JURNAL PENDIDIKAN & PENGAJARAN GURU SEKOLAH DASAR *Volume 6, Number 3, October 2023, Page* 187-192
http://journal.unpak.ac.id/index.php/jppguseda, *e-ISSN: 2623-0232 ; p-ISSN: 2623-0941*

THE EFFECT OF PROJECTS BASED LEARNING MODELS WITH ECOBRICKS ON PROCESS SKILLS IN PRIMARY SCHOOLS

Rosdiana Hasan[1]), **Syarifuddin Kune**[2]), **Rahmawati**[3])
[*] *University of Muhammadiyah Makassar, Country Makassar*
e-mail correspondence : rosdianahasan2011@gmail.com

Abstract. *The purpose of this study is to determine whether the Ecobrick-assisted Project Based Learning Model for class V UPTD SDN 67 Parepare can enhance students' Science Process Skills in the area of Environmental Care. This study employed a quantitative research design, specifically a quasi-experiment. Two classes (VA and VB) totaling sixty-three students in the fifth grade served as the study's subjects. Tests, observation sheets, and documentation were the types of instruments used in this investigation. Descriptive tests (mean, median, mode, and standard deviation) and inferential tests (normality, homogeneity, and Manova) were used to analyze the data. Based on data analysis using SPSS 25, the Manova test reveals a significance value of 0.000. 0.000 < 0.05 then Ho rejected and Ha accepted. The normality test for cyan literacy and learning outcomes using Kolmogorov-Smirnov is sig > 0.05 from the pretest and posttest results of the control and experimental classes. The homogeneity test using the based mean is sig > 0.05 from the pretest and posttest results of the control and experimental classes. This leads to the conclusion that Class V UPTD SDN 67 Parepare's Science Process Skills on Environmental Care Topics are impacted by the Project Based Learning Model with Ecobrick.*

Keywords: *Project Based Learning Model; Science Literacy; Ecobrick*

I. INTRODUCTION

The purpose of education is to help students actively realize their potential through the conscious and planned realization of learning and the learning process. to possess the qualities that society, the country, and the state require of them, including religious spiritual strength, self-knowledge, personality, intelligence, and noble character [1]. Enhancing the learning process has a significant impact on quality, which extends to the entire process. As a result, if one of these factors is isolated, the process will not function as intended [2]. Teaching is an intentional endeavor on the part of educators to enhance their capacity to improve students' knowledge, attitudes, and behavior [3].

Science learning is a field of study in the educational curriculum that focuses on understanding the universe, natural phenomena, and the processes that occur in them [4]. Science exists in the form of facts, data, concepts, principles, and theories. Science as a process is a method or strategy used to find various products. Science as an implication has findings about natural events or events. Science as a product is a collection of results of empirical activities and analytical activities carried out by scientists [5]. Science learning will be very meaningful when the learning process is meaningful if the learning process is understood and understood by students towards natural science concepts, phenomena and natural events that can be observed around their environment, through an experimental process through observation, To enhance science process skills, use categorization, communication, predictions, and conclusions [6]. Studying alone or in groups is one way that elementary schools try to help students develop their science process skills so that they have a more fulfilling educational experience [7]. Three domains—processes, attitudes, and products—that are innate in students should be developed through the process of independent or group learning [8]

One of the suggested learning models to be used in the Merdeka curriculum is Project Based Learning, which was just introduced in February 2022. Students who are taught through curriculum and project-based learning have responded well to it because it allows them to be actively involved in their education, avoid boredom easily, and be directly involved in the learning process [9]. Students are encouraged to become more proactive, independent, and creative problem solvers through the use of the Project Based Learning learning model. As a result, a project-based learning approach can help students develop their moral principles, particularly those of creativity and curiosity [10]. One of the distinctive features of project-based learning is that students create their own procedures for solving the problems that are presented, and the process is continuous [11]. Learning steps: 1) Project determination; 2) Project design and completion; 3) Schedule preparation; 4) Monitoring; 5) Results testing and presentation; 6) Project process and outcome evaluation [12].

