Science Education and Application Journal (SEAJ)
Program Studi Pendidikan IPA
Universitas Islam Lamongan
http://jurnalpendidikan.unisla.ac.id/index.php/SEAJ

March, 2024. Vol. 6, No. 1,
p-ISSN: 2656-6672
e-ISSN: 2656-8365
pp. 27-33

Application of POE (Predict, Observe, Explain) Learning Model to Improve Understanding of Concepts

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Article Info
Article History
Received: Jan, 20th, 2024
Revised: June, 22nd, 2024
Published: June, 30th, 2024
Keywords:
POE, Concept Understanding, Chemistry

Abstract
This research aims to determine the POE (Predict, Observe, Explain) learning model in improving students' understanding of concepts in the Chemistry subject at SMA Negeri 1 Gondang. This research method uses a class action research model. The research subjects were 35 students in class X-4. This research has a good impact on students' understanding of concepts, this can be conveyed through the results of cycle I and cycle II research. Cycle I completed 25 students with a completion percentage of 71.4%, while Cycle II completed 28 students with a completion percentage of 82.9%. So in cycle I and cycle II there was an increase in students' understanding of concepts in the Chemistry subject.

Citations: Dewi, I S & Rahmawati, M D. (2024). Application of POE (Predict, Observe, Explain) Learning Model to Improve Understanding of Concepts. *Science Education and Application Journal (SEAJ)*, 6(1), 27-33.

INTRODUCTION

The education system is an activity and business that can realize and increase the capacity of quality human resources. Education aims to increase students' potential and be able to deepen and become familiar with various sciences. The potential in question are skills that will be provision for students when they are in society (Purba et al., 2021). Understanding concepts is a skill for understanding material or knowledge, such as being able to explain a lesson that will be presented in a more understandable form, and being able to interpret it through one's own understanding. Understanding this concept is divided into three categories, namely translating, interpreting, and extrapolating (Wiguna, 2018).

Chemistry is a material that is considered not easy by most students starting from high school (SMA) and university students. This response may not be too excessive because it still has an abstract nature, in studying chemical material you need to have a good understanding of the concepts, because to understand the material new material is needed and the material must meet the requirements and understanding of the previous concepts. Understanding concepts in chemistry learning has a big influence on students, therefore chemistry concepts are interconnected between one concept and another and are related so that when studying chemistry concepts it must be related to one concept and another (Domitila et al., 2018).

However, based on field studies looking at teachers in delivering chemistry learning material, many educators still use simple methods, namely the teaching and learning process is centered on the teacher and students are only able to memorize the material. This makes students quickly forget the lessons they have been taught and become bored with studying chemistry material. Apart from that, the process of transferring knowledge between teachers and students is sometimes only carried out in one direction, so this has an impact on students' understanding of interpreting cognitive abilities to be less than optimal.

A combination of learning models also needs to be developed to provide a maximum understanding of the concepts of chemistry subjects. The basis for selecting the learning model in this research is that it requires students to be more active independently in the learning process. One learning model that provides students with the opportunity to actively construct and develop their knowledge independently is the POE (Predict, Observe, Explain) learning model. The POE (Predict-Observe-Explain) model is a model that comes from constructivism theory, namely an educational theory that prioritizes increasing the development of logic and concepts. The advantages of the POE (Predict-Observe-Explain) model include that students are able to think creatively to be able to put forward an assumption regarding existing problems and can trigger students to make observations to prove predictions (Fitrianingsih Eka, 2021).

The application of the POE (Predict, Observe, Explain) learning model is to predict the type, properties, and changes in litmus paper in acid-base solutions, make observations, and explain the results of the observations so that it is hoped that students at SMAN 1 Gondang can understand the concept of acid-base theory. The POE learning model includes things that teachers do to improve conceptual and psychomotor understanding (Restami, Suma, & Pujiani, 2013). This model teaches students to make predictions and events based on their ideas, observing events that come true, and finally explaining observations in actual situations (Amal, Rifa'i, & Hindarto, 2013).

