**International Journal of Multidisciplinary Research and Development**
**www.allsubjectjournal.com**
**ISSN Online: 2349-4182 ISSN Print: 2349-5979**
**Received: 10-09-2023, Accepted: 26-09-2023, Published: 12-10-2023**
**Volume 10, Issue 10, 2023, Page No. 17-22**

# The influence of project based learning models on learning outcomes and creativity of Class VI students of santa clara tomohon catholic primary school

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**Abstract**
This research aims to determine the influence of the project based-learning (PjBL) learning model on the science learning outcomes of VI students at Santa Clara Elementary School Tomohon, the influence of the project based-learning (PjBL) learning model on the creativity of science learning students at VI Santa Clara Elementary School Tomohon, and the influence project based-learning (PjBL) learning model on student creativity and science learning outcomes for class VI students at SD Santa Clara Tomohon. This research is a quasi-experimental research with a non-equivalent group pretest-posttest design. The population in this study was class VI students at SD Santa Clara Tomohon for the 2023-2024 academic year, totaling 50 students. Determination of the research sample was carried out deliberately to be selected as the research sample. Data collection uses test and non-test methods. The instruments used were learning outcomes tests and student creativity questionnaires. Data were analyzed using the independent sample t-test and multivariate analysis of variance (MANOVA). The research results show that the project based learning model has an effect on learning outcomes. This is proven by the significance value on learning outcomes through the independent sample t-test of 0.001 or a sig value <0.05, so that H0 is rejected and H1 is accepted, so there is a significant influence on the learning outcomes of students who use the project based learning model in class VI elementary school. Santa Clara Tomohon Catholic. The project based learning model influences student creativity. This is proven by the significance value through the independent sample t-test, namely 0.002 or sig < 0.05, so that H0 is rejected and H1 is accepted. This shows that there is an influence of creativity between students who use the project based learning model and conventional learning in class VI of Santa Clara Catholic Elementary School, Tomohon. The project based learning model influences student learning outcomes and creativity. This is proven by testing MANOVA analysis with Hotteling's Trace which has a significance value of 0.001 or significance <0.05, so H0 is rejected and H1 is accepted. This shows that there is a significant influence on learning outcomes and creativity among students who use the project based learning model in class VI of Santa Clara Catholic Elementary School, Tomohon.

**Keywords:** Project based learning, learning outcomes, student creativity

## Introduction

The Industrial Revolution 4.0 with its myriad of benefits and sophistication is creating increasingly competitive global competition. Individuals are required to be more creative and innovative and master various skills. Therefore, in order to create quality individuals, education must improve itself. One of them is by redesigning learning. The development of technological knowledge means that everything can be fulfilled quickly and instantly. The rapid development of technology is also occurring in the world of education. Technology is a demand for teachers to be able to adapt to technological developments as additional learning media. Teachers must be capable in terms of skills and keep up with current technological sophistication, so as not to be left behind by their students in understanding technology and honing students' skills. Teachers must also hone students' skills so that after graduating from school, students will master a skill for work.

Over time, it turns out that current learning still uses a teacher-centered learning approach. Teacher-centered learning greatly reduces students' responsibility for their learning tasks. Teacher-centered learning does not increase student activity, resulting in low learning outcomes in terms of cognitive, affective and even psychomotor abilities. This is indicated by the methods used by teachers in the classroom in the conventional learning process. Apart from that, learning models that are less constructivist do not encourage students to build on their initial knowledge. Students do not actively participate directly in the teaching and learning process. Therefore, it is necessary to have a learning model that is student-centered so that it allows for knowledge sharing between friends and teachers in a relatively short time. In addition, students need to be given the opportunity to learn to work together with friends to develop an understanding of important concepts and principles. One learning model that is predicted to be able to overcome this is the Project Based Learning Model.

