



Effectiveness of local culture supplement books in improving students' ecoliteracy in coastal areas

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ABSTRACT

Introduction. The growing popularity of the coastal area's industry in the Sidoarjo district, East Java, Indonesia, not only had a significant impact on the local economy, but it has also caused ecological problems and an overall decrease in student literacy rates. Ecoliteracy is crucial to developing sustainable thinking in the next generation. Given the significant ecological challenges posed by the rapid expansion of agricultural industries in coastal areas, the study investigates the integration of local culture into educational materials to improve students' understanding and appreciation for their surroundings

Study participants and methods. The type of research used is quasi-experimental with a pretest-posttest control group design pattern. The sample in this research is the primary school located in the coastal area's farming, among them SDN Banjar Kemuning, Sedati District, SDN Gisik Cemandi, Sedati District and SDN Balongtani, Jabon District, all of them at Sidoarjo, with a total of 86 students. Data collected using test and lifting techniques consisting of 5 indicators of eco-literation understanding. Test the hypothesis using independent t-test samples and using n-gain analysis.

Results. The outcome of the research revealed that local-culture supplementary books were successful at increasing student eco-literacy in desired areas. This is demonstrated by the experimental class having a higher average value and n-gain value than the control class. Based on the results of the hypothesis test using the independent formula sample t-test obtained a significance value of $0,000 < 0,05$ and $t\text{-value} > t\text{-table}$ ($8,486 > 1,663$). The use of this supplementary book not only improves students' knowledge of the environment but also motivates them to be more caring and responsible for the ecosystems around them. Integrating local wisdom into formal education can be an effective model for environmental education in a variety of other local contexts.

Practical significance. The study analysed the effectiveness of local cultural supplement books in improving student eco-literation in the coastal region of Sidoarjo, East Java, Indonesia. This research makes an important contribution to students' understanding of local ecosystems, using local wisdom as a relevant and useful learning foundation. By considering the introduction of typical foods, local cultures, and traditional habitat points in the supplementary book, the study provides a better understanding to students of the complex relationship between humans and the environment in the desire area.

KEYWORDS

ecoliteracy, local-culture, environmental education, coastal areas, supplement book

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INTRODUCTION

The development of eco-literacy among elementary school students is vital for creating mindful societies. The Council of Europe supports incorporating ecological education into school curricula to increase student environmental awareness [1]. Furthermore, UNESCO emphasizes the importance of Education for Sustainable Development (ESD) by assisting people develop the knowledge, skills, and attitudes necessary to create a more sustainable future [2]. The International Association of Universities (IAU) also promotes global education initiatives that encourage inter-university collaboration in addressing global environmental challenges through sustainable learning [3].

Environmental awareness must be reinforced in the younger generation from an early age to promote an environmentally responsible society [4]. Modern technology has created several problems, notable among them being environmental ones [2; 3]. Studies reveal, referring to work from Lopez-Leon & Encino-Muñoz [7] and that of López-Rodríguez et al [8], that people frequently take advantage of natural resources carelessly, not taking into account the long-term effects. Human activity is the primary cause of global environmental degradation, rising temperatures, and the depletion of natural resources, according to studies conducted by the IPCC (Intergovernmental Panel on Climate Change), the G-8 group of developed countries, and 20 major economies [6; 7].

Referring to Morris's and McGill's [11] research, David Orr coined the phrase «ecological literacy» in the early 1990s to characterize people's capacity to comprehend the intricate natural processes and behaviors that support life on Earth. To increase knowledge of one's environment, ecoliteracy should be ingrained in children from a young age. According to McBride, et al [12] and Nurwidodo, et al [13], ecoliteracy has a major role in raising environmental awareness. According to Vargaz-Madrado [14] and Tiwari [15], people can increase their awareness of the environment and how their activities affect it by becoming more ecoliterate. People who possess this insight can act more responsibly and with greater caution when protecting the environment. As mentioned by Han [16] and Zhong et al. [17], knowledgeable people incorporate ecological ideas into their daily activities. Sigit et al. [18] research indicates that ecoliteracy has a favorable impact on environmental care. Ecoliteracy programs in primary schools can help create environmentally conscientious individuals [19]. Tapia-Fonllem et al. [20] assert that the primary aim of introducing ecoliteracy at an early age is to allow children to apply their acquired knowledge through engagement with their environment. Moreover, due to the swift development of cognitive, affective, and psychomotor abilities in young children, Wulandari et al [21] identify early ecoliteracy education as the most effective method for fostering ecologically literate future generations.

Students with good ecoliteracy skills can have a comprehensive conceptual understanding of ecological and environmental sustainability aspects [22]. This understanding serves as a basis for solving problems, especially those related to the environment in daily life. Students can gain ecoliteracy abilities, especially in formal educational settings, which serve as a medium for character development and becoming change agents [23].

Teachers can foster ecoliteracy by incorporating local expertise into their students' learning environments [24]. Local culture in communal life stems from years of environmental adaptation [22; 23]. Similarly, Local culture is a cultural process that is in harmony with the natural environment, developed over time, and passed down through generations [24; 25]. Local culture is inextricably related to nature and must be considered [29]. Local culture teaches students about their nearby environment, which has personal benefits.

In Indonesia, particularly in Sidoarjo, East Java, the growth and development of the fish farming industry have significantly contributed to the local economy [27; 28]. The rapid development of fish farming can cause various ecological problems, including the decline of ecoliteracy among students [32]. Based on this reality, efforts are needed to enhance students' ecoliteracy in the coastal areas of Sidoarjo, Indonesia. One way to achieve this is by using Local culture supplement books. By integrating Local cultural values into these books, students are expected to better understand and appreciate their environment.

