

To organize learning activities Predict Observe Explain (POE) And attitude To study science projects In the third grade.

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Abstract

This paper aims to develop an instructional model concerning teaching subject: scientific project which had learning activities based on predict observe explain (POE) model and learning attitude in 9 grade students. A target group selected in the activities was 37 9-grade students studying in their second semester, 2017. POE model was adopted as a tool and an assessment form of learning attitudes towards scientific project subject was utilized.

Comparative data analysis was performed on learning achievement and learning attitudes of the target group participated in learning activities based on predict observe explain (POE) model. Mean was applied in an analysis. The results showed higher learning achievement and moderate learning attitude toward scientific project subject which had learning activities based on predict observe explain (POE).

Background and rationale

Nowadays, technology is constantly advancing. With science being reckoned as a critical foundation to support technological development which is essential to a human living in the present and future, science development is deemed a direct important aspect. Science is knowledge concerning testable explanations; therefore, science study is not about memorization, but a practice to gain skills. Given that, basic education management concerning a science study group has took such concept to develop into the institutional curriculum, to create a standard study group concerning science subjects and to clearly determine required characteristics of students in each education level as per the curriculum which requires the subject: scientific project (SCI23202) as an additional course (Demonstration School of Suan Sunandha Rajabhat University, 2010: 168).

POE is instructional management based on Constructivism. It is the instruction model encouraging students to make a deduction based on their existing belief, express their opinions and discuss about scientific by steps by steps. A scenario is given and task them to predict what would happen in case of changing. After predicting, Experiment and observation are performed, followed by proof to find an answer from the given scenario, then the students are tasked to explain what they noticed from self-seeking and learning. They must be able to discuss the differences between findings derived from the prediction and observation or experimental outcomes (White and Gunstone, 1992 cited in Namkangchanserm, 2008: 16). That is to say, POE is the instruction model emphasizing self-learning encouragement based on learner's basic knowledge and existing experience, as well as emphasizing training of scientific process for learners. As the model emphasizes self-knowledge creation, it allows students to learn by themselves and promotes participation in a process of finding an answer and to encourage them to develop interpretation and inference skills; thus, the model is suitable to be adopted in instruction of a class of scientific project subject.

Objective(s)

1. To study learning attitudes towards a subject: scientific project which had learning activities based on predict observe explain (POE) model and learning attitude in 9 grade students;
2. To be guidelines for better instructional development of a subject: scientific project

Hypothesis

Students participating in a scientific project subject which project which had learning activities based on predict observe explain (POE) model would gain positive learning attitudes toward the subject.

Definition of term

1. Scientific project means an activity for students to study a topic by themselves by basing on scientific process under guidance of an instructor or expert;
2. POE means a learning activity prioritizing learners to encourage them to think and predict what would happen or ensuing events by basing on rationality, then the observation, experiment or proof from the scenario are performed and the students must be able to describe what they noticed and distinguish between findings derived from the prediction or observation;
3. Learning attitudes towards scientific project which had learning activities based on predict observe explain (POE) model means positive or negative sentiment of the students from learning activities based on POE model.

Related literature

Definition of scientific project

The Institute for the Promotion of Teaching Science and Technology (2001:1-2) has defined the scientific project as an activity related to science and technology by utilizing scientific process in study and research for finding questions which students bring up and choose to study and research by themselves in align with their interest, knowledge and skill. In addition, the activity must proceed with a plan for study, research, collecting data, experiment or invention, conclusion by themselves with instructors as their advisors.

Ladda Phukiet (2009: 21-22) has summarized a project as a learning method arisen by an interest of a learner who wishes to study and research in a matter or matters in doubt or for finding clear and detailed answers, utilizing multiple aspects of skills, procedures and intelligence. Study must proceed in systematic way and continuous procedures and must be thoroughly planned and proceeded as planned until conclusions or results are reached. Main principle of scientific project is an activity focusing on thinking, doing and problem-solving by a person him/herself from identifying a problem which a student want to study, planning for problem-solving, studying and researching, undertaking, collecting studied data, experimenting, recording results, interpreting and presentation what he/she researched or distributing to other people, all of which cover clear systematic learning process.

