Enhancing the Students' Critical Thinking Ability and Learning Outcome Through Poe Learning Model

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ABSTRACT

This study aims to determine the implementation of Predict-Observe-Explain (POE) learning model, enhancing critical thinking and students' learning outcome on archiving. This research is a classroom action research utilizing qualitative approach consisting of two cycles on students of Office Administration. The subject were students at one of the vocational school in East Java, using data analysis in the form of data reduction, data presentation, and drawing conclusion or verification. The results showed that POE learning model is able to improve students' ability to think on Archiving. The students' cognitive learning, affective, and psychomotor also increased as the implementation of learning model. Hence, the POE learning model is effectively used in learning.

Keywords: POE; Critical Thinking Skills; Learning Outcome

INTRODUCTION

Teaching and learning activities are supported by the quality of teachers' performance in designing the learning process. The quality of teachers' performance is one of the factors that influence the success of the learning process that occurs in the classroom. Teachers as a facilitator in the implementation of learning that is very influential during the learning process takes place (Susanto, 2016: 92). As a result, in the learning process, teachers are required to not only delivering material or passing their knowledge to students (Amran *et al.*, 2016; Nugraha *et al.*, 2016) but also maintaining activities to keep the students active in learning (Leong & Clutter, 2015; Nugraha, *et al.*, 2016), to build his own knowledge (Klement *et al.*, 2015), and invites students to think (Smetanova *et al.,* 2015) thus, increasing willingness to learn. Thinking activity is important in learning because it can improve students' skills (Huang *et al.*, 2017). Thus, improving the quality and work activities of teachers in learning needs to be done to achieve the goal of education (Tyabaev *et al*, 2015).

Students' thinking activity is a mental process that can produce knowledge. Thinking activities are able to prepare students to a variety of discipline and can be used to meet the intellectual needs and the development potential of learners (Susanto, 2016: 121). Thinking skills are grouped into two basic thinking skills and higher level thinking skills (Susanto, 2016: 121). One of the most important activities in thinking is called as a higher-level thinking activity (Ay *et al.*, 2015). High-level thinking skills in making decisions affecting students. Criteria for high-level thinking is through critical thinking activities (Ay *et al.,* 2015). Critical thinking is the ability and inclination to create and make an assessment of the conclusions based on evidence (Eggen & Kauchak, 2012: 119). Critical thinking activities are also defined as the

activity of thinking about an idea or ideas related to a given concept or problem presented (Susanto, 2016: 121). Through analyzing the students' critical thinking , they are abe to create ideas towards more specific, unique, selective, identified, assessable, and developed perfectly. Critical thinking causes people to continually upgrade their skills for personal growth and professionalism in solving problems (Popil, 2011; Pieterse *et al.,* 2016). Critical thinking with regard to the assumption to think that the ability to analyze the existing problems in students need to be developed which optimally. Activity in communicating and discussing with classmates and teachers also needed their critical thinking activities (DeWaelsche, 2015; Sarigoz, 2012). Critical thinking activities as a whole in a discussion process involving a variety of skills and attitudes in decision making (Smetanova, *et al.*, 2015, Dwee *et al.,* 2016). Hence, the development of critical thinking skills in the learning activities are needed (Dwee *et al.,* 2016; Kobzeva, 2015; Popil, 2011; Pieterse *et al.*, 2016).

Most teachers of Vocational School subjects in East Java in the teaching of teachers only use the lecture method in delivering the material, so that students' critical thinking activities on archival learning less applied. Activities of students' critical thinking is still not visible during the learning process (Anggrianto *et al.*, 2016). The learning model used by the teachers still do not associate with the students' thinking skills. Teachers only deliver material and give students individual assignments. Learning procedures like observing phenomena around, asking questions about things that are not yet understood, gather information, process information, to communicate. These are also not yet fully implemented. Applied learning have not been able to grow and develop critical thinking skills. That is because the delivery of material that teachers still less innovative (Suleimanova, 2013; Restami *et al.*, 2013) , monotonous, and does not involve the role of students in full (Tyabaev, 2015). The teacher becomes the only source of knowledge for students, so that the learning is done less effective in the development of communication skills (Amran *et al.*, 2016).

Documentation of student learning outcomes obtained by researchers from archival lesson teacher shows students' learning outcomes have an average score of 71.9 with less criteria and classical completeness is only 28.5%. Low learning outcomes are influenced by a lack of student understanding of the material and activities involving students who lack the capacity to think in the learning process.