In project-based learning, learning activities take place collaboratively in heterogeneous groups. Project-based learning has the potential to increase student learning activity and motivation. Students design a problem and find their own solution. The project-based learning model has the advantage of its characteristics, namely helping students design a process to determine an outcome, training students to be responsible in managing information carried out on a project and finally students producing a real product

resulting from the students themselves. which is then presented in class (Amirudin et al., 2015) [3]. Apart from that, the project-based learning model is a learning model that is able to improve students' psychomotive abilities in terms of acting after receiving learning experiences, not only that, even cognitive and affective abilities also increase.

Science learning in elementary school is adjusted to grade level and is given based on the stages of student development. Budimansyah (2003) said that science learning should emphasize direct experience for students. Apart from that, the implementation of science learning is also required to be able to develop the process skills that students have. The process of forming science concepts in elementary school through various process skills is called science process skills (Science Process Skills). These process skills are then adapted to the development stages of students in elementary school (Samatowa, 2010: 5) [28]. Semiawan, et al (1985) in Bundu (2006: 5) [10] stated that the importance of the science process for elementary school students to master is as follows: (1) the rapid development of science and technology so that it is no longer possible to teach facts and concepts to students, (2) students will gain more experience and easily understand abstract concepts when learning to use concrete objects and immediately discover them for themselves, (3) the nature of scientific discoveries is relative truth, (4) in the teaching and learning process the development of concepts cannot be separated from the development of attitudes and values. Therefore, science process skills play an important role in developing students' concepts, attitudes and values.

A learning process that is said to be successful is learning that can be seen in terms of mastery of the material and the learning outcomes obtained. In a learning process teachers and students are required to be actively involved and creative and become subjects when learning occurs. This can stimulate students in their learning, both in terms of knowledge of the material and creativity in creating something according to their knowledge in learning. Learning outcomes are achievements that students must fulfill in the learning process, because learning outcomes are the goals of learning outcomes that must be achieved (Khair, 2023). However, apart from learning outcomes, student creativity in learning is also needed for student survival, especially application in everyday life.

Based on the results of observations and interviews conducted during the learning process, the teacher explains the learning material and the students just listen. Just doing conventional learning, there is no group learning so students are not given the freedom to seek knowledge on their own or interact with groups as an act of collaboration. This makes students feel bored during the learning process so that 85% of students' learning outcomes have not reached the value set in the KKM and only around 15% of students have reached the set KKM, namely 75. The learning model has a very important role in achieving learning objectives. One learning model that can be applied is the project based learning model. The project based learning learning model is a learning model that involves student activity in solving problems so that the learning process that uses the project based learning learning model requires student creativity to design a product that is appropriate and integrated with new knowledge according to their experience (Rajagukguk, 2023) .

Based on this description, the right learning model will make it easier for students to develop process skills and scientific attitudes. The use of the problem based learning model needs to be proven in terms of its effect on science process skills and scientific attitudes at elementary school level on electrical circuits in series, considering that science process skills and scientific attitudes are important aspects in the student development process. Researchers tested this truth by conducting research in class VI of Santa Clara Elementary School, Tomohon, on the topic "Electric Circuits in Series". In order to be valid, quasi-experimental research requires homogeneous control and experimental classes. Class V students of Santa Clara Tomohon Elementary School are considered to be a place for research because has parallel classes where class grouping is done randomly and not based on students' abilities. This research aims to determine the influence of the project based-learning (PjBL) learning model on the science learning outcomes of VI students at Santa Clara Elementary School Tomohon, the influence of the project based-learning (PjBL) learning model ) on students' creativity in science learning for sixth grade students at Santa Clara Elementary School, Tomohon, and the influence of the project based-learning (PjBL) learning model on student creativity and science learning outcomes for sixth grade students at Santa Clara Elementary School, Tomohon.

