

The Effect of Class Discussion Learning Models Using Concept Map to Physics Students' Learning Outcomes in SMA Al-Washliyah Medan, Indonesia

by

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Abstract

The purpose of this study was to determine the significant influence between the Class Discussion Learning model using Concept Maps on student physics learning outcomes in class XI at SMA Al Washliyah Medan. The population in this study was all class XI students of SMA Al Washliyah Medan in the 2018/2019 academic year, totaling 120 students from 3 classes with a sample size of 60 people. This study involved 2 sample classes which applied two different treatments, namely class XI - IPA 1 applied the Class Discussion Learning Model and Class XI - IPA 3 applied the Conventional Model. As a data collection tool, a student's physics learning outcome test was used in the form of 30 multiple choice questions, which had been tested for validity and reality. From the data obtained after doing the test, 20 questions are obtained that are valid, the average score of the learning outcomes of each class taught by two different learning models, namely class with Discussion Learning Model Using concept maps $\bar{X}_1 = 13.88$, $s_1 = 4.93$, while the conventional class $\bar{X}_2 = 10.54$, $s_2 = 4.62$. From the t-test statistical analysis, the value of t_{count} was obtained = 3.52, while the value of t_{table} for the significant level $\alpha = 0.950$ and the degree of freedom of 68 was 1.67, because if $t_{count} > t_{table}$ or $3.52 > 1.67$, then the research hypothesis can be accepted. In other words, it can be decided that there is a substantial influence between the Class Discussion Learning model Using Concept Maps on student physics learning outcomes on particle motion kinematics material in the classroom of XI odd semester at SMA Al-Washliyah Medan in the 2018/2019 academic year.

Keywords: Discussion, Concept Map, Physics.

Introduction and Background Problem:

The central role of the teacher in learning is as a facilitator in which the teacher will provide facilities or expediency in the learning process as well as a mediator. This also occurs when the teacher acts as an intermediary in student learning activities (Sardiman, 2004, p. 146). In order to carry out this role, there are several things that must be understood; especially information technology which has become very influential. Learning is a process of interaction between various related elements, the main component in learning is the individual as a learning participant, the need as a driving force, a learning situation that provides the possibility of different activities to learn from (Slameto, 2010). Thus, the manifestation of learning actions is expressed in the form of changes in behavior (Djamarah, 2013).

One of the increasing student learning outcomes is influenced by the role of the teacher in managing the learning process. The teacher must be able to choose a learning method that is suitable for the material to be taught because a good method in conveying the material will increase students' interest in paying attention to the material presented (Richard, 2008). The discussion method in learning is a rewarding alternative for teachers to use in the process of delivering information or lessons. It is because the discussion method is a means of exchanging ideas verbally. By using this method, students are expected to be more active in teaching and learning activities. As a result of that activity, unquestionably, the goal of the learning process is that excellent learning outcomes can be achieved optimally.

Teaching with the discussion method increases the relationship between students and teachers and students to students so that the teaching and learning process can be created well. Discussion as a learning method is a process of involving two or more participants to interact, exchange opinions, and/ or defend opinions in problem-solving so that an agreement is obtained between them. Learning that uses the discussion method is interactive learning. A concept map is a tangible graphic design that points toward how a particular conception is concomitant to other concepts in the matching classification. It is better if concept maps are arranged hierarchically, meaning that inclusive concepts are placed at the top of the map, the lower the concepts are sorted into less inclusive concepts.

Based on the background of the problem above, the researcher is interested in conducting a study with the title: "The Effect of Class Discussion Learning Model Using Concept Maps on the Physics Outcomes of Students at SMA Al Washliyah Medan. The objective of the study is to investigate whether there is a significant effect in the Class Discussion Learning Model using concept maps on student physics learning outcomes at SMA Al Washliyah Medan". The low learning outcomes of students' Physics are caused by the current learning model that has been widely applied to date. The model is known to still employ abstract and taught by the lecture method which emphasizes students' memory of the material. As a result, students become drained and uninterested in following the learning process. The teacher in this case is less creative in making variations in learning to stimulate students' enthusiasm for learning. Thus, it is necessary to use a Class Discussion Learning model using Concept Maps as an alternative learning model to improve student learning outcomes of physics.

