The Effectiveness of Teaching Materials of Local-Wisdom Based Picture Storybooks on the Eco-Literacy of Elementary School Students

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Abstract

The underlying background of this research with the importance of eco-literacy for students' elementary school. Ecoliteracy refers to the awareness of protecting nature and consuming local food for a healthy life. This experimental research aims to described the effectiveness of local wisdom-based picture storybook teaching materials on the eco-literacy of elementary school students. The applied design was a pretest-posttest control group design with a random sampling technique. The researchers used theme 3, caring for livings, and subtheme three, about loving the environment for the fourth graders of 2 (two) elementary schools in Indramayu, West Java. The results were 1) no significant experience increase found in the control group and 2) a significant experience increase found in the experimental group. Both groups' obtained N-gain values had huge differences, indicating the effectiveness of the applied local-wisdom-based picture storybook to improve students' eco-literacy.

Keywords: *teaching materials, local wisdom, eco-literacy.*

Abstrak

Penelitian ini dilatarbelakangi oleh pentingnya eco-literacy bagi siswa sekolah dasar. Ekoliterasi mengacu pada kesadaran menjaga alam dan mengkonsumsi pangan lokal untuk hidup sehat. Penelitian eksperimen ini bertujuan untuk mendeskripsikan keefektifan bahan ajar buku cerita bergambar berbasis kearifan lokal terhadap literasi lingkungan siswa sekolah dasar. Desain yang digunakan adalah pretest-posttest control group design dengan teknik random sampling. Peneliti menggunakan tema 3, merawat kehidupan, dan subtema tiga, tentang mencintai lingkungan untuk siswa kelas IV dari 2 (dua) sekolah dasar di Indramayu, Jawa Barat. Hasilnya adalah 1) tidak ada peningkatan pengalaman yang signifikan pada kelompok kontrol dan 2) peningkatan pengalaman yang signifikan pada kelompok eksperimen. Nilai N-gain yang diperoleh kedua kelompok memiliki perbedaan yang sangat besar, hal ini menunjukkan keefektifan penerapan buku cerita bergambar berbasis kearifan lokal untuk meningkatkan eco-literacy siswa.

Kata kunci: *bahan ajar, kearifan lokal, eko-literasi.*

INTRODUCTION

Ecoliteracy ability is included in something important because it relates to everyday life. Echoliteracy is related to how the abilities of the head, heart, and hands are related. This ability not only prioritizes what is known but what is felt. And it ends in what is done and then becomes a habit. Ecoliteracy is referred to as ecological intelligence. This means that a person's ability to adapt to the environment in which they live (Rusmana, 2017). Thus the ability of eco-literacy can create better human beings in responding to life. Eco-literacy is intelligence towards the environment using various experiences, knowledge, and skills. This ability also includes the ability to adapt humans to the environment in which humans as a result of a combination of cognitive intelligence and empathy for all forms of life (Rusmana, 2017; Setyaningrum & Gunansyah, 2020; Sholihah et al., 2021; Yonanda et al., 2022). Ecoliteracy abilities prioritize changes in student behavior from knowledge and attitude to psychomotor.

The awareness includes the interest to save nature gained from the knowledge while learning and observing the environment. Observation will always occur daily, but environmental awareness is only observable from attitudes. Based on the psychomotor aspect, awareness requires beneficial actions, such as eating local food rather than junk food (Febriasari & Supriatna, 2017). This action is crucial for the eco-literacy inculcation of the students at early developmental age. Thus, education should introduce eco-literacy to elementary school students to manage environmental problems (Paryanti et al., 2021). Early eco-literacy introduction encourages students to create mutual environmental relationships. This matter also improves the students' health, learning ability, gratitude, and loving nature (Kurniasari, 2018).

However, the reality on the ground based on observations at 2 (two) elementary schools in Indramayu, West Java, Indonesia, shows that students are not yet aware of the importance of eco-literacy. This can be seen from the habits of students who are used to eating fast food such as nuggets, instant noodles, meatballs, and french fries. Other packaged snacks that are less healthy, such as cake, chocolate, and jelly, are not suitable for health because they contain ingredients that are not good for health. In accordance with the following statement that if fast food is consumed in excess, it can cause health problems such as obesity, hypertension,

diabetes, cancer, heart disease, and stroke (Pamelia, 2018). Besides that, food packaging made of plastic can also damage the surrounding environment. Plastic waste is difficult to process and decompose with the soil. So that it can cause damage to the soil and groundwater sources (Gunadi et al., 2020).

