

Implementation of Learning Models of Problem Based Learning to Improve the Creative Thinking Ability of Vocational Student

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Abstract—There are various learning models that can be applied during the learning process. Generally, teachers apply a teacher-centered learning model. Learning conditions by using a teacher-centered learning model can make the condition becomes bored, so it can reduce the students' concentration in paying attention to the subject matter. In addition, students will be difficult to develop himself as well as passive because students are lazy to think and low in the creative thinking ability. In order to improving students' creative thinking ability, it can be done with the use of appropriate learning model, one of them can be used with Problem Based Learning (PBL) model. This research describes the implementation of Problem Based Learning model of learning to improve vocational students creative thinking skills. The purposes to be achieved in this research are to know the implementation of the application of PBL learning model. The method in this research is to use quasi-experiment with quantitative approach. This research was conducted at vocational high school 5 Bandung in classroom X DPIB on Building Construction Fundamentals subjects. The instrument used in this research is essay-test and observation. Based on the results of the research through N-gain test results, hypothesis testing and observation results during the learning process took place, on the implementation of PBL learning model can be improving students' creative thinking skills vocational high school.

Keywords—creative thinking; Problem Based Learning (PBL); vocational student

I. INTRODUCTION

Generally, teachers apply teacher centered learning models. Based on the results of interviews with any students of vocational high school 5 Bandung and observations during the Field Experience Program (PPL) activities at vocational high school 5 Bandung, on the skill of Modeling Design and Information Building (DPIB) in class X subjects of Building Construction Basics, students in the ability to think creatively still low. Learning conditions using teacher centered learning models tend to make the atmosphere boring, so that it can reduce students' concentration in paying attention to the subject matter. Demands of the times that are increasingly developing requires more creative human resources, so that vocational

students are required to have 21st century skills, one of which is creative thinking ability.

A. Problem Based Learning (PBL)

Problem Based Learning (PBL), is a learning model that requires mental activity of students to understand a concept of learning through situations and problems presented at the beginning of learning with the aim of training students to solve problems using a problem-solving approach [1]. In learning Problem Based Learning (PBL) the teacher plays a role in providing various real problems so that students are required to be active in solving these problems. A teacher's planning is one of the things that can facilitate the smooth process of each learning process or stages with Problem Based Learning (PBL) learning strategies and in achieving the desired learning goals. In the Problem Based Learning strategy, the process is the most important thing than the learning outcomes obtained. There are several steps in the learning process using the Problem Based Learning method. As explained in the table as follows [2]:

TABLE I. PROBLEM BASED LEARNING SYNTAX

Learning Phase	Teacher Behavior
Part 1: Student orientation on problems.	The teacher explains the learning objectives, explains the logistics needed, proposes phenomena or demonstrations or stories to raise problems, and motivates students to be involved in selected problem solving activities.
Part 2: Organizing students to learn.	The teacher helps students to define and organize learning tasks related to the problem.
Part 3: Guiding the individual/group experience.	The teacher encourages students to gather appropriate information, conduct experiments to get explanations and problem solving.
Part 4: Develop and provide work results.	The teacher assists students in planning and preparing appropriate works such as reports, videos and models and helps them to share assignments with their friends.
Part 5: Analysis and evaluate the problem solving process.	The teacher helps students to reflect or evaluate their investigations and the processes they use.

B. The Creative Thinking

That creativity comes from the word 'to create' means to make. In other words, creativity is a person's ability to make something, whether it is in the form of ideas, steps, or products [3]. The ability to think creatively is the ability to think someone in developing ideas or ideas that are fluent, flexible, originality, and elaboration [4]. Creative personalities can occur because of several things including because of the environment or because of the learning process, because basically every human being has the potential for creative thinking. Creative thinking focuses on the search for ideas, the ability to look for various possible correct answers about the problem. The characteristics of the four components of creative thinking as the following process [5]:

1) *Fluency: features include bellow.*

- Generate any of ideas, any of answers, any of problem solving, any of questions smoothly.
- Give many ways or suggestions to do various things.
- Always think of more than one answer.

2) *Flexibility: features include bellow.*

- Producing a variety of ideas, answers, or questions, can see a problem from different points of view.
- Look for many different alternatives or directions.
- Able to change the way of approach or way of thinking.

3) *Originality: features include bellow.*

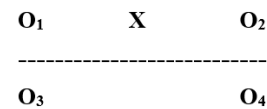
- Able to give new and unique expressions.
- Think of unusual ways to express yourself.
- Able to make unusual combinations of parts or elements.

4) *Elaboration: features include bellow.*

- Able to enrich and develop an idea or product.
- Add or details of an object, idea or situation so that it becomes more interesting.

II. METHODS

The approach used in this study is a quantitative approach. The quantitative approach itself "is used to examine certain populations or samples, data collection uses research instruments, data analysis is quantitative / statistical, with the aim of testing the hypotheses that have been established" [6]. The research method used in this research is quasi experimental designs. The research design used in this study is nonequivalent control group design. "Nonequivalent control group design is almost the same as the pretest-posttest control group design, only in this design the experimental group or the control group are not randomly selected" [6]. In the two groups, the experimental group and the control group were both pretest-posttest, but only the experimental group was treated. This design can be described as follows [6]:



Information:

O_1 and O_3 : Pretest

O_2 and O_4 : Posttest

X : Treatment with Problem Based Learning (PBL) learning model in the experimental class

This research will be implemented at vocational high school 5 Bandung. The population in this study were students of vocational high school 5 Bandung, on the skill of Modeling and Building Information Design (DPIB), class X in the subjects of Building Construction Basics 2017/2018 school year. The sample used in this study were students of class X DPIB 1 as the experimental class and class X DPIB 2 as the control class.