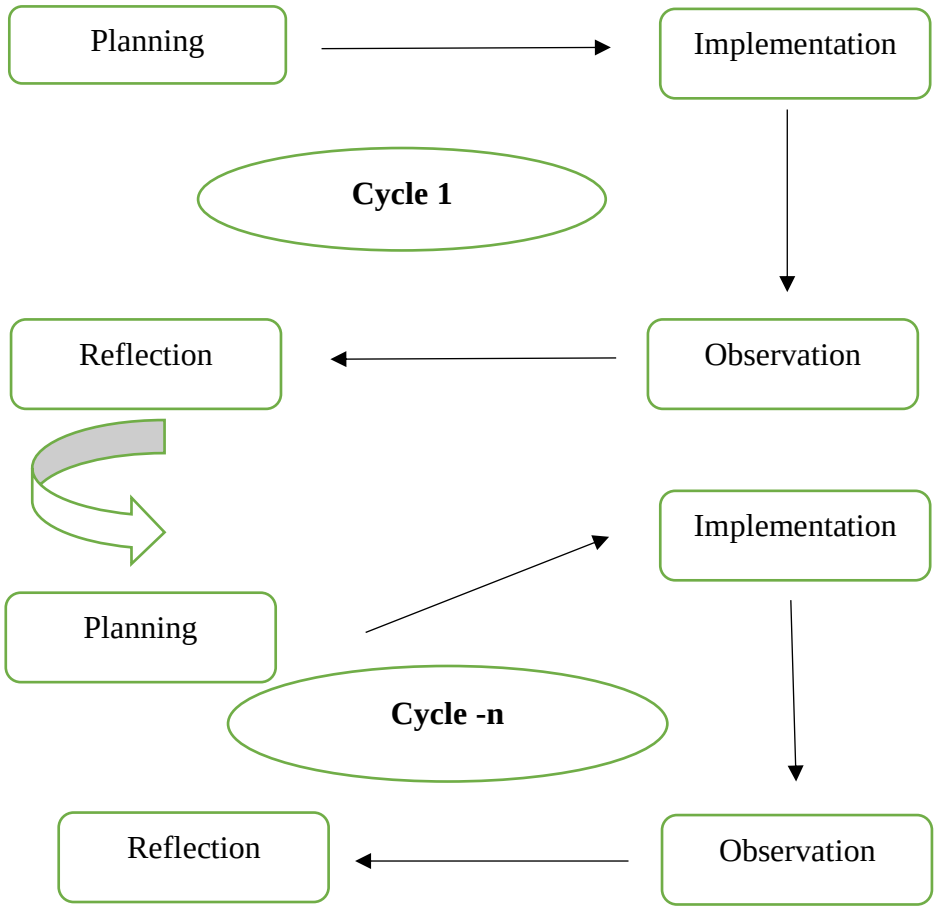
Rosdianto (2017) has conducted research on the development of a POE-based learning model with research results that the POE-based learning model can improve students' understanding of concepts in chemistry subjects. Gitnita (2018) also conducted the same research with the results that the POE-based teaching materials developed were able to improve student learning outcomes in the aspects of knowledge, spiritual attitudes, social and skills. One of the advantages of the POE model is that it can recognize students' abilities and skills during the learning process and is more enthusiastic because students play a direct role in determining and determining the concepts and skills of the learning process (Ismayanti, 2021). Apart from that, the aim of this research is a form of reform so that students are more active so that it is easier to understand chemical concepts.

METHODS

This research was carried out in class X-4 at SMAN 1 Gondang and the research was carried out in the 2023/2024 academic year, odd semester. This research uses a class action research model, each cycle has 4 stages.

The subjects of the classroom action research were class X-4, totaling 35 students consisting of 11 men and 24 women. The research object is chemistry subjects on atomic structure and acid-base solutions.

In the research there are two cycles where each cycle carries out 4 stages as follows:



Classroom action research cycle
Source: personal image (Kemmis and Taggart)

The data collection stages used in this research are as follows:

1. Observations and tests

   Observations and tests are two methods of data collection carried out in this research. The aim of collecting data by observation is as a research source and observers are involved in this stage. Meanwhile, the test method is to measure the extent of students' abilities in the material they have studied. In this research, students are given a test at the end of learning to measure the success of the material or learning that has taken place in each cycle.
2. Documentation model

   Documentation in the form of student pretest and posttest sheets, which are carried out or taken during learning.

Table 1. Categories of students' conceptual understanding achievement

Category	Value Range
A	90-100
B	80-89
C	75-79
D	<75

$$Percentage\ of\ concept\ understanding = \frac{number\ of\ students\ completed}{total\ of\ all\ students} \times 100\%$$

RESULTS AND DISCUSSION

This research was carried out in 2 cycles. In this research, 2 cycles were carried out and there were differences between cycles one and two. In the student cycle, students still use a simple learning model that only focuses on the students. Meanwhile, cycle two uses the POE (Predict, Observe, Explain) learning model, this learning influences the understanding of chemical concepts. In each cycle there is planning, implementation, observation, and reflection with the following explanation:

1. Planning

This initial stage is planning, this planning is determining the activities that will be carried out by the group to achieve the desired desires or according to the target (Sufiati & Afifah 2019). Planning for this research can start with learning tools, including creating teaching modules, LKPD, grids, rubrics, learning media, etc. The planning or preparation of these learning tools is assisted by the tutor or supervisor at school.

