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The Influence of Problem-Based Learning Model on Learning Outcomes in Webbed Integrated Learning at Elementary Schools.

Nurul Halimah[1*], Alwen Bentri[1], Elfia Sukma[1], Melva Zainil[1]

[1] Universitas Negeri Padang, Indonesia.

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Corresponding Author:
Nurul Halimah
aleshanurmaghfirah@gmail.com

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Abstract: The purpose of this study was to investigate the impact of using the Problem-Based Learning (PBL) model on learning outcomes in Webbed integrated learning at elementary schools. Webbed integrated learning is an approach that integrates multiple subjects into a single learning theme, while PBL is a learning method that emphasizes real-world problem-solving within the learning context. The research employed an experimental design with a Post-test Only Control Group Design. The sample consisted of third-grade students in Gugus VI, Kuranji District, Padang City, with two groups: an experimental group comprising 20 students and a control group comprising 20 students. The experimental group implemented the PBL model in Webbed integrated learning, while the control group used conventional learning in Webbed integrated learning. Learning outcome data were obtained through written tests that covered cognitive and affective aspects of integrated learning. Data analysis was conducted using an independent t-test to compare the learning outcomes between the experimental and control groups. The results showed a significant difference in the average learning outcomes of Webbed-integrated learning using the PBL model compared to the average learning outcomes of Webbed-integrated learning using conventional learning based on the results of the independent sample t-test, which yielded a sig value of 0.00 < 0.05 and a t-value > t-table with a t-value of 5.463 and a t-table value of 2.024. Therefore, it can be concluded that the use of the PBL model has an impact on learning outcomes in Webbed integrated learning.

Keywords: Elementary School; Integrated Learning; Learning Outcomes; Problem-Based Learning; Webbed Approach.

Introduction

The popularity of the Webbed integrated learning approach is on the rise in elementary schools. This methodology enables the incorporation of multiple subjects within a unified thematic framework, aiming to foster a comprehensive understanding and the acquisition of applicable skills across diverse fields of study. The Webbed integrated learning approach entails the fusion of various subjects or disciplines into an interconnected theme or focal area of instruction (Armadi & Astuti, 2018; Marzuki, 2017; Wali et al., 2020). This approach acknowledges the interconnectedness of various knowledge areas and skills in real-life situations, striving to create more meaningful and relevant learning experiences for students. The use of themes is crucial in the learning process as it facilitates information communication by connecting one subject to another. The goals of Webbed integrated learning include deepening understanding of the concepts being taught, developing skills in information search, processing, and utilization, cultivating positive attitudes, good habits, and high values in life, building social skills, enhancing learning motivation, and selecting activities that align with students' interests and needs (Wali et al., 2020). The learning materials and students' learning experiences are combined in the Webbed integrated learning model to enhance student engagement. In this model, students

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can actively and creatively participate in the learning process, which has the potential to influence the desired learning outcomes (Nuraeni, 2016; Pramita et al., 2022).

However, despite the promising nature of this approach, there are still challenges in achieving optimal learning outcomes. One of the learning models that can be implemented in Webbed integrated learning is Problem-Based Learning (PBL). PBL is a learning model that focuses on solving real-world problems within the context of learning. Through PBL, students are encouraged to be active, think critically, collaborate, and develop problem-solving skills. By emphasizing the application of problem-solving skills in everyday life, the PBL learning approach actively involves students as participants in the learning process.

In the Problem-Based Learning (PBL) approach, the real world serves as a backdrop for students to acquire knowledge, skills, and abilities to solve their problems. The teacher's responsibility is to provide learning opportunities for students (Anjelina Putri et al., 2018; Asyari et al., 2016; Febriana et al., 2020; Rahayu & Fahmi, 2018). Research findings indicate that the utilization of Problem-Based Learning (PBL) models can support the development of student's critical thinking abilities (Ardyanto et al., 2018). In integrated thematic learning, students need to actively engage in the learning process (Fitria, 2018). The PBL approach can serve as a solution to address challenges in integrated thematic learning. The goals of integrated thematic learning are to assist students in developing critical thinking skills, actively participating in the learning process, generating innovative solutions to encountered challenges, as well as analyzing and processing information to overcome difficulties they encounter (Khasanah et al., 2022).

However, despite evidence that PBL can enhance learning outcomes in various instructional contexts, there is a limited amount of research specifically investigating the impact of the PBL model on learning outcomes in integrated Webbed learning at the elementary school level. Therefore, this study aims to fill this research gap and examine whether the PBL model can positively contribute to learning outcomes in integrated Webbed learning at elementary schools. The research question posed is: Does the problem-based learning model influence learning outcomes in integrated Webbed learning at elementary schools? To address this, the proposed research hypothesis is as follows:

Ho = There is no influence of the problem-based learning model on learning outcomes in integrated Webbed learning. Ha = There is an influence of the problem-based learning model on learning outcomes in integrated Webbed learning.

