

The Development of Scientific Concept of “Momentum and Regarding Collision” For Grade 10th Students Through Learning Activities Based on The Predict-Observe-Explain (POE) Method.

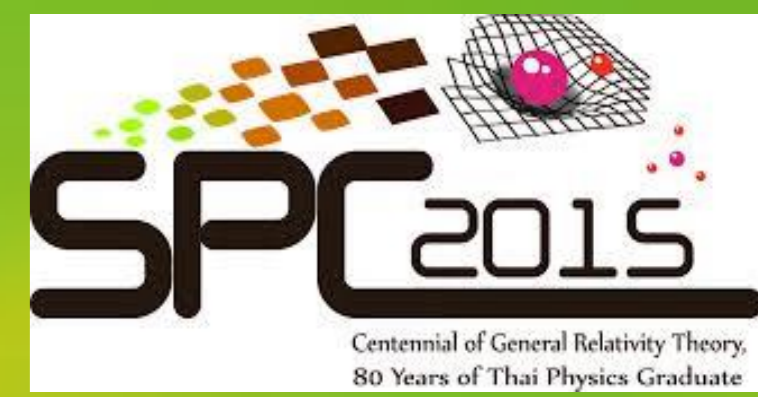
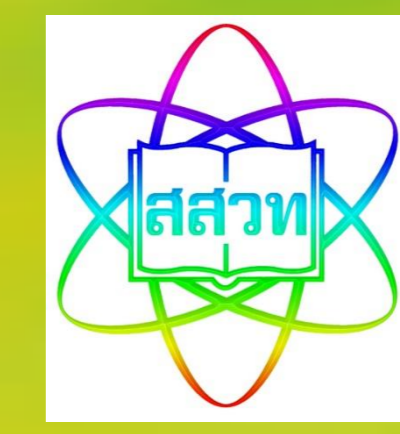
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Abstract The purpose of this research was to develop scientific concepts of momentum and collision for grade 10th students through Predict-Observe-Explain (POE) learning activities. There were 34 grade 10th students of Roi-Et Wittayalai School, during the second semester of academic year 2014 (November 2014 – March 2015) participated in this study. There were two research tools used in this study. Firstly, experimental tool is 6 POE lesson plans. Secondly, data collection tool was a two-tier multiple choice test which was used to investigate the students' understanding on the scientific concept of momentum and collision. The pre-test results performed that most of the students contained partial conceptual understanding while some students represented alternative concepts. In contrast, the post-test showed that the number of students' alternative conceptions was decreased and most of them performed good science conceptual understanding.

Introduction

This study focuses on an effectiveness active learning strategy called predict-observe-explain (POE). The POE approach consists of three main steps: 1) predicting the results of a demonstration; 2) observing the demonstration; and 3) explaining and discussing the reasons for the results and comparing them with the initial prediction. It elicits students' existing ideas and also promotes discussion of their ideas. The POE strategy is based on the constructivist learning theory, which proposes that students build their own body of knowledge through their experiences. When students confront a new experience they accommodate it with their existing ideas, perhaps changing what they already know, or perhaps discarding the new information as irrelevant. The constructed knowledge is strongly influenced by the current ideas, and supported by social interactions. In order to walk this line, classroom instructors have to explore what students already know and use this as a primary resource to promote classroom interactions. Additionally, previous researchers have reported positive outcomes for use of POE tasks in several physics topics (S Rakkapao, 2013).

Momentum and collision are one of the most difficult topics in physics, and this content is relevant to their daily lives. The students had misconceptions on momentum, most of them contain the concept that not aligned with the scientific concepts (S Roobliem, 2012). In physics focus on student explain phenomena in nature, if student don't understand and don't like knowledge between prior knowledge and current knowledge including they can't apply knowledge, it makes student have low achievement and alternative conceptions.

So, the researcher interested in the learning activities based on the predict-observe-explain (POE) method to develop the concept on Momentum and Regarding Collision to make the students have scientific concepts in correct and complete.

Result and discussion

The average of the scientific conceptions on momentum and collisions.

