

THE DEVELOPMENT OF SCIENTIFIC CONCEPTS ON ELECTROSTATICS OF GRADE 11 STUDENTS THROUGH PREDICT-OBSERVE-EXPLAIN (POE)



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Abstract

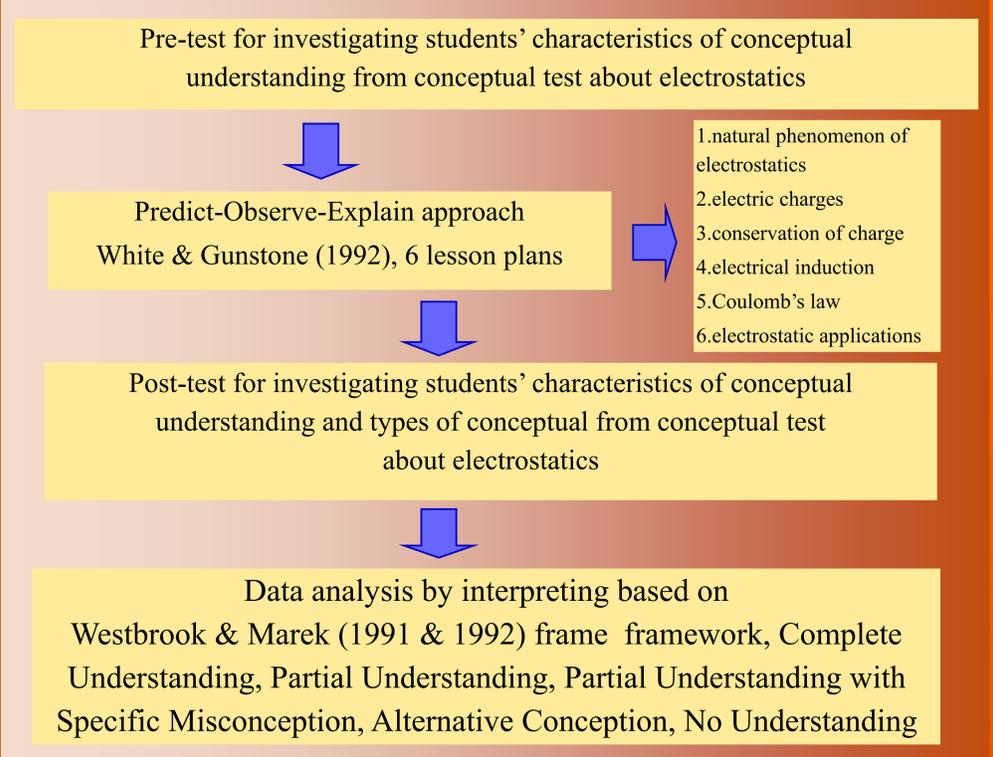
This research was aimed to study and enhance the students' concepts on electrostatics by using Predicts-Observe-Explain approached. There were 45 grade 11 students, second semester of academic year 2014 (November 2014-March 2015), Roi-Et Wittayalai School Office of Secondary Education Service Area 27, participated this study. This research was performed in qualitative research designed. There were two main research tools used. Firstly, 6 lesson plans (total 12 hours) on electrostatics. Secondly, evaluation tools, 20 questions with two-tier multiple choices. The response from both student and observer were interpreted soon after each learning activity finished. It was found that the pre-test of students showed their partial understanding with scientific and misconception. After finished Predicts-Observe-Explain approached, post-test performed that student had perfectly the correct while still remained some misconceptions on electrostatics. It could be concluded that students had developed their misconceptions to scientific concepts on electrostatics.

Introduction

Problems and difficulties of conceptual learning in science have been found widely across all ages and levels in science education research [1]. Student of any age come to science classes with informal ideas, disorganized experience, unstructured conception, and initial understanding that usually were unscientific basis because of misinterpretation for science terminology, unmeaning knowledge construction about the physical world, unreasonable explanations for how and why things function over many years of everyday experience disconnected from the reality of world [2].

Physics is seen as very difficult for student which be similar to many other countries around the world. Some research showed that Thai student held common misconception of physics [3]. The subject of electrostatics is important topic in the physics curriculum of middle and upper high schools. In this context, electrostatics a phenomenon that can occur in everyday life. Therefore, electrostatics physics is being taught at different education levels such as primary school, high school, and university. Therefore, researchers choose using POE develop of scientific concepts on electrostatics of grade 11 student.