The following are some benefits of the project-based learning approach: 1) Raise students' motivation to learn, support their capacity to perform significant work, and emphasize their need to be respected, Enhance students' capacity to solve problems, 3) Make them more engaged and effective in handling challenging issues, 4) Promote teamwork, 5) Motivate students to learn and hone their communication skills, 6) Enhance students' resource management abilities, 7) Give students opportunities to learn and practice project organization, including allocating time and other resources like equipment to finish assignments. 8) Providing students with learning opportunities that are intricate and created to help them grow in line with the real world, 9) Create an enjoyable learning environment so that both teachers and students look forward to coming to class. However, its drawbacks include: 1) taking a long time to solve issues, 2) costing a lot of money, 3) A lot of teachers

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e-ISSN: 2623-0232 ; p-ISSN: 2623-0941

find comfort in traditional classroom settings where they are the primary educators; 4) A lot of equipment needs to be provided; 5) Students who struggle with conducting experiments and obtaining data will face challenges. 6) It's probable that pupils participate less in group projects, 7) It is feared that students won't be able to comprehend the topic as a whole when different topics are assigned to each group.

The Model of Project-Based Learning Students engage in learning activities that are inextricably linked to their daily consumption of packaged goods, the majority of which are wrapped in plastic [13]. People buy products out of desire as much as necessity. Students must eat during the school day through snacks, but using plastic packaging—which poses health and environmental risks—is not the best option when there are safer options available, like using bowls, plates, and glasses for food [14]. Through the use of the Project Based Learning Learning model, students are becoming more conscious of the fact that their habit of consuming food and drinks that are typically packaged in plastic adds to a variety of plastic wastes that threaten the sustainability of life and are difficult for the environment to break down naturally [15]. Ecoliteracy in the management of plastic waste is regarded as a competency that should be developed in students as an endeavor that can overcome environmental issues. Students can make useful, sustainable ecobricks to help develop their ecoliteracy in waste management [16]. Ecobricks are reusable building blocks made from plastic bottles that have been solidly filled with non-biological waste [17]. These eco-bricks are a cooperative technology that offers people, homes, businesses, and communities a free solid waste solution. Ecobrick is a solution if reducing and reusing is extremely difficult [18].

Caring for the environment is an attitude and action that always tries to prevent damage to the surrounding natural environment and develops efforts to repair the natural damage that has occurred [19]. Students who care about the environment are reflected in not destroying nature while in the school environment and maintaining the cleanliness and beauty of the classroom and school.

With the tagline, "Earth is inherited from our ancestors, but it is a mandate from our children and grandchildren that must be maintained," environmental care is about respecting the environment as a resource that needs to be preserved and protected by its function. Ecological intelligence includes the behavior and attitude of caring for the environment, which is defined as maintaining ecosystems and natural resources. Protecting the environment involves taking all necessary steps to avoid harming the surrounding natural resources and ecosystems [20]. Everyone has the right to receive environmental education [21]. Instill and develop student attitudes to care more about the environment and participate in protecting and protecting the environment.

The Care for the Environment indicator mentions things that can be done to preserve the environment in daily life as follows; 1) Improving environmental health which involves cleaning gutters, bathing-washing-latrines, maintenance of drinking water wells, 2) Cleanliness in the house, including windows that allow sunlight to enter, cleanliness of the kitchen, 3) Energy-saving efforts, 4) Utilization of the garden or yard with useful plants, planting seeds of plants for greening the house and yard are kept as clean and beautiful as possible so that it is a healthy and pleasant environment for the family [22].

Factors that become obstacles in instilling a caring character for the environment in elementary school children include: 1) Environmental factors, 2) The environment in which the child is located greatly influences the formation of the child's character, 3) Social relations factors because the community has manners and traditions that must be used as a habitat where children grow and develop, so that later they practice it, as well as they can respect it [23]. The definition of science process skills is the combination of manual, social, and cognitive abilities. Cognitive or intellectual skills involve using students' minds to carry out their process skills; manual skills involve using tools and materials, measuring, preparing, or assembling tools; and social skills involve students interacting with one another while using their process skills to carry out teaching and learning activities. Science process skills encompass all students' capacities to learn through phenomena-based knowledge. It is the students' observational, grouping, interpreting, predicting, questioning, hypothesizing, planning experiments, applying concepts, communicating, and experimentational skills that are in question. Scientists possess and employ science process skills, which are cognitive abilities, when studying natural phenomena [24]. Students can acquire the science process skills utilized by these scientists in more simplified forms based on their developmental stage. in particular, Syntax Science Process Skills 1) Watching; 2) Sorting; 3) Interpreting and interpreting; 4) Making predictions; 5) Questioning; 6) Conjecturing; 6) Arranging Tests and Studies; 7) Employing Instruments and Supplies; 8) Speaking[25].

II. RESEARCH METHODS

Types and Research Design

In this study, a quantitative research design was adopted. This study employs a quasi-experimental research design, which has a group but cannot completely control outside factors that influence how the experiment is carried out [26]. Design of Research A nonequivalent control group design was the method employed in the experimental study [27]. Two groups were not chosen at random for this study. In this design, two groups—one receiving the PJBL learning model and the other not—are given a pretest and a posttest, respectively, and are subsequently treated accordingly [28]. This study was carried out in the South Sulawesi Province's Class V UPTD SDN 67 Parepare, City of Parepare..

The population is a generalization made up of items or subjects chosen by the researcher to be examined in order to determine specific attributes and characteristics from which conclusions can be made. The sample, however, is representative of the population under study since it is a portion of the overall population. A saturated sample technique was used for sampling [29]. Regarding methods of

gathering data and research tools, specifically: Examinations, Remarks, and Recordings [30].

In order to determine the effectiveness of the variables in this study, hypothesis testing is conducted in the next stage. During the data analysis step, this research is aided by using SPSS Version 25 software and One-way Multivariate Analysis of Variance (One-way MANOVA) analysis [31]. The data analysis technique used in this study is divided into data analysis that must be prepared in this study normality test and homogeneity test. These data are useful as a requirement in hypothesis analysis.

III. Research results Discussion funds

Research result

Descriptive Analysis Test

To determine the overall score for each item on the observation sheet pertaining to the science process skills of students in the control class, the researcher calculated the scoring for each type of question. After that, tabulating is carried out, specifically tabulating the answer data that has been provided in tabular form, to facilitate understanding in the following table. Table 1 below presents a table of the frequency distribution of science process skills among science students.

Table 1. Distribution of Observation Values Frequency of Control Class Science Process Skills

No	Range Value	Frequency	Percent	Category
1	80-100	-	-	Very High
2	66-79	-	-	High
3	56-65	4	13,33	Currently
4	40-55	21	70	Low
5	≤39	5	16,67	Very Low
Amount		30	100	

Source: Processed primary data, from Appendix 5, page 127

Table 1 above illustrates how the observation sheet was used to conduct a statistical analysis of Science Process Skills in the control class. The results showed an average score of 32.67, with a maximum score of 53 and a minimum score of 13. Five students were in the very low category, represented by a percentage of 16.67%, 21 students were in the low category, represented by a percentage of 70%, four students were in the medium category, represented by a percentage of 13.33%, and no students were in the high or very high categories, according to the Table of Frequency Distribution of Science Process Skills for the control class above.

