The development of scientific concept on electric current of grade 11 students through Predict – Observe – Explain : Classroom – Based Action Research

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ABSTRACT

This research aims to develop Predict – Observe – Explain (POE) approach learning activities and to develop scientific concepts in Electric current. There were 28 grade 11 students, second semester of academic year 2014 (November 2014 – March 2015), Narinukul School Office Mathayomsuksa Area 29, participated this study. The research methodology is classroom – based action research. The instrument used in this study were including POE 6 lesson plans on electric current, The evaluation instrument **D**etermining and **I**nterpreting **R**esistive **E**lectric **C**ircuits **C**oncepts **T**est (DIRECT) Version 1.2 Thai version. The qualitative data was analyzed and interpreted for the development scientific of concepts on electric current while the effectiveness had been analyzed by using basic statistics. The findings showed that students' understanding of electric current concept that were taught using Predict – Observe – Explain : classroom – based action Research has been improvenent.

INTRODUCTION

In these day a science and technology curriculum for primary, secondary, and tertiary education in Thailand outlined what students have to know and be able to do in science and provided teaching programs and also assessment and policies. Regarding the national science curriculum standard in Thailand, science is the principal subject for basic education. This also helps to understand the nature of science. And technological development and on the other hand, technology has helped develop scientific knowledge and research. [4]

Predict-Observe-Explain (POE) approach learning activities is the learning activities on constructivist theory. (White and Gunstone,1992) POE approach is an effective way to Means for students to thinking and discussions about the scientific conception as a process presentation scenarios were for students to predict what will happen if to the change. After that students predict to observe the situation. The students do the experiment and observation prove or find the answers from the situation is teacher created. Then tell students what students have to do on the experimental and observation of a inquiry by themselves. The last, Students are required to explain the difference between predicted and observation [6]. The research finding though POE to teaching to make students' more reduced misconceptions [3]

The lesson physics in electric current As the content is difficult to understand. And this content that is relevant to their daily lives. Most of the area were the students have misconceptions like When the connect resistor front bulb in series circuit make light decrease [1]. Students' misconceptions indicates that the main source of the difficulty is with term confusion, generally associated with current. Students' assign the properties of energy to current, and then assign these properties to voltage and resistance [5]. Specifically, both voltage and resistance can only occur in the presence of a current.[2]

METHOD

Research Purposes

Development of scientific concept on electric current of grade 11 student through Predict – Observe – Explain.

Research Design

In order Development of scientific concept on electric current of grade 11 student through Predict – Observe, this present study used quantitative research design.

Study participant

There were 28 grade 11 students, second semester of academic year 2014, Narinukul School Office Mathayomsuksa Area 29. All of them were studying of secondary education program emphasizing science and mathematic.

Research instrument

1. Science lesson plans about electric current through Predict – Observe – Explain, 6 lesson
2. Conceptual test of Determining and Interpreting Resistive Electric Circuits Concepts Test (DIRECT) Version 1.2 development by Paula V. Engelhardt and Robert J. Beichner in Thai version, 25 questions.

DATA COLLECTION

The data collected this research following, for investigating students' characteristics of conceptual understanding, the student at the beginning and the end of learning Predict – Observe – Explain in 6 lesson plans include, the series of resistor, the parallel of resistor, the mixed resistor, the series of battery, the parallel of battery and the mixed of battery as a pre-test and post- test.

DATA ANALYSIS

The data analysis is analyze with statistic such ase mean, strandard deviation, t-test and compare the difference students' response to conceptual test between pre-test and post-test. The pre-test and post-test results were calculate in percentage.

RESULTE AND DISCUSSION

The average of the scientific conception on Electric current pre – test and post – test

For analysis the test was entered into Excel and analyzed for a correct percentage. The result analysis was test 25 items by students' getting correct answer and shown percentage of learning of POE before and after the study in Figure. 1

