



THE EFFECT OF THE BRAIN-BASED LEARNING (BBL) MODEL ON THE LEARNING OUTCOMES OF 5TH GRADE STUDENTS OF SD NEGERI 105288 SEI ROTAN

PENGARUH MODEL PEMBELAJARAN *BRAIN BASED LEARNING* (BBL) TERHADAP HASIL BELAJAR IPAS SISWA KELAS V SD NEGERI 105288 SEI ROTAN

Alda Alviola Silalahi¹, Imelda Free Unita Manurung²

¹ Jurusan Pra Sekolah dan Sekolah Dasar, fakultas Ilmu Pendidikan, Universitas Negeri Medan
email: aldaalviolasilalahi@gmail.com

² Jurusan Pra Sekolah dan Sekolah Dasar, fakultas Ilmu Pendidikan, Universitas Negeri Medan
email: imeldafreeunitamanurung@gmail.com

*email Koresponden: aldaalviolasilalahi@gmail.com

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Abstract

This research is motivated by the existence of problems in learning, especially in class V of SD Negeri 105288 Sei Rotan. Through the results of observations and interviews, it was found that the results of students' science learning are classified as low. In addition, student participation is low and passive. The purpose of this study is to determine the effect of the application of the Brain Based Learning (BBL) learning model on the results of science learning of class V students of SD Neri 105288 Sei Rotan. The type of research used is quantitative research with a nonequivalent control group design. The population in this study were class V students of SD Negeri 105288 Sei Rotan with a sample of class VA totaling 24 people as the experimental class and VB totaling 24 people as the control class. Based on the results of the study, the average pretest score of students was 52.33 in the experimental class before being given treatment. After treatment using the BBL learning model, the results of the posttest score of students were 71.25. Furthermore, a t-test was conducted which showed the results of the Sig. value. (2 tailed) $0.000 < 0.05$, then H_0 is rejected and H_a is accepted. These results indicate that there is a significant influence of the application of the Brain Based Learning (BBL) learning model on the science learning outcomes of fifth grade students of SD Negeri 105288 Sei Rotan.



Abstak

Penelitian ini dilatarbelakangi oleh adanya permasalahan dalam pembelajaran khususnya pada kelas V SD Negeri 105288 Sei Rotan. Melalui hasil observasi dan wawancara, ditemukan bahwa hasil belajar IPAS peserta didik tergolong dalam kategori rendah. Selain itu, partisipasi peserta didik tergolong rendah dan bersifat pasif. Tujuan penelitian ini untuk mengetahui pengaruh dari penerapan model pembelajaran *Brain Based Learning* (BBL) terhadap hasil belajar IPAS siswa kelas V SD Neri 105288 Sei Rotan. Jenis penelitian yang digunakan yaitu peneliian kuantitatif dengan desain *nonequivalent control group design*. Populasi dalam penelitian ini adalah siswa kelas V SD Negeri 105288 Sei Rotan dengan sampel yaitu kelas VA berjumlah 24 orang sebagai kelas eksperimen dan VB berjumlah 24 orang sebagai kelas kontrol. Berdasarkan hasil penelitian diperoleh nilai *pretest* siswa dengan rata-rata 52,33 pada kelas eksperimen sebelum diberikan *treatment* atau perlakuan. Setelah dilakukan perlakuan dengan menggunakan model pembelajaran BBL, diperoleh hasil nilai *posttest* siswa dengan nilai 71,25. Selanjutnya dilakukan uji *t-test* yang menunjukkan hasil nilai Sig. (2 tailed) $0,000 < 0,05$, maka H_0 ditolak dan H_a diterima. Hasil ini menunjukkan bahwa terdapat pengaruh yang signifikan dari penerapan model pembelajaran *Brain Based Laearning* (BBL) terhadap hasil belajar IPAS siswa kelas V SD Negeri 105288 Sei Rotan.

1. INTRODUCTION

Science learning at the elementary school level plays a crucial role in shaping students' understanding of natural phenomena and the scientific processes around them. Science learning serves as the primary foundation for instilling ideas and understanding basic science concepts, which are then contextually linked to everyday life (Wuryaningsih & Radiansyah, 2023). It can be said that the emphasis of science learning in elementary schools is not only aimed at providing basic knowledge but also at developing critical thinking, analytical, and problem-solving skills in children. This is with the hope that students can utilize science learning as a foundation that can be developed into more meaningful applications in their daily lives (Fadillah Salsabila, 2023).

