INTERNATIONAL SEMINAR ON TRENDS IN SCIENCE AND SCIENCE EDUCATION 2015
State University of Medan
12 - 13 December 2015

THE EFFECT OF *GUIDED INQUIRY* LEARNING MODEL TOWARDS THE OUTCOME OF STUDENT LEARNING

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Abstract

This research is based with a low student learning outcomes, particularly in the course of General Physics. To overcome these problems, applied guided inquiry learning model that aims to determine the effect of inkuiry's model to the outcome of student learning. The method which used in this study is quasi-experimental with pretest-posttest control group design. The Samples are students that taking the course General Physics I at the University of Medan on odd semester in the academic's year 2015/2016 which consisting of two classes are determined by cluster random sampling. One class as the experimental group numbered 42 people by applying the guided inquiry learning model and one other class as a control group numbered 26 people by applying conventional learning. The Instrument test of learning outcomes in the realms cognitive formed multiple choice with five options totaled 27 items that have been validated. Based on the results of different test (t-test) obtainable the significant difference due to the application of guided inquiry learning model towards the outcome of student learning on the Particle Kinematic subjects. In the other words, the application of guided inquiry learning model is better to improve the learning outcomes than the conventional learning.

Keywords : guide inquiry learning model, learning outcomes, Kinematics Particle

A. INTRODUCTION

General Physics is part of the learning physics that has an important roles in following and developing science and technology. Therefore, in promoting science and technology, physics learning process should receive more attention. One of the fundamental problems in physics learning, both at school and in college today is the difficulty of studying physics. The difficulty of studying physics supported by the low number of students learning outcomes, especially in the course of General Physics. This also happened at the State University of Medan.

Low outcomes of student learning are less equipped with the necessary skills to be able to master and apply the concepts of physics. Lack debriefing these abilities can be seen from the learning process of physics, especially General Physics that dominant use the lecture method in the form of explanations theory, the translation of mathematical formulas and the presentation the problems of physics that emphasize mathematical

equation to solve them so the students that less intelligent of mathematics will be more difficult to learn physics.

Based on interviews, the lecturer acknowledge that traditional teaching methods in physics course fail to implant a deeper understanding of the concept so that the outcomes of learning is low. As the result, students do not have the necessary skills in solving problems, especially related to daily life. This is reinforced by the results of interviews to some students. Students find it difficult in terms of: understanding the physics of matter that is too abstract and require laboratory activities; difficult to solve the problems of physics involving mathematical formulas and difficult to solve problems related to everyday life.

Based on these problems, need to be implemented the learning that can equip students with the necessary skills to overcome the difficulties of learning and improve the outcomes of learning physics. One of the learning model that can be used for overcomse these problem is guided inquiry learning (guided inquiry). This learning model focusses on the work process using inquiry methods, problem solving, demonstrations and experiments. In the guided inquiry learning, the concept is found through investigation through the experiment.

Model guided inquiry is an design of inquiry learning in which the implementation of lecturers provide guidance or instructions that broad enough to learners (Kuhlthau, et all, 2012 and 2007). Implementation of this model is expected to encourage students to think for themselves, discuss and analyze the phasees of presenting problems, collect datas, implement the experiments,organizedatas and formulate explanations so we can find the concept based on the data collected. By applying a model of guided inquiry allows students to try to do an investigation through the experiment so that they are more active and more motivated and more helpful in understanding the concept of physics more deeply so that achieve the better learning outcomes (Panasan&Nuangchalerm, 2010).

B. RESEARCH METHOD

The method that used in this study is quasi-experimental with pretest-posttest control design group as shown in Table 1. The Samples were students that taking the course General Physics I at the University of Medan on odd semester in the academic's year 2015/2016 which consisting of two classes are determined by cluster random sampling. One class as the experimental group numbered 41 people by applying the guided inquiry learning model and one other class as a control group numbered 26 people by applying conventional learning. The Instrument test of learning outcomes in the realms

cognitive formed multiple choice with five options totaled 27 items that have been validated.