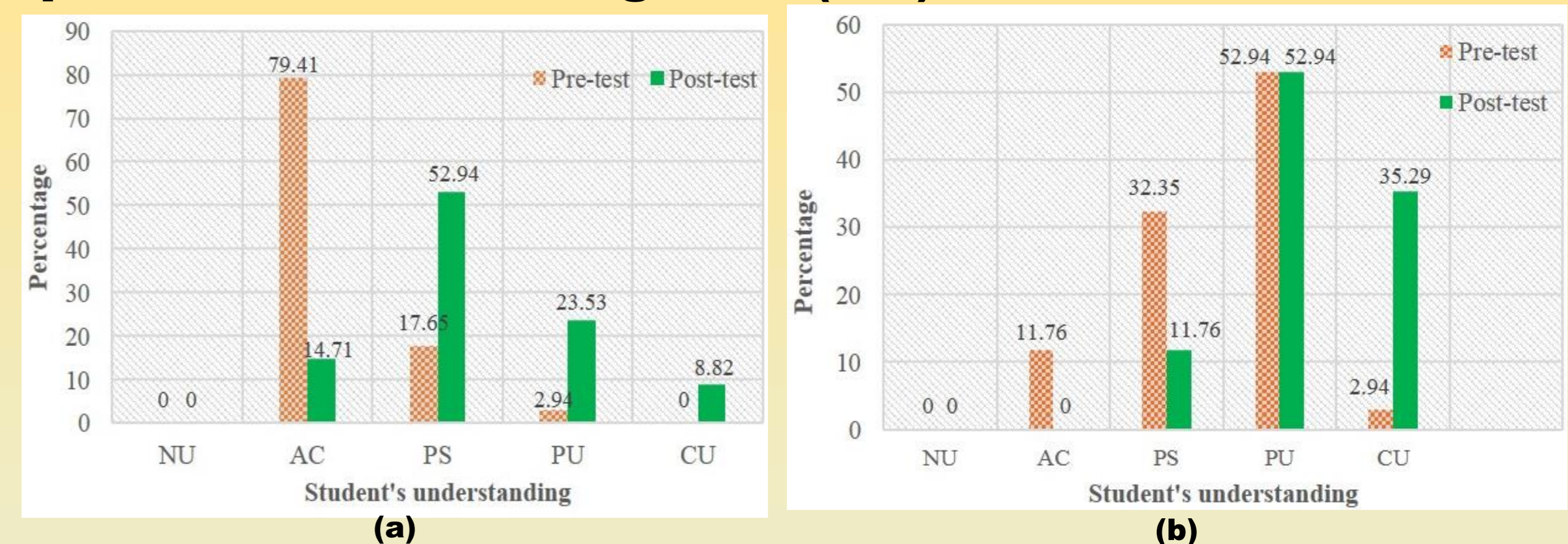
Table 1: The comparison of the average in the scientific conceptions on momentum and collisions pre-test and post-test

Conceptual test	N	\bar{X}	S.D.	t-test	Sig.
Pre-test	34	6.85	2.64	28.87	0.000
Post-test	34	21.15	2.84		

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

Students' understanding about momentum

The scientific conceptions test on momentum had two questions. The results were compared using understanding conceptions between pre-test and post-test shown in Figure 1 (a-b).



Before the study using POE, students have understanding concepts at three levels (NU, AC, and PS) in pre-test. After learning POE, students developed understanding concepts at levels from AC through PU and AC. The activities POE allow students to change their completely scientific conceptions. This is consistent with Plermpit Namwad (2011). Found that the learning POE allows students to change their non-scientific understanding to scientific understanding.

Conclusions

The purpose of this research was to develop the scientific concepts on “momentum and regarding collision” for grade 10th students through learning activities based on the predict-observe-explain (POE) method. The result showed that quantitative analysis was done in order to find whether there is a significant difference between pre-test and post-test ($p < 0.05$) and the activities POE allow students to change alternative concepts through complete understanding.