## Method

This research uses a quantitative approach with a quasi-experimental type of research. The design used is a non-equivalent control group design. This research has a population of 50 students, the sources come from all grade VI students at Santa Clara Tomohon Elementary School for the 2023-2024 school year. Data collection techniques in this research are test and non-test. Next, validity and reliability tests were carried out on the test instruments for student learning outcomes and creativity. Data analysis techniques carried out prerequisite tests through normality tests and homogeneity tests. In hypothesis testing, there are 2 data analysis techniques used, namely the independent t-test and MANOVA.

## Results and Discussion

### Univariate test

The independent sample t-test aims to determine whether there is an influence on each dependent variable, namely learning outcomes and student creativity between the control class or class using conventional learning and the experimental class or class using the project based learning model. The independent sample t-test calculation was carried out with the help of the SPSS 27 for Windows application.

The hypotheses tested in the learning outcome variables are as follows.

**H0:** There is no difference in student learning outcomes who use and do not use the project based learning model.

**H1:** There are differences in student learning outcomes who use and do not use the project based learning model.

The criteria for accepting and rejecting H0 at the significance level are if the significance value is > 0.05 then H0 is accepted, if the significance is < 0.05 then H0 is rejected. Table 1 describes the results of the independent sample t-test on the pretest learning outcomes data which

shows a significance value of 0.348 or sig > 0.05 so that H0 is accepted and H1 is rejected. In the pretest data between the control class and the experimental class there was no effect. Meanwhile, posttest data or data obtained after treatment in experimental classes or classes using the project based learning model and control classes or classes using conventional learning is known to have a significance value of 0.001 or sig < 0.05 so that H0 is rejected and H1 is accepted. Thus, there is an influence on learning outcomes between students who study using the project based learning model and who do not use the project based learning model or conventional learning.

The hypothesis tested in the student creativity variable is as follows.

**H0:** There is no difference in the creativity of students who use and do not use the project based learning model.

**H1:** There is a difference in the creativity of students who use and do not use the project based learning model.

The criteria for accepting and rejecting H0 at the significance level are if the significance value is > 0.05 then H0 is accepted, if the significance is < 0.05 then H0 is rejected. Below are presented the results of the independent sample t-test for student creativity data.

**Table 1:** Independent sample t-test of learning outcomes

| Data | Class | df | Value Sig. (2-tailed) | Result |
|---|---|---|---|---|
| Pretest learning results | Control and experiment | 48 | 0,348 | H0 is accepted |
| Posttest learning results | Control and experiment | 48 | 0,001 | H0 is rejected |

**Table 2:** Independent sample t-test of student creativity

| Data | Class | df | Value Sig. (2-tailed) | Result |
|---|---|---|---|---|
| Creativity pretest | Control and experiment | 48 | 0,348 | H0 is accepted |
| Creativity posttest | Control and experiment | 49 | 0,002 | H0 is rejected |

Table 2 describes the results of the independent sample t-test, pretest data or initial data before treatment on student creativity between the control class or class with conventional learning and the experimental class or class using the project based learning model. The significance value was obtained, namely 0.348 or sig > 0.05 so H0 is accepted, H1 is rejected. There was no significant difference in student creativity in initial abilities between the control class and the experimental class, while the posttest data or after treatment was carried out in the experimental class or classes using the project based learning model and the control class or classes using conventional learning, the significance value was 0.002 or <0.05, so that H0 is rejected and H1 is accepted. Thus, it can be said that there is an influence on student creativity between students who use the project based learning model and those who do not use the project based learning model or conventional learning.

**Multivariate test**

Multivariate test analysis was carried out using MANOVA which was calculated with the help of the SPSS 27 for Windows application. This test was carried out to find out whether the project based learning model had an effect on student learning outcomes and creativity together. Before the MANOVA hypothesis test is carried out, an assumption test is first carried out. The assumption test is in the form of a normality test and homogeneity test, and then a hypothesis test is carried out.