Materials and Methods



Results and Discussion

Students' conceptual understanding about natural phenomenon of electrostatic

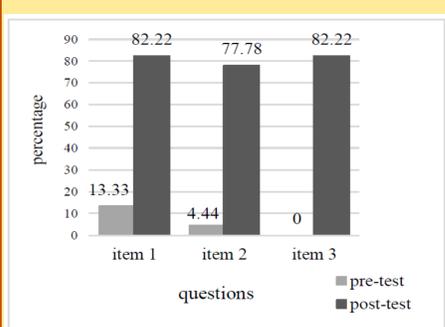


Figure 1. Pre-test and Post-test scientific concept results about natural phenomenon of electrostatic.

Students' conceptual understanding about electric charges

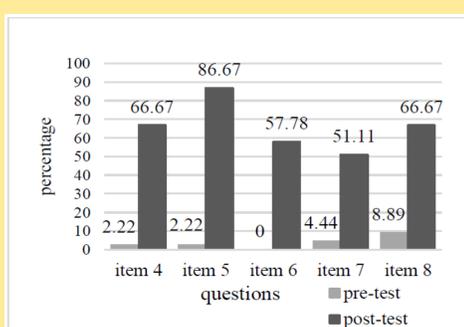


Figure 2. Pre-test and Post-test scientific concept results about electrical charges.

Students' conceptual understanding about conservation of charge

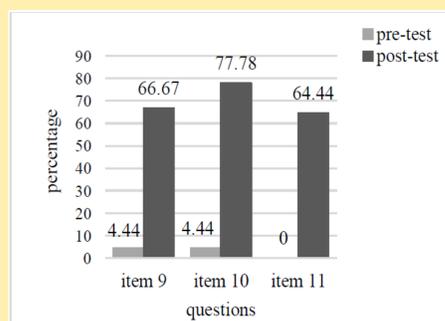


Figure 3. Pre-test and Post-test scientific concept results about conservation of charge.

Students' conceptual understanding about electrical induction

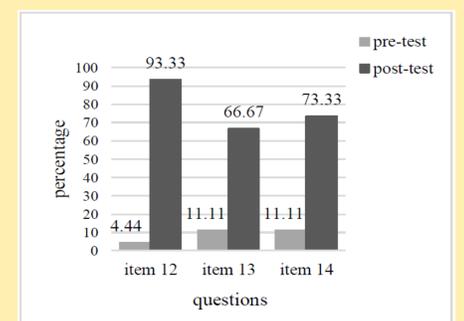


Figure 4. Pre-test and Post-test scientific concept results about electrical induction.

Students' conceptual understanding about Coulomb's law

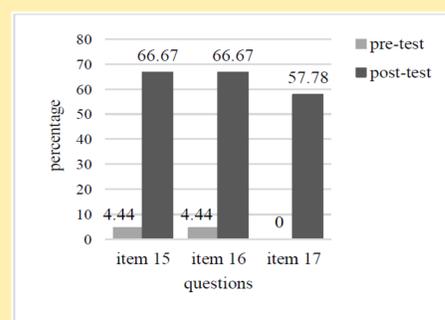


Figure 4. Pre-test and Post-test scientific concept results about Coulomb's law.

Students' conceptual understanding about electrostatic applications

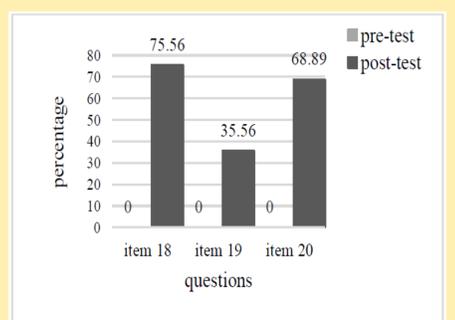


Figure 6. Pre-test and Post-test scientific concept results about electrostatic applications.

Students' understanding about electrostatics all 6 conceptions, all Figure shown that pre-test most students misconceptions all conceptions when comparing with post-test most students developed scientific concepts about electrostatics as their percentage dramatically change from misconceptions to scientific concepts, which after learning POE each conceptions students can explain correctly consistent with the scientific concepts.

The result shows that the students' scientific concepts about electrostatics after learning through POE approach are developed. It is confirmed by the students' post-test of students' about electrostatics, 20 questions students had scientific concepts higher than pre-test. The evidence is consistent with research findings of Keles and Demirel [4] found that POE provide the opportunity for students to demonstrate changes in their achievements and help students manage conceptual change in terms of realizing their own misconceptions.

Conclusion

This study aimed to enhance the students' concepts on electrostatics. The learning activities were based on POE approach. The results showed that student's scientific concepts of all are enhanced. The POE approach can greater improves students' understanding on electrostatics.

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