

Influence of Project-Based Learning Model to Increase Cadet Creativity in Politeknik Penerbangan Surabaya: Literature Review

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Abstract.

This article is to describe the Project-Based Learning Model that is applied to enhance the cadet creativity in Politeknik Penerbangan Surabaya. Project-based Learning (PjBL) is effective Learning applied because it emphasizes contextual Learning through complex activities. The focus of Learning lies in the concepts that involve cadets in problem-solving investigations and task activities to develop creativity, provide opportunities for cadets to work autonomously to construct their own knowledge, and reach their peak, which is to produce tangible products. The purpose of this study was to find out how the role of the PBL learning model was in increasing the creativity of the cadets in Politeknik Penerbangan Surabaya. This research is a descriptive study by collecting data through literature studies. Usage of the application of a good PjBL learning model will increase the creativity of cadets in working on projects that have been planned. The results of literature studies from various relevant journals obtained data that the PjBL learning model is effective in enhancing creativity.

Keywords: *Project-based Learning, Creativity Cadets, effective Learning, Literature Study.*

1. INTRODUCTION

In building a community order in a nation lies in the quality of human resources. To build a good quality of human resources that will not be realized except by education. So education has a very important and strategic role in building a knowledgeable society. In the 21st century, competition in various fields of life is increasingly competitive. Therefore education that is applied must form learning skills that can compete in overcoming the problems faced. One way that must be taken is to improve the quality of education. (The Partnership for 21st Century Skills, 21st-century skills, education & competitiveness, 2008).

Quality education is not only oriented towards the level of achievement of cognitive aspects but also focuses on developing aspects of attitudes and values, as well as aspects of skills. The intended skills are the skills to utilize the tools or objects that are around us as learning tools so that everything around us becomes useful. Education is a manifestation of human culture must be able to mobilize and support

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future development. Education must be able to develop a student's potentials comprehensively so that they can face and solve increasingly complex life problems.

In Permendikbud Number 65 on 2013 years concerning process standards, it is stated that the characteristics of learning in each educational unit are closely related to student's Competency Standards and Content Standards. The graduate competency standard provides a conceptual framework about the learning objectives that must be achieved. Standards content provides a conceptual framework of learning and learning activities, which is derived from the competence level and scope of the material. Learning objectives include developing the realm of attitudes, knowledge, and skills that are elaborated for each education unit. Likewise, in Permendikbud No. 66 on 2013 years concerning the assessment standards that an educator has to assess the competency of skills through performance appraisal, which is an assessment that requires students to demonstrate a certain ability by using practice tests, projects, and portfolio assessments.

The learning process in the Aircraft Engineering Study Program in Politeknik Penerbangan Surabaya is still a learning process that requires cadets to memorize a subject matter. Learning like this causes less interest by cadets. In addition, Learning that always memorizes tends to make the learning atmosphere less meaningful; this is similar to the research of Chepy et al. [1]. Less meaningful Learning can inhibit student's ideas and the development of student's creativity. Creativity can make students able to develop their abilities to get better learning outcomes. According to Maryani (2009), creativity is really needed in Learning because it has several interests, namely: 1) unequal distribution of natural resources; 2) advocating a deductive-predictive approach; 4) useful to understand the problems of humanity in the world [2]. Piers in Asrori (2007) argues that the characteristics of creativity consist of: (1) Having a high drive. (2) High involvement. (3) Have a great curiosity. (4) Having high perseverance. (5) Tends to be dissatisfied with the establishment. (6) Confident. (7) Having high independence. (8) Free in making decisions. (9) Accepting yourself. (10) Happy humor. (11) Having a high intuition. (12) Tends to be attracted to complex matters. (13) Tolerant of ambiguity. (14) Are sensitive " [3].

Creativity can be seen as an equation in divergent thinking. However, the relationship between divergent and convergent thinking is measured in highly complex intelligence abilities [4]. Based on Vangundry's research, explains that there are six main principles of creativity: separation of ideas from judgment, convergent idea evaluation, acceptance of tests, reducing negative thoughts, creating perspectives on new thoughts, and taking risks carefully. Creativity will produce various innovations and new developments in human life [5]. In addition, the creativity that grows is able to make learning active; the active learning process, according to Tandogan, is learning-centered on students and teachers only as guides in the process [6]. If cadets have an adequate level of creativity, they will be able to produce graduates who have creativity, so that cadets at the can actively think, develop, and produce creative ideas.

From the explanation above, the writer tries to do a study about the use of a learning model to improve the creativity of cadets Aircraft Engineering Study Program in Politeknik Penerbangan Surabaya. In this context, the writer assumes that Learning that uses a project-based learning model is able to remind the creativity of cadets. To answer this hypothesis, the authors are interested in conducting literature studies from various sources with the aim of analyzing the use of the PjBL model in enhancing creativity and learning outcomes in various areas, levels of education, and fields of study.