Learning outcomes are the changes that happen to students, both involving cognitive, affective, and psychomotor as a result of learning activities (Susanto, 2016: 5). Learning outcomes as the success rate of students in the study which stated in the score of the test results. The results of student learning is influenced by the activity during the learning process, active students in learning activities and learning processes are done (Lile and Bran, 2014). Therefore, it is necessary to have quality teachers in choosing learning model that makes the students active and thinking in learning to optimize student learning outcomes.

The quality and success of learning is also influenced by the competence and accuracy teachers choose and use models and learning methods (Tyabaev *et al,* 2015). Many models of learning that can be applied by teachers in the learning process. Teachers can choose the model of learning appropriate to student characteristics, learning materials, and facilities available. Each model of learning that will be used has advantages and disadvantages, so that teachers are required to have high creativity to be able to select and implement learning model (Tyabaev *et al*, 2015; Nugraha *et al.*, 2016) in accordance with the situation of students and learning objectives to be achieved,

One of the methodologies used in the learning process and improve the quality of learning is applying the POE (Predict Observe Explain) learning model. POE learning model is a learning model that expresses the ability of students to make predictions, observations, and explain things thoroughly observed. Learning Model POE involve students actively and comprehensively in the use of critical thinking skills (Warsono & Hariyanto, 2016: 93). POE learning model used to provide student activities in predicting the outcome of the situation with reasons, to observe the situation and explained the issue to eliminate the difference between prediction and observation (Ipek *et al*., 2010).

METHOD

This study uses a qualitative approach. This type of research is the Classroom Action Research (CAR). The research was conducted in one of the vocational school in East Java. The subjects are the tenth grader students of Office Administration which consists of 35 students. Data was collected through interviews, observation, field notes, test, and documentation. The research instrument used in this study is the observation sheet of the learning implementation by teachers and students, critical thinking skills observation sheets, field notes, written test, result sheet to learn the affective and psychomotor learning outcomes sheet. Analysis of the data used in this study is an analysis model of Miles and Huberman of data reduction, data presentation, and drawing conclusion. This research was conducted in two cycles. Each cycle consists of four stages: planning, implementation, observation, and reflection.

RESULT AND DISCUSSION

Implementation of POE Learning Model on Archiving Subject

The research finding of the POE learning model application has been done by observing the action by teachers and students during the learning process takes place through observation sheet and field notes show that the POE learning model effectively used in the classroom and were able to improve critical thinking skills and student learning outcomes on archieving. POE application of learning models make students play an active role in the classroom so that critical thinking skills and student learning outcomes to be increased (Yulianto *et al.,* 2014; Pratisa *et al*., 2015; Udayani *et al*., 2016).

The implementation of POE learning models involves students directly in the learning process both in individual and group activities. Darsono and Hariyanto (2016: 94) said that POE learning model has three steps which are predicting, observing, and explaining. The POE (Predict-Observe-Explain) learning model is a model of learning by order of the process of building knowledge by first predicting the solution of the problem, then experiment or observation to prove the last prediction and explain experimental results or observations (Nawawi, 2013).

POE learning model is an active learning that makes the students active in the learning process. Active learning provides students to be active in speaking, listening, writing, reading, and thinking on ideas, issues, and problems (Amran, 2016). Active learning involves students in practical activities, students do not just listen to the material, but students are active in practice, analysis, and evaluation of the knowledge they have acquired to improve their skills

(Vidermanova & Vallo, 2015). Active learning involves students to do something and thinking about something that is being done during the course, the students are also actively involved in the learning process (Warsono & Hariyanto, 2016).

The implementation of POE learning model is in accordance with the archival learning lesson plans that have been made previously. In the Observe stage, students are required to do observation or observations related to things that have been predicted through practice. Observations through practice are then compared with the predicted results, so that students can draw conclusions from the available data. Phase explain, students give the result of thinking in predicting problems and make conclusions on experiments and observations that have been made in front of the class.

The POE learning model application on the lessons found in the archives Predict phase, where it increased excitability through the provision of predictable answers to questions related problems by students. This Predict stage is used to make the students to actively predict, predict and provide allegations related issues initially granted in accordance with the understanding and knowledge possessed (costumers *et al.,* 2011; Nawawi *et al.,* 2013; Rahayu *et al.,* 2013). Moreover, in the Predict phase, students are also more actively use the thinking skills to find their own understanding in resolving problems (Yulianto *et al.,* 2014; Pratisa *et al.,* Nurmalasari *et al.,* 2016; Prayogi *et al.,* 2013).