The Nature of Learning:

Learning is a multifaceted course that occurs to everyone and continues in a lifespan; this process is begun from the early age of an infant and continued entirely in a duration of a lifetime. One of the signs a person has well-read is a transformation in behavior. Changes in behavior encompass changes in understanding (cognitive) and abilities (psychomotor) as well as those concerning ethics and attitudes (affective).

Muhibbin (2010, p. 90) provides a definition of learning, namely "the stages of change in all individual behavior that are relatively sedentary as a result of experiences and interactions with the environment that involve cognitive processes". Interaction and social exposure have become significant to be embedded in personal development for it is an avenue for an individual to grow and develop. This is also associated with the surrounding sphere particularly at schools where children will befriend their schoolmates. The classroom has become another space for this kind of social interaction where students are not only expected to study but also discuss things with their classmates.

Nature of Learning Outcomes:

The level of mastery of lessons or teaching and learning outcomes is the apprehension /development of a person's perspective skills/ aptitudes. Activities and efforts to achieve observable and measurable changes in behavior are considered as learning outcomes. In learning, there is a process of thinking. A person is said to think when that person is doing mental activities. Learning outcomes are the results obtained from the teaching and learning process. Therefore, student learning outcomes are predisposed by student abilities and teaching quality (Istarani, 2012).

Learning outcomes can be seen after attending lessons, based on these learning outcomes, information is obtained about how much student mastery of the material that has been given, which can be written in numbers and grades. According to Dimyati (2006), learning outcomes are a description of learning achievement in following the teaching and learning process at a level that is followed. The learning outcome is necessary to be evaluated and assessed for it becomes a benchmark for what to be done in the future particularly when it comes to teaching strategies or assessment. Some students might experience different ways of learning which results in dissimilar learning outcomes. However, teachers must be able to pay attention to this detail and move forward with an innovative way of teaching in order to stimulate and develop a better result for their students' learning.

Class Discussion learning model:

The class discussion learning model is a central aspect of all aspects of teaching. The effective use of classroom discussions requires an understanding of some important topics related to classroom discourse and discussion. Discussions are employed by teachers to accomplish as a minimum of three central instructional aims. First, a discussion develops students' rational skills and benefits them to construct their own considerate of educational content. Second, discussion upsurges student engagement.

Inquiries as well as the wisdom of veteran teachers show that for true learning to occur, students must be responsible for their own learning and not completely dependent on the teacher. Third, discussions are employed by teachers to help students acquire essential communication skills and cognitive processes. As such, the discussion provides a social scope for teachers to help students scrutinize thinking developments and learn vital communication skills such as articulating thoughts clearly, listening to others, responding to others in good behaviors, and probing good questions (Omatseye, 2007).

Concept Mapping:

Concept mapping is a new innovation that is important to help children produce meaningful learning in the classroom (Trianto, 2011, pp. 157). What is meant by a concept map is a concrete graphic illustration that indicates how a single concept is linked to other concepts in the same category. Concept maps are developed to dig into the cognitive structure of students and to find out, both for students and teachers, to see what students already know and can be developed either by students or teachers consciously and freely, (Dahar, 1996).

This can also be in the form of a collection of images in a concept map as a graphical tool that is capable of representing words. This can in through color, symbols and material abbreviations at length that can be written more concisely. Concept Map Method is also called Mind Mapping or Concept Mapping. This method was popularized by Tony Buzan, an expert and

prolific writer in the fields of psychology, creativity and self-development in the 1970s, but was originally created by Gelb. Buzan who explained that a concept map or mind mapping is a creative, effective, and literal way of taking notes that will “map” the mind (Buzan, 2002).

Research Method:

The type of research used is a quasi-experiment. In the implementation of the research, the authors performed two different treatments (Suharsimi, 2006); one class was taught the class discussion learning model with the concept map as (X1) while the second class was taught the conventional model (X2). Sugiyono (2008) also stated that quasi-experimental non-equivalent pre-test post design used when the study wishes to perceive the effect of treatment where experimental and control group are not selected unsystematically.

Research Design:

Table 1 Research Design

Class	Pretest	Treatment	Posttest
Conventional	T ₂	X ₂	T ₂
Class Discussion	T ₁	X ₁	T ₁

Population and Sample:

The population in this study was all class XI students of SMA Al-Washliyah Medan semester I 2018/2019 academic year, with 3 classes consisting of 120 students. The sample of this study consisted of two classes selected by simple random sampling, namely by taking randomly from two classes. One class is presented with a class discussion class, namely the class using the class discussion learning model and the other class is presented with a conventional class with a conventional learning model.