**Multivariate normality test**

The data to be analyzed must come from a population that has a multivariate normal distribution and the covariance matrix between populations is the same (Johnson & Wichern, 2007: 285). The calculation of the multivariate normality test was carried out by making a scatter plot between the mahalanobis distance and Chi Square and then calculating the correlation between the two data with the help of SPSS 27 for windows. The following is the formula for the multivariate normality test.

**H0:** Data comes from a population with a multivariate normal distribution.

**H1:** The data comes from a population that does not have a multivariate normal distribution.

The decision criteria are based on if the significance value in the sig calculation is <0.05 then H0 is accepted. The results of the multivariate normality test are presented in Table 3. Based on Table 3, the significance value obtained is 0.000, which means <0.05. So that H0 is accepted and H1 is rejected or it can be concluded that the data has a multivariate normal distribution.

**Table 3:** Multivariate normality test results

| Mahalanobis distance and chi square tests | | | |
|---|---|---|---|
| **Class** | **Pearson Correlation** | **Sig** | **Information** |
| Control and experiment | 0.931 | 0.000 | Multivariate normal |

**Multivariate homogeneity test**

The multivariate homogeneity test was carried out using the Box's M test. The results of the Box's M homogeneity test are presented in Table 4. Based on Table 4, it is known that the significance value is 0.387 or > 0.05 so it can be said that the data on student learning outcomes and creativity are homogeneous.

**Table 4:** Box's M homogeneity test results

| Box's test of equality of covariance matrices[a] | |
|---|---|
| Box's M | 3.173 |
| F | 1.010 |
| df1 | 3 |
| df2 | 414720.000 |
| Sig. | 0.387 |

**Hypothesis testing**

MANOVA hypothesis test to determine the effect of the project based learning model on student learning outcomes and creativity. The formulation of hypothesis testing in research is as follows.

**H0:** There is no significant difference in the learning outcomes and creativity of sixth grade students at Santa Clara Catholic Elementary School Tomohon between those who took part in learning using the project based learning model and those who did not take part in learning using the project based learning model or conventional learning.

**H1:** There is a significant difference in the learning outcomes and creativity of sixth grade students at Santa Clara Catholic Elementary School Tomohon between those who took part in learning using the project based learning model and those who did not take part in learning using the project based learning model or conventional learning.

The criteria for accepting and rejecting H0 at the 5% significance level are based on the significance value obtained. If the Sig value > 0.05 then H0 is accepted, conversely if the Sig. < 0.05 then H0 is rejected. The MANOVA test results which have been calculated using the SPSS 27 for Windows application are presented in Table 5.

**Table 5:** MANOVA test results

| Effect | Value | F | Hyphotesis Df | Error df | Sig. |
|---|---|---|---|---|---|
| Hotteling's Trace | 2.414 | 56.725 [b] | 2,000 | 47,000 | 0,001 |

Table 5 describes that the significance value is 0.001 which means <0.05, so H0 is rejected and H1 is accepted. This means that there is a significant influence on the learning outcomes and creativity of class VI students at Santa Clara Catholic Elementary School, Tomohon between those who take part in learning using the project based learning model and those who do not take part in learning using the project based learning model or conventional learning.

**The influence of the project based learning model on learning outcomes**

The research results show that the project based learning model has an effect on learning outcomes. This is proven by the significance value on learning outcomes through the independent sample t-test of 0.001 or a sig value <0.05, so that H0 is rejected and H1 is accepted, so it can be concluded that there is a significant influence on student learning outcomes who use the project based learning model in sixth grade at Santa Clara Catholic Elementary School, Tomohon. The results of this research are in line with research conducted by (Nurhadiyati et al., 2020) that learning using the project based learning model can facilitate students individually and in groups to work, because the aim of learning using this model is that students play an active role in learning. The enthusiasm and enthusiasm of students in learning using the project based learning model has a positive impact or improvement on the learning outcomes obtained by students. This is caused by the increase in student motivation which is seen when the teacher gives a project. Students are very motivated to work on the project given by the teacher. In fact, students feel more enthusiastic in the learning process and there is very little delay in the learning process (Hutapea & Simanjuntak, 2017), so that the changes that occur in students, both changes regarding cognitive, affective and psychomotor aspects, are the result of learning activities using the project model. based learning (Surya et al., 2018). (Maula et al., 2014) continued that the project based learning model provides cognitive abilities that result in increased learning and the ability to better retain or apply knowledge. The project based learning model can also meet learning demands in the aspect of cognitive learning outcomes according to Bloom's taxonomy.