Table 1. Control Group Pretest-Posttest Design

Group	Prior test	Treatment	FinalTest
Eksperiment	O_1	X_1	O_2
Control	O_1	X_2	O_2

Descripton:

O_1 = prior test (*pretest*)
X_1 = *guided inquiry* learning model *guided inquiry*
X_2 = conventional learning
O_2 = final test (*posttest*)

Different test (t-test) was used to determine the effect on learning model towards learning outcomes with term normal distribution of data and homogeneous. Improved learning outcomes seen using gain normalized ratio (N-gain) learning outcomes obtained in the experimental class with those obtained in the control class. N-gain is calculated with an equation developed by Meltzer (2002), where:

$$g = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}}$$

the gain g is normalized, S_{max} is the maximum score (ideal) from the initial test and final test, S_{post} is the final test score, while S_{pre} is the initial test scores. The level of normalized gain can be classified as follows: (1) if g> 0.7, then the N-gain resulting in a higher category; (2) if $0.3 \leq g \leq 0.7$; then the N-gain generated in the medium category; and (3) if g <0.3, then the N-gain resulting in a lower category.

The phases of the learning model your inquiry used in this study are: open , implant, explore , identify , collect, create and share and evaluate(Kuhlthau, et al., 2012) as shown in Table 2.

Table 2. The sintaks of Guided Inquiry Models

Learning Phases	Lecturer Activities
open	Giving curiosity and create the interest of prior knowledge student with asking some questions
implant	Build the basic knowledge with invite the student to observation the things that related with subject that taught
explore	Guide the student to extracted the information from various of relevant sources and guide the student to implement the investigation

Learning Phases	Lecturer Activities
identify	Consider the mind of students and asking the question which suitable with the student investigations
collect	Guide the student to collect the important informations
create and share	Guide the student for creating and sharing the result of investigation from every groups to be able develop their investigation result
Evaluate	Evaluate the content and the process of learning

Source Kuhlthau, *et all*, (2012)

C. RESULT AND DISCUSSION

Based on initial test results showed that the experimental class and control class normal distribution and homogeneous. The average initial test experimental class at 34.24 and the average initial test control class is 30.91. Based on initial test data using hypothesis testing with different test (t-test) showed that the experimental class and control class has the initial capability level is almost same. The average final test experimental classs is 59.83 and average final test control class is 67.57. Based on the results of different test (t-test) showed that a significant difference due to the application of guided inquiry learning model the learning outcomes of students on the material particle kinematics. In other words, the application of guided inquiry learning model is better improve learning outcomes compared to conventional learning. Calculation of normality, homogeneity and t-test for two independent samples (independent samples t-test) using SPSS 15.0.

Testing the effectiveness of the model quided inquiry in improving learning outcomes expressed in% of N-gain on the topic particle kinematics. The percentage increase in learning outcomes in the experimental class 49%, while in the control group 40%, respectively in the category. The mean N-gain learning outcomes for the experimental class is greater than the average N-gain control of the learning outcomes in the classroom. Comparison of the mean score of the initial test, the final test and the N-gain learning outcomes experimental class and control class is shown in Table 3.

Table 3. The Comparison of Average Initial Test, Final Test and % N-Gain Learning Outcomes of Experiment Class and Control Class

Class	Initial Test	Final Test	% N-gain
Eksperimen	34,24	67,57	49
Control	30,91	59,83	40

The percentage of N-gain can be described by every indicators of learning outcomes, namely remember (C1), understand(C2), apply (C3), analyze (C4), evaluate (C5) and create (C6) between the experimental group and the control group as shown in Picture 1. According to Picture 1, for the experimental class% N-gain learning outcomes on indicators of C1, C2, C3, C4, C5 and C6 respectively are 70%, 47%, 51%, 43%, 45% and 44%.Pesentase% N-gain learning outcomes on indicators of C1, C2, C3, C4, C5 and C6 respectively are 46%, 35%, 40%, 30%, 32% and 29%. Improved the highest learning outcomes which achieved experimental group occurred in indicator C1 and C3 and the lowest on indicators of C4, C6 and C5. Improved the highest learning outcomeswhich achieved control group also occurs in the indicator C1 and C3 and the lowest on indicators of C5, C6 and C4.