The results of research on the observe stage was found that students conduct of observation, so that requires students to conduct experiments to prove the prediction results, the students are getting a more meaningful learning. During Observation stage, it made students perform experiments and practice to test the prediction that give a particular impact on students' understanding of the material (Farikha *et al.,* 2015). Observation activities undertaken to facilitate the students to understand the material because students experience for themselves the learning is done during the learning process (Wahyuni *et al.,* 2013). Observe on the stage, the students are also more active and important role in conducting experiments and observations. The implementation at this stage is also good because observing stage is the most important stages and requires students to be careful in experiments and observations, so that students get a good result (Hilario, 2015).

The results of the study at the explain stage, the students presented the results of the predictions and observations in class. Students gain a greater opportunity to explain the results of prediction and observation results, so that students are given another chance to better understand the material (Hilario, 2015; Restami *et al.,* 2013). In addition, explain stages, students are given the opportunity to express their opinions and ask questions related to the analysis of predicted results and observations, so that students are active in their thought (Yulianto *et al.,* 2014).

The success gained from POE implementation learning models is also found in the archives learning, where students become active in learning activities. This is because in POE learning model, students actively involved ranging from activities such as Predict, Observe, and Explain (Prabawa *et al.,* 2014; Anisa *et al.,* 2013). Students who are active in the learning activities are also due to motivation done by teachers in the activities of prediction, observation, and presentation (Nana *et al.,* 2014). Additionally, POE implementation learning model also makes students more active in thinking (Nawawi *et al.,* 2014; Teerasong *et al.,* 2010; Yulianto *et al.,* 2014). This is due to start early learning students are required to think in predicting problems, thinking in observing, and thinking in presentations. Lesson activities also took place

entirely dominated by the activities of students (Farikha *et al*., 2015), because in this POE learning model, the teacher only plays a role as a facilitator to guide students to develop ideas and opinion (Teerasong *et al.,* 2010).

The Implementation of POE Learning Model to Improve Students' Critical Thinking Skills on Archiving Subject

Table 1 covers the research finding about students' critical thinking ability during POE implementation in cycle 1 and cycle 2.

Table 1.
The Mean of Students' Critical Thinking Skill in Cycle 1 and Cycle 2

Indicators	Cycle I		Cycle II	
	Score	%	Score	%
Facing the problem	102	72,5%	121	86,4%
Giving an answer on the given question	98	70%	110	78,6%
Referring to problem hypothesis with relevant theory	98	70%	117	83,6%
Arranging trial conclusion	102	72,5%	109	77,9%
Delivering relevant argument or idea	85	60,4%	111	79,3%
Facing the challenge with reason and example	83	59,3%	111	79,3%
Delivering relevant questions	81	57,9%	110	78,65%
Mean	**67,1%**		**84,88%**	

Table 1 shows an increase in the results of students' critical thinking skills in learning using POE model, the first cycle average critical thinking ability of students reached 67.1% during the learning process. Improved learning outcomes occur in cycle II with an average of critical thinking ability of students reached 84.88% during the implementation of POE learning model. The research findings have shown that students' thinking skills can be increased by applying POE learning model that makes students active in their thinking. The learning model POE steps can make students active learning in critical thinking activities (Teerasong *et al.,* 2010; Yulianto *et al*., 2014).

The research finding in Table 1 on indicators of students' ability to think critically shows the respond to the problem in the first cycle increased by 72.5% to 86.4% in the second cycle. The ability of the students, providing answers to the problems addressed in the first cycle 70% increase to 78.6% in the second cycle. The ability of students in linking the alleged problems with the relevant theory on the first cycle to 70% increased to 83.6% in the second cycle. The ability of students in deducing trial increased 72.5% to 77.9% in the second cycle. Students' ability to convey ideas or arguments in the first cycle 60.4% increase to 79.3%. Students' ability to respond to challenges with work reasons and examples in the first cycle of 59.3% increased to 79.3, and the ability of students in delivering relevant questions at cycle 57.9% increase to

78.65% in cycle. Overall, indicators of students' critical thinking skills have improved from the first cycle to the second cycle for the implementation of learning model POE.

