

Effectiveness of Problem Based Learning (PBL) Towards Learning Outcomes Through Critical Thinking Skills

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ABSTRACT

The learning model is one of the important roles that has components and it is important to note that a learning model can be performed properly. The purpose of this study is to determine the effect of Problem Based Learning (PBL) on learning outcomes through critical thinking. This research is quasi experimental with posttest only control group design. Analysis of data using Two Way Anova. The result of this research shows that (1) There is a difference between students who are taught by using teaching model PBL and students who are not taught by using teaching model PBL. (2) There is a difference in learning outcomes between high critical thinking skills with low critical thinking skills. (3) There is an effect between Problem Based Learning model with the ability to think critically in learning outcomes.

Keywords: Learning model, problem based learning (PBL), learning outcomes, critical thinking

INTRODUCTION

Over the past few years, education has undergone changes in terms of learning process and curriculum renewal (Arhas, 2018), (McCann et al., 2020), (Bravo & Alves, 2019), (Machali, 2014). Learning in the 21st century demands a new generation of students and workers who think critically and creatively, as well as character (Susilawati et al., 2015), develop knowledge and skills (Buabeng-Andoh, 2012). This has an impact on the learning process to be diverse and interesting, the learning environment becomes better with cooperation between individuals, even technology and techniques in teaching are needed (Lou et al., 2011). One of the teaching techniques so that the learning process can be better through the use of learning models.

The learning model is one of the important roles that has components and it is important to note that a learning model can be performed properly. components include design and implementation (Hanum, 2013). One of the design of learning models that can make the learning process better is to use the Problem Based Learning (PBL) learning model (Liu et al., 2019), (Park & Choi, 2015), (Kek & Huijser, 2011). The Problem Based Learning (PBL) learning model is an active learning model that can support creativity in developing knowledge, improving self-teaching skills, teamwork, problem solving skills and critical thinking skills (Hsu et al., 2016), (Lin et al., 2010).

Several studies have developed the Problem Based Learning (PBL) model, in which it was developed in IPA learning materials (Cahyaningsih & Ghufon, 2016), geography learning (Maulidiyahwanti & Amirudin, 2016), even in nursing (Park & Choi, 2015), ((Vitrup & Davey, 2010), (Lin et al., 2010). Based on some research it can be concluded that the use of Problem Based Learning (PBL) model can be used as a reference for teachers in conducting good teaching activities. the use of such models can also improve critical thinking skills and learning

outcomes of students (Khatiban & Sangestani, 2014).

Based on the results of interviews with teachers at SMK Terpadu Al-Ishlahiyah Singosari it is known that critical thinking skills and student learning outcomes in general administration subjects are still not optimal. The learning process still uses the method of lectures, causing students to be less enthusiastic about learning. Some of the students who responded to what had been conveyed by the teacher at the time were given a understanding in asking or expressing their opinions. Learning media facilities are also less optimal, given the limited number of projector LCD. Therefore, this research aims to determine the effect of the Problem Based Learning (PBL) model on learning outcomes through students' critical thinking skills in general administration subjects for Students of Grade X Office Governance Automation at Al-Ishlahiyah Singosari Integrated Vocational School.

The use of problem based learning (PBL) models is sought to address problems related to learning outcomes and critical thinking skills of students. Some research by (Park & Choi, 2015), (Martyn et al., 2014), (Wulandari & Surjono, 2013), (Kek & Huijser, 2011) states that there has been a significant improvement in learning attitudes, decision making, problem solving skills, critical thinking, and motivation. However, in previous research there is still nothing to prove that the Problem Based Learning (PBL) model can improve learning outcomes through critical ness. It can only prove to increase one of the variables between learning outcome variables and critical thinking variables. Based on this, researchers conducted research using the Problem Based Learning (PBL) model on learning results through critical thinking skills.

METHOD

This research is a type of quasi experiment with the design of research using Posttest Onlt Control Group Design. This study aims to find out the differences in the learning outcomes of students who use models with those who do not use the model, to know the difference in learning outcomes between high critical thinking ability and low thinking ability, and to know how models influence learning outcomes through critical thinking abilities.

