THE EFFECT OF PROJECT-BASED LEARNING ON THE LEARNING OUTCOMES OF VOCATIONAL STUDENTS IN THE TIME OF COVID-19 PANDEMIC

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ABSTRACT

This study aims to determine the effect of project-based learning on vocational student learning outcomes during the covid-19 pandemic. The research method used is experimental research with a true experimental design using a pretest posttest control group. The data collection technique in this study used an instrument in the form of a test to measure students' cognitive. The sample used in the study was 40 students, consisting of two homogeneous classes, namely 1 control group class and 1 experimental group class each of 20 students. -count is 4.088 and t-table = F(0.05)(38) = 2.024, so it is stated that the value of t-count > t-table or 4.088>2.024. Based on the results of the assessment, it can be concluded that there is an effect of project-based learning on the learning outcomes of vocational students in the time of covid-19 pandemic.

Keywords: Project-based learning, learning outcomes, vocational students.

I. INTRODUCTION

The educational paradigm in Indonesia has experienced a shift in the past year, this cannot be separated from the impact of covid 19 where competency-based vocational learning which is always carried out in the classroom or laboratory has turned into the implementation of learning through virtual systems using learning applications that are carried out online. However, vocational learning in all universities must still be implemented. The vocational learning process in higher education even though online learning still needs to maintain the quality of education in order to produce competent graduates facilitated by the role of lecturers to plan, develop, implement, control and evaluate learning in realizing learning outcomes. One of the learning methods currently used in vocational education during a pandemic is interactive learning to produce a project.

The contribution of project-based learning to the development of (self) general competencies and subjects of learners has been widely recognized. However, in an effort to develop student competencies, it is necessary to apply project-based learning strategies and methods as one of the most essential means for (independent) education in higher education institutions. (Lasauskiene. J & Rauduvaite. A, 2015). PjBL as a learning strategy in product design courses helps students to implement knowledge in engineering and design science courses to develop practical product design solutions, both hard skills and soft skills so that there is skill development between knowledge and skills. (Kuppuswamy.A & Mhakure. D, 2020). PjBL has a more positive impact on students' academic achievement than direct teaching (Chen & Yang, 2019). Project-based learning (PjBL) is conceived as a promising approach that enhances student learning in higher education. Future research should investigate further about the student learning process and the final product. (Pengyue Guo, 2020). Therefore, researchers feel the need to know the effect of project-based learning on learning outcomes in vocational education.

II. LITERATURE REVIEW

a. Learning Outcomes Vocational Students

Anderson divides abilities into dimensions of knowledge and cognitive processes. The knowledge dimension is divided into four aspects, namely: factual, conceptual, procedural, and metacognitive. While aspects of cognitive processes are categorized into six levels, namely remembering (remembering), understanding (understanding), applying (applying), analyzing (analyzing), evaluating (evaluating), and creating (create) (Anderson, 2001:27-32).
The six levels of cognitive processes are further grouped into higher order cognitive and lower order cognitive. The higher-order cognitive domain includes aspects of analysis, evaluation, and creation. While the low-level cognitive domain includes aspects of remembering, understanding, and applying.

Learning outcomes are one of the basic elements that can improve the quality of education. Learning outcomes consist of three domains: 1) cognitive domains, including: memory, understanding, application, analysis, synthesis, and evaluation, 2) affective domains, including: attitudes, interests, self-adjustment appreciation, 3) psychomotor domains, including: skilled in appearance, skilled in communication, skilled in arithmetic, skilled in learning while working, and skilled in social relations (Dunifa, et al, 2017: 26).