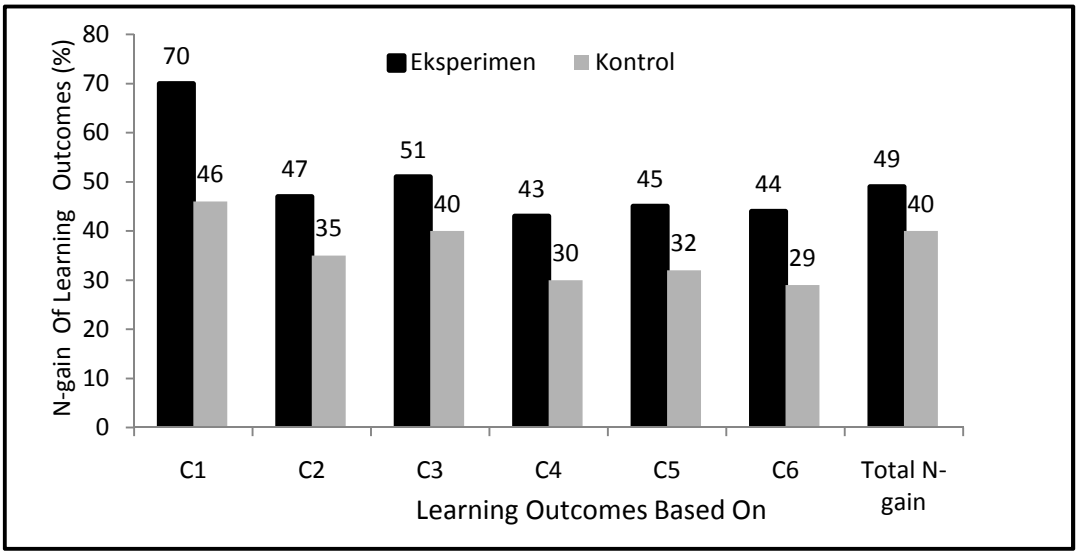

Figure 1. The Comparison N-Gain for Learning Outcome Indicators between Two Goups

The most low of Percentage N-Gain towards learning outcomes for the experimental group and the control group occurred in indicators C4, C5 and C6. This can be happen because of work to analyze, evaluate, and create has more difficulty levels than with other aspects of cognition (remember, understand, and apply).

Guided inquiry model application gives a better effect in improving student learning outcomes. Learning through guided inquiry is intended to guide students find the concept independently through experiments. The concept discovery begins with concrete facts that students are directly encountered when conducting experiments. Concrete facts that students encountered processed again to form ideas, and of the idea of the students will find a concept.

This is supported by the Heating &Nuangchalerm, (2010) which states that the application of learning guided inquiry allows the students more active in conducting an investigation through experiments that help them to understand the concepts of physics more deeply so as to achieve the better learning outcomes (Panasan&Nuangchalerm, 2010) ,.

These results are consistent with the results of the study Herlina (2005) and Wijayanti (2010), which concluded that the guided inquiry learning can improve the activity of study and mastery of concepts students who have an impact on their learning outcomes. This is supported by Kuhlthau, et al., (2012) and Kuhlthau, et al., (2007) which states that by applying guided inquiry, students attempted berinkuiri. This activities will bring cognitive abilities of student become better and more meaningful, because students become more active in acquiring knowledge through direct experience, and not just hear and receive knowledge or information of what was said by the teacher

D. CONCLUSIONS AND SUGGESTIONS

The conclusion based on the result of research that has been done is as follows:

1. Based on the research, found that there is significant influence as a result of the application of guided inquiry learning model towards the learning outcome of student on the material Particle Kinematics
2. The percentage improvement of learning outcomes for the experimental class is higher than the percentage increase in learning outcomes in the control class and included at the medium category.

E. GREETINGS THANKS

The Greetings sincere gratitude to the Director General of Higher Education which has provided funds to support the implementation of this fundamental research with the agreement numbered: 016/UN33.8/KU/2015.

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