In recent years, experts have concentrated heavily on boosting students' ecoliteracy levels. A recent study investigated unique ways for generating procedures and learning materials to attain this goal. Rantung et al. [33] devised an innovative technique for increasing students' ecoliteracy

in language acquisition via song lyrics. Vioreza et al. [34] worked to promote primary school students' ecoliteracy by creating digital learning tools based on Betawi local cuisine. Rubini et al. [35] investigated the design of interactive electronic learning resources to improve students' ecoliteracy in the context of climate change. The proposed research is innovative in that it focuses on the production of Local culture supplement books for fish farming. This strategy seeks to incorporate local knowledge of coastal areas into ecoliteracy education.

Despite much research has been initiated to improve eco-literacy among students, there is still an absence of understanding about how the application of local culture can strengthen ecoliteracy, particularly in coastal areas like Sidoarjo, Indonesia. A large number of past studies focused on innovative learning methods and digital learning tools, with little emphasis placed on the use of additional books based on local culture. Therefore, this article aims to study the usage of supplementary books that integrate local cultural values in improving student eco-literation in coastal areas. A supplementary book is expected to fill the gaps and provide new insights into effective ways to raise environmental awareness through local culture-based education. The proposed research is innovative in that it focuses on the production of Local culture supplement books for fish farming. This strategy seeks to incorporate local knowledge of coastal areas into ecoliteracy education.

The supplement book is designed to include Local cultural values related to fish farming, teaching students about ecological principles associated with the fish farming environment. By using these supplement books, students will develop a greater awareness of the environment while also connecting with their cultural history and local traditions. For example, presenting traditional meals might serve as a starting point for learning about the ecological implications of these items, such as the environmental impact of farming or fishing. Furthermore, knowledge of local culture can assist students grasp the interaction between humans and the environment, and knowing traditional lifestyles can provide insights into economic sustainability in the coastal areas.

THEORETICAL BACKGROUND

1. Ecoliteracy

Ecological knowledge, or ecological literacy, refers to the ability to understand the natural systems that shape life on earth. Ecology is an important and crucial factor for human survival [36]. This concept was popularized by David Orr in the early 1990s and focuses on understanding ecological processes and the interrelationships between humans and environmental systems [37]. Ecological knowledge is important to increase environmental awareness and sustainability. humans need to understand how the earth works and supports life [38]. This theory explains the understanding of how the Earth works which is considered the basis of ecological knowledge [39]. Johns & Pontes [40] and Nurlaili [41] emphasize the importance of integrating ecological knowledge into education to increase awareness of environmental issues.

In 1996, Sobel claimed that, further supported by Gobel in 2022 [42], learning experiences that include students in understanding local and cultural history can serve as a foundation for understanding the larger notion of ecology. Similarly, Mahbud [43] believes that empathy for other living beings and a sense of responsibility for the environmental world are essential components of ecological education, a view supported by Kopnin & Cherniak [44]. Teachers have utilized a range of ways to raise environmental awareness, as claimed by Pitt et al. [45]. One of the most promising strategies is the use of textbooks, which Ramos & Ramos [46] stated are essential tools in the learning-teaching process, a view further supported by Ramos and Ramos [47]. Educators may help children understand ecological principles and develop a lifelong commitment to environmental conservation by providing them with hands-on learning experiences in natural environments.

2. Environmental education

Environmental education seeks to raise knowledge and comprehension of environmental issues, hence encouraging responsible environmental behaviour. Ardoin, Bowers & Gaillard [48] emphasised this goal. According to Dillon [49], environmental education not only conveys information but also develops the attitudes and abilities required to sustain and improve environmental quality. According

to Han [16] and Zhong et al. [17], knowledgeable individuals integrate ecological principles into their daily activities, promoting sustainable living. An environmental approach helps students develop critical thinking and the ability to analyze environmental problems from various points of view [47; 48].

According to Tapia-Fonllem et al. [20], introducing eco-literacy at a primary age allows children to apply their knowledge through engagement with their environment. Environmental education in the primary age is crucial because students tend to absorb information more easily and develop lifelong habits [52]. Educators strive to build more compassionate and responsible environmentalists by teaching kids the importance of environmental care.

3. Local culture

Integrating local culture into education can help students connect with their environment and cultural heritage [50; 51]. Local culture is a collection of knowledge and practices that have evolved throughout time due to environmental adaptation [22; 23]. Vioreza et al. [24] proposed that students' ecoliteracy can be upgraded by incorporating local knowledge into the classroom. To support that, it is true that local cultures are influenced by a rich number of cultural components, such as values, rules and regulations, rituals, and practices passed down through generations. According to ecological pedagogy theory, education that focuses on recognizing and understanding local culture can help students develop a greater sense of responsibility towards their environment [55].

A local culture-based approach allows students to learn in contexts they recognize and experience every day, making learning more relevant and meaningful [53; 54]. Moreover, Yi et al. [58] which was later agreed upon by Tan et al. [53], proposed that embedding local cultural elements into the education system would provide students with a strong sense of self-identity as well as esteem in cultural heritage among the community. Erikson (1968), in his theory of identity development, stated that a thorough understanding of one's cultural identity is important for healthy personal development. Students' involvement in the learning process also increases when they believe that educational material is directly relevant to their lives [59]. According to Reyes-García et al. [28], knowing traditional environmental techniques such as sustainable agriculture and water management can help lead modern environmental solutions.

RESEARCH METHODS

1. Research model

This study employs a quantitative approach, focusing on analyzing numerical data through statistical approaches. According to Sