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THE INFLUENCE OF THE PROJECT BASED LEARNING MODEL ON THE LEARNING OUTCOMES OF IPAS STUDENTS IN CLASS V MIN 2 MOJOKERTO

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ABSTRACT

Student learning outcomes are often categorized as low, especially in the field of IPAS science. This is due to the continued use of conventional models in teaching and the lack of student involvement in practical activities or project activities as a form of contextual understanding in the IPAS learning process. The PjBL model can be a solution to address that issue. The selection of the PjBL model was made because this learning model is believed to help students become active participants in the learning process and create meaningful understanding for the students, thereby improving their comprehension of the material and impacting the quality of their learning outcomes. This study aims to determine how the PjBL model affects the learning outcomes of IPAS students on the topic of electrical energy sources in grade V at MIN 2 Mojokerto. The research method in this study is a quantitative method with a quasi-experimental type and a non-equivalent control group design. The research results show that there is an influence of the PjBL model on the improvement of student learning outcomes, as evidenced by the t-test sig (2-tailed) result of 0.000 < 0.05.

Keywords: Project based learning; learning outcomes; IPAS

INTRODUCTION

Education is the key to shaping a generation that is intelligent, open-minded, and democratic. Furthermore, education serves as a means to create a positive image of a person so that they can develop their full potential (Juniat *et al*., 2023). The goals of national education are established by Law No. 20 of 2003 to enhance students' abilities to become individuals who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable, skilled, creative, independent, and become democratic and responsible citizens (Aryanto *et al.*, 2021).

One of the goals of education is to produce a generation that is intelligent and highly knowledgeable, which can be reflected in students' learning achievements. In reality, there are some students who are still hindered in their learning process, which affects their academic achievements. Based on observations and discussions with the fifth-grade homeroom teacher at MIN 2 Mojokerto, issues were found in the students' learning outcomes. This can be attributed to the use of a conventional teaching model based on lectures, which makes students less active, a lack of contextuality in the material, and a shortage of practical activities, especially in complex subjects like IPAS, resulting in suboptimal student understanding.

IPAS is a combination of two branches of science, namely Natural

Sciences (IPA) and Social Sciences (IPS), which is designed because elementary school students generally understand concepts comprehensively and integratively (Marwa *et al*., 2023). In the realm of natural sciences, explaining material about nature and the environment presented in detail and systematically. The process of learning science is not solely based on memorization, but also emphasizes a contextual approach, such as directly observing the environment (Sinta Mertasari & Nyoman Ganing, 2021), for example, in the subject of electrical energy.

In the topic of electrical energy, students learn how to obtain electrical energy and understand the importance of electricity in life. However, many students face difficulties due to the teacher-centered teaching method and the lack of practical activities, resulting in a shallow understanding that will affect their learning outcomes. A good selection of learning models is needed to address this issue.

The learning model deemed suitable to address the above issue is the project-based learning model. PjBL is a learning model that places students at the center of learning and emphasizes the process that creates a product at the end. Students can engage in learning activities according to their preferences and work on projects by collaborating with their study groups, allowing them to create tangible results (Nababan *et al*., 2023). The implementation of PjBL can help students understand concepts through problem-solving manifested in the form of works or products (Lioba Nahak & Ndapa Lawa, 2023).

The application of the PjBL model in the subject of electrical energy is carried out by creating a simple electrical circuit board. Students will be faced with the challenge of obtaining electrical energy as efficiently as possible while minimizing costs and materials. They will create two parallel electrical circuits with different voltages and cable lengths. The purpose of creating a simple electrical board is to provide a direct understanding of how electrical energy is obtained and how the flow of electricity can be formed. Students will also observe the differences between the two circuits and understand the concept of electricity directly, as well as draw conclusions from the established problems. Students can actively engage through these activities, allowing them to independently understand the material and produce relevant outcomes. The PjBL model is very suitable for subjects like IPAS, as it can create meaningful learning, increase student enthusiasm, and improve their learning achievements (D. P. Lestari *et al*., 2023).

Research discussing project-based learning is considered suitable for implementation in education and has also been discussed by (Kusmiati, 2022) who explained that the PjBL model is influential and can enhance students' creativity. Research conducted by (Anwar *et al*., 2021) also states that the PjBL model has an impact on student learning outcomes at the high school level. This opinion is also explained by (Hamidah & Citra, 2021) that the implementation of PjBL is effective in increasing students' interest and learning outcomes.

Based on the background explanation and previous research described above, the researcher is interested in applying the PjBL model to the IPAS subject on electrical energy sources because it is

believed to provide a more meaningful understanding to students, thereby improving the quality of their learning. The purpose of this research is to determine whether the application of the PjBL model has an impact on improving students' learning outcomes. Thus, the researcher is interested in conducting a study titled "The Influence Of The Project Based Learning Model On The Learning Outcomes Of Ipas Students In Class V MIN 2 Mojokerto".

METHOD

This research uses a quantitative method (Makhrus *et al*., 2022) with a quasi-experimental type. The research design applied is a non-equivalent control group. The subjects of this research are fifth-grade students at MIN 2 Mojokerto for the 2024/2025 academic year, with a total population of six classes. The sampling technique used is cluster random sampling, in which the researcher selects class VB (control group) and class VD (experimental group) as the research samples. Both groups were given a pretest and posttest (Abraham & Supriyati, 2022).

This research collects data through testing techniques, observation, and documentation. Tests are used to compare or assess the impact of learning outcomes between the experimental class and the control class. The test items in the research consist of multiple-choice questions and also essays. The data collection technique in the form of observation was conducted to observe the researcher's teaching method by applying the PjBL model and to observe students during the learning process. The documentation technique in this research includes photographs taken during the research process and teaching modules used as references for the implementation of the learning process. This research uses t-test data analysis techniques and N-Gain calculations.