In order to find out how big the changes that occur in students or the extent to which student learning outcomes are achieved, it is necessary to evaluate learning outcomes or assessment of learning outcomes. Assessment of learning outcomes carried out by lecturers on learning outcomes with a view to measuring the level of achievement of student competencies, and used as material for preparing reports on progress of learning outcomes, as well as material for improving the learning process (Rusmono, 2013: 13). Thus it can be formulated that learning outcomes are abilities possessed by students after receiving learning experiences.

b. Project-Based Learning (PjBL)

Project-based learning (PjBL) refers to an inquiry-based learning method that engages learners in knowledge construction by asking them to complete meaningful projects and develop real-world products (Brundiers & Wick, 2013; Krajcik & Shin, 2014). The application of project-based teaching improves the quality of teaching and learning and contributes to higher-level cognitive development that involves students in solving complex and innovative problem solutions, teaching them complex processes and procedures such as planning and communication, and independent learning. (Lasauskiene & Rauduvaite, 2015). Project-based learning experiences provide a more realistic environment for applying engineering, science and math principles to solve practical problems. (Richard N, et.al, 2009)

The characteristics of PBL are developing students' thinking skills, allowing them to have creativity, encouraging them to work cooperatively, and leading them to access the information on their own and to demonstrate this information. PBL usually require students to participate willingly in the meaningful learning activities proposed, mostly teamwork. (Chiang, 2016:709).

Duncan Mhakure (2020) The use of PjBL, as a learning strategy, in product design courses has helped students to implement the knowledge learned in both engineering and design science courses to develop practical product design solutions. There is a significant increase in the implementation of Project Based Learning on creativity and motivation (Shui-fong Lam, 2010). Apply PJBL model as an effort to improve the quality of the learning process (Shinde, 2014; Ismuwardani. Z, et.al, 2019).

The majority of teachers indicated that the project encouraged active participation of students (95%), motivated them to learn (96%) and helped them acquire various curricular skills (90%). (Pablos, et al, 2017).

Assessing student learning outcomes in project-based learning can be divided into four categories, namely cognitive, affective, behavioral outcomes, and product performance, while the five categories of instruments used can be questionnaires, rubrics and taxonomies, interviews, tests, and self-reflection journals. (Pengyue Guo, 2020).

However, there are some negative implications related to project based learning, therefore in the application of this method can take advantage of the advantages of modern teaching techniques. (Douladeli Efstratia, 2014). Successful results have been reported from the project-based learning (PBL) approach in combination with other tools or approaches such as e-learning (Blackburn, 2015).

Students’ online discussion during project-based learning is characterized by a more advanced level of knowledge construction, where ideas are rationalized and integrated into a coherent solution. In contrast, students’ online postings outside of project-based learning rarely move beyond lower levels of information sharing and exploration of ideas. Based on these results, guidelines for designing and facilitating online project-based learning are presented and discussed. (Hwee Ling Koh, et.al 2010).
III. METHODOLOGY

In this study using the true experimental design method, using the Control Group Pretest Posttest design. The pretest data was to determine the situation before being given action, then the control class was given Asynchronous Project-based learning (PjBL) and the experimental class was given Project-based learning (PjBL) through Synchronous.

The research design carried out is as follows:

1. Determine the experimental class and control class with the available data.
2. Giving pretest questions to the experimental class and control class
3. Carry out treatment in the experimental class with Project-based learning (PjBL) through Synchronous, while in the control group using Project-based learning (PjBL) through Asynchronous.
4. Give posttest questions to the experimental class and control class.
5. Comparing the learning outcomes of the Project-based learning experimental class (PjBL) through Synchronous with the Project-based learning control class (PjBL) through Asynchronous.
6. Analyzing the effect of Project-based learning (PjBL) on student learning outcomes

The data taken and analyzed in this study are the average learning outcomes of cognitive domains (pretest and posttest), attitudes, skills and projects. The research was conducted on students who took the make-up course at the State University of Jakarta. The sample used for the study was 40 students consisting of two homogeneous classes seen from the aspect of being taught by the same lecturer and the same subjects, namely 1 control group class and 1 experimental class that has 20 students per class.

