability are matching, classifying, error analysis, generalizing, and specifying (Teodorescu et al. 2013).

Data were analyzed using paired t-test which began with a prerequisite test, namely the normality test and homogeneity test. The null hypothesis of H<sub>0</sub> in this study is that there is no difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application. The alternative hypothesis of H<sub>a</sub> in this study is that there is a difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application. Paired t-tests were carried out with the help of SPSS.

#### **RESULT AND DISCUSSION**

Learning using the mindmapping method uses the iMindmap application to be carried out on Static Electricity material. The use of iMindmap is equipped with features for presentation, so this will facilitate the delivery of material in learning.



Figure 1. Display of Mind Map by iMindmap



Figure 2. Presentation of Mind Map by iMindmap

The results of descriptive statistics about students' pretest and posttest are shown in Table 1.

Table 1.	Result's	of pretest	and posttest
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	Ν	Minimum	Maximum	Mean
Pretest	15	0,00	24,00	10,2000
Posttest	15	12,00	90,00	49,4667

Table 1 shows that there is an increase in the minimum value at the pretest and posttes. At the pretest there were students who could not answer the test at all, while in the posttest the minimum score was not 0. The increase was also seen in the posttest, where in the posttest there were students who scored 90. The posttest was higher than the pretest, 49.5> 10.2. These results are then tested using a paired t-test.

 Table 2. Paired t-test results

		t	df	Sig. (2- tailed)
Pair 1	Pretest – Posttest	-6,510	14	,000

The results of the paired t-test are shown in Table 1. The results of the t-test analysis obtained values t = -6,510 with sig (2-tailed) = 0,000 which is smaller than the significance level of 0.05. Thus the Null Hypothesis is rejected, the Alternative hypothesis is accepted. The results of the paired sample t-test analysis showed that there was a difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application.

The effect of the mindmapping method using the iMindmap application can be seen from the advantages of mindmapping itself. Using mindmapping can simplify the learning process (Jariyah & Harahap, 2018). The application of mind mapping makes students feel happy, not bored and, because there are colors, symbols and short words, and are instructed to make mind maps, so that they are easier to understand, memorize. and remember (Arlivah & Ismono, 2015; Imaduddin & Utomo, 2012). In addition, mind mapping can facilitate the development of student abilities in the affective, cognitive, and psychomotor domains (Resti, 2015).

The aspects of analysis ability measured in this study are matching, classifying, error analysis, generalizing, and specifying. Teodorescu et al. (2013) has outlined the important characteristics of matching which are determining the characteristics of the items that have been chosen, determining and explaining how similarities and differences, and expressing similarities and differences as precisely as possible. Mind mapping makes students able to map conceptual relationships with other concepts (Resti, 2015). Thus, using mind mapping using the iMindmap application can help students determine the characteristics, similarities and differences of a given case.

The aspect is classifying. next Teodorescu et al. (2013) has described its classification based on the ability to identify certain characteristics of items to be classified, identifies the superordinate categories of items possessed and explains why it belongs to that category, identifies from one or more (if any) subordinate categories for items and explains how they are related. The use of mind mapping can help in organizing the knowledge it receives (Hairani et al., 2016). With the ability to organize knowledge, the students are able to classify certain items based on the character possessed by a symptom.

The third aspect is analyzing errors. Analyzing errors is analyzing logic, reasonableness, and accuracy based on knowledge of physics. Mindmapping helps in activating and exploring thinking skills (Hairani et al., 2016; Jariyah & Harahap, 2018). The basic function of the iMindmap application is to help humans map the mindset later to find bright spots and solutions problems from the being experienced. Thus, mindmapping using the iMindmap application can help students think ability in analyzing various errors that exist in a case.

The fourth aspect is generalizing. Generalizing is an activity of building new generalizations or principles from available physical knowledge. Another advantage besides facilitating the brain to understand and absorb information is mind mapping accommodates various perspectives on information (Efi et al., 2016). Mind mapping makes it easier for students to channel the results of their ideas and make it easier for them to keep in mind the new conceptions that have been formed (Rasu & Djudin, 2018). Building generalizations is very easy if students also easily channel the results of their ideas so that mind mapping using the iMindmap application greatly helps improve analytical ability in the generalizing aspects.

The last aspect is specifying. In this aspect students are expected to be able to compare physical phenomena, equations, and related physics statements and be able to find similarities and differences between them and, categorize and specify in meaningful categories. The benefits of using mindmapping in the learning process, among others, can be used to sort out important information that is preferred and supporting information (Puspitaningrum, Bektiarso, & Maryani, 2018).

# CONCLUSION

The conclusion of the results of this study is that there is a difference between the initial analytical ability and the final analytical ability of students after applying learning with the mindmapping method using the iMindmap application. Based on the results of this study it is recommended that readers can try using the mindmapping method using the iMindmap application in learning to improve students' analytical ability.

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