This study is of paramount importance as it significantly contributes to improving the quality of primary school education, especially in the context of webbed integrated learning. The utilization of the Problem Based Learning (PBL) model enables students to actively participate in problem-solving and establish connections between learning concepts, thereby enhancing their understanding of instructional materials (Nofziarni et al., 2023; Putri & Zainil, 2021; Sutrada & Sukma, 2023). Additionally, the research makes a valuable contribution to educational literature by presenting empirical evidence on the effectiveness of the PBL model within the framework of webbed integrated learning. The research findings lay the groundwork for the development of more efficient teaching methods in the future.

Through this study, it is expected to provide valuable insights for educators and policymakers involved in crafting effective integrated learning approaches in primary schools. Furthermore, the research seeks to provide empirical evidence as a foundation for recommending the adoption of the PBL model to improve student learning outcomes in webbed integrated learning. By gaining a deeper understanding of the impact of the PBL model in the context of webbed integrated learning, this study is poised to contribute to enhancing the quality of primary school education and preparing students to confront the challenges of an increasingly intricate real-world environment.

Method

This study is quantitative research that employs an experimental approach. The experimental research method is one approach that investigates how different treatments can affect the variables under study. (Sugiyono, 2022). This study utilizes a Post-Test Only Control Group Design. The experimental and control groups were not randomly selected in this design. In this design, both the experimental and control groups are compared. The experimental class receives treatment, while the control class does not receive any treatment. The Post-test Only Control Group Design scheme is illustrated in the following table 1.

The research was conducted in SD Negeri in Cluster VI, Kuranji Sub-District, Padang City, during the second semester of the academic year 2022/2023. The population of this study includes all third-grade students in SD Negeri in Cluster VI, Kuranji Sub-District, Padang City. A total of 40 third-grade students were selected as the research sample, with 20 students in the experimental group and 20 students in the control group. The control group did not receive any treatment and followed the webbed integrated learning using

traditional teaching methods. Meanwhile, the experimental group implemented the Problem-Based Learning model in webbed integrated learning.

Table 1. Post-test Only Control Group Design Scheme

Groups	Treatment	Posttest
Experiment	X	O
Control	-	O

(Sugiyono, 2022)

Afterward, both groups were given a post-test. The post-test was used to assess and compare the students' learning outcomes between the Problem-Based Learning model and the standard model used in webbed theme-based learning. The data on students' learning outcomes were obtained through a written test that covered both the cognitive and affective aspects of integrated learning. The written test consisted of 10 multiple-choice questions and five essay questions, and it served as the primary data collection tool in this study. Additionally, non-test methods using observations were also employed to support the research findings.

Data analysis was performed by analysing the test results, conducting tests of normality, and hypothesis testing. Normality tests were conducted initially to ensure that the data followed a normal distribution before hypothesis testing. In this study, the Shapiro-Wilk test was used for normality testing. Data processing was conducted using SPSS 25 software.

To examine whether there is a significant difference in students' learning outcomes between the Problem-Based Learning model and the traditional teaching model in webbed integrated learning, hypothesis testing was conducted. Since the data used came from two independent groups and had a normal distribution, the Independent Samples T-Test was used to test the mean differences between the two independent data groups.

Result and Discussion

The initial stage in evaluating the influence of the Problem Based Learning model on learning outcomes in webbed integrated learning is by analysing the post-test data collected from both the control and experimental classes. In the experimental class, the learning process is conducted using the Problem Based Learning (PBL) model, while the control class employs a conventional learning model. The following is an illustration of the learning process in the experimental class.

In Figure 1, it illustrates the webbed integrated learning process using the Problem Based Learning (PBL) model. The learning process with an environmental theme begins by orienting students to a problem. The problem discussed relates to environmental damage. Subsequently, students are asked to discuss and solve the problem, presenting the results of their group discussions. In contrast to the experimental class, the webbed integrated learning process in the control class is conducted using conventional methods, namely lectures and question-and-answer sessions. The following is an illustration of the learning process in the control class.

Figure 1. Illustration of the Learning Process in the Experimental Class

Figure 2. Illustration of the Learning Process in the Control Class

After the learning process in both the experimental and control classes is completed, a post-test is conducted at the end of the instruction. The following are the post-test results for the experimental and control classes. Table 2, compares the learning outcomes between the experimental group, which implemented the Problem-Based Learning model in webbed integrated learning, and the control group, which used the traditional teaching model in webbed theme-based learning. The data in this table can be either normally distributed data or data from two independent groups.