2. Implementation

The next stage is implementation, implementation is the motivation or direction given by educators to students to be more optimal in carrying out their duties or learning objectives appropriately (Baharun et al., 2021). This implementation starts from preparation for learning until completion of learning. In this implementation, the research object is class X-4.

3. Observation

The third stage is observation, the observation in question is the teacher's observation of students. Observation of learning and student learning outcomes, to determine understanding of concepts in chemistry subjects. Apart from that, it is to see students' cognitive abilities in learning.

4. Reflection

The final stage is reflection, this reflection is carried out by the teacher for the students to find out the students' strengths or weaknesses. In this research, the reflection carried out was to determine whether this classroom action research was carried out in the next cycle or whether it was sufficient in the last cycle.

The results of Classroom Action Research carried out at SMA Negeri 1 Gondang class X-4 through two cycles using the POE (Predict, Observe, Explain) method provided changes to the learning process, especially in understanding the material. The most visible change is

that students can predict, observe, and explain the material well. The results of the first cycle are as follows:

Cycle I

This first cycle was carried out through 4 stages, namely planning, implementation, observation, and reflection, and went according to plan.

Following are the results of the first cycle:

Table 2. Results of Cycle 1

Category	**Description**
Number of students	35 students
Total Scores	2676
Max Score	90
Min Score	38
Complete	25 students
Incomplete	10 students
Percentage of complete	71,4

In cycle I, the percentage of completion was 71.4% of the total number of 35 students with 25 students completing and 10 students not completing. The reason why students do not complete is that students do not understand the concept of chemical material. Factors that influence students not understanding the concept are students not paying attention when learning, being too focused on their cell phones, etc.

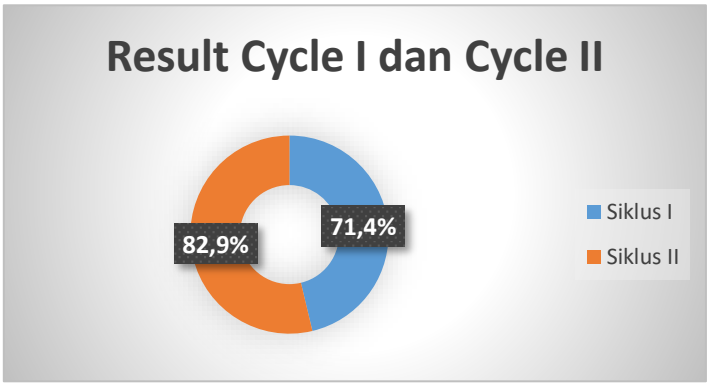
Cycle II

In cycle II, it is carried out to improve actions from cycle I. Cycle II is carried out using the POE learning method (predict, observe, explain) and the stages in cycle II are the same as in cycle I, namely four stages. Cycle II gave results which can be seen in the table below.

Table 3. Analysis of Cycle II Results

Category	**Description**
Number of students	35 students
Total Scores	2818
Max Score	95
Min Score	60
Complete	29 Students
Incomplete	6 Students
Percentage of complete	82,9

Based on Table 3, the percentage of students who completed was 82.9%. In general, it can be said that there has been an improvement in this second cycle. Based on the results of the reflection, there is no need to take action in the next cycle.



Picture 1. Circle Diagram of Cycle I and Cycle II Results

In this research, cycle I and cycle II were carried out, in cycle II there was an increase in value. The table and diagram show that there was an increase from cycle I and cycle II, from 71.4% to 82.9%. The highest score in cycle I was 90 and the highest cycle score increased, namely 95. The percentage of completeness in cycle I was 71.4% and in cycle II it increased to 82.9%. Based on the explanation above, it can be formulated that using the POE (Predict, Observe, Explain) method can improve student learning outcomes in chemistry subjects for class X-4 for the 2023/2024 academic year. The choice of learning method greatly influences students' understanding of concepts and the increase in presentation that occurs is due to the results of the pretest and posttest carried out by students. This will be something meaningful for students because students are directly involved, actively take part in activities, and provide real and concrete experiences for students in learning so that learning becomes meaningful, quality, fun, and not boring.

CONCLUSION

The application of the POE (Predict, Observe, Explain) method in class X-4 chemistry learning at SMA Negeri 1 Gondang has been proven to increase students' understanding of concepts. In this classroom action research in cycle I, the completion percentage was 71.4% and increased to 82.9% by using the POE (Predict, Observe, Explain) learning method.

Before conducting learning, teachers can adjust the learning model that can be applied in the class, to support students in the process of understanding concepts. This is so that there is variation in the learning process which can help increase student motivation and student understanding in learning.

SUGGESTION

This research is classroom action research, which is a process to find out the learning model applied by a teacher. Apart from that, it is also to develop learning models that suit students' abilities in understanding concepts in chemistry subjects.

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