

**THE EFFECT OF GUIDED DISCOVERY LEARNING MODEL ON
THE STUDENT'S ACHIEVEMENT IN PHYSICS OF VII GRADE
IN SMP N 1 TEBING TINGGI ACADEMIC YEAR 2013/2014**

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ABSTRACT

The objective of this research is to know the effect of using Guided Discovery learning model on the students' achievement in physics especially in temperature topic at VII Grade SMP N 1 Tebing Tinggi. The research method is quasi experiment. The populations are all of VII grade students in semester II that consist of 9 classes SMP N 1 Tebing Tinggi. The samples of this research are two classes and consist of 70 students, 34 students from experiment class and 36 students from control class and define by random sampling. Data shows that pre test mean value of experiment class is 42.06 and control class is 40.3. Post test mean value of experiment class is 70 and control class is 65.28. The data distribution of both sample are normal and homogenous. The criteria for hypothesis test is: H_0 is accepted if $-t_{table} < t_{count} < t_{table}$ and H_0 is rejected if t_{count} has another score, where t_{table} obtained from list of t distribution. Research result shows that t-test for concept mastery using $\alpha = 0.05$, obtained $t_{count} = 0.507$, where $t_{table} = 1.99$. It can be concluded that the experiment class and control class have same ability. The criteria for post test analysis is : H_a is accepted if $t_{count} > t_{table}$ and H_a is rejected if t_{count} has another score. Based on research data for $\alpha = 0.05$, obtained $t_{count} = 1.73$, where $t_{table} = 1.67$. So, there is effect of Guided Discovery Learning Model on the Student's Achievement in Temperature Topic at VII Grade in SMP N 1 Tebing Tinggi Academic Year 2013/2014. Based on observation using observation sheet of student activity, it can be concluded that the students in experiment class are more active than control class.

Key word: Guided Discovery, student's achievement, physics

INTRODUCTION

Gagne in Sridevi (2008) state that science is what the scientist does. It is a process by which we increase and refine our understanding and of the universe through continuous observation, experiment, application and verification. Sciences is the body of knowledge, a way of thinking, a way of investigation, and a way of experimentation in the pursuit of

exploring the nature (Sridevi, 2008:5). One of science branch is physics, which is study about phenomenon of nature.

Learning physics must involve students in science process, inquiry and analysis of contents. According to Gagne (Rao, 2008:21) in science learning process needs to do what scientist do. Scientists do observe, and classify and measure, and infer, and

make hypotheses and perform experiments. All those skills can be acquired through a process of inquiry learning (discovery), lab activities or experiments so that students get hands-on experience and discover the process themselves.

Generally, learning physics in schools are still using conventional learning methods because this method is easy to implement. Most conventional learning are expository and discussion method. In the learning process that is likely to be teacher centered domination in the classroom. Teacher writes on the blackboard, and then, goes on solving the problems related to it. The students prepare for the exam by memorizing these concepts and formulas, and by solving the related problems. Using this method, some of the students can not comprehend the concept, some others are not interested in the subject as they think that it is not useful for them, and the others are like spectators while few students come to the blackboard and solve the problems. Most of the students is not participate actively and can not comprehend the concept. Teacher only expects them to write, memorize and solve problems. Students become not active, don't have creative and critical thinking, and easy to forget what they already learned. So, the student's achievement in physics subject still low.

To improve student's achievement in physics subject, teachers can perform a variety of ways, for example by using a model of effective teaching and learning in accordance with the objectives set in the curriculum. Constructivism associates learning to the building of one's own knowledge, is much more appropriate to today's situation, in that it views learning in the perspective of

the learner. The teacher is considered as a cognitive guide while the learner is empowered to construct his own meaning, not just memorize the right answer. Constructivism is not a new concept. It is learning or meaning making theory. It suggests that individuals create their own understanding, based upon the interaction of what they already know and believe and the phenomena or ideas which they come into contact (Sridevi, 2008:9). One model of learning based on constructivist views is Discovery Learning Model.

The aim of the Discovery Learning was as a powerful instructional approach that guides and motivates learners to explore information and concepts, embrace new knowledge, and apply new behaviors back on the job. Using this methodology, organizations can educate their employees quickly and with higher levels of retention than traditional training methods.