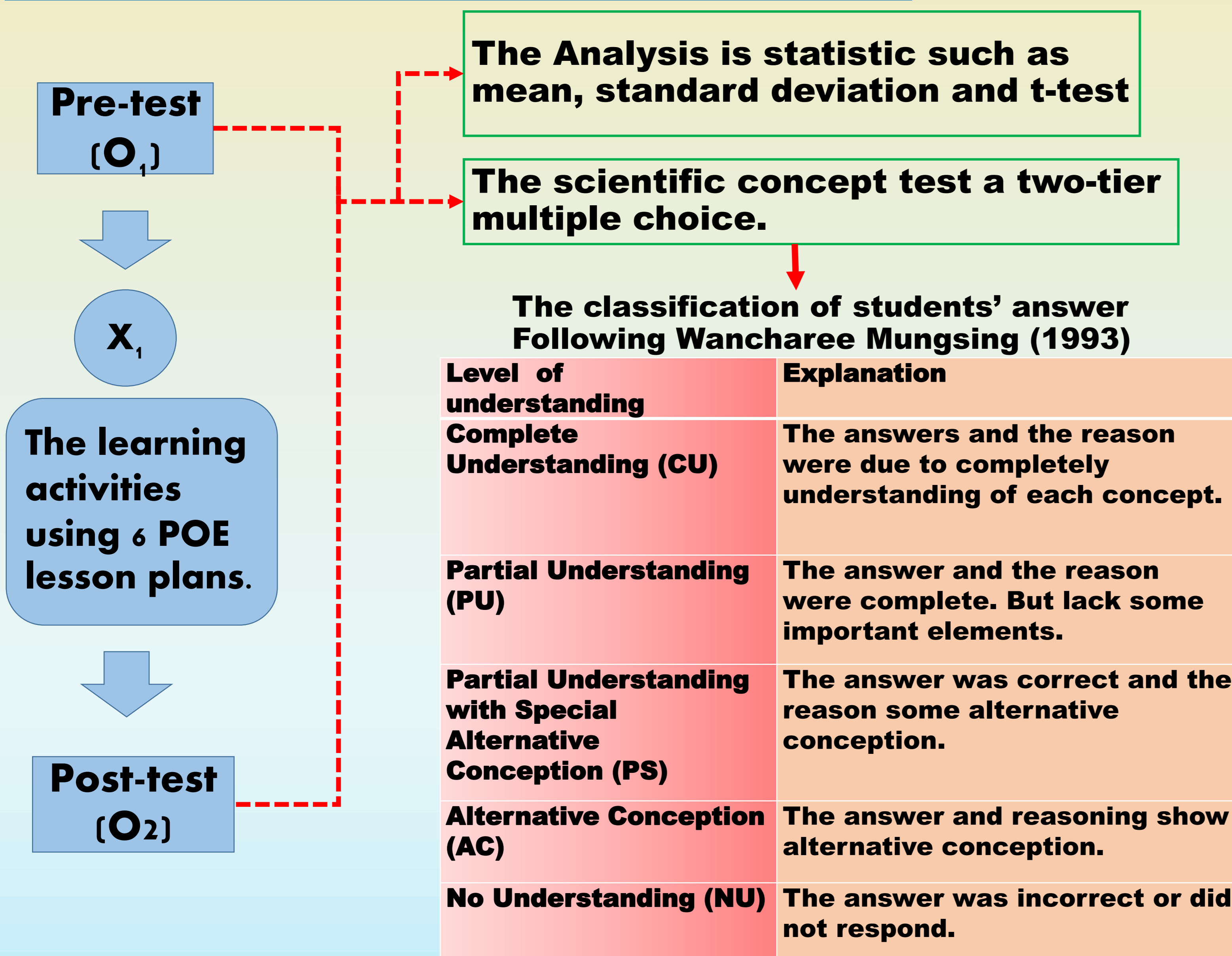
Acknowledgments

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Materials and Methods

The participants of this study were 34 grade 10th students at Roi-Et Wittayalai School, Roi-Et province, Thailand.

This research forms Pre-Experimental Research (One-Group Pre-test Post-test Design)



References

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