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The Influence of Teaching Models to Provide Concept Change (M3PK) and Project Based Learning (PJBL) Assisted Mind Mapping Media with Creative Thinking about Student Learning Result In Koloid Sistem Material of Class Xi Man

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Abstract: *This study aims to determine: (1) Differences in student learning outcomes M3PK with PjBL using mind mapping media. (2) Differences in student learning outcomes that have high creative thinking ability with low creative thinking ability. (3) The interaction between M3PK and PjBL uses mind mapping media with students' creative thinking ability in influencing learning outcomes. The population in this study is all students in MAN 2 Padangsidimpuan in 2016/2017 academic year. Sampling technique with purposive sampling. The sample in this research consists of two classes namely class XI IPA-1 and XI IPA-3. Class XI IPA-1 as an experimental class 1 that is taught by the Teaching Model Induced Changes in Concepts with mind mapping media. Class XI IPA-3 as an experimental class 2 that is taught with Project Based Learning with mind mapping media. The research instruments are objective test of learning result and observation sheet of students' creative thinking ability. Data analysis technique is done with General Linier Models (GLM) univariate using SPSS 18.0 program. The results showed that: (1) There is a significant difference from the learning of M3PK and PjBL with the help of mind mapping media on student learning outcomes. (2) There are differences in student learning outcomes that have high creative thinking ability with low creative thinking ability. (3) There is an interaction between learning model with students' creative thinking ability in influencing learning outcomes.*

Keywords: *Teaching Model Induces Change of Concept, Project Based Learning, Mind Mapping, Learning Outcomes, Creative Thinking Ability.*

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I. Introduction

Education is an important part in the development of civilization of the nation, where education has a central role to improve the quality of human resources. As a logical consequence, education is always required to be able to innovate, dynamic and able to adapt in every layer of the times. Through education, the nation's generation has the knowledge to become an independent and qualified individual (Jayawardana, 2015). Education function to develop what potentially and actual have owned learners, because learners is not empty glass that must be filled from outside. They have something, a little or a lot, have grown (actualized) or are still buds (potential). The role of educators is to actualize the buds, and to further develop what little or only part of the actualized, as much as possible in accordance with existing conditions (Jagantara, 2014). Reality shows that education in this country is still not in accordance with what is expected although the acceleration of science and technology appear very amazing. At the level of practice, the implementation of education has not been implemented correctly in accordance with the direction of education policy (Supardi, 2012). The low quality of education is due to many factors such as inadequate school facilities, lack of knowledge of teachers about the use of appropriate models, strategies and approaches and media and has not been used in learning, the environment of students and many others.

Renewal in education continues to improve the quality of education, including the implementation of Education Unit Level Curriculum (KTSP) which then turns to the Curriculum 2013. This curriculum emphasizes the active involvement of students and seeks to find their own concepts in the learning process in all subjects including chemistry . Not only the cognitive intelligence should be high, but the students are required to have the character and personality that ultimately education in this country is expected to give birth to a generation that excels in intellectual, intelligent and moral in the moral graceful.

Until now the learning process is still dominated by teachers and lack of space for learners to develop independently, to explore their potential through discovery and thought process. Teaching is more teacher centered, some teachers assume that learning is limited to transferring knowledge. The teacher acts as the only

informant while the students are only actively receiving information, so the learning outcomes are only visible from the students' ability to memorize the material in the short term (Desnylasari, 2016). Students need to be exposed to real-life learning situations, learn to identify available and unavailable information and understand how to get new information with the latest technology. In this process, it is important for the teacher to act as a facilitator rather than a problem solver and informant, but it is the students who are the main players in learning (See, 2015).

Selection of learning models must first consider the characteristics of knowledge based on factual, conceptual and procedural categories. Classroom learning is expected to meet effective and efficient standards. So students can construct their own knowledge (consequently that it is true for someone and may not be true for others) through the science process (Belford, 2013). Project based learning is a learning model that can involve students directly and in the classroom learning of students not being passive. Characteristics Project-based learning is developing students' thinking skills, enabling them to have creativity, encouraging them to work cooperatively, and directing them to access their own information (Chiang, 2016).