II. THEORETICAL REVIEW

Project-Based Learning Model

The project-based learning model was developed based on the theory of constructivism. This is a type of active learning that involves students in a relatively long term, focused on the problem and the meaning of teaching that integrates concepts from a number of disciplines or fields of study [7]. According to Holbrook, Rannikmaa, and Valdmann, project-based learning has been defined as a model for classroom activities where the focus on teachers decreases and the focus on student activity increases with greater emphasis on interdisciplinary and long-term integrated handling of real-world problems in the format practice-based [8]. Project-based learning has been described as an innovative approach to learning that teaches many important strategies for success in the 21st century compared to conventional models.

Active learning models that are able to increase the creativity of cadets are the Project-Based Learning (PjBL) learning models. Project-Based Learning is a learning model that organizes classrooms in a project [9]. The project-based learning model focuses on the main concepts and principles of a discipline, engages students in problem-solving activities and other tasks, provides students with opportunities to work independently in the learning process, and ultimately produces valuable, realistic student work products. According to Audet (2000) in Sumarmi, the purpose of implementing Project Based Learning is (a) integrating the real world with learning, (b) making students work honestly, (c) making students learn to work together / cooperatively, (d) encourage students to investigate, and (e) solve problems. Project-based learning connects a lot of students' thinking abilities so that it is multi-intelligence because students use various intelligence (intelligence) in carrying out projects carried out in the surrounding environment. This is consistent with Johnson Project-based learning is able to connect academic content with real-world contexts; in this case, the project can arouse the enthusiasm of students to participate in learning activities".

PjBL learning is a learning model that involves a project in the learning process. Projects undertaken by cadets can be individual or group projects and carried out within a certain period of time in collaboration, producing a product, the results of which will then be displayed and presented. Project implementation is carried out in a

collaborative and innovative, unique way, which focuses on solving the problem being studied. The steps of project-based learning as developed by Jalaluddin consist of [10]:

a. Determination of the Basic Question (Start with the Essential Question)

Learning begins with essential questions that are questions that can assign students assignments in carrying out an activity. Take a topic that matches the reality of the real world and starts with an in-depth investigation. Lecturers try to make the topic that is relevant to students.

b. Designing a Project Planning (Design a Plan for the Project)

Planning is done collaboratively between lecturers and cadets. Thus cadets are expected to feel "ownership" of the project. Planning contains rules, the selection of activities that can support in answering essential questions, by integrating a variety of possible subjects, as well as knowing the tools and materials that can be accessed to help complete the project.

c. Arrange Schedule (Create a Schedule)

Lecturers and cadets collaboratively arrange activities in completing projects. Activities at this stage include: (1) creating a timeline (time allocation) to complete the project, (2) creating a deadline (deadline) for completing the project, (3) bringing students to plan a new way, (4) guiding the participant's students when they make ways that are not related to the project, and (5) ask students to make an explanation (reason) about the choice of away.

d. Monitor project cadets and progress (Monitor the Students and Progress of the Project)

The lecturer is responsible for monitoring the activities of cadets while completing the project. Monitoring is done by facilitating cadets in each process. In other words, lecturers play a role as mentors for cadets' activities. To assist the monitoring process, a rubric is created that can record all important activities.

e. Assessing Outcomes

The assessment is carried out to assist the lecturer in measuring the achievement of standards, play a role in evaluating the progress of each cadet, provide feedback on the level of understanding that has been achieved by cadets, assist the lecturer in developing the next learning strategy.

f. Evaluate the Experience

At the end of the lesson, lecturers and cadets reflect on the activities and results of the projects that have been carried out. The reflection process is carried out individually or in groups.

Project-based learning can provide experience for cadets to form their own knowledge. Cord (2007) suggests that the PjBL model is intended to encourage students to learn more deeply by using inquiry. The PjBL learning model encourages students to build their own content knowledge and demonstrate new understanding through various forms of representation (NYC Department of Education, 2009). According to Moursund (1997, in Wena, 2013) and Kemdikbud (2014), the PjBL

model has many advantages. Apart from being able to provide experience to students in practical learning, this PjBL model is also able to improve student learning outcomes.

There are several advantages of the PjBL learning model if this model can be applied to students, including (1) making students motivated to learn in doing projects; (2) make students more creative in learning and able to solve problems; (3) increase collaboration, i.e., students need cooperation in groups and be able to create a pleasant atmosphere; (4) and make scientific attitudes such as conscientious, honest, responsible and creative. Based on the advantages of the project-based learning model, learning can make students more creative in learning, and then this model will be able to increase student creativity in Learning [11].

III. METHODOLOGY

Types of research

This research is a literature study research by finding reference theories that are relevant to the existing problems. Reference theory is obtained by means of research literature studies used as a foundation and the main tool in the practice of research in the middle of the field.