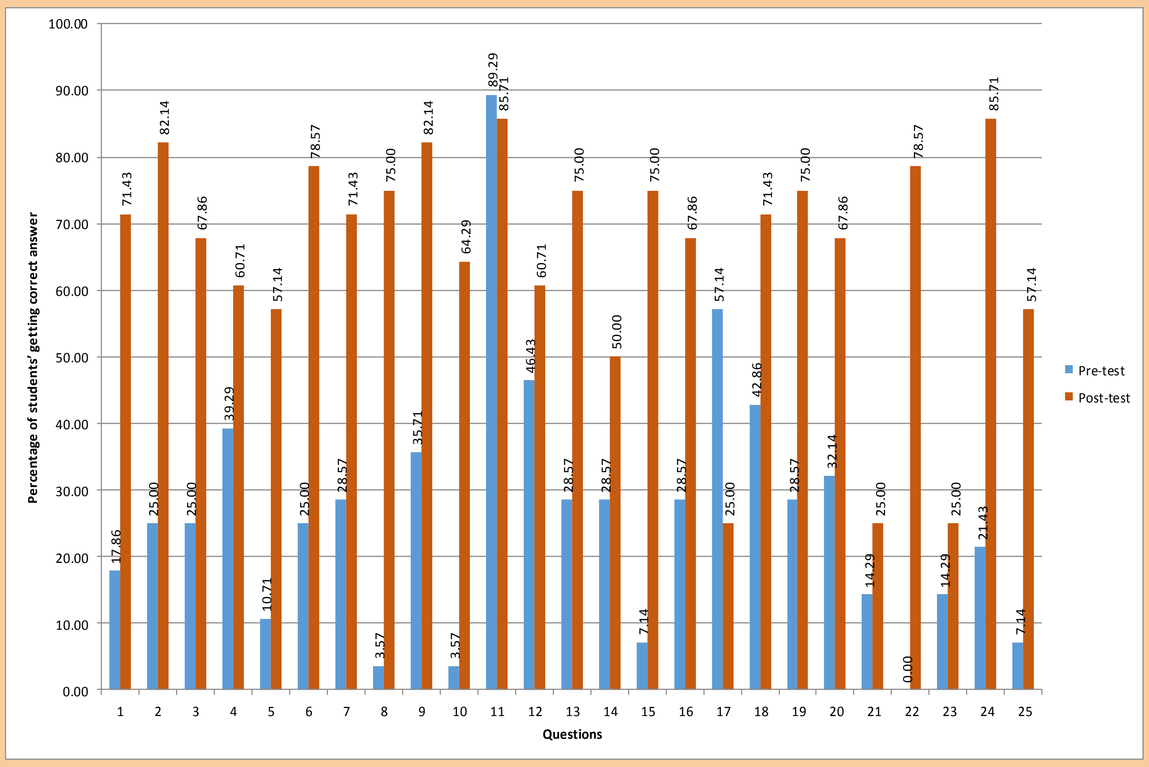

Fig 1. Show the percentage students' getting correct answer

Question 1, 3, 4, 5, 9, 11, 12, 13, 15, 17, 18, 19 20, 21, 22, 24 and 25 were used to ark about connectivity resistor of series parallel and mixed. The students' can test for 50 percentage. Notice is the item 21 because of students' respond is when put the bulb in circuit series resistor will have resistance increase make brightness decrease.

Question 2, 6, 7, 8, 10, 14, 16 and 23 were used to ark about connectivity battery of series parallel and mixed. The students' can test for 50 percentage.

The average of the scientific conceptions on Electric current.

The result of the average of scientific conceptions on Electric current. The pre – test and post – test learning activities base on POE method Following Table 1.

Table 1: The comparison of the average in the scientific conceptions on electric current pre – test and post – test.

Conceptual test	N	$\bar{X}$	S.D.	t-test	Sig.
Pre - test	28	6.32	2.62	15.47	0.00
Post - test	28	15.67	2.46		

The result in table 1 showed that pre – test was mean 6.32, The standard deviation of 2.62 and post – test was the mean 15.67, The standard deviation of 2.46. In addition, the results of the paired sample t – test of the data via the electric current test applied to learning of POE before and after the study. There are different significant at $p < 0.05$.

The learning using POE on electric current. The average of the scientific understanding before and after learning higher than before the study. The mean score of understanding conceptions there are difference significantly at $p < 0.05$.

CONCLUSION

The purpose of the this research were to development of scientific concept on electric current for grade 11 students' through about Predict – Observe – Explain. The result showed that quantitative analysis was done in order to find whether there is a significant difference between pre – test and post – test and activities POE allows the student to development scientific concept has been improvement.

ACKNOWLAGEMENT

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