The data collection technique in this study was to use an instrument in the form of a test to measure students cognitive. The test was conducted twice, namely before treatment (pretest) and after treatment (posttest). Then to measure learning outcomes in the control class, posttest activities were carried out. The final test given to students aims to measure the extent to which students who are given treatment can understand the course well. Learning outcomes are changes in behavior caused by educational efforts which include cognitive, affective, and psychomotor changes after the student experiences the learning process. In learning makeup, it is intended that students have knowledge and skills in makeup. In the cognitive domain, students are expected to be able to explain the concepts of makeup, facial morphology, facial shape analysis, while in the psychomotor domain students are expected to be able to practice facial correction techniques, makeup procedures must be done correctly, therefore in project-based learning students are directed to create the latest techniques in makeup in order to improve learning outcomes of makeup. However, in this case, this article is only limited to research on cognitive learning outcomes.

IV. RESULT AND DISCUSSION

The pretest score in the control class before the treatment was carried out and the average score from the assessment of learning outcomes was obtained, namely the minimum score was 24, the maximum value was 72, the average was 53, the median was 56, the mode was 56, the variance was 142,947, the standard deviation was 11,95606. After the treatment and the average of the learning outcomes has been calculated, it can be seen in the table below:

<table>
<thead>
<tr>
<th>Description</th>
<th>Learning Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Score</td>
<td>78,06</td>
</tr>
<tr>
<td>Minimum Score</td>
<td>50,61</td>
</tr>
<tr>
<td>Range</td>
<td>27,45</td>
</tr>
<tr>
<td>Mean</td>
<td>68,154</td>
</tr>
<tr>
<td>Variance</td>
<td>49,5</td>
</tr>
<tr>
<td>Deviation</td>
<td>7,03561</td>
</tr>
</tbody>
</table>
In the table above, most of the data are in the 3rd class (66-73), which is as many as 8 students or 40%.

Then to measure learning outcomes in the experimental class, posttest activities were carried out. The final test given to students aims to measure the extent to which students who are given treatment can understand learning well. After the treatment and the average of the learning outcomes has been calculated, it can be seen in the table below:

**Table 3. Treatment and the average of the learning outcomes**

<table>
<thead>
<tr>
<th>Description</th>
<th>Learning Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Score</td>
<td>82.86</td>
</tr>
<tr>
<td>Minimum Score</td>
<td>69.72</td>
</tr>
<tr>
<td>Range</td>
<td>13.14</td>
</tr>
<tr>
<td>Mean</td>
<td>75.14</td>
</tr>
<tr>
<td>Variance</td>
<td>15.314</td>
</tr>
<tr>
<td>Deviation</td>
<td>3.91329</td>
</tr>
</tbody>
</table>

In the table above, most of the data are in class 2 (70-74), namely 9 students or 45%. Testing the normality of the experimental and control group data in this study used the Kolmogorov-Smirnov normality test. The results of the analysis of the normality test were 0.200 and the data were normally distributed. For learning outcomes and attitude data, Fcount > Ftable or 4.295 > 2.168, it means that there is a difference in variance between the experimental group and the control group or the two variances are not homogeneous. Because the control and experimental class data are normally distributed, then for the next test using parametric statistics, namely the independent t test.

Based on the calculation results, the tcount value is 4.088. Then look for the value of t table from the t distribution table with a significance level of 0.05 and db = 20+20-2=38, so ttable = F(0.05)(38) = 2.024. Thus, the value of tcount > ttable or 4.088 > 2.024 means that there is an effect of project-based learning on the learning outcomes of makeup.

(V. CONCLUSION)

Student learning outcomes in the experimental class were better than those in the control class. This is reinforced by the acquisition of the results of the calculation of the hypothesis test using the t-test, so that the tcount value is 4.088 and ttable = F(0.05)(38) = 2.024. So it is stated that the value of t count > t table or 4.088 > 2.024. The
results of this calculation prove that there is an effect of the synchronous PjBL model on the learning outcomes of vocational students in the time of covid-19 pandemic.

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