Based on Table 1, there is a significant difference in learning outcomes between webbed theme-based learning with the implementation of the PBL model in the experimental group and webbed theme-based learning using the traditional model in the control

group. In the experimental group, the average score obtained is 78, while in the control group, the average score is 70. The highest score achieved by the control group is 85, while the experimental group reached the highest score of 92. Additionally, the average learning score of the experimental group, which is 84.25, is also higher compared to the control group, which has an average score of 76.50. The following graph illustrates the variation in learning outcomes between the experimental and control groups.

Table 2. Comparison of Learning Outcomes Between Experimental and Control Groups

Statistic	Control Groups	Experimental Groups
Minimum	70.00	78.00
Maximum	85.00	92.00
Average	76.50	84.25

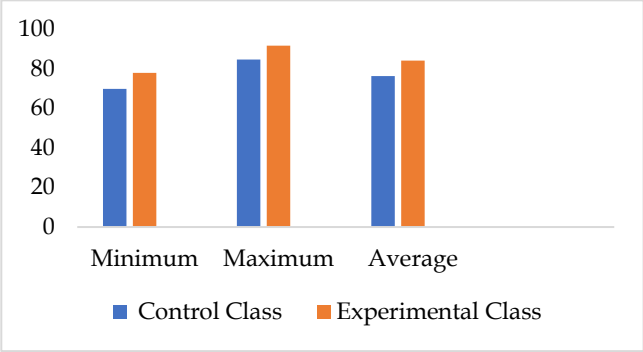

Figure 3. Illustrating the variation in learning outcomes between the experimental and control groups

The learning outcomes in webbed theme-based learning using the Problem-Based Learning (PBL) model show a higher level compared to webbed theme-based learning using the conventional model, as seen in the previous graph. From the table above, it can be observed that the average learning outcome in webbed theme-based learning with the PBL model is 84.25, which is higher than the average learning outcome in webbed theme-based learning with the conventional model, which is 76.50.

To determine whether the use of the PBL model has a significant impact on learning outcomes in webbed theme-based learning, an independent samples t-test is conducted. Before conducting the t-test, the data must meet the requirements that it is derived from separate groups, has a normal distribution, and has a homogeneous variance. Therefore, a normality test and a homogeneity test are performed. Here are the results of the normality test.

Based on the results of the Shapiro-Wilk normality test using SPSS 25 software, the obtained significance values (sig) are 0.131 for the experimental group and 0.143 for the control group. Both of these significance values are greater than 0.05, indicating that the data in both groups have a normal distribution. Next, a homogeneity test is conducted to determine whether the data has equal or different variances. The following Table 3 shows the results of the variance homogeneity test.

Table 3. Tests of Normality

Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Control	0.164	20	0.166	0.928	20	0.143
Experiment	0.177	20	0.102	0.926	20	0.131

Table 4. Test of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Based on Mean	1.977	1	38	0.168
Based on Median	1.545	1	38	0.221
Based on Median and with adjusted df	1.545	1	37.84	0.221
Based on trimmed mean	1.91	1	38	0.175

A significance value of 0.168 was obtained at a significance level of 0.05, as shown in Table 3. This indicates that the significance value of 0.168 > 0.05. Therefore, it can be concluded that the data has homogeneous variances. The next step is to determine whether there is a significant difference between the learning outcomes in webbed-integrated learning using the Problem-Based Learning model and webbed-integrated learning using the conventional teaching model.

To do this, an independent samples t-test is used after confirming that the data to be tested has a normal distribution and homogenous variances. An independent samples t-test is a parametric test used to evaluate whether there is a significant difference in means between two independent or unrelated groups. In this test, the learning outcomes in webbed-integrated learning using the Problem-Based Learning model are compared to the learning outcomes in webbed-integrated learning using the conventional teaching model. The hypotheses are Ho: There is no significant difference in the mean learning outcomes between webbed-integrated learning using the Problem-Based Learning model and webbed-integrated learning using the conventional teaching mode; Ha: There is a significant difference in the mean learning outcomes between webbed-integrated learning using the Problem-

Based Learning model and webbed-integrated learning using the conventional teaching model.

The decision based on the significance value (sig) are (a) If the sig value > 0.05, then Ho is accepted and Ha is rejected; (b) if the sig value < 0.05, then Ha is accepted and Ho is rejected. Meanwhile, the decision based on the t-value are (a) if the t-value < critical t-value, then Ho is accepted and Ha is rejected; (b) if the t-value > critical t-value, then Ha is accepted and Ho is rejected. The results of the independent samples t-test can be observed in the Table 5.

Table 5. Independent Samples Test

	F	Sig.	T	df	Sig. (2-tailed)
Equal variances assumed	1.977	0.168	-5.463	38	0.000
Equal variances not assumed			-5.463	36.814	0.000

Based on the t-test results shown in the table 5, a significance value (sig) of 0.00 was obtained at a significance level of 0.05. The calculated t-value of 5.463 can also be found in the table. Using the formula (α/2); df equals (0.05/2); 38 = 0.025; 38, the tabulated t-value is determined to be 2.024. The significance value of 0.000 in the equal variances assumption, which is less than 0.05, indicates the rejection of the null hypothesis (Ho) and acceptance of the alternative hypothesis (Ha), as seen in the t-test results above. Additionally, the calculated t-value is greater than the tabulated t-value, with 5.463 > 2.024, further supporting the rejection of Ho and acceptance of Ha. These findings indicate a significant difference between the learning outcomes of webbed integrated learning using Problem-Based Learning and conventional instructional models. It demonstrates the influence of Problem-Based Learning on learning outcomes in webbed-integrated learning.

The average learning outcome in webbed-integrated learning using Problem-Based Learning in the experimental group is 84.25, which is higher than the average learning outcome in webbed-integrated learning using the conventional model, which is 76.50. Furthermore, the independent samples t-test with a significance value of 0.00 < 0.05 and a calculated t-value of 5.463 > tabulated t-value of 2.024 indicates a statistically significant difference in the average learning outcomes between the two groups in webbed integrated learning.

Thus, the findings of this study are consistent with previous research that demonstrates the positive impact of using the PBL model and webbed-integrated learning on student learning outcomes. Previous studies (Nuraeni, 2016) have shown that the use of PBL in the context of webbed integrated learning can enhance student motivation and learning outcomes. Integrated learning is defined as learning that connects various ideas, concepts, skills, attitudes, and values, both across subjects and within a single subject (Novelni & Sukma, 2021). Through integrated learning, students can gain hands-on experience and be trained to independently explore various knowledge holistically, meaningfully, and actively (Sutrada & Sukma, 2023). The use of the Problem-Based Learning (PBL) model in thematic learning has been proven to encourage students to develop critical thinking skills, problem-solving abilities, and collaborative work within groups. The Problem-Based Learning (PBL) model helps students apply their knowledge to understand real-life problems (Putri & Zainil, 2021). As a result, there is an improvement in student learning outcomes (Puspita & Yuhelman, 2017; Setiyaningrum, 2018; Sihombing et al., 2022; Surtikawati et al., 2022; Tebu et al., 2021; Wardani, 2021; Yolanda, 2018).

The implementation of the Problem-Based Learning (PBL) model in education has been proven to enhance critical thinking skills (Ardyanto et al., 2018), boost self-confidence and engagement in the learning process (Khasanah et al., 2022), and improve creative thinking abilities (Novellia, 2018). Students also demonstrate higher motivation and enthusiasm in the learning process when the Problem-Based Learning approach is used (Nurdiansyah et al., 2022). On the other hand, webbed-type integrated learning provides meaningful contexts and connections between the topics being studied.

For elementary school students, the combination of both methods creates an engaging and productive learning environment. Previous research findings also indicate that the use of the webbed approach can enhance students' learning outcomes (Mardinie, 2020; Pramita et al., 2022). Through webbed-type integrated learning, students gain direct experience in the learning process, thereby improving the quality of education (Efendi, 2021). The use of the PBL model can serve as a solution to address challenges in webbed-type integrated learning, enabling students to develop critical thinking skills, actively participate in the learning process, and generate innovative solutions to the challenges they face (Khasanah et al., 2022). Additionally, webbed-type integrated learning can be employed to stimulate maximal growth in students' learning interests (Dewi, 2017).

In conclusion, the implementation of the Problem-Based Learning (PBL) model in webbed-type integrated learning has a significant impact on students' learning

outcomes. This is evident from the higher academic achievements of students in the experimental class using the PBL model compared to students in the control class using a conventional model in integrated learning. Therefore, in integrated learning, educators need to demonstrate creativity in delivering high-quality teaching through various approaches, methods, and learning models (Ruhiyat et al., 2018). The PBL model is a framework that actively engages learners in the learning process by presenting problems and posing questions, enabling students to construct their own knowledge (Maharani & Zainil, 2022).

Conclusion

Based on the research findings, it can be concluded that the use of the Problem-Based Learning model has a significant influence on the learning outcomes of webbed-integrated learning. This finding is supported by the results of the independent sample t-test, which shows a significance value (sig) of 0.00 < 0.05, and a t-value that is greater than the critical t-value, specifically 5.463 > 2.024. Therefore, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. This indicates that there is a significant difference between the average learning outcomes of webbed-integrated learning using the Problem-Based Learning model and the average learning outcomes of webbed-integrated learning using conventional teaching methods. The use of the Problem-Based Learning model in webbed-integrated learning has a positive impact on student learning outcomes in elementary schools. This approach promotes better conceptual understanding, the application of knowledge in real-world contexts, and the development of critical and collaborative thinking skills.

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Nurul Halimah: writing-original draft preparation, result, discussion, methodology, conclusion, review, and editing. Alwen Bentri, Elfia Sukma and Melva Zainil: analysis and proofreading.

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