



THE INFLUENCE OF PROJECT-BASED LEARNING MODEL ON STUDENT LEARNING OUTCOMES IN SYLLABUS DEVELOPMENT

Ismail Hanif Batubara¹, Ajeng Famella², Nova Anggrilla Yossa³, Muhammad Yamin⁴, Kiki Ramadhani⁵, Indah Purnama Sari⁶

^{1,2,3,4,5} *Fakultas Keguruan dan Ilmu Pendidikan, Universitas Muhammadiyah Sumatera Utara*

⁶ *Fakultas Ilmu Komputer dan Teknologi Informasi, Universitas Muhammadiyah Sumatera Utara*

Abstract: The purpose of this study was to find out whether the improvement in student learning outcomes taught with the project-based learning model was greater than the increase in learning outcomes of students who did not obtain the project-based learning model. This study is quasi-experimental. The Population of this study is the entire class of mathematics education program semester Five which amounted to approximately 67 people. Experimental classes were given project-based learning model treatment, and control classes were not given learning treatment. The instrument used is a test, and data analysis is done with a t-test. The results showed that the improvement in student learning outcomes through the learning model project-based learning was bigger than the improvement in learning outcomes in students who were not given the treatment of learning models (control classes).

Keywords: Project-Based Learning; Learning Outcomes; Syllabus Development

INTRODUCTION

Cultural diversity in Indonesia is very important to be understood by learners in addition to the introduction of cultural diversity across countries. Learners must have an attitude of tolerance and recognize the existence and uniqueness of every tribe and region in Indonesia. Learners often interact and communicate with people from different cultural backgrounds and customs. Understanding habits, customs, languages, cross-cultural uniqueness is knowledge is very important knowledge in conducting communication and interaction so as not to cause misunderstandings and maintained a sense of national unity and unity (Batubara, 2020). Communication skills are intended so that learners can establish relationships and convey ideas well verbally, written, and non-verbally. Similarly, in the development of syllabus, learners must be able to communicate their ideas and understanding of the preparation and development of mathematical learning syllabuses in particular so that the concept of the preparation of syllabus or learning goals that have been delivered before can be achieved to the maximum (Guo *et al.*, 2020).

But the reality in the field shows that there are still many students who are confused in preparing the syllabus, determining indicators and learning objectives derived from basic competencies, and confused in determining the components contained in the syllabus and advanced syllabus (Surya, Relmasira, and Hardini, 2018). Students who validate learning devices before conducting research, for example, often find errors in the manufacture of syllabuses and advanced syllabuses (Uziak, 2016).

One of the solutions to the aforementioned issues is to use the project-based learning approach. Project-Based Learning (PjBL) is defined by Goodman and Stivers as a teaching style based on learning activities and real-world assignments that offer learners with difficulties to tackle in groups (Nair and Suryan, 2020). According to Afriana and Sharma, project-based learning is a learning model that is student-centered and provides a meaningful learning experience for learners (Sharma *et al.*, 2020). Learners' learning experiences and concepts are built on products produced in the project-based learning process (Aranzabal, Epelde, and Artetxe, 2021). Grant and Niemiler define project-based learning as a student-centered learning model for conducting an in-depth investigation of a topic (Niemiller, Davis, and Niemiller, 2021). Learners constructively deepen learning with a research-based approach to problems and



questions that are weighty, real, and relevant. From the explanation of some experts above, it is known that the problems that are facing students today can be solved by applying the Project-based learning model (Lobczowski *et al.*, 2021), (Bashirova and Sattarova, 2018).

This model is very appropriate because it is based on the syllabus project that must be produced by students as an exterior of the syllabus development lecture (Astawa, Artini, and Nitiasih, 2017). This is in accordance with research conducted by Surya that the use of project-based learning can improve learning outcomes and student creativity (De Los Ríos-Carmenado, López and García, 2015). Likewise, the opinion of Maya Nur explained that students' problem-solving skills taught with project-based learning are better than other learning. It is for this reason that researchers try to use the Project based learning Model to see students' learning outcomes in developing the learning syllabus (Murniarti, 2017).