RESULTS AND DISCUSSION

This research was conducted through a series of face-to-face meetings held from November 6 to 20, 2024. In the first meeting, a pretest was conducted to measure the initial knowledge and understanding of the students before the treatment was given. In the next meeting, learning activities were conducted with a different approach, where the experimental class applied the project-based learning (PjBL) model, while the conventional learning method was used in the control class. In this meeting, students also took a posttest to evaluate their learning outcomes.

The use of the PjBL learning model in the experimental class begins with the stage of asking essential questions. At this stage, the teacher poses questions or problems to the students related to the material that will be taught (Susilawati, 2021). Based on the results of observations of the students, at the first stage of this PjBL model, almost all students appeared active and enthusiastic regarding the problems and questions given by the teacher. The second stage of PjBL is planning the project, at this stage the teacher forms several groups for project work. In addition, students also appeared to be actively involved in determining the tools and materials, with guidance and assistance from the teacher (Sastradiharja & Febriani, 2023).

The third step of the PjBL model is to create a project schedule (Amelia & Aisya, 2021). Students, with the help of teachers, actively and enthusiastically engage in creating the project implementation

schedule. The next stage is the implementation and monitoring phase of the project (Cyndiani *et al*., 2022). At this stage, students begin working on the project and the teacher acts as a facilitator. The teacher helps students if they encounter difficulties during the project execution. The fifth step is to evaluate the project results by giving students the opportunity to present their project outcomes. At this stage, the teacher also conducts an assessment according to the predetermined criteria (Almuzhir, 2022). The final stage of the PjBL model is conducting an evaluation of the completed project (Ansar & Rahmah, 2023). The teacher evaluates the project results and provides reflections and feedback throughout the project execution process. The results of the students' pretest and posttest are described in the following descriptive analysis:

Table 1. Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	28	34	88	56.96	14.094
Posttest Experiment	28	61	100	81.25	9.470
Pretest Control	27	28	77	50.78	13.013
Posttest Control	27	46	84	66.85	9.371
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Based on the table above, the mean pretest in the experimental class is 56.96, while the control class is 50.78. The mean posttest of the experimental class reached 81.25, while the control class was 66.85. To determine whether PjBL has an impact on students' learning achievements, a series of tests are required.

1. Normality Test

There are several prerequisite tests before conducting hypothesis testing, namely performing normality and homogeneity tests. The purpose of conducting the normality test is to determine whether the data used is normally distributed or not (Sintia *et al*., 2022). Data is considered normal if the sig. value > 0.05, and vice versa. The results of the normality test are as follows:

Table 2. Normality Test

Normality Test Kolmogorov-Smirnov	
Kelas	Sig.
Pre-Test Experiment	.200
Post-Test Experiment	.188
Pre-Test Control	.200
Post-Test Control	.200

The significance values in the normality test above all obtained (sig.) values > 0.05, which means the data is considered normal.

2. Homogeneity Test

The homogeneity test is conducted so that we can determine whether two or more samples come from a population with uniform variance or not (Sianturi, 2022). Data is considered homogeneous if the sig. value > 0.05. The results of the homogeneity test are as follows:

Table 3. Homogeneity Test

Homogenity Test Levene's Test	
Sig.	.567

The homogeneity test obtained a sig. value of 0.567 > 0.05, which means the data is homogeneous.

3. Hypothesis Test

The hypothesis testing of this research was conducted using an independent sample t-test. The independent sample t-test was chosen because the data to be analyzed comes from unpaired samples. The decision

on the hypothesis test using the t-test is as follows:

a. If the sig. (2-tailed) value > 0.05, Ho is accepted and Ha is rejected.
b. If the sig. (2-tailed) value < 0.05, Ho is rejected and Ha is accepted.

Table 4. Independent Sample T-test

Independent Sample T-test	
Sig. (2-tailed)	.000

The Sig. (2-tailed) value is 0.000, which is less than 0.05. Therefore, Ho is rejected and Ha is accepted. This shows that the PjBL model has an impact on improving student learning outcomes in the experimental class compared to the control class, which still uses conventional methods.

4. N-Gain Calculation

The next step is to calculate the N-Gain value. This test is conducted to measure the extent of student learning progress and to compare the pretest and posttest data of the students. Here are the N-Gain calculation results for both:

Table 5. N-Gain Calculation

N-Gain Calculation	
Class	Mean N-Gain
Experiment	0,59
Control	0,31

Based on the results above, the implementation of the PjBL learning model is more efficient and contributes to the improvement of students' IPAS learning outcomes on energy source materials compared to conventional methods. It is evidenced by the average N-Gain score of the experimental class reaching 0.59 or 59, which falls into the moderate category, while the average N-Gain score of the control class is smaller at 0.31 or 31, which also falls into the moderate category.

Through several tests conducted, it is evident that the PjBL model has an impact on improving students' learning outcomes in the subject of electrical energy sources at MIN 2 Mojokerto. The results of this study are in line with the explanations of (K. A. Lestari et al., 2022) and (Nurhadiyati et al., 2020), which state that the PjBL learning model improves students' science learning outcomes.

CONCLUSION

The PjBL model influences the improvement of student learning outcomes in the IPAS subject on electrical energy material in the 5th grade at MIN 2 Mojokerto. This is reinforced by the t-test which obtained a sig. (2-tailed) value < 0.05, indicating that Ho is rejected and Ha is accepted. Based on the N-Gain calculation test, it also shows that the mean N-Gain of the experimental group > mean N-Gain of the control class, which means that the PjBL model is more effective in improving student learning outcomes than the conventional model.

EXPRESSIONS OF GRATITUDE

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