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The Effect of Implementing the Wordwall Media Assisted Problem-Based Learning Model on the Learning Outcomes of Year 4 Students in the Subject of Climate and Climate Change at the UPTD SDN Banyubunih 1

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Abstract

This study aims to determine the effect of applying the Wordwall-assisted Problem-Based Learning (PBL) model on the science learning outcomes of fourth-grade students on the topic of Climate and Climate Change at UPTD SDN Banyubunih 1. This study is a quasi-experimental design using a nonequivalent control group design. The research sample consisted of 43 students, comprising an experimental class (21 students) and a control class (22 students). The instrument used was a multiple-choice test consisting of 12 questions that had been validated. The data were analyzed using normality, homogeneity, and t-tests. The results showed that the pretest scores of the experimental and control classes were not significantly different (Sig. 0.255 > 0.05). However, there was a significant difference in the posttest results (Sig. 0.001 < 0.05). Thus, it can be concluded that the application of the Problem Based Learning model assisted by Wordwall media had a positive and significant effect on the science learning outcomes of fourth-grade students on the topic of Climate and Climate Change.

Keywords– *Problem Based Learning, Wordwall, Science, Learning Outcomes.*

1. Introduction

Education plays an important role in shaping the character and competence of students, with the aim of creating meaningful learning experiences. In the implementation of the Merdeka Curriculum, educators are given the freedom to choose and apply learning models that suit the characteristics of their students, such as Project Based Learning (PjBL) or Problem Based Learning (PBL). IPAS (Natural and Social Sciences) learning aims to enable students to use scientific methods in solving problems they encounter.Based on initial observations in class IV of UPTD SDN Banyubunih 1 on 15 July 2025, it was found that students' IPAS learning outcomes were still relatively low. This is reinforced by the average IPAS scores of Grade IV A at 73% and Grade IV B at 68%, which are still below average.

The learning process is not yet optimal, tends to be teacher-centred, and group activities are not fully involved in problem solving, with only about 30% of students actively participating in discussions.One learning model that is considered to improve learning outcomes is Problem-Based Learning (PBL), which emphasises student involvement in collaborative problem-solving and is in line with the principles of the Merdeka Curriculum. To be more effective, PBL is supported by interactive learning media such as Wordwall. Wordwall is an educational game-based digital platform that can increase student motivation and participation in learning through visual, audio and game elements.

The material 'Climate and Climate Change' was chosen because it contains abstract concepts that often cause difficulties for students in understanding the differences between weather and climate, as well as the factors causing climate change. The PBL model assisted by Wordwall media is considered relevant for solving real problems related to climate change through interactive and meaningful learning activities. Based on this background, this study was conducted to examine the effect of the PBL model assisted by Wordwall media on the science learning outcomes of fourth-grade students.

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2. Method

This study utilised quantitative research with a quasi-experimental design and a non-equivalent control group design. This design was chosen because the researchers were unable to randomly assign subjects to the experimental and control groups. The research design used can be described as follows:

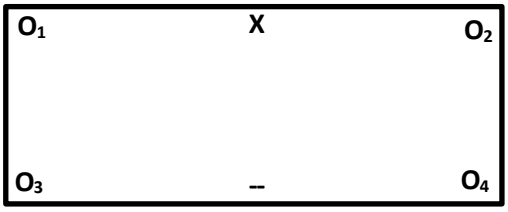

Figure 1. Non-Equivalent Control Group Design Research Design

Description:

O1: Pre-test results for the experimental class (class IV A)
O2: Post-test results of the experimental class (Class IV A)
O3: Post-test results of the control class (Class IV B)
O4: Post-test results of the control class (Class IV B)
X: Treatment using the PBL (Problem-Based Learning) model assisted by Wordwall media

The research was conducted at UPTD SDN Banyubunih 1 in the even semester of the 2024/2025 academic year. The population consisted of all fourth-grade students, and the sample was determined using purposive sampling, namely fourth-grade class A as the experimental group (21 students) who were given the Wordwall-assisted Problem-Based Learning (PBL) model, and fourth-grade class B as the control group (22 students) who used conventional learning. The independent variable was the application of the PBL model assisted by Wordwall, and the dependent variable was the students' IPAS learning outcomes. The main instrument was a multiple-choice learning outcome test consisting of 12 questions on the material of Climate and Its Changes, which had been tested for validity and reliability.