METHOD

The Population of this study is the whole fifth-semester mathematics education program class, which numbered around 67 participants. At the same time, the sample in this study consists of two classes chosen from the Faculty of Teacher Training and Education's existing offerings, University of Muhammadiyah Sumatra Utara. This study is a quasi-experimental study. This research was conducted with an online project-based learning (PjBL) model. Broadly concluded that this research is carried out with stages: (1) The stage of preparation of learning devices and research instruments that includes initial tests (2) The stage of conducting experiments in the form of online learning treatment (3) The analysis stage of research results (Monti, Novoa and Vizcaíno, 2003), (Aksela, 2019). Each stage is designed in such a way that valid data is obtained in accordance with the characteristics of variables and research objectives.

The data that will be collected in this study is data related to student learning outcomes taken using tests. The test is done by giving the question's description. Tests are given in the form of pretest questions and posttest questions. Data Processing starts with a series of statistical tests that serve as a foundation for hypothesis testing, such as the data normality test and the variance homogeneity test. All statistical calculations in this study use the help of SPSS computer programs (Anazifa and Djukri, 2017). The hypothesis to test this research is

$$H_0 : \mu x = \mu y$$

$$H_a : \mu x \neq \mu y$$

μx = Improved student learning outcomes taught with the PjBL model

μy = Improved student learning outcomes that are not taught with the PjBL model

The t-test method was applied with the help of SPSS to evaluate this hypothesis. The testing criteria were to reject H_0 if t generates at a table and accept H_0 for other conditions with a preset degree of significance.

RESULTS

The results of the analysis prerequisite test showed that the N-gain data of students distributed normal and variance from each data group Sama, then to analyze it using parametric statistical tests using the t-test. The results are shown in the table below:

Table 1. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Results Outcome	Equal variances assumed	.158	.692	2.785	58	.007	.09600	.03447	.02700	.16500
	Equal variances not assumed			2.785	57.931	.007	.09600	.03447	.02700	.16500



Based on the findings of the computations in the table above, t counts of 2.785 with a significance value of 0.007 and at-table of 2.00 were produced using the test t at a significance level of = 0.05 and a significance level of = 0.05. H_0 is rejected because of $t\text{-count} > t\text{ table}$ and significance. As a result, it was determined that students who were taught Project Based Learning improved their learning outcomes more than students who were not taught Project Based Learning.

Discussions

The t-test method was applied with the help of SPSS to evaluate this hypothesis. The testing criteria were to reject H_0 if t generates at the table and accept H_0 for other conditions with a preset degree of significance. If we pay attention to the learning model used in both classes is a natural thing to occur differences. Theoretically, project-based learning models have several advantages when compared to conventional methods (Shin, 2018). These advantages can be seen through the active role of students as well as the interactions that occur during classroom learning.

According to some experts, there are several advantages of project-based learning, among others as follows:

1. Increased motivation. Project-based learning can increase student learning motivation, as evidenced by several research reports on project-based learning that state that students are very diligent, strive to complete projects, students feel more passionate about learning, and delays in attendance are greatly reduced.
2. Increased problem-solving ability Some sources describe that project-based learning environments can improve solving skills problems, make students more active, and successfully solve problems that are complex. Because project-based learning requires students to be able to quickly obtain information through sources of information, then students' skills to find and get information will increase.
3. Improved library research skills Because project-based learning requires students to be able to quickly obtain information through sources of information, then students' skills to seek and get information will increase.
4. The importance of group work in projects requires students to develop and practice communication skills. Cooperative working groups, student evaluations, online information exchange are collaborative aspects of a project.
5. Improved resource management abilities Project-based learning that is well-implemented teaches students how to organize projects and makes time and other resources such as equipment allocations for finishing tasks (Jalinus, Nabawi, and Mardin, 2017). Some of the advantages of the project-based learning model are the ones that cause the ability of student learning outcomes in groups that get higher Project-based learning compared to groups that do not get Project-based learning (Thuan, 2018).

CONCLUSION

We stated that the improvement of student learning outcomes taught through the project-based learning model is greater than the improvement of learning outcomes not given the learning model, based on the results of the analysis data above obtained conclusions that are the answers to the questions on the problem formulation. This is because, in Project-Based Learning, students are required to be active in learning to do step by step in learning so that the understanding of student concepts is more focused and more targeted. While in control classes or classes that are not given project-based learning, students are less noticed in learning, and learning is dominated by teachers so that students are less focused on learning that eventually students' learning outcomes also become drastically down.

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