Table 2. Distribution of Observation Results of Frequency Science Process Skills in Experiment Class

No.	Value Range	Frequency	(%)	Category Percentage
1	80 – 100	25	75,76	Very high
2	66 – 79	8	24,24	Height
3	56 – 65	-	-	Currently
4	40 - 55	-	-	Low
5	≤ 39	-	-	Very low
	Amount	33	100	

Source: processed primary data, from Appendix 5, page 126

Based on table 2 above, it is evident that the experimental class's Science Process Skills statistical analysis, which applied the PjBL learning model, produced an average score of 85.21, a minimum score of 70, and a maximum score of 92. Based on the application of the PjBL learning model, the frequency distribution of class science process skills is shown in the following Table: 8 students received a high category, represented by a percentage of 24.24%; 25 students received a very high category, represented by a percentage of 75.76%; no students received the low category, represented by a percentage of 0%; and no students received the medium category, represented by a percentage of 0%.

Inferential Statistics Test

Normality test

Table 3 Science Process Skills Normality Test

Tests of Normality

	Class	Kolmogorov-Smirnov[a] Statistic	df	Say.	Shapiro-Wilk Statistic	df	Say.
Model	Model	,150	30	,082	,948	30	,153
Buyer teachings PjBL Limited ap KPS	Learning PJBL Control Model	,145	33	,075	,949	33	,122
	Learning PJBL Experiment Skills Proses Sains	,153	30	,070	,951	30	,175
	Control Skills Proses Sains	,152	33	,051	,925	33	,026
	Experiment						

a. Lilliefors Significance Correction

Source: processed primary data, from Appendix 6, page 134

The output of the aforementioned SPSS program indicates that the sig. for Kolmogorov-Smirnov statistics. This value indicates that the value of science process skills in the experimental class and control class is normally distributed since it is greater than the significant level α =

0.05 (sig.0.05). The control class had results of 0.070 and the control class post-test of 0.51; the experimental class results were 0.082 and the experimental class post-test was 0.075. The Kolmogrov-Smirnov test results for SPSS 25 were more than 0.05.

Homogeneity Test

Table 4 Science Process Skills Homogeneity Test

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Say.
PJBL Ran Learning Model Against KPS	Based on Mean	2,390	3	122	,072
	Based on Median	2,287	3	122	,082
	Based on Median and with adjusted df	2,287	3	90,101	,084
	Based on trimmed mean	2,388	3	122	,072

Source: processed primary data, from Appendix 6, page 135

Based on the output of the SPSS program above, it can be shown that the sig. for Based on Mean statistics. From this value it shows that it is greater than the significant level α = 0.05 (sig. 0.05), so it can be concluded that the value of science process skills in the experimental class and control class is normally distributed, the results obtained are 0.072 so the data is homogeneous.

Hypothesis Testing

Table 5 Hypothesis Testing

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Say.	t	df	Say. (2-tailed)	Mean Difference	Std. Error Difference up	95% Confidence Interval of the Difference Lower	Upper
PJBL Learning Model Limited to KPS	Equal variances associated with	1,305	,258	-13,285	61	,000	-34,955	2,631	-40,216	-29,693
	Equal variances not associated with			-13,065	51,244	,000	-34,955	2,675	-40,325	-29,584

Source: processed primary data, from Appendix 6, page 136

The Independent Sample T-test results show that the significance value of the Leavenes' test analysis is Sig. (2-tailed) is 0.000, indicating that 0.000 <0.05. Based on these findings, the conclusion that "There is a significant effect of the PjBL Learning Model on the Science process Skills of Class V students of UPTD SDN 67 Parepare" can be drawn. Stated differently, the theory is confirmed.

IV. Discussion of Research Results

The Impact of the Ecobrick-Assisted PJBL Model on Science Process Skills in Class V UPTD SDN 67 Parepare: The topic of environmental care. The value of students' Science Process Skills is very low, as evidenced by the maximum score of 53, the minimum score of 7, and the average score of 21, which are based on data from the control class and several learning models. According to the Science Process Skills Frequency Distribution table above, 12 students receive a percentage of 40% in the low category, while 17 students receive a percentage of 56.67% in the very low category. The Science Process Skills class, after applying some of the learning models above, shows that 5 students get very low category, this is indicated by a percentage of 16.67%, 21 students get low category, this is indicated by a percentage of 70%, 4 students get medium category, this is indicated by a percentage of 13.33%, and no students get high and very high categories. The maximum score is 53, the minimum score is 13, and the average score is 32.67.