Based on the experience of researcher in the Integrated Field Experience Program (PPLT) in SMP Negeri 1 Tebing Tinggi, low yields physics student learning is result of teachers present material with conventional methods, expository, and giving tasks. This causes students are less active and got low achievement because not directly involved in the learning process so that students irresponsible. This condition certainly have an impact to student's grade and will cause a minimum completeness criteria (KKM) of SMP N 1 Tebing Tinggi not be reached or is below standard students that is 75.

There is evidence of the influence of guided discovery learning model for student's creative thinking where this was proved by normalized gain test results showed an increase of

0.3 creative thinking skills in students who are taught using guided discovery, while the average increase student learning outcomes are taught using discussion method by 0.09 (Rohim, et al:2012). But, in this research, there is a weakness. In the group discussions there were some students who are silent and less participate actively in group discussions. Using the discovery learning method, which is one of the various teaching methods in which the students are active and are guided by the teacher, is considered to increase students' success and inquiry learning skills more than the traditional teaching methods (Balim : 2009).

Based on the description above, researchers interested in conducting research entitled " The Effect of Guided Discovery Learning Model on the Student's Achievement in Temperature Topic at VII Grade in SMP N 1 Tebing Tinggi Academic Year 2013/2014."

RESEARCH METHOD

The research has been done at Junior High School (SMP Negeri) 1 Tebing Tinggi. The populations of this research are all of students in VII grade SMP Negeri 1 Tebing Tinggi that consist of 9 classes with each class consist of 34 – 36 students. The sample is chosen by cluster random sampling. The sample is divided into two classes consisting of one class as experimental class and the other class as control class.

This research is involved two different treatments for the experimental class and the control class, where the two classes are treated differently. The experimental class treated with guided discovery learning model and the control class

treated with direct instructional learning model.

To determine the student's understanding of the concept, researcher use test on both classes before and after treatment, which are called pretest and posttest.. The design of the research is as follows:

Table 3.1. Design of Research

Class	Pretest	Treatment	Posttest
Experiment	X_1	P	X_2
Control	X_1	Q	X_2

Description :

X_1 = Pretest

X_2 = Posttest

P = Learning using guided discovery learning model

Q = Learning using direct instructional learning model

The selection of data is carried out to observe whether the samples come from normal distribution population or not. The test used is Lilliefors test and Homogeneity test, to know the homogeneity of both samples. The test criteria are received H_0 : the data come from a homogeneous population if $F_{count} < F_{table}$, where the F_{table} obtained from the distribution list F with $\alpha = 0.05$. Here α is a real level for testing.

Hypothesis test use t-test with formula. Testing Criteria : H_0 accept if $t_{calculate} < t_{(1-\Gamma)}$ where $t_{(1-\Gamma)}$ get from distribution table t with independent degree $(dk) = n_1 + n_2 - 2$ and the probability $(1-\Gamma)$ with $\Gamma = 0,05$ for another value of t H_0 not accept, so Guided Discovery Learning Model has influence to the student's achievement in learning physics.

RESULT of RESEARCH

The results of research is to know students learning achievement before the two of samples applied

different treatments, namely the experimental class treated by using Guided Discovery Learning Model and control class treated by Direct Instructional Model.

Based from research data, the pre-test of student in experiment and control class in score range from 0 until 100, and got the mean of pre test score in experiment class is 42.06 with the deviation standard of 14.09 while mean pre-test score in control class is 40.28 with deviation standard of 14.8.

The experiment class with treatment using Guided Discovery Learning Model has mean score is 70 with deviation standard of 10.44. While in control class after given treatment with Direct Instructional Model has mean post test score is 65.28 with deviation standard of 12.07.

The results of hypothesis testing one tail on the post-test with $\alpha = 0.05$ obtained the score $t_{count} = 1.73$ and $t_{table} = 1.67$. By comparing t_{count} and t_{table} obtained $t_{count} > t_{table}$ it's $1.73 > 1.67$ so H_a accepted. It can be conclude that guided discovery learning model has effect on student's achievement in temperature topic at VII grade in SMP N 1 Tebing Tinggi academic year 2013/2014.