Every student has a different learning style and pace, so a unified approach is often ineffective. Learning in schools often involves conventional learning models such as lectures, taking notes, and answering teacher questions. In this situation, students tend to simply listen, take notes, and follow the teacher's instructions without attempting to discover the concepts themselves. As a result, the learning process does not provide students with the opportunity to learn science meaningfully. This challenges teachers to implement more innovative learning.

During observations and interviews, a problem was found in class VA of SD Negeri 105288 Sei Rotan. The teacher had not used varied learning methods, resulting in the learning process not running optimally. Students were still lacking in responding to stimuli and learning only focused



on the teacher. The teacher also stated that students' needs and learning styles were different. This resulted in students tending to lose focus and being passively involved in the learning process. Students were still lacking in asking, responding, and answering questions given by the teacher. This resulted in the learning outcomes needed to meet learning objectives being relatively low.

Brain-based learning (BBL) offers an exciting learning innovation. BBL is a learning model that synchronizes with the brain's natural learning system (Farida, 2021). The BBL learning system has characteristics such as calm, solution-oriented, structured learning, and sufficient time for students to reflect on the material taught. BBL, as a learning model based on the structure, performance, and function of the brain, can provide ideal learning conditions in accordance with the brain's capabilities (Cahyani et al., 2023). The BBL learning model has various benefits because it synchronizes with the brain's natural learning system (Pramana, 2024). The BBL learning system supports students in learning through their experiences and can foster ideas to develop broad knowledge. The brain-based learning model directs students to carry out learning activities according to existing rules.

Jensen (2008:484-490) outlined seven stages of Brain-Based Learning: Pre-exposure, which provides the brain with a preview of new learning before it is fully explored; Preparation, which creates curiosity; Acquisition, which creates connections; Elaboration, which processes information; Incubation, which emphasizes the importance of rest and review time; Verification, which is the teacher's check on students' understanding of the material they have learned; and Integration, which instills the importance of a love of learning.

Behind that, there are advantages and disadvantages in Brain Based Learning, as stated by Jensen (in Sadiyah, 2020) that the advantages of BBL include (1) creating patterns, contexts, and connections between learning and the mind; (2) collecting information in one unit in various ways; (3) learning is student-centered and makes students active; (4) freeing students to learn according to their style; (5) teachers can provide positive experiences.

2. RESEARCH METHOD

This study used a quantitative research method with a quasi-experimental design. In this experiment, treatment was only given to the experimental group. Meanwhile, the control group was given a different treatment, or even no treatment at all. According to Sugiyono (2022, p. 77), a quasi-experimental design has a control group, but it is not fully able to control external variables that could affect the implementation of the experiment. In this study, the quasi-experimental design used was a nonequivalent control group design. In this research design, both the control and experimental groups were given pre-tests and post-tests, and only the experimental group received treatment.



After conducting the pretest and posttest, the researcher will conduct a data normality test. This normality test is conducted using the Shapiro-Wilk test with the help of Statistical Package For Social Sciences (SPSS) 26 for Windows software. The difference testing criteria are compared with 0.05 at a significance level of 5%. Next, the researcher will conduct a homogeneity test. The homogeneity test used in this study is the Lavene test at the 5% level using Statistical Package For Social Sciences (SPSS) 26 software (Sugiyono, 2022, p. 292). The final stage, the researcher will conduct a hypothesis test. The research hypothesis test used is the Independent Sample T-Test with SPSS version 26.

3. RESULTS AND DISCUSSION

In this chapter, the researcher presents data from the research conducted. The research instruments in this study consisted of a pretest and a posttest. Hypothesis testing using SPSS 26 included average scores and a significance t-test. The test type used was multiple-choice. The total number of questions in each test was 18. For scoring, each correct answer was awarded one point. The test results can be seen below:

Table 1. Frequency Distribution of Pretest and Posttest Scores of the Experimental Class

Class	Interval		Frekuensi	Distribusi	Avarage
Posttest	Poor	50-59	8	33,33%	52,33
	Fair	60-69	6	25%	
	Good	70-79	9	37,5%	
	Very Good	80-99	1	4,16%	
Pretest	Very Poor	21 – 49	10	41%	71,75
	Poor	50 – 59	6	25%	
	Fair	60 – 69	5	20,83%	
	Good	70 – 79	3	12,5%	