Prior to using the PJBL learning model, the statistical analysis of Science Process Skills in the experimental class produced an average score of 26.24, a maximum score of 40, and a minimum score of 7. According to the Science Process Skills Frequency Distribution Table for the aforementioned class, 13 students fell into the extremely low category, The results of the statistical analysis of the Science Process Skills for the experimental class after applying the PjBL learning model above obtained a maximum score of 92 and a minimum score of 70 with an average score of 85.21. The Science Process Skills of the class before applying some of the conventional models above shows that there were no students who received the low category, this was indicated by a percentage of 0%. 20 students received the low category, with a percentage of 60.61%. No students received the medium, high, or very high categories, A percentage of 0% indicated that no students were placed in the medium category, a percentage of 24.24% indicated that eight students were placed in the high category, and a percentage of 75.76% indicated that 25 students were placed in the very high category.

According to the Homogeneity and Normalcy tests, the Kolmogorov-Smirnov statistics' sig. It can be inferred from this value that the value of science process skills in the experimental class and control class is normally distributed because it exceeds the significant level α = 0.05 (sig. > 0.05). The results of the Kolmogrov Smirnov 25 SPSS 25 were greater than 0.05 and indicated that the sig. for the experimental class was 0.082, the experimental class post test was 0.075, the control class was 0.070, and the control class post test was 0.51, based on average statistical data. This value indicates that the value of science process skills in the experimental and control classes is normally distributed, with results of 0.075 indicating that the data is homogeneous, and it is greater than the significant level α = 0.05 (sig. > 0.05).

These findings support the findings of [24], [32], who conducted a study titled Project-Based Learning Assisted by

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e-ISSN: 2623-0232 ; p-ISSN: 2623-0941

the Krpl Program Module to Develop Environmental Care Attitudes and Science Process Skills of Elementary School Students Islam Moh. Hatta Malang, and who found that the ecobrick-assisted PJBL learning model had a significant impact on students' science process skills. The study's findings demonstrate that this lessens the significance of learning activities. One possible remedy is to offer alternative learning [33], [35], [36]. With support from the KRPL program module, project-based learning (PJBL) is the method of instruction used. Science process skills and attitudes toward environmental care are among the variables that can be measured during PJBL learning activities [32], [34]. Before and after learning, the average scores for students' attitudes toward environmental protection were 85.20% and 95.04%, respectively. The mean scores for the proportion of pupils possessing science process skills were 71.75%, 74.32%, and 81.96%, in that order.

IV. CONCLUSION

The results of studies carried out at UPTD SDN 67 Parepare support the idea that the Ecobrick-assisted Project Based Learning Model (PJBL) can enhance students' Science Process Skills in the area of Environmental Care in class V at UPTD SDN 67 Parepare. The study's findings indicate that the PJBL learning model has a significant impact on students' science process skills. According to the frequency distribution data, 4 students (13.33%) in the control class were classified as moderate, and 21 students (70%) were classified as low, In the experimental class, 8 students (24.24%) were high and 25 students (75.76%) were very high. Five students (16.67%) were very low. The conclusion that "There is a significant effect of the PJBL Learning Model on the Science Process Skills of Class V UPTD SDN 67 Parepare" can be drawn from the Independent Sample T-test results, the analysis value of the Leavenes' test, and the significance value of Sig. (2-tailed) is 0.000, indicating that 0.000 <0.05. Stated differently, the theory is confirmed..

It can be inferred from the research and discussion above that teachers in schools should be able to plan and execute a lesson that can foster a positive environment and provide science process skills and learning outcomes for students.

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