A. Research Instruments

The instruments used in this research are tests and observations. Tests are implemented to measure the ability of students to think creatively. The form / type of test given is an objective test in the form of problem solving tests.

Observation sheet to find out students' creative thinking skills during the learning process. The type of observation used in this study is participatory observation, which is an observation that involves observers in the activities being observed. The observation instrument used in this study is the rating scale.

B. Data Analysis Technique

1) *Gain index analysis:* Quantitative data analysis implemented includes analysis of pretest and posttest data.

2) *Normality test:* Normality tests are implemented to find out whether a data device is normally distributed or not. In this research the normality test used is the Kolmogorov-Smirnov Test, with the help of SPSS version 16.

3) *Homogeneity test:* Homogeneity test is implemented to know the variance of the population of the control class group as large as the variance of the experimental class group.

4) *Hypothesis test:* Hypothesis testing is used to test whether or not the hypothesis is proposed in this research.

III. RESULTS AND DISCUSSION

After searching for data from test the following data can be described. Based on the results of the analysis of pretest and posttest data, there were differences in the mean scores of pretest and posttest. In the control class the pretest average score was 42.5 from the maximum score of 100 and the posttest average score was 56.07 from the maximum score of 100. Whereas in the experimental class the pretest average score was 44.3 from the maximum score, namely 100 and the posttest mean score of 79.6 from the maximum score of 100. The N-gain test will strengthen the significance of the pretest and posttest results, whether the experimental class is more

significant than the control class in terms of students' creative thinking abilities. In terms of the N-gain average score, there are differences in the control class and the experimental class. The average N-gain score in the control class is 0.23 with the low category and the average N-gain score in the experimental class is 0.64 with the medium category. Based on the data for the average N-gain score the experimental class was significant compared to the control class. Test results data in this study are normally distributed, so the hypothesis test is done by Parametric statistics, namely the Independent T-test. Based on the results of the Independent T-test, the sig value was obtained. 0,000. Because sig 0,000 is smaller than 0,05, H_0 is rejected. Therefore, can be concluded based on the hypothesis in this study, that there are differences in the increase in creative thinking abilities of students who learn by using the PBL model after experiments with before experiment.

In addition to the results of the analysis of pretest and posttest data, there were observations during the learning process. The following table observations between the experimental class and the control class:

TABLE II. RESULTS OF EXPERIMENT CLASS AND CONTROL CLASS OBSERVATIONS

Aspects of Creative Thinking Ability	Experimental (biggest percentage)	Control (biggest percentage)
Fluency	47,1% creative	74,3% not creative
Flexibility	41,2% very creative	54,3% not creative
Originality	44,1% creative enough	82,8% not creative
Elaboration	41,2% creative enough	85,6% not creative

IV. CONCLUSION

Based on the data collection and analyzed, it is implementation using of Problem Based Learning (PBL) on building basic construction lessons in vocational school 5 Bandung:

A. Part Orientation of Students on Problems

- Explaining learning purposes
- Explaining the material
- Issue the problem
- Motivate students
- Students observe what the teacher explained

B. Part Organizing Students to Learn

- Giving to know what the students' knowledge
- Students provide questions in the form of problems that arise from understanding of materials
- Teachers give opportunities to other students to answer/ give comments

C. Part Guiding The Individual / Group Experience

- Teachers share students become 7 groups
- Teacher gives assignments at every group
- Teacher encourages students to determine the main problems
- Students are in every group searching for information and data

D. Part Develop and Provide Work Results

- Students are workers cooperate in group to work in finding information
- Teacher ensures the group process in collaborative, cooperative and communicative
- Teacher assigns students to groups to display its assignments in power point forms
- Teachers do research on creative thinking ability

E. Part Analysis and Evaluate The Problem Solving Process

- Teacher facilitates students to discussion in the form of questions on the presentation that has been delivered by other groups
- Meeting ended by conclusion of discussion by students and evaluation of today's learning

In addition, it is improving creative thinking ability after implementing the Problem Based Learning (PBL) on the construction of building basic in vocational school 5 Bandung:

1) The availability of average scoring data:

a) Pretest:

- Experimental: 44,3 from maximum scores 100
- Control: 42,5 from maximum scores 100

b) Posttest

- Experimental: 79,6 from maximum scores 100
- Control: 56,07 from maximum scores 100

c) This is N-gain test result (N-gain average scores):

- Experimental: 0,64 (medium category)
- Control: 0,23 (low category)

2) Observation results (category):

TABLE III. OBSERVATION RESULT CATEGORY

Aspect	Experimental	Control
Fluency	Creative	Not Creative
Flexibility	Very Creative	Not Creative
Originality	Creative Enough	Not Creative
Elaboration	Creative Enough	Not Creative

Problem Based Learning (PBL) influences the improvement of student creative thinking ability. such can see from cognitive aspects, which results of test and affective aspects are the behavior of students during learning as well as

aspects of psychomotor in the form of presented assignments. creative thinking ability of students using higher learning models of PBL compared using student centered.

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