According to above definitions, it can conclude that a scientific project means study on a matter related to science and technology in align with aptitude or interest of students which they undertake and study by themselves by utilizing scientific process in order to study and research for finding an answer under guidance of instructors or experts.

Attitude towards scientific project

Gardner (1975 cited in Maka Thipkiri: 2004) provided an explanation concerning an attitude regarding science that it has 2 definitions i.e. scientific attitude and attitude towards science. When a person studies science, both of these attitudes will occur at the same time (personal aspect), however, with variation of expression: scientific attitude in the form of knowledge and scientific principle belief and attitude towards science in the form of personal like, dislike, favorite towards science.

Scientific attitude means sentiment and confidence of students towards science in both positive and negative benefits, importance, and contents of science (Bupphachat Rungsuwan, 1987: 10). It is individual sentiment, belief and appreciate towards science directly and indirectly and scientific findings can affect human behavior towards science (Hassan and Billeh. 1975: 247).

In summary, it means individual belief, though and sentiment towards science. The behavior can be expressed in 2 characteristics i.e. 1) positive scientific attitude means a behavior expressed in satisfactory manner, like, wanting to learn and wanting to be related with science and 2) negative scientific attitude means a behavior expressed in unsatisfactory manner, dislike, not wanting to learn and not wanting to be related with.

Attitude assessment

According to Priyaporn Wongsanotararatjana (2003:252), she said that an attitude tends to be more abstract than concrete, it is an emotion and personal belief, all of which can change. Thus the assessment cannot be done in simple manner but has to be performed according to the individual tendency which is expressed on language and to assess from opinions. Personal attitudes towards things or persons can be assessed from actions, words, facial expression or interviewing their thoughts. Nevertheless, assessment method or tools widely utilized by

psychologists is a questionnaire or survey called attitude assessment form. There are several assessment scales in use. Phuangrattana Thawirattana (1997: 112) said that there are 3 methods being widely used i.e. 1) Thurstone's method 2) Likert's method 3) Semantic differential scales.

In this paper, Likert's method was applied. In regard to this method, Buntham Kitpridaburisut (1999: 141-142) mentioned its benefits as it is a tool easy to apply and capable to analyze the attitude results accurately and highly reliably, also capable to widely apply in assess attitudes affecting different situations and capable to assess direction and high or low quantity of attitudes.

Predict Observe Explain

Kwanchanok Kanthathong (2010) said that POE model is a learning management based on Constructivism. Learners utilize existing knowledge as a foundation for creating new knowledge by themselves. Following people are an endorser of POE model:

Phacharawarin Kliengnuan (2013: 22) has performed study: learning achievement and POE instruction with graphic embedding technique affecting learning achievement and scientific process of 7 grade students and found that students with instructional management based on POE with graphic embedding technique scored post-scientific process learning higher than the pre-learning one with statistical significance at .01 level. Owing to such outcome, the instruction based on POE model was a learning management according to Constructivism encouraging decision making utilizing the student's understanding based on their existing beliefs. In the instruction, students had to predict events by basing on existing knowledge rationally and in this process, they had to apply scientific process in learning processes.

Kiet Bamrungrai (2010:15) said that instruction based on POE model is instructional management according to Constructivism utilizing existing knowledge as a foundation for creating new knowledge by the learners themselves. This POE model encourages students to express their thoughts with planning, supervising and assessment of thinking to promote metacognition in students. POE model consists of 3 steps:

1. Predicting or P: a step concerning a prediction based on problematic events;
2. Observing or O: a step to find answers by experimenting, observing, holding activities, retrieving data and methods in order to obtain the answers of problematic event;.
3. Explaining or E: a step concerning an explanation of prediction outcome and to differentiate the similarity and dissimilarity.

To conclude, instruction management based on POE model is instruction in accordance with Constructivism, emphasizing self-learning, creation of new knowledge utilizing existing knowledge and experience and interaction with other people. The instructional management based on POE allow students to train their prediction skill and observation skill (which are one of scientific skills). After training the two skills, explanation skill as per POE model is followed.