**The influence of the project based learning model on student creativity**

The research results show that the project based learning model has an effect on student creativity. This is proven by the significance value through the independent sample t-test, which is 0.002 or sig < 0.05. so that H0 is rejected and H1 is accepted. So it can be concluded that there is an influence of creativity between students who use the project based learning model and conventional learning in class VI of Santa Clara Catholic Elementary School, Tomohon. This is in line with research conducted by (Hartono & Asiyah, 2018) [15] that active learning can foster creativity in students. Learning using the project based learning model can increase student creativity. The project based learning model has the advantage of being able to motivate students to learn in making projects because this learning model focuses more on students, not teachers, making students more creative in learning and able to solve problems. Based on the stimulus provided by the teacher through this model, collaboration can increase in groups so that it can create a pleasant atmosphere. According to Wicaksana et al. (2022) students' creativity in learning can be seen from activities during the learning process where the attitudes and skills demonstrated by students through the work or products produced. The project based learning model is a project based learning model that is able to make students active and independent in learning. One of the characteristics of the project based learning model is using creative thinking skills to carry out investigations to draw conclusions and produce a product. Thus, the project based learning model has a significant effect on student creativity.

**The influence of the project based learning model on student learning outcomes and creativity**

The research results show that the project based learning model influences student learning outcomes and creativity. This is proven by testing MANOVA analysis with Hotteling's Trace which has a significance value of 0.001 or significance <0.05, so H0 is rejected and H1 is accepted. This means that there is a significant influence on learning outcomes and creativity among students who use the project based learning model in class VI of Santa Clara Catholic Elementary School, Tomohon. This research is in line with research conducted by (Wicaksana et al., 2022) [32] that student learning outcomes and creativity are still low due to the learning process not being managed well and the use of inappropriate learning methods or models. The use of appropriate learning models in the learning process is expected to improve student learning outcomes so that during the learning process students are active and able to express their creativity. According to Utami et al. (2018) [31] the project based learning model is also called a project based learning model which has great potential to create a more interesting and useful learning experience for students, in which students are encouraged to be more active in learning. The teacher, who acts as a facilitator, evaluates the students' work products which are displayed in the project results, thereby producing real products that are able to encourage students' creativity. According to Natty et al. (2019) the project based learning model has a significant effect on learning outcomes and student creativity in learning.

**Conclusion**

1. The project based learning model influences learning outcomes. This is proven by the significance value on learning outcomes through the independent sample t-test of 0.001 or a sig value <0.05, so that H0 is rejected and H1 is accepted, so it can be concluded that there is

a significant influence on student learning outcomes who use the project based learning model in sixth grade at Santa Clara Catholic Elementary School, Tomohon.
2. The project based learning model influences student creativity. This is proven by the significance value through the independent sample t-test, which is 0.002 or sig < 0.05. so that H0 is rejected and H1 is accepted. So it can be concluded that there is an influence of creativity between students who use the project based learning model and conventional learning in class VI of Santa Clara Catholic Elementary School, Tomohon.
3. The project based learning model influences student learning outcomes and creativity. This is proven by testing MANOVA analysis with Hotteling's Trace which has a significance value of 0.001 or significance <0.05, so H0 is rejected and H1 is accepted. This shows that there is a significant influence on learning outcomes and creativity among students who use the project based learning model in class VI of Santa Clara Catholic Elementary School, Tomohon.

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