Data collection techniques included administering a pretest and posttest to both groups and treatment twice during the meetings. Data analysis was performed using inferential statistics with the SPSS program, beginning with a prerequisite test (normality with Kolmogorov-Smirnov and homogeneity with Levene's Test). Next, hypothesis testing was performed using a t-test (Independent

Sample T-Test) to compare the post-test averages of the two groups. Significance testing was carried out with the criterion that the alternative hypothesis was accepted if the Sig. (2-tailed) value in the t-test results showed a number $ < 0.05 $.

3. Result and Discussion

This study was conducted in Grade IV of UPTD SDN Banyubunih 1, which consists of two classes, namely Grade IV A as the control class (22 students) and Grade IV B as the experimental class (21 students). The experimental class was taught using the Problem-Based Learning model assisted by Wordwall media, while the control class was taught using the conventional model. Data collection was conducted through pre-tests and post-tests using a learning outcome test instrument consisting of 12 multiple-choice questions that had been validated. The average pretest and posttest scores of students in both classes are presented in the following table:

Table 1. Average of pretest and posttest

Classes	number of students	pretest average	posttest average
Eskperimen	21	63,33	89,05
Control	22	62,77	77,27

The table shows that both classes had almost the same initial abilities, with a pretest average of 63.33 in the experimental class and 62.77 in the control class. After the treatment, the posttest scores of the experimental class increased higher than those of the control class. This indicates that the application of the Wordwall-assisted Problem-Based Learning model provided a more significant improvement in learning outcomes. The normality test was performed using the Shapiro–Wilk test with a significance level of 0.05. The results of the normality test are shown in the following table:

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Tabel 2. Normality Test Results

Groups	*Shapiro-Wilk*	
	Sig Value	Remarks
Pretest Experimental Classes	0,072	Normal
Posttest Experimental Classes	0,079	Normal
Pretest Control Class	0,066	Normal
Posttest Control Class	0,200	Normal

Since the significance value of all data is greater than 0.05, the pretest and posttest data are normally distributed. Next, a homogeneity test was conducted using Levene's Test to determine the similarity of variance between groups

Tabel 3. Results of Pretest Homogeneity Test Analysis

Based On Mean	**Sig**	**Verdict**
	0,397	Not Homogeneous

Tabel 4. Results of Posttest Homogeneity Test Analysis

Based On Mean	**Sig**	**Verdict**
	0,702	Homogeneous

Homogeneity testing was conducted using Levene's Test to determine the similarity of variance between groups. Subsequently, a t-test was used to determine whether there was a difference in learning outcomes between the experimental class and the control class.

Tabel 4. Independent Sample Test Hypothesis Test Results

Data	**Sig (2-tailed)**	**Verdict**
Pretest	0,248	Ho Rejected
Posttest	0,023	Ho Accepted

The t-test results show that the Sig. (2-tailed) value for the pretest is 0.702 (> 0.05), meaning that there is no significant difference between the two classes before the treatment. However, in the posttest, the significance value of 0.023 (< 0.05) shows that there is a significant difference between the learning outcomes of the experimental and control classes after the treatment. The results of the study indicate that the application of the Wordwall-assisted Problem-Based Learning model has a significant effect on improving students' IPAS learning outcomes.

This improvement occurred because the Problem-Based Learning model actively involved students in solving real problems, thereby training them to think critically and collaboratively. The use of Wordwall media reinforced this process through interactive games that were interesting and motivated students to learn.

These results are in line with Permana & Kasirman (2022), who stated that Wordwall increases learning motivation because it is interactive, and Fitriyani & Setiawan (2021), who found that Problem-Based Learning is effective in improving concept understanding. Thus, the combination of the two has been proven to create more meaningful and enjoyable IPAS learning.

4. Conclusion

Based on the results of the research conducted, it can be concluded that the application of the Wordwall-assisted Problem-Based Learning model has a significant effect on improving the science learning outcomes of Grade IV students on the subject of 'Climate and Its Changes' at UPTD SDN Banyubunih 1. The application of this model is able to create a more active, interactive, and enjoyable learning process, making it easier for students to understand the concepts taught. The combination of a problem-based approach and the use of Wordwall digital media encourages students to think critically, collaborate, and be motivated in their learning activities. This is evident from the higher average learning outcome scores in the experimental class compared to the control class. Thus, the Wordwall-assisted Problem-Based Learning model can be used as an alternative innovative learning strategy to improve IPAS learning outcomes, especially for material that requires conceptual understanding and application in everyday life.

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