In learning activities, teachers should apply learning models that involve students' early skills, as this will make it easier for students to accept the lessons, concepts or ideas of the IPA in which the new concept they receive will be connected to earlier concepts they already possessed. The teaching model induces concept change is a teaching model that takes into account and engages students' early knowledge, where the teaching model is based on constructivism thinking. They assume that the knowledge is built in the mind of the students by the students themselves. So the main task of the teacher is to induce the students' initial concepts and make conceptual changes. (Tarigan, 1999).

In addition to model selection, instructional media have an important role in supporting the quality of teaching and learning process. Media can also make learning more interesting and fun (Purwono, 2014). The provision of dynamic, conducive and dialogical educational media and methodologies is essential for the development of potential learners, optimally. This is because the potential of students will be more aroused when assisted with a number of media or facilities and infrastructure that support the process of interaction that is being implemented (Putra, 2013). Media greatly influences learning outcomes, with the selection of an appropriate media then one of the benefits of students become motivated and enthusiastic follow the process of learning (Wahyudi, 2016). However, many teachers have not included the media in the learning process.

There are some simple products or media that students can create in learning such as mind mapping, pocket books, image maps, and so forth. One of the products that can be made students simply and only takes a short time is mind mapping. Through mind mapping, all the key and important information information of each learning material can be organized using radians that match the brain's natural work mechanism so that it is easier to understand and remember (Silaban, 2012). Mind Mapping is a route map that facilitates memory and makes it possible to construct facts and thoughts, thus the natural workings of the brain are involved from the beginning. This means remembering information becomes easier and more reliable than using traditional notes (Lukman, 2015). Not only stimulating the five senses, Mind Mapping can also explain the relationship between one issue and another in terms of comparison, levels, interrelationships, and other relationships. From the learning experience gained by students directly this will increase the motivation and student learning outcomes and also the level of students' understanding of the material provided by teachers (Permatasari, 2013).

Based on the above description, the authors are interested to examine the influence of teaching models to induce conceptual changes and project-based learning using mind mapping media with creative thinking ability to student learning outcomes. This study investigated the differences in learning outcomes and students' creative thinking abilities among students who were taught by teaching models to induce concepts and student changes that were taught by a project-based learning model.

The study aims to: (1) To know the difference of student learning outcomes from M3PK with PjBL using mind mapping media. (2) To know the difference of learning result of students who have high creative thinking ability with low creative thinking ability. (3) To know the interaction between the learning model using mind mapping media with students' creative thinking ability in influencing the learning result.

II. Research Methods

This research included quasi experiment research, which was given the treatment of learning by grouping the research sample into two groups with each variable that is M3PK and PjBL. The research design that will be done can be seen in table 1 below:

Table 1 Research Design

Creative Thinking	M3PK with Mind Mapping media (A_1)	PjBL with Mind Mapping media (A_2)
High (B_1)	A_1B_1	A_2B_1
Low (B_2)	A_1B_2	A_2B_2

Where:
A_1B_1 : The standardized student gain scores that were taught by M3PK using Mind Mapping media had a high level of creative thinking.
A_1B_2 The standardized student gain scores taught by M3PK using Mind Mapping media have a low level of creative thinking.
A_2B_1 : The normalized student gain scores with PjBL learning using Mind Mapping media have a high level of creative thinking.
A_2B_2 : The students' normalized gain scores with PjBL using Mind Mapping media have a low level of creative thinking.

The population in this study were all students in MAN 2 Padangsidimpuan academic year 2016/2017. Sampling by purposive sampling is based on the consideration of the researcher. This research uses two experimental classes and each class consists of 24 students. Both classes were given the same material about the colloid system as many as 5 times the meeting. The difference lies in the given learning model. The experimental class 1 group was given a teaching model inducing a change in mind-assisted concept of mind mapping and experimental class 2 was taught by a project-based learning model.

The data collected in this study is data of student learning result collected with objective test in the form of multiple choice, and the data of creative thinking ability of the students measured by using observation sheet of creative thinking ability of students observed every learning process take place. Data analysis technique is done with General Linier Models (GLM) univariate using SPSS 18.0 program. The steps taken in data collection are preparing the instrument, determining the sample, preparing the syllabus and lesson plans, learning media, implementing the pretes, doing the learning according to the design, and implementing the postes. During the learning process takes place observation of the ability to think creatively conducted observer.