Methodology

Population (N) and sample group (n)

Population was grade 9 students selected from Demonstration School of Suan Sunandha Rajabhat University. Purposive sampling was applied from 47 grade 9 students registering in scientific project subject.

Tool(s)

Attitude assessment questionnaires were applied for assessing 9-grade student's attitudes towards scientific project subject which had learning activities based on POE model. They were consisted

of 20 questions divided into 12 positive questions (favorable statement) and 8 negative questions (unfavorable statement).

Procedure(s)

Attitude assessment questionnaires (20 questions) were made for assessing 9-grade student’s attitudes towards scientific project subject which had learning activities based on POE model. 5 Likert’s scales were implemented and utilized to score the positive and negative questions as follows:

Positive questions (Favorable Statement)		Negative questions (Unfavorable Statement)	
Totally agreed Score	5	Totally agreed Score	1
Agreed Score	4	Agreed Score	2
Moderate Score	3	Moderate Score	3
Disagreed Score	2	Disagreed Score	4
Totally not agreed Score	1	Totally not agreed Score	5

Average score criteria of the questionnaires were determined by basing on Sakchai Serirat’s criteria (1987), they were as follows: >1.55 meant completely unfavorable attitude, 1.56-2.55 signified unfavorable attitude, 3.56-4.55 demonstrated favorable attitude and 4.55 signified completely favorable. The questionnaires were given to students of the sample group, then collect them to analyze.

Data analysis outcome(s)

According to the study on learning attitude towards a subject: scientific project in 9 grade students which had learning activities based on POE model, outcomes were as follows:

Table 1: Data analysis outcomes concerning attitude assessment questionnaires of learning attitude towards a subject: scientific project in 9 grade students which had learning activities based on POE model

No.	Statement(s)	Mean (\bar{x})
1.	You study the scientific project subject happily.	3.69
2.	Scientific project help you work rationally.	3.72
3	You want science class to end quickly.	2.55
4.	If possible, you wish to replace science class with other class.	2.31
5.	Studying science help you gain process skills	4.27
6.	When studying science, you always feel sleepy.	2.28
7.	Studying science does not help self-development.	1.83
8	When selecting a subject, science will be the first choice.	3.13
9.	Studying science make you feel stressful as you have to think and solve problems all the times.	2.70
10.	You are determined in science subject.	3.39
11.	Scientific project help people to solve personal problems.	4.06
12.	Studying scientific project make you feel worried.	2.66
13.	You think that it is impossible to study scientific project.	2.07
14.	Scientific project is a subject promoting initiative and creativity.	4.03
15.	If possible, scientific project will not be in your choice.	2.56
16.	Scientific project subject is really important in daily life.	3.76
17.	Activities in scientific project subject is interesting.	3.46
18.	Studying scientific project subject make you better understanding in scientific process.	4.05
19	Studying scientific project subject make you more reasonable.	4.06
20	Scientific project is my most interesting subject.	3.61
Total		64.19
Average		4.27

As per table 1, it demonstrates moderate male learning attitude towards scientific project subject which had learning activities based on POE model with an average of 4.27.

Chapter 5

Conclusion, discussion and suggestions

Learning activities based on predict observe explain (POE) model and learning attitude towards a subject: scientific project in 9 grade students participating in learning activities based on POE model was able to conclude, discuss and suggest for using the results, as well as topics for further study as follows:

Conclusion

1. Male learning attitude towards scientific project subject which had learning activities based on POE model was moderate (average = 4.27).

Discussion

Learning activities based on predict observe explain (POE) model and learning attitude towards a subject: scientific project in 9 grade students participating in learning activities based on POE model was moderate. According to the analysis of mean from each question (positive and negative questions), it was found that there was some confusion between positive and negative questions in most students.

Suggestion(s)

1. For further study, a comparison between attitudes of students who study scientific projects should be performed by basing on other instruction model or performed with other course to be preliminary information and for benefits of instructional development further.
2. Attitude assessment questionnaires should be developed in more and deep psychological questions in order to obtain clear data.