Improving the ability of critical thinking occurs because POE Learning Model requires students to actively think from beginning to end of the lesson. Predicting phase, students are required to use critical thinking skills to solve the problems given. Students are required to think critically find yourself understanding to predict the answers to the problems of material suitable storage archive system knowledge initially. Students think critically in making predictions or alleged problems given. Observe stage, students are required to go back to thinking in observation and practice to prove the results of predictions or expectations. In the observation, students are also required to think critically to infer data from the predictions and research findings. Then, the students analyzed the data of the present invention thus demanded to think critically. Explaining phase, the students present the results of observations and predictions in the presentations, so that students are required to think critically again in response to activity predictions. Explaining phase also require students to ask questions and express opinions that requires students to critically think with. The results of the study explained that students can develop critical thinking skills by using POE Learning Model (Yulianto *et al*., 2014; Teerasong *et al.,* 2010). Through the application of learning models can be active POE students in critical thinking activities that students' critical thinking skills can flourish (Yulianto *et al*., 2014; Teerasong *et al.,* 2010)

The results showed that the indicators of students' thinking skills in responding to problems has the highest value. This is because at this stage of Predict students are required to think critically and teachers guide students to make predictions and guesses the problem, so that students can think critically respond to a given problem. Yulianto *et al*. (2014) revealed the POE learning model in predicting activity invites students to critically find their own understanding of the material that is taught so as to make the students get even more capacity to think in finding solutions to problems. Indicators of students' ability to provide arguments or ideas that are relevant and meet the challenges with reasons and examples of obtaining a fairly high percentage, it is because in the learning phase POE explain students conduct a class discussion so that students are required to keep thinking in discussion activities. Through the activities of the students explain discussing with students one class so that students continue to do things thinking to respond to ideas, opinions, and questions from other students. Sarigoz study (2012) revealed through discussion of students actively thinking so that they can develop their critical thinking skills.

Through the activities of students' thinking, they can find their own answer to the problems so that students are able to understand and appreciate the learning materials. Thinking activities causes the students to gain knowledge by linking concepts, ideas, or the definition so as to form a conclusion. Through analyzing the students' critical thinking or ideas towards more specific, sharply distinguish, select, identify, assess, and develop better. Critical thinking enables students to achieve self-concept that allows students to get an idea or ideas and identify good or bad opinion (Kamgar & Jadidi, 2016). Their critical thinking activities help students to absorb knowledge learning materials so that students get a more meaningful learning (Zivcovil, 2016).

The Implementation of POE Learning Model with a Scientific Approach to Enhance Student Learning Outcomes in Archiving Subject

Learning outcomes are the changes that happen to students, both involving cognitive, affective, and psychomotor as a result of learning activities (Susanto, 2016: 5). Learning outcomes in this study was assessed with three ways, first for cognitive assessment done by looking at the ability of students after learning process with POE model of learning through evaluation tests conducted at the end of the cycle, both the first cycle and the second cycle. Secondly, the assessment for affective domain by observing the attitudes of students during the learning process takes place through observation sheet affective domain. Third, for psychomotor assessment made by observing the students' skills in practice the tasks assigned by using psychomotor observation sheet.
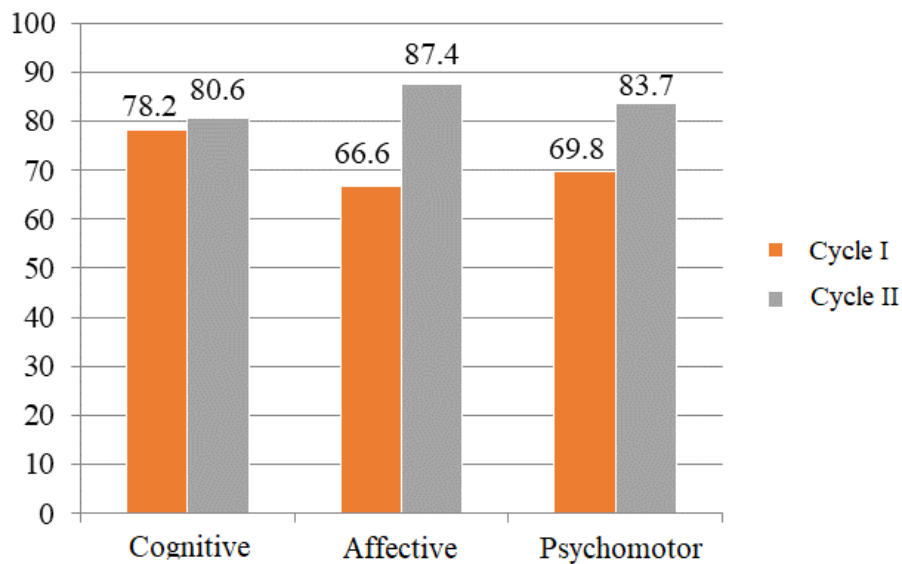