III. Results and Discussion

The learning in experimental class 1 that was taught by the Mind Modeling Teaching Model (M3PK) with mind mapping media showed the maximum result of learning compared to the experimental class 2 that was taught by Project Based Learning which was accompanied by mind mapping media. The result of posttest of student in experiment 1 class that is students taught by M3PK using Mind Mapping media have average = 76,25 and standard deviation 11,73 with highest value 90 and lowest value 50. For experiment class 2 that is student taught by PjBL Using Mind Mapping media has average = 69.17 and standard deviation of 15.44 with the highest value of 90 and the lowest value 50.

Table 2. Average Score of Student Learning Results

Treatment	Experiment 1	Experiment 2
Postest	76,25	69,17

Comparison diagram of postes value in experiment class 1 (M3PK with Mind Mapping media) and experiment class 2 (PjBL with Mind Mapping media) can be seen in Figure 1:

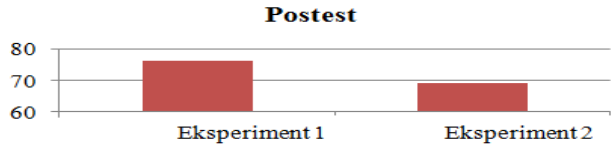


Figure 1. Average Class Values Comparison

Data of students' creative thinking ability is obtained by observation (observation) to students during the learning process takes place. The data of students' creative thinking ability is described in the table.

Table 3 Average Ability of Student Creative Thinking

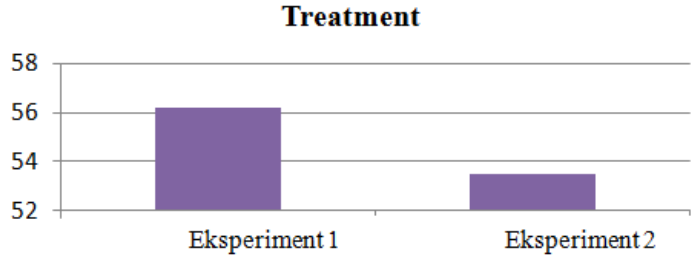
Class with Treatment	**Average**
Experiment 1 M3PK with Mind Mapping media	56,25
Experiment 2 PjBL with Mind Mapping media	53,54

The creative thinking ability of students taught by M3PK using Mind Mapping media has an average value of 56.25 and standard deviation of 6.48 with the highest creative thinking score of 59.49 and the lowest

creative thinking value 53.01. The average grade of creative thinking ability of the high category taught by M3PK using Mind Mapping media is 87.14 and deviation standard 3,934, while the low category creative thinking ability has average value 71,76 and deviation standard 10,889.

Creative thinking ability of experiment class 2 that is students taught by PjBL using Mind Mapping media has average value equal to 53,54 and standard deviation 6,66 with highest creative thinking value 63,75 and lowest creative thinking value 38,75. The average grade of creative thinking ability of the high category taught by PjBL using Mind Mapping media is 88,13 and deviation standard 2,588, while the ability of creative thinking of low category has an average value of 59,69 and standard deviation 8,654.

Figure 2. Comparison of Student Creative Thinking Skills



Normality test used with Smpnov-kolmogrov test in SPSS 18 program. Normally distributed data if result obtained> 0,05 (significant level). Based on the results of the second experimental test the experiments obtained at 0.808, significantly higher than 0.05 then the data is said to normal distribution (0.808> 0.05).

Table 4. Data Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		24
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	11.58231097
Most Extreme Differences	Absolute	.131
	Positive	.095
	Negative	-.131
Kolmogorov-Smirnov Z		.639
Asymp. Sig. (2-tailed)		.808

a. Test distribution is Normal.

b. Calculated from data.

Based on the homogeneity test of both experiment class obtained by 0,075, significantly higher than 0,05 then the data stated homogeny (0,075> 0,05). The homogeneity test data is presented in table 5.

Table 5. Data Homogeneity Test Results

Test of Homogeneity of Variances

Eksperimen1

Levene Statistic	df1	df2	Sig.
3.331	6	16	.075

Hypothesis testing in this research is done by using General Linier Model (GLM) univariat. This test aims to analyze the presence or absence of the influence of both classes of experiments on student learning outcomes and creative thinking ability and the presence or absence of interaction between the variables studied.