Data collection technique

Data collection techniques are carried out with data collection techniques through the study of literature, where the authors collect articles published between 2010-2020 consisting of Indonesian journal articles and International journal articles that have the same theme as this research. The problem examined in this study is the role of the PjBL model in increasing creativity. Articles are taken from various levels of education from elementary, high school, university, and taken from several countries.

Data analysis

The data obtained from several articles were analyzed by descriptive analysis. The descriptive analysis method is carried out to describe the facts, which are then compiled by analysis, not merely describing, but also provides sufficient understanding.

IV. RESULT AND DISCUSSION

Literature study research in increasing creativity using the PjBL learning model shows the differences in key findings in various study articles. Students who are facilitated with PjBL based learning have creativity, motivation, activity, and high learning outcomes. Referring to cognitive domains, according to Bloom, that will be achieved in learning and paying attention to the unique characteristics of project-based Learning, the PjBL has the potential to meet the demands of Learning. This is due to PjBL assisting students in Learning: 1) solid and meaningful knowledge and skills to use authentic tasks and work, 2) broadening knowledge through authentic extracurricular activities with the learning process of conducting open-ended planning

or investigative activities, and 3) in the process of building knowledge through real-world experiences and interpersonal cognitive negotiations that take place in a collaborative work atmosphere. Thus, the project-based learning model can increase creativity and learning outcomes. The results of the literature study can be seen in Table 1 below.

Table 1. Literature Study of the Project-Based Learning Model

No.	Researcher (Year)	Topic	Findings
1	Mohamadi, Zohre [12]	PjBL-Learning Outcomes	Effective in increasing student activity and participation in Learning
2	Kokotsaki et al. [13]	PjBL-Learning in Schools	An important role in facilitating the learning process at the level of kindergarten, elementary, junior high school, senior high school, and University
3	Helle et al. [14]	PjBL-Learning Process	Can foster activeness, creativity, understanding of concepts, and application of concepts
4	Karaçalli, et al. [15]	PjBL-Learning Outcomes	Can improve student learning outcomes
5	Castaldi et al. [16]	PjBL-Teaching Experience	Effective in academic activities in the laboratory
6	Arcidiacono et al. [17]	PjBL-Learning Outcomes	Can optimize learning outcomes
7	Wu, T. T., & Wu, Y. T. [22]	PjBL-Creative Thinking	Can achieve greater imagination and creativity
8	Burcu Gulay Tasc [18]	PjBL-Academic Achievement	Can affect learning achievement
9	Cansuelo Garcia [19]	PjBL-Learning Outcomes	Can improve academic, professional and applied knowledge
10	Pablos et al. [20]	PjBL- Teaching Experience	More effective in the learning process
11	Splichal et al. [21]	PjBL-Learning Outcomes	Can improve learning outcomes
12	Chu et al. [23]	PjBL- Effectiveness	The learning process in higher education is more effective

No.	Researcher (Year)	Topic	Findings
13	Harahap et al. [24]	PjBL-Creativity	Can increase student creativity
14	Triani et al. [25]	PjBL-Learning Outcomes	Can improve learning outcomes
15	Nur et al. [26]	PjBL-Learning Outcomes	Can increase teacher creativity and student learning outcomes

Based on the findings in Table 1, it can be seen that the PjBL learning model plays an important role in efforts to increase student creativity. The effectiveness of the PBL learning model in enhancing creativity and learning outcomes has been proven from the journal articles that have been reviewed. Project-based learning model (project-based learning model) has the advantage of its characteristics, namely helping cadets design processes to determine an outcome, train cadets responsible for managing information carried out on a project, and finally, cadets produce a tangible product of the cadets themselves then presented in class. Based on the findings in the article [12,16] have a common finding that the PjBL learning model is effective in increasing creativity in the learning process. Even though the levels of science and fields of study of these two studies are different, this shows that the PjBL model is effective in the learning process not bound by a particular field of study and Education level. In the Karaçalli study [15], that the PjBL learning model applied at the elementary level in science lessons was able to improve student learning outcomes compared to the scores in the control and experimental classes.

The findings in the article [14, 21, 22] stated the results of their research that the PjBL learning model can improve student learning outcomes and student creativity. The results of this study indicate that the application of the PjBL learning model is learning that enables students to work on diverse activities in order to build and apply the concepts of the project produced by exploring and solving problems in the real world independently. The George Lucas Educational Foundation explains that project-based learning provides opportunities for students to explore content (material) by using various means that are meaningful to themselves and conducting experiments collaboratively [27].

IV. CONCLUSION

Based on the results of qualitative data analysis, it can be concluded that Project-Based Learning (PjBL) learning can increase the creativity of the cadets of the Poltekbang Surabaya. Creativity with the help of PjBL learning models not only increases at the same school level and field of study, but in different categories; it turns out the level of creativity, and student learning outcomes will increase if educators apply the PjBL model in their learning.

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