Table 2. Data on Pretest Score Completion for Experiment and Control Classes

		Experiment Class		Control Class	
		N	%	N	%
<70	complete	3	12,5%	3	12,5%
≥70	incomplete	21	87,5%	21	87,5%
Total		24	100%	24	100%

**Table 3. Post-test Values of the Experiment Class and Control Class**

		Experiment Class		Control Class	
		N	%	N	%
<70	complete	15	62,5%	10	41,66%
≥70	incomplete	9	37,5%	14	58,33%
Total		24	100%	24	100%

Table 4. Frequency Distribution of Pretest and Posttest Scores of the Control Class

Class	Interval		Frekuensi	Distribusi	Avarage
Posttest	Poor	50 – 59	8	33,33%	
	Fair	60 – 69	6	25%	
	Good	70 – 79	9	37,5%	
	Very Good	70 – 99	1	4,16%	
Pretest	Very Poor	30 – 49	6	25%	
	Poor	50 – 59	6	25%	
	Fair	60 – 69	9	37,5%	
	Good	70 – 79	3	12,5%	

Through table 1 above, there are several categories in the pretest scores. Namely very poor (21-49) as many as 10 students (51%), poor (50-59) as many as 6 students (24%), fair (60-69) as many as 5 students (20.83%) and good category (70-79) as many as 3 students (12.5%). After being given treatment, student scores have improved. Student score data after conducting the posttest has 4 ranges of scores, the first is the poor score category, in the 50-59 range as many as 8 people (33.33%). Second is the fair category, namely the 60-69 score range as many as 6 people (25%). Next is the good category at a score of 70-79 as many as 9 people (37.5%). And the last is the very good category with a score range of 80-99 as many as 1 person (4.16%). While in the very poor category there is no student score gain.

Table 2 shows the range of students' success in achieving the expected grades before treatment. The success rate was only 12.5% (3 students). Meanwhile, the number of students who failed reached 87.5% (21 students). Furthermore, Table 3 shows the level of student success after treatment. After treatment, posttest scores showed an increase in student success. Fifteen students (62.5%) successfully met the expected criteria. Nine students (37.5%) did not meet the expected standards.



Table 4 shows the range of student success scores in the control class. There were several categories during the pretest. In the poor category (50-59) there were 8 students (33.33%). In the fair category (60-69) there were 6 students (25%). Furthermore, in the good category (70-79) there were 9 students (37.5%). And finally, the very good category (70-99) there was 1 student (4.16%). Meanwhile, the posttest scores showed a slight increase in the control class. During the posttest, there were several categories. The first category is the very poor category, namely 30-49, with 6 students (25%). Next, in the poor category with a score of 50-59 there were 6 students (25%). Furthermore, in the fair category with a score of 60-69 there were 9 students (37.5%) and the good category with a score of 70-79 there were 3 students (12.5%).

The Normality Test

After obtaining pretest and posttest scores, the researchers used the Shapiro-Wilk normality test using Statistical Package For Social Sciences (SPSS) 26 for Windows software to determine whether the data followed a normal distribution. The results of the normality test can be seen in the table.

Table 5. Results of Data Normality Test

		Tests of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Kelas	Statistic	Df	Sig.	Statistic	Df	Sig.
Hasil Belajar	Pretest Eksperimen	.141	24	.200*	.964	24	.523
	Posttest Eksperimen	.159	24	.117	.945	24	.211
	Pretest Kontrol	.169	24	.075	.932	24	.108
	Posttest Kontrol	.166	24	.084	.932	24	.109

Table 4.4 results of data normality testing with a Sig. level of 5% shows that the data is H0. This was obtained in the pretest data of the experimental class (df = 24) at a statistical figure of 0.964 with Sig. 0.523 > 0.05 (5%) and in the pretest of the control class (df = 24) at a statistical figure of 0.932 with Sig. 0.108 > 0.05 (5%). In addition, in the posttest of the experimental class (df = 24) at a statistical figure of 0.945 with Sig. 0.211 > 0.05 (5%) and in the posttest of the control class (df = 24) at a statistical figure of 0.932 with Sig. 0.109 > 0.05 (5%). The data shows that the results of the Sig. calculation are overall above the 5% level (0.05), so that the decision making is that the data is H0 which means the data is normally distributed.