The subjects of this study were all students of class X OTKP at SMK Terpadu Al-Ishlahiyah Singosari. There are two classes used and taken by looking at abilities that are almost identical to midterm test scores (UTS). The determination of the expansive class and control class is determined using purposive sampling or intentional retrieval. Classes with high average grades are defined as control classes and given treatment using conventional models (variation lectures), while classes with low average grades are assigned as experiment classes and given treatment using the Problem Based Learning (PBL) model.

Research instruments used include critical thinking skills instruments and cognitive learning instruments in the form of essays. Critical thinking instruments refer to critical thinking indicators, including formulating problems, giving arguments, concluding, evaluating, and providing solutions (Sumarmo et al., 2012), (Mulnix, 2012).The study instrument refers to the cognitive realm of C2-C6 according to bloom taxonomy. Instrument development procedures are carried out through validity and reliability tests. Data analysis was conducted using the Anova Two Way Anova test with the help of the SPSS 24.0 for Windows program.

RESULT AND DISCUSSION

Data on critical thinking skills and learner results are obtained from tests given to students after treatment. The data of the study results is obtained from posttest scores, while critical thinking ability data is obtained from test scores before posttest. Data descriptions of critical thinking abilities and learning outcomes can be found in Table 1 and Table 2.

Table 1 Critical Thinking Ability Data

Class Learners	Class					
	Experimental Class	f	%	Control Class	F	%
High	82.5	16	57.2 %	76.81	11	39.3 %
Low	63.1	12	42.8 %	60.73	17	60.7 %
Average	74.2	28		67.05	28	

Source : Research processed data. 2020

Based on Table 1, it can be noted that the average value of critical thinking abilities of the two classes is different. The experiment class had an average score of 74.2, the control class had an average score of 67.05.

Table 2 Learning Results Data

Class Learners	Class					
	Experimental Class	f	%	Control Class	F	%
High	82.44	18	64.3 %	79.43	14	50 %
Low	68.40	10	35.7 %	59.71	14	50 %
Average	77.43	28		69.57	28	

Source : Research processed data. 2020

Based on Table 2, it can be noted that the average score of the learning outcomes of both classes is different. The experiment class had an average score of 77.43, the control class had an average score of 69.57. From Table 1 and Table 2 it can be concluded that the classes treated by the Problem Based Learning (PBL) model have an average value of critical thinking ability and higher learning outcomes than classes that get conventional learning treatment (variation lectures).

While the results of the two-track Anova test (Two Way Anova) on critical thinking ability data and the learning results of experiment class students and control classes can be seen in Table 3.

Table 3 Two Way Anova Test Results

Tests of Between-Subjects Effects					
Dependent Variable: hasil belajar					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4852.870 ^a	3	1617.623	59.864	.000
Intercept	281799.788	1	281799.788	10428.635	.000
Class	458.852	1	458.852	16.981	.000
Think	3819.046	1	3819.046	141.332	.000
Class * Think	107.727	1	107.727	3.987	.051
Error	1405.130	52	27.022		
Total	308784.000	56			
Corrected Total	6258.000	55			

a. R Squared = .775 (Adjusted R Squared = .763)

Based on Table 3 it is known that the signification value of the study results test between classes using the Problem Based Learning (PBL) model and classes using conventional models (variation lectures) of $0.000 < 0.05$. So it can be concluded that there are differences in the learning outcomes of students using the Problem Based Learning (PBL) model with conventional models (variation lectures). The results of the experiment class study had a higher average score than the control class. This is because in the learning process of Problem Based Learning (PBL) there are stages of bloating group investigation that can strengthen each other's interaction and communication so that the skills in expressing themselves develop, the activeness and courage of the learners in expressing their opinions increases, the knowledge of the learners increases and better understands the material conveyed (Khatiban & Sangestani, 2014). This makes the learning outcomes better, too. The results of the study showed the ability and quality of the students as a result of the learning process that he went through (Nurhasanah & Sobandi, 2016).