Student's activity in learning process of experiment class using guided discovery learning model at meeting I was 73.51, meeting II was 76.8, and meeting III was 82.64. While, student's activity in learning process of control class using direct instructional learning model at meeting I was 34.2, meeting II was 39.17, and meeting III was 42.25. This case shows that the Guided Discovery Learning Model not only improve learning achievement, but also increased the students activity. So it can be concluded that learning activity

with using Guided Discovery Learning Model better than Direct Instructional Learning Model.

The achievement of cognitive test shows average score of pretest in the experimental class is 42.06 with deviation standard of 14.09 and the average posttest value is 70 with deviation standard of 10.44. While the values obtained in the control class average pretest is 40.28 with deviation standard of 14.28 and the average posttest value is 65.28 with deviation standard of 12.07. From the data, average posttest value in experimental class is greater than control class. The increasing of posttest value is caused by the treatment given to the students. In experimental class given treatment using guided discovery learning model and control class given the treatment using direct instructional learning model.

The observation result in student's activity showed the activeness of students during the learning greatly affects the value of learning achievement. The activity of student can be seen more specific from doing worksheet in the experimental class and in control class, the activity of students can be observed when the researcher doing the teaching activity and giving problems. When students active in the learning activities then the learning outcomes become higher. There is different activity of students' in experimental class and control class. The average value of students' activity in experimental class is higher than control class. It also the reason that the average value of posttest value in experimental class is greater than control class.

The results in Cognitive and Activity of students showed that there was effect of Guided Discovery

Learning Model on the student's achievement in temperature topic at VII grade in SMP N 1 Tebing Tinggi Academic Year 2013/2014.

Observation result in student activity showed that students' attitude in experiment and control class is in good category, but average value of student activity in experiment class more active than control class.

Implementation of Guided Discovery Learning Model in experiment class make the students become active, because Guided Discovery Learning Model make student more creative and understand about physics phenomena. Guided Discovery Learning Model developed good ethic of student, like creative, discipline, and responsibility so the affective of students is good. The student achievement in cognitive of experiment class is also high.

Good achievement of student in experiment class is due to better teaching and learning process using Guided Discovery Learning Model that carried the students directly in the learning process to find a concept or principle. With these techniques, the students find themselves left or experiencing a mental process themselves, teacher only guide and provide instruction. Method of discovery learning as a theory of learning can be defined as learning that occurs when students are not presented with a lesson in its final form, but is expected to organize themselves. They found the concept of physics from experiment/observation by themselves and make students more interesting to learn physics, so they also remember it for long time and make students understand about the concepts.

In hypothesis test showed that there is different increasing of

student's achievement in experiment and control class. The student's achievement is better in experiment class. So, can be concluded that Guided Discovery Learning Model have effect to student's achievement in temperature topic at VII grade in SMP N 1 Tebing Tinggi Academic Year 2013/2014.

The Guided Discovery Learning Model has been researched by M. A. Akanmu (2013), A. G. Balim (2009), M. T. Cohen (2008), Udo, M. E. (2010), and the result of this research is suitable with their research result, where in their result the student's achievement taught by Discovery Learning Model is better than Direct Instructional Learning Model.

Although the Guided Discovery Learning Model could improve learning achievement, but during in teaching and learning process the Guided Discovery Learning Model has the disadvantage, that is the student not ready and afraid to present they discussion result when the teacher ask them to present their results, so the student not effective to present it. So, for the next author who want to do research using Guided Discovery Learning Model, for the first her/him motivate their student to discuss each other, and giving the reward or add value for the student that active when present their discussion result. And then appreciate the answer and discuss result of student with say thanks to student to develop their confidence.

CONCLUSION

Based on the result of research data, it can be concluded that:

Student's achievement in experiment class is greater than student's

achievement in control class. This reveal that Guided Discovery Learning Model has effect on student's achievement in learning physics at SMP Negeri 1 Tebing Tinggi.

SUGGESTION

According to the data of student's achievement and the experience of research when applying the Guided Discovery Learning Model in class, so the researcher gives suggestion as follow:

For the next researcher who wants to do research using Guided Discovery Learning Model, the first step that must be carried out is motivate the student to develop their confidence to communicate their observation results. Researcher must restricts allocated time for each step of Guided Discovery Learning Model, in order to avoid necessary delay in data collection and analysis of experiment data.

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