Testing Homogeneity

Table 5 Results of Homogeneity Test

		Test of Homogeneity of Variance			
		Levene Statistic	df1	df2	Sig.
Hasil Belajar	Based on Mean	1.721	3	92	.168
	Based on Median	1.442	3	92	.236
	Based on Median and with adjusted df	1.442	3	81.860	.236
	Based on trimmed mean	1.681	3	92	.176

The homogeneity test for data in this study used the Levene type with the help of SPSS 26, as shown in the table above. Based on the data in the table above, the results of the homogeneity test for variance showed that the Sig. level was $0.168 > 0.05$ (5%), meaning the data were homogeneous.

Testing Hypothesis

In formulating a hypothesis in research, a T-test is necessary. This T-test is conducted using SPSS and can be presented in the following table.

**Table 6. t-Test Results
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	
									Lower	Upper
Hasil Belajar	Equal variances assumed	3.318	.075	-5.500	46	.000	-19.417	3.530	-26.523	12.310



Equal variances not assumed			-5.500	42.015	.000	- 19.417	3.530	- 26.54 1	- 12.29 2
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Based on Levene's Test with a Sig. value of $0.075 > 0.05$, it can be concluded that the variance of the two groups (experimental and control classes) is homogeneous or the same. Therefore, the t-test used is the Independent Samples t-test with the assumption of equal variances (Equal variances assumed). The test results show a t-value of -5.500 with a degree of freedom (df) of 46 and a Sig. value (2-tailed) of $0.000 < 0.05$, which means there is a statistically significant difference between the average posttest scores of the experimental class and the control class. This means that there is a significant and positive influence between the Brain Based Learning (BBL) learning model on the science learning outcomes of fifth-grade students of SD Negeri 105288 Sei Rotan.

Discussion

The researchers want to discuss the research findings that aim to answer the problem statement. This study focuses on students' science learning outcomes using the Brain Based Learning (BBL) learning model. There is a significant increase after learning using the BBL learning model, supported by statistical results. Sig. 2 tailed (p) is lower than alpha (α) ($0.000 < 0.05$). Thus, the application of the BBL learning model is an effective strategy to improve student learning outcomes. This finding can also be supported by previous research. Hasri (2017) stated that choral reading is more beneficial to use to teach students and help them build their reading comprehension. It is better than using read-aloud because choral reading is done in groups, not individually, so students become more confident when they read and understand the text. Mustopa and KMS Badaruddin (2019) in this study, the BBL learning model improved students' science understanding, with learning completion increasing from 83% to 96% based on the data and information provided. This also indicates that the results of previous research are still relevant to current learning.

Learning with the BBL model is a series of lessons that encourage students to actively and independently improve their brain's ability to find information that is more relevant to their needs. In the pre-exposure stage, participants are taught to introduce a problem to facilitate the processing of new information. Then, in the preparation stage, students are given an apperception by the teacher to foster curiosity. This aims to lead students to explore the puzzle. Next, in the initiation and acquisition stage, students are formed into several groups to carry out simple practices according to the material (the properties of light). At this stage, students also engage in group discussions. Next, in the incubation and memory encoding stage, students make short presentations in groups. Finally, there is the verification and belief checking stage. At this stage, students



collectively draw conclusions and ask questions independently about material that is not yet understood.

Based on the discussion above, we know that the BBL learning model has an effect on improving student learning outcomes, where students taught using this strategy experienced significant improvements, while students who were not taught using the BBL learning model did not experience significant improvements. From these results, the researcher concluded that the use of the BBL learning model can improve the learning outcomes of fifth-grade students at SD Negeri 105288 Sei Rotan.

4. CONCLUSION

Through the results and data analysis of the research that has been done previously, the conclusion in this study is as follows. There is an influence of the Brain Based Learning (BBL) learning model on the results of students' science learning in the experimental class. This is shown through the data on the results of the posttest scores that increased compared to the results of the pretest that had been carried out previously. The results of the average score of students at the time of the pretest was 52.33 and after being given treatment obtained a posttest result with an average of 71.75. While in the control class obtained a pretest score with an average of 56.5 and at the time of the posttest obtained an average score of 65.25. Furthermore, a hypothesis test was conducted to see whether or not there was an influence of the BBL learning model through a hypothesis test with the Paired Sample t-Test type. The test results showed a t value of -5.500 with a degree of freedom (df) of 46 and a Sig. (2-tailed) value of 0.000 < 0.05, which means there is a statistically significant difference between the average posttest scores of the experimental class and the control class. Therefore, the decision H_0 is rejected and H_a is accepted. This means that there is an influence of the implementation of the BBL learning model on the science learning outcomes of fifth-grade students at SD Negeri 105288 Sei Rotan.

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