

Effect of Free Inquiry Models to Learning Achievement and Character of Student Class IX

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Abstract. The aim of this was; 1) to know the difference of student's learning achievement following the free inquiry learning model with conventional learning, 2) to know the improvement of student's learning achievement after following the free inquiry model, and 3) to know the character development of the students. The type of research used is quasi experimental research. The research was conducted at Catholic Junior High School Maria Goreti Ende academic year 2017/2018. The sample of the research is the students of class IXa as the experimental class which amounted to 33 students and IXd as the control class which amounted to 34 students. Sampling technique is purposive sampling technique. Student achievement data obtained from the results of the initial test and the final test is the type of multiple choice test. Student character development data obtained through questionnaire. The result data were analyzed by t-test and gain test. The results of the analysis can be concluded; 1) there are significant achievement dissections between students in the experimental class with the students in the control class, 2) there is an increase in student achievement, where the students who get the free inquiry model learning have increased higher learning achievement than students who get the conventional model learning 3) free inquiry self-learning model can also develop the character of students, especially on the character of curiosity, creative, honest, confident, disciplined, and responsible.

Keywords: Soil Erosion, Conservation, Geospatial Information.

INTRODUCTION

Inquiry learning model is very well used because it is able to encourage students to construct knowledge either in the form of concept, theory, or problem solving meaningfully. Students undertake challenging activities to solve problems encountered through reliable scientific investigations. Kahle is recommended [1], all educators in the field of science to apply inquiry learning model in science learning activities, because with inquiry can improve problem solving ability.

The inquiry model is one of the learning models that is oriented towards student-centered learning. The essence of the inquiry learning model is to engage students in real problems by challenging an investigation, helping them to identify a problem conceptually or methodologically, and engineer them to devise how to solve the problem. Inquiry learning is used in physics learning, because it can develop students' ability to understand and acquire knowledge through systematic and scientific thinking. Has been proposed by Feinman [2], scientific thinking in inquiry includes activities; observing, formulating relevant questions, planning investigations, revising what is known, conducting experiments using tools to obtain data, analyze and interpret data, and make predictions and communicate results.

The purpose of this research is to know the difference of the students learning achievement which applied the free inquiry model with the learning achievement of students applying the conventional model, and to know the character development of the students after applying the free inquiry self-study model.

METHODS

This research uses quasi-experimental design with pretest-posttest design. Population in this research is all students of class IX Catholic Junior High School Maria Goreti Ende Academic Year 2017/2018. The samples were taken by two classes with purposive sampling technique. Class IXd as an experimental class using free inquiry self-learning model, while class IXa as control class using conventional learning model. Instrument of data collection to know the result of cognitive learning that is in the form of question test of multiple choice form. While the instrument to measure the character of students used questionnaire.

Analysis of the test instrument is the test of validity, reliability test, distinguishing power and difficulty level. While the questionnaire was done validation construct by experts. Data that have been collected from post test and questionnaire results, then analyzed using;

Character Development Analysis

The development of the character of the student is calculated by looking for a percentage. To obtain a percentage of a value can use the equation formulated by Sugiyono [3];

$$p = \frac{f}{N} \times 100\%$$

The student character development criteria are as follows.

81.25%	- 100%	= culture
62.50%	- 81.24%	= begin to develop
43.75%	- 62.49%	= starts to look
25%	- 43.74%	= not yet seen

Improved Analysis of Learning Outcomes

a) Normality Test

Normality test is used to determine whether the data being analyzed is normal distribution or not. Normality test using the equation formulated by Sudjana [4]:

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

Information:

χ^2 = chi squared

E_i = expected frequency

O_i = frequency of observation

k = number of interval classes

If χ^2 obtained is at the H_0 receiving area, then the data is normally distributed.

b) t-test

To know the difference of student learning achievement after using free inquiry model, use t-test. t-test is formulated by equation by Riduwan [5], that is:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1}{n_1} + \frac{S_2}{n_2} - 2r \left(\frac{s_1}{\sqrt{n_1}} \right) + \left(\frac{s_2}{\sqrt{n_2}} \right)}}$$

c) Gain test

To see the magnitude of the increase in student learning achievement used gain test with equations in Wiyanto [6]:

$$\langle g \rangle = \frac{\langle S_{post} \rangle - \langle S_{pre} \rangle}{100\% - \langle S_{pre} \rangle}$$

Information:

- $\langle g \rangle$ = gain factor
- $\langle S_{pre} \rangle$ = average initial test score (%)
- $\langle S_{post} \rangle$ = average final test score (%)

Given factor criterion $\langle g \rangle$:

- $g \geq 0.7$ = high
- $0.3 \leq g < 0.7$ = moderate
- $g < 0.3$ = low

RESULTS AND DISCUSSION

Learning Achievement

Learning achievement obtained through written test. Written tests are conducted before and after learning using the free inquiry model. The cognitive learning achievement were analyzed using the gain and t-test. The gain test is used to know the significance of the improvement of learning achievement. The t-test is used to determine the difference in mean learning achievement. The results of the pre-test and post-test of both classes tested the difference of two averages indicating that the experimental class is better than the control class. The students' cognitive learning achievement are presented in Table 1. and Figure 1. as follows.