Discussion

There is collaborative learning at the stage of developing and presenting work and in the stage of analyzing and evaluating problem solving that can assist students in listening to and respecting the opinions of others, so that in this case it can develop skills and build good communication (Hsu et al., 2016). The Problem Based Learning (PBL) learning process also emphasizes strengthening concepts in real situations, high-level thinking skills, and problem-solving skills (Supiandi & Julung, 2016), as well as developing various types of investigative activities and effective collaboration capabilities (Sasson et al., 2018).

Problem Based Learning (PBL) also has advantages that can involve students in the process of learning according to real life, not only focusing on the problem-solving process in finding solutions but taking responsibility in developing other skills (Ali, 2019), no longer given learning materials in one direction as in the lecture model (Anggraini & Mukhadis, 2013). In contrast to variety lecture learning, students gain knowledge from teachers to receive materials and not build their own knowledge (Qomariyah, 2016).

There is a difference in learning outcomes between high critical thinking ability and low critical thinking ability, seen in Table 3 that the signification value for thinking is $0.000 < 0.05$. This means that students who have high critical thinking skills can explicitly improve their learning outcomes (Kek & Huijser, 2011) by students who have low critical thinking skills.

Improving critical thinking skills in improving learning outcomes depends not only on academic ability and knowledge, but on effective teaching knowledge and methods by being given a problem can challenge students to develop critical thinking (Espy, 2018). There are indicators of evaluating arguments on the given issue so as to guide development and make judgments in taking action (Geçit & Akarsu, 2017). Indicators provide solutions also play a role in improving critical thinking skills and resulting in logical decisions towards solving a problem (Dwyer et al., 2014).

The importance of critical thinking is able to master new situations and problems so that students have the awareness to design, monitor, and assess what to learn (Ejin, 2017) receive unlimited information, face and solve complex problems, as well as technology and social changes that are changing faster (Vong & Kaewurai, 2017), (Geçit & Akarsu, 2017), (Ridho et al., 2019).

Critical thinking should also be trained on students because it is necessary to analyze their thoughts and make choices and draw precise conclusions (Nuryanti et al., 2018), so that in this case students are required to be active in learning to use problems related to real situations and encourage interaction between students to share different points of view (Oliveras et al., 2013). High academic ability in material mastery will affect his learning outcomes and have a higher speed of thinking anyway (Dehghani et al., 2011).

There is an influence between problem based learning (PBL) learning models and critical thinking skills on learning outcomes. Based on Table 3 it appears that the test results obtained a signification value of 0.051 and $F_{hitung} > F_{tabel}$. This is because the Problem Based Learning (PBL) model uses the problem as a first step that can gather and integrate new knowledge and help students to find suitable solutions (Muhson, 2009), (Weiss, 2017). Group learning can also affect critical thinking skills and student learning outcomes. Students collaborate with each other and discuss in determining the subject matter that has been given. The collaboration process here aims to help students in producing solutions (Kuvac & Koc, 2018). In the Problem Based Learning (PBL) learning model, group learning can apply what has been learned by

discussion in the classroom and outside the classroom, which can stimulate the development of their abilities (Luo, 2019). This results in students being able to develop critical thinking skills and find solutions to solve the problem.

The Problem Based Learning (PBL) model also has a phase of providing solutions and drawing conclusions that can encourage the critical thinking skills of students because it is also included in critical thinking ability indicators (Setyowati & Subali, 2011). The evaluation process can also affect critical thinking skills and learning outcomes in using the Problem Based Learning (PBL) model used for reflection activities (Supiandi & Julung, 2016). Reflection activities can also help improve the quality of learning, critical and collaborative skills among students (Yew & Goh, 2016). Sehingga in this case positively impacts the memory of students on the materials taught and can affect learning outcomes. The Problem Based Learning (PBL) model in influencing the development of critical thinking skills and improving learning outcomes can also be based on the purpose of the model itself whereby not only learning to acquire knowledge, but allowing students to acquire skills to determine the course of their own learning process (Luo, 2019).

CONCLUSION

Based on the results of data analysis and discussion, it was concluded that (1) There were differences in student learning outcomes between classes using the Problem Based Learning (PBL) learning model and conventional models (variation lectures). (2) There is a difference in learning outcomes between high critical thinking ability and low critical thinking ability. (3) Problem Based Learning (PBL) learning models with critical thinking skills affect learning.

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