Hypothesis Testing:

Hypothesis testing is done in two ways, namely; a two-party t-test is used to determine two parties as well as to determine the similarity of students' initial abilities in the two sample groups. The t-test formula used is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ (Sudjana, 2005:377)}$$

The test criterion is Ho is accepted if $t_{count} < t_{table} < t_{1-x}$ wherefrom the distribution list t with $dk = n_1 + n_2 - 2$ and probability $(1-x) = 0.05$. for other t values Ho is rejected. Ha is accepted if $t_{count} > t_{table}$ (t_{table} is obtained from the t distribution list for $x = 0.05$).

Research Results:

Table 2 Experiment Class - Frequency Distribution (X1)

No	In Class	(xi)	fi	(xi) ²	fi xi	fi xi ²
1	5-7	6	4	36	24	144
2	8-10	9	6	81	54	486
3	11-13	12	7	144	84	1008
4	14-16	15	6	225	90	1350
5	17-19	18	6	324	108	1944
6	20-22	21	6	441	126	2646
Total		-	35	1251	486	7578

$$: \bar{X} = \frac{\sum f_1 X_1}{\sum f_1} = \frac{486}{35} = 13,88$$

Table 3 Conventional Class - Frequency Distribution (X2)

No	In Class	(xi)	Fi	(xi) ²	fi xi	fi xi ²
1	2-4	3	4	9	12	36
2	5-7	6	6	36	36	216
3	8-10	9	7	81	63	567
4	11-13	12	8	144	96	1152
5	14-16	15	6	225	90	1350
6	17-19	18	4	324	72	1296
Total		-	35	819	369	7578

$$\bar{X} = \frac{\sum f_1 X_1}{\sum f_1} = 10,54$$

Hypothesis Testing:

The hypothesis can use the following formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{gab} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} = 3,52$$

Discussion:

From the sequence of data analysis, the research shows that the learning outcomes of class XI IPA 1 students using the learning model (Class Discussion Using Concept Maps) obtained X1 = 13.88 and S1 = 4.93 while in class XI IPA 3 (using conventional learning models) obtained X2 = 10.54 and S2 = 4.62. So that Sgab = 4.74 is acquired.

In testing the hypothesis from the analysis of the difference in the average arithmetic obtained by the t value = 3.52. While the value of t_{table} for the significance level of 0.950 and degrees of freedom of 68 is 1.671, meaning that t_{count} ≥ t_{table} (3.52 > 1.671).

So, it can be said that the hypothesis is accepted, in other words, the data shows that the physics learning outcomes of students from classes using the class discussion learning model using concept maps are better than conventional classes. Similarly, it echoes Fariza and Nury's (2012) study in which they implemented a class discussion learning model with Beach Ball strategy on

the subject matter of electrolytes and non-electrolyte solution in class X SMAN 22 Surabaya. The study also concluded that the student's mastery learning has increased substantially to 86, 84% and 94,73% in the first and second meeting, respectively.

Conclusion:

The fact above explains that learning by using a class discussion learning model using concept maps is better and more effective for learning physics, especially on the subject of particle motion kinematics that can improve student learning outcomes. This is because by using a class discussion learning model using concept maps students understand the material deeper and have prior knowledge before receiving the material presented. In using concept maps, children are more effective in observing learning material. This is aligning with the study of Fathoni (2014) which study is designated to discover the implementation of the Classroom Discussion learning model impact with Beach Ball approach on the focus of chemical bonding on the outcomes of learning and students' self-confidence. The study resulted in several discoveries including progressive learning management which has shown an excellent increase of 3.07 %. The Classroom Discussion learning model applied with the approach of Beach Ball in the subject of chemical bonding has become of assistance to students in better refining the self-confidence which is perceived from the middling measurement of self-confidence.

The purpose of the study has been achieved which is to find out whether there is a significant effect in the Class Discussion Learning Model using concept maps on student physics learning outcomes at SMA Al-Washliyah Medan.” It can be decided that there is a substantial influence between the Class Discussion Learning model Using Concept Maps on student Physics' learning outcomes on particle motion kinematics material in the classroom of XI odd semester at SMA Al-Washliyah Medan in the 2018/2019 academic year.

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