Table 1. Average Cognitive Learning achievement of Students

Class	Average Pre-test	Average Post-test	Criteria Enhancement
Experiments	48.03	66.52	Medium
Control	43.24	43.68	Medium

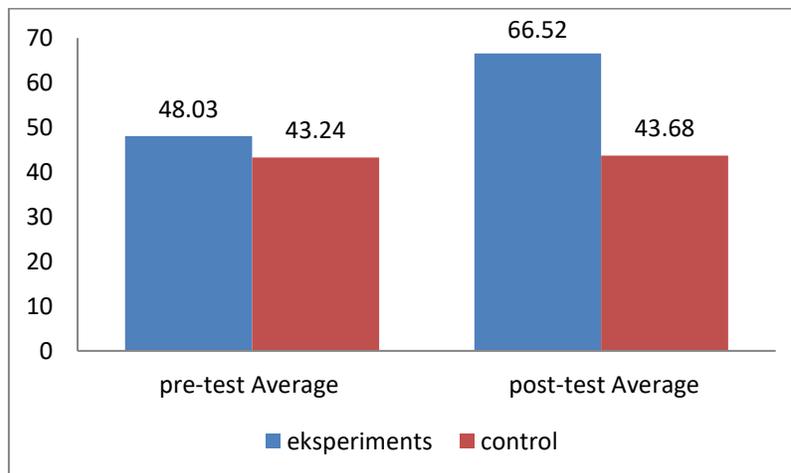


Figure 1. Average Student Learning Achievement

The results of the analysis show that students' concept of understanding increases after learning. In the experimental class, the gain factor is 0.36, while in the 0.01 control class, it can be said that the improvement of understanding of science concept of electrical circuit material is in medium criterion for experimental class, and low

criterion for control class. Based on the analysis, it can be concluded that the students' understanding of the concept of experimental class is higher than the control class students.

Based on the result of t-test analysis shows that there is a significant difference between experiment class learning achievement and control class learning result. From the difference of learning achievement shows that free inquiry model is effectively used as a learning model for class IX students. The existence of differences in the improvement of learning outcomes is because learning is done through a scientific investigation, where students can experience themselves a scientific work process that includes; students provide temporary answers to a problem to be investigated, students can plan inquiry, retrieve data, process data, and draw conclusions. This is according to the results of research Beninga, at al and research Yildirim, at al [7, 8].

Student Character

Characters excavated in this research are curiosity, creative, honest, confident, discipline, and responsible. Character development data obtained through questionnaire. The amount of student character is analyzed using gain test. Student character analysis results are presented in Table 2.

Table 2. Results of Student Character Analysis

Student Character	Before Treatment (%)	After treatment (%)	Gain
Curiosity	82.26	83.91	Low
Creative	63.39	66.09	Low
Honest	72.81	74.52	Low
Confident	83.23	84.06	Low
Discipline	88.44	90.48	Low
Responsible	81.25	81.45	Low
Average	78.56	80.09	Low

Based on the analysis of character development as a whole, it can be seen that the character value increases from before learning and after learning.

a) Character Curiosity

The development of curiosity character is measured based on two indicators, namely; 1) interest and curiosity about the material being studied, 2) answering questions at the experimental stage. The result of character data analysis shows that there is an increase in the curiosity character of the year before and after learning using the free inquiry model although it shows a relatively small increase. This means that from the beginning students already have interest and curiosity about the material to be studied and the desire to answer all questions in the student worksheet. This is in accordance with Amelia research results [9].

b) Creative Character

The development of creative character is measured based on three indicators, namely; 1) use different ways in experiment, 2) desire to accept challenge, 3) dare to try. The result of character questionnaire analysis shows that there is an increase of creative character before and after learning using free inquiry model, although still in criteria start to develop.

c) Honest Character

The development of honest character is measured based on two indicators namely; 1) not cheating, and 2) reporting data according to experimental results. The result of character questionnaire analysis shows that there is an improvement of honest character before and after learning using free inquiry model, although still in the criteria of each developing.

d) Confident Character

The development of confident character is measured based on two indicators namely; 1) give their own opinions in groups, and 2) able to complete the assigned task. The result of character questionnaire analysis showed that there

was an increase of confident character before and after learning using free inquiry model although the increase was not significant.

e) Discipline Character

The development of the discipline character is measured based on two indicators, namely; 1) work on time, 2) maintain comfort during experimental activities. Character questionnaire results show that there is an increase in the character of discipline before and after learning using the free inquiry model. Before and after learning, the criterion of discipline character has been on the category of entrepreneurship, meaning that students already have a very good character of discipline. In line with Bear research, et al [10].

f) Responsible Character

The development of responsible characters is measured based on two indicators, namely; 1) completing all tasks assigned, and 2) maintaining equipment safety. The results of the questionnaire analysis show below, there is an increase in the character of students before and after learning, although the magnitude of the increase is not too significant. Prior to learning with free inquiry models, the criteria of responsible characters were already in the category of entrapment. This means that the character is very good, because students are accustomed to complete the tasks assigned by teachers, and maintain the safety of practicum tools.

CONCLUSION

The conclusions that can be drawn from the results of this study are;

a. There is a significant difference between student learning achievement using free inquiry models and student learning achievement using conventional models.

b. Application of free inquiry models can improve students' understanding of the subject matter of electrical circuits. Increased cognitive aspects of learning achievement include moderate criteria.

c. The use of free inquiry model can develop the character of students that is in the criterion of culture

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