Figure 1. Mean Comparison of Students' Learning Outcome in Cycle I and Cycle II

Figure 1 shows that there is improvement of student learning outcomes in cognitive, affective, and psychomotor aspects from the POE learning model on archiving subject. Cognitive learning outcomes assessment is done by comparing the cognitive learning cycle I to cycle II. Research results in Figure 1 shows an increase in cognitive achievement of students which is an average cognitive achievement of students in the first cycle of 78.2 rose to 80.6 in the second cycle, it indicates that the POE learning model can improve cognitive learning outcomes of students. Affective student learning outcome can also be seen in Figure 1, which shows the average student learning outcomes in the first cycle increased to 87.4 to 66.6 in the second cycle, it is clear that the learning model POE affect affective student learning outcomes. Learningoutcome also occurred in psychomotor learning outcomes of students in which the first cycle an average of 69.8 students' psychomotor learning outcomes increased to 83.7 in the second cycle, it indicates POE learning model can improve student learning outcomes psychomotor. Overall, increased student learning outcomes after implementation of POE learning models.

Improved cognitive achievement of students because POE learning model uses the working principle of critical thinking and doing their own learning process. POE learning model encourage students to critically think and finding their own understanding of the taught material through discussions. Problem-solving activities presented in the discussions is a reflection of the material being studied. Reflection through problems can increase understanding and memory of students (Rifai & Anni, 2009; Yulianto *et al.,* 2014). Improved cognitive achievement is also caused by the activities Observe during learning. Simpleobservation method can improve students' test results (Mustika & Muniarti 2009; Farikha *et al.,* 2015; Yulianto *et al,* 2014). Observe activities provide hands on experience to students regarding instructional materials (Wahyuni *et al*., 2013; Yulianto *et al.,* 2013). In addition, the implementation activity stage, the students may find themselves learning concepts that improve learning outcomes (Deta *et al*., 2013). This is according to research conducted by Yulianto *et al*., (2014) that measures learning model POE able to make students actively involved in learning and can improve the cognitive abilities of students.

Affective student learning outcome occurs because students are getting used to POE learning model application. Students are also actively cooperating with friends while activity Predict, Observe, and explain. The attitude of the students are also actively involved in the learning process. This was confirmed by Rahayu *et al*., (2013) which revealed that the POE learning model can improve learning outcomes for learners can use the knowledge that has been held to explain a concept. POE learning model also makes students are actively involved in the learning process so that the affective learning outcomes (Rahayu *et al.,* 2013; Anisa *et al*., 2013, Prabawa *et al*., 2014). Increase students' understanding because POE learning model helps students to prove a concept based on searches of students themselves in kegaiatan Observe (Farikha *et al*., 2015). Increased yield affective learning students according to the study Bennet (2015) that the average value of affective student increase at every meeting, the row 73, 92, 95, and 97, so it is stated that the average value of affective students during the learning model with POE is 89.7.

The results of the data analysis also showed an increase in psychomotor learning outcomes of students. Improved student learning outcomes in psychomotor aspect is due to students to be more active and more focused on practical activities performed on observe and explain stage. Rahayu (2015) showed in his study that the POE model learning students perform vigorous activity during the implementation. POE learning model make students better prepared and more skilled as if going to the observation and practice. This is because the students before practice and observation should read the theory and practicum how they are doing. In addition, the learning model POE make students actively interact with the tools and materials, so that students can test the predictions through observation (observation stage), and then put forward an explanation of the phenomena they encounter (explain), after which the student test and refine an explanation or even modify it (Nawangsari, 2015). Psychomotor learning outcome of students is reinforced by Rahayu *et al*. (2013) research which mentioned that the results of the study conducted shows the increased average scorefor psychomotor aspects that is 77 in the first cycle and increased to 97 in the second cycle that because students are actively engaged and more focused when doing lab activities.

CONCLUSION

POE can be considered highly effective learning model because it can improve students' critical thinking skills and student learning outcomes. POE learning model makes students active in learning activities. Students are active in the activities of thinking so that they are directly involved in the learning process. In addition, it makes students active and involved during the learning so that the thinking of students are active and increase student learning outcomes. The research finding showed that there is increased students' thinking skills and the learning process of students active in thinking. The results also showed that the cognitive learning, affective and psychomotor student increase with the implementation of the POE model of learning because students are actively involved in learning.

POE learning model can be used as an alternative learning strategies. The development model of learning by adding stages in learning is also suitable to be applied. Additionally, POE learning model is also suitable if collaborated with other learning models. POE learning model which has been generally used only in the learning of Science, was also effectively used in social learning. This study shows that archival learning (Social) with POE learning model is proven to be effective to be used in learning. Thus, POE learning model is suitable to be used in social learning.

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