Table 6. Results of Hypothesis Testing Class Experiment 1 and Experiment 2

Tests of Between-Subjects Effects

Dependent Variable:Model

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6087.688[a]	3	2029.229	28.253	.000
Intercept	241731.421	1	241731.421	3365.637	.000
Model	316.307	1	316.307	4.404	.042
Berpikir kreatif	4932.956	1	4932.956	68.682	.000
Model * Berpikir kreatif	438.220	1	438.220	6.101	.017
Error	3160.228	44	71.823		
Total	263000.000	48			
Corrected Total	9247.917	47			

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Corrected Total	9247.917	47			

a. R Squared = .658 (Adjusted R Squared = .635)

3.1 First Hypothesis

Based on the results of anava analysis obtained significant value of student learning result 0.042. Therefore sig (0,042 <α = 0,05), so hypothesis testing reject Ho and accept Ha. The conclusion obtained there are differences in student learning outcomes are significant from M3PK with PJBL using mind mapping media.

3.2 Second Hypothesis

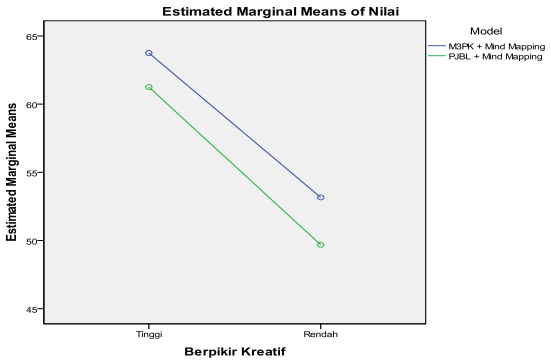
Based on the results of anava analysis obtained significant value of student learning result 0,000. Therefore sig (0,000 <α = 0,05), so hypothesis testing reject Ho and accept Ha. The conclusion obtained there are differences in student learning outcomes that have high creative thinking ability with low creative thinking ability.

3.3 The Third Hypothesis

Because sig (0,017 <α (0,05) so that hypothesis testing reject Ho and thank Ha. Thus it can be concluded that there is interaction between learning model using mind mapping media with creative thinking ability of student in influencing result learn.

Based on the results of hypothesis testing research can be seen the picture of the interaction between learning models using mind mapping media with students' creative thinking ability in influencing the learning outcomes in Figure 3.

Figure 3 Interaction Between Using Mind Mapping Media With Student Creative Thinking Ability on Learning Outcomes.



IV. Discussion of Research Results

Table 7 Description of Learning Outcome Statistics and Student Creative Ability in Experiment Class 1 and Experiment 2

Descriptive Statistics

Dependent Variable:Model

Model	Berpikir Kreatif	Mean	Std. Deviation	N
M3PK + Mind Mapping	dimension2 Tinggi	87.14	3.934	7
	dimension2 Rendah	71.76	10.889	17
	dimension2 Total	76.25	11.726	24
PJBL + Mind Mapping	dimension2 Tinggi	88.13	2.588	8
	dimension2 Rendah	59.69	8.654	16
	dimension2 Total	69.17	15.440	24
Total	dimension2 Tinggi	87.67	3.200	15
	dimension2 Rendah	65.91	11.487	33
	dimension2 Total	72.71	14.027	48

The results of the first study showed that the use of effective M3PK learning model to improve student learning outcomes. The results of the second study generally show that the learning model significantly affects the students' creative thinking ability, with the sig value. 0,000. Price sig. 0,000 means that the learning model influences students' creative thinking ability on the subject of the colloidal system. The third research result shows that there is interaction between learning model using mind mapping media with students' creative thinking ability to influence learning result.

V. Conclusion

Based on data processing and discussion of research results that have been done, can be drawn conclusion as follows:

1. There are significant differences in learning M3PK and PjBL with Mind Mapping media assisted on student learning outcomes. This is evident from the average value of student learning outcomes taught with M3PK is 76.25, higher than the average value of student learning outcomes that dibelajarkan with PjBL is 69.17.
2. There are differences in student learning outcomes that have high creative thinking ability with low creative thinking ability. This can be seen from the average ability of students' creative thinking that dibelajarkan with M3PK using mind mapping media of 56.25. While the creative thinking ability of students who dibelajarkan with PjBL using mind mapping media of 53.54.
3. There is an interaction between the learning model with students' creative thinking ability in influencing the learning outcomes.

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