Ecoliteracy development requires interesting teaching material or teaching books so that the learners can directly interact with the environment. One of the efforts is to provide a picture storybook based on local wisdom as the community life guideline and tradition (Dwianto et al., 2017; Suastra et al., 2017). The guideline includes the hereditary values from the ancestors to the following generations, such as religion, culture, and social life system. In this research, the researchers took local wisdom as the community life guideline to foster students' eco-literacy regarding local food. This literacy achievement requires teachers' environmental literacy to provide a better understanding for the students. With the implementation of picture storybooks, learners could choose healthy local and beneficial local foods for the students and the environment.

Muthukrishnan (2019) found picture books with environmental literacy improved the students' cognition. Pictures for teaching elementary school students could internalize character values. The media could also make students interact with people enjoyably (A. Mustadi, S. Suhardi, E.S. Susilaningrum, R. Ummah, P.E. Wijayanti, 2017). Through local wisdom, students can love the surrounding environment, such as being aware of utilizing natural resources (N. D. R. Kurniasari et al., 2020). Picture books based on local wisdom can be used as an educational medium for understanding healthy living and fostering a love for local wisdom (Suryani et al., 2021). Based on the results of the study indicate that elementary school students need to know their environment. The research explained that learning using picture stories, books teaching materials increased students' interest in participating in learning. In addition, students are more enthusiastic about learning what happens in their area so that understanding of local wisdom can be absorbed through everyday life.

Current research described the effectiveness of local wisdom-based picture storybook teaching materials on the eco-literacy of elementary school students. The novelty of this research was the implementation of Indramayu's local wisdom. This implementation was also helpful in introducing and preserving wisdom.

Research is vital because changing times can affect a person's behavior, such as eating ready-to-eat food, which is not suitable for health, and producing a lot of plastic, so it is not environmentally friendly either. Therefore, an understanding of eco-literacy is needed for students from an early age. Because through understanding eco-literacy, students can have the ability to solve environmental problems that occur in society (Nadiroh & Siregar, 2019).

METHODS

Current quasi-experimental research applied a two-group pretest-posttest design (Creswell, 2014). The first group was the experimental group with the applied treatment. The second group was the control group without the applied treatment. The researchers used the sample of 68 fourth graders with random sampling technique from 2 (two) elementary schools in Indramayu, West Java, Indonesia. For the first group, the experimental group, the participants consisted of 34 students. They were 17 male and 17 female students. These students received the picture story teaching materials based on local wisdom. On the other

hand, the second group, or the control group, consisting of 34 students, 12 male and 22 female students, who received conventional teaching.

In this research, the researchers applied the material used in this study class IV material with theme 3, caring for living things, sub-theme 3, let's love the environment. The material consists of local healthy food typical of Indramayu, its impact on the environment and the human body if you don't eat healthy food, and practice questions packaged as games and recipes for making healthy local food typical of Indramayu. The material in teaching materials is presented as stories from students' travels around Indramayu with their friends to introduce healthy and unhealthy foods to their surroundings. The teaching material becomes a learning companion book introducing eco-literacy to elementary school students. The special foods that are introduced are *nasi lengko, burbacek, pedesan entog, kerupuk kulit ikan, pindang gombyang and rumbah.*

This research applied five indicators: 1) understanding environmental content and problems, 2) understanding ecological principles, 3) solving problems and applying knowledge, 4) assessing the impact of human action and technology, and 5) considering the consequences of the taken decisions (Pectas et al., 2013).

Data collection techniques using tests. The eco-literacy test is applied at the pretest and posttest. Questions test the validity and reliability using SPSS software and meet valid and reliable criteria. The test questions consist of 20 multiple choice questions, the data taken during the pretest and posttest.

Firstly, the researchers shared the pretest for both groups to determine the initial eco-literacy. Then, the researchers analyzed the results with a t-test. Once the results indicated normal data distribution and homogeneity, the researchers would apply the treatment with story media teaching materials based on Indramayu's local wisdom.

The researchers applied the action for the experimental class. Then, the researchers shared the posttest for both groups to obtain the students' eco-literacy data. After that, the researchers analyzed the data statistically to determine the data types, parametric or non-parametric. The researchers used the parametric test once the data was deemed to have a normal distribution. Then, the researchers conducted a paired sample t-test, homogeneity test, independent sample t-test, and N-gain test to determine the teaching material's effectiveness. Meltzer, cited by Putri (2015), explains the criteria for effective improvement.

Table 1. The Improvement Criteria

Boost Intervals	Improvement Criteria
N-Gain > 0,7	High
0,3 < N-Gain ≤ 0,7	Sufficient
N-Gain ≤ 0,3	Low

RESULTS AND DISCUSSION
Descriptive Analysis of Students' Ecoliteracy Ability

The following table, Table 2, summarizes the groups' pretest-posttest on eco-literacy abilities.

Table 2. Descriptive Statistics of Pretest and Posttest Data of Two Groups

| | Control Group (N=34) | | Experimental Group (N=34) | |
	Pretest	Posttest	Pretest	Posttest
Minimum	50	50	60	80
Maximum	72	73	76	96
Mean	61.38	61.82	68.73	88.32
SD	5.81	7.08	4.84	3.9

Table 2 shows that the experimental group scores are higher than the control group. The same results are observable in the posttest results of both groups. Specifically, the difference between the posttest and pretest scores of the experimental group is higher than the difference between the control group's pretest-posttest. These results indicate a significant experience increase in the experimental group.

After analyzing the data descriptively to get an overview of the minimum, maximum, average, and standard deviation values, the researcher tested the data normality of the two groups. Table 3 shows the results calculated by researchers using SPSS 26.

Table 3. Two Group Data Normality Test

| | Group | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
		Statistic	Df	Sig.	Statistic	df	Sig.
Student Ecoliteracy Ability Test Results	Pretest Experiment	.121	34	.200*	.941	34	.064
	Posttest Experiment	.128	34	.176	.971	34	.483
	Pretest Control	.112	34	.200*	.962	34	.272
	Posttest Control	.105	34	.200*	.949	34	.115

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 3 shows the obtained data, based on Kolomogorov-Smirnov and Shapiro-Wilk tests, are typically distributed. The evidence is the significant values are higher than 0.05.

After confirming that the data were normally distributed, the researcher continued the paired sample t-test. Table 4 shows the results of the paired sample t-test using SPSS 26.

Table 4. Paired Sample T-Test Results

Paired	T	Df	Sig (2-tailed)
Pretest-Posttest Experiment	-22.064	33	0.000
Pretest-Posttest Control	-8.121	33	0.000

Table 4 shows each group test obtains sig (2-tailed) values lower than 0.05. The results indicate the average difference between the experimental and control groups' eco-literacy.

This average difference is also proven based on the results of the paired sample statistics in Table 5.

Table 5. Statistical Paired Sample Results

Paired	Mean	SD
Pretest Experiment	61.82	7.081
Posttest Experiment	88.32	3.90
Pretest Control	61.38	5.81
Posttest Control	68.73	4.84

Table 5 shows that the average increase between the pretest-posttest results of the experimental group appears to be more significant than the control group.

Since the researchers found the average difference between the experimental and control group, the researchers continued the test with a homogeneity test on the posttest results. Table 6 shows the results of the homogeneity test of the eco-literacy abilities of the two groups.

Table 6. Homogeneity Test Results of the Ability of the Two Groups

Posttest Result	Levene Statistic	df1	df2	Sig
Based on Mean	2.043	1	66	0.158

Table 6 shows the Sig value of 0.158 is more significant than 0.05, indicating the obtained data were homogeneous. This result also indicated both groups' subjects have the same characteristics.

The next step was testing with the intended sample t-test, as shown in Table 7.

Table 7. Independent Sample T-Test Results

Posttest Result	F	Sig	t	Df	Sig (2-tailed)
Equal variance assumed	2.043	0.158	18.353	66	0.000

Table 7 shows the test results obtained a sig (2-tailed) value of 0.000, indicating a significant average difference between both groups' learning outcomes. This result supported both groups' mean scores, as shown in Table 8.

Table 8. Average Student Ecoliteracy Test Results

Student Ecoliteracy Test Result	Mean	SD
Posttest Experiment	88.32	3.90
Posttest Control	68.73	4.84

Table 8 shows the mean scores of both groups, consecutively, are 88.32 and 68.73. The mean difference is enormous. Thus, the result supports the independent sample t-test. This result also supports the significant mean difference between both groups.

The ninth test was the N-gain test to determine the effectiveness of the developed teaching material in improving students' eco-literacy, as shown in Table 9.

Table 9. Descriptive Data on Student Ecoliteracy Results

Tes	Learning	Score		$\bar{x}$	Sd	N-Gain
		Maximum	Minimum			
Pretest	Using picture story teaching materials based on local wisdom	50	73	61,82	7,08	0,68
Postest		80	96	88,32	3,90	
Pretest	Convensional	50	72	61,38	5,81	0,18
Posttest		60	76	68,73	4,84	

Table 9 shows the N-gain value of the experimental group is 0.68, medium category; while the N-gain value of the control group is 0.18, the low category. These results confirm that learning using picture story teaching materials based on local wisdom is adequate to improve students' eco-literacy abilities at a moderate level.

The Effectiveness of Local Wisdom-Based Picture Story Book Teaching Materials on Ecoliteration of Elementary School Students

The developed teaching material was adequate for the elementary school students' eco-literacy. This literacy is vital for students to develop a loving attitude toward the environment. This literacy has implications for environmental problem-solving in complex and urgent situations. Ecoliteracy is also vital for individuals to preserve the ecosystem (Education, 2017). One way that teachers can do to develop students' eco-literacy is by using picture storybooks based on local wisdom.

The developed storybook could improve the students' eco-literacy in this research. The students could learn about environmental concepts, problems, and the excessive use of resources due to human activities (Hsiao & Shih, 2016). Illustrated teaching materials also make it easier for students to learn and understand rather than reading long texts (Furenes et al., 2021). In accordance with another statement, teaching materials equipped with pictures can facilitate students during the learning process because they are easy to use, and the material being taught is explicit. It can activate students (Sarwik, 2018). Therefore, illustrated teaching materials can stimulate student understanding (Nurzayyana et al., 2021).

Using picture storybooks based on local wisdom, students can make direct contact with these illustrated teaching materials. This direct contact can inspire students to know what they are learning so that student learning outcomes increase (Bilewicz-Kuźnia, 2021). In addition, it improves students' abilities and the teacher's ability to manage the class during learning (Belcher et al., 2019). For example, teachers can prepare their teaching materials that can be adapted to learning materials so they can have guidelines for directing all activities in the learning process.

The developed teaching materials had interesting pictures, clear information, and readable language. Thus, the developed teaching material met the characteristics of elementary school-age children, such as concrete operational, loving stories, and thinking narratively (Fatmawati et al., 2018; Oktapyanto. R., 2017). The students could also think highly and become curious, so they were motivated to learn the material with the pictures in the teaching material (Purwani, 2020).

Indramayu local wisdom-based illustrated story teaching material is a learning companion book to introduce eco-literacy to students. Teaching materials include local healthy food typical of Indramayu, the environmental impact if you don't eat healthy food, and practice questions packaged in games and recipes for making healthy local food typical of Indramayu. This material is presented as stories from students' travels around Indramayu with their friends to introduce healthy and unhealthy foods. Local wisdom in each region can increase knowledge. In addition, learning becomes more meaningful for students regarding the local wisdom of their area and as a means of regenerating knowledge (Dewi et al., 2019).

Teaching materials are equipped with practice questions packaged as games about eco-literacy to determine student understanding. The statement that the practice questions in this teaching material have an essential role in determining the standard of students' ability to understand the material that has been studied and students also better understand the material they are studying (Syarifah et al., 2020). In this research, implementing picture book teaching material based on local wisdom could develop the students' ecoliteracy; and introduced and preserved Indramayu's local wisdom because this teaching material effectively improved students' eco-literacy.

CONCLUSION

Local-wisdom-based picture storybook teaching could effectively improve the fourth graders' eco-literacy because the teaching material was attractive and relevant to their characteristics, such as concrete operational stage, loving stories, and thinking narratively. Thus, the students could pay attention. They could also improve eco-literacy and become more familiar with the local wisdom of their area. In addition, students also become accustomed to consuming healthy local food and are more aware of protecting nature by reducing food wrapped in plastic. This research is expected to improve the learning process and achieve the learning objectives. The researchers recommended that future researchers apply different media to improve students' eco-literacy.

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