

A Study of Learning Achievement for Heat Transfer by Using Experimental Sets of Convection with the Predict-Observe-Explain Teaching Technique

Authors : Wanlapa Boonsod, Nisachon Yangprasong, Udomsak Kitthawee

Abstract : Thermal physics education is a complicated and challenging topic to discuss in any classroom. As a result, most students tend to be uninterested in learning this topic. In the current study, a convection experiment set was devised to show how heat can be transferred by a convection system to a thermoelectric plate until a LED flashes. This research aimed to 1) create a natural convection experimental set, 2) study learning achievement on the convection experimental set with the predict-observe-explain (POE) technique, and 3) study satisfaction for the convection experimental set with the predict-observe-explain (POE) technique. The samples were chosen by purposive sampling and comprised 28 students in grade 11 at Patumkongka School in Bangkok, Thailand. The primary research instrument was the plan for predict-observe-explain (POE) technique on heat transfer using a convection experimental set. Heat transfer experimental set by convection. The instruments used to collect data included a heat transfer achievement model by convection, a Satisfaction Questionnaire after the learning activity, and the predict-observe-explain (POE) technique for heat transfer using a convection experimental set. The research format comprised a one-group pretest-posttest design. The data was analyzed by GeoGebra program. The statistics used in the research were mean, standard deviation and t-test for dependent samples. The results of the research showed that achievement on heat transfer using convection experimental set was composed of thermo-electrics on the top side attached to the heat sink and another side attached to a stainless plate. Electrical current was displayed by the flashing of a 5v LED. The entire set of thermo-electrics was set up on the top of the box and heated by an alcohol burner. The achievement of learning was measured with the predict-observe-explain (POE) technique, with the natural convection experimental set statistically higher than before learning at a 0.01 level. Satisfaction with POE for physics learning of heat transfer by using convection experimental set was at a high level (4.83 from 5.00).

Keywords : convection, heat transfer, physics education, POE

Conference Title : ICPE 2018 : International Conference on Physics Education

Conference Location : Singapore, Singapore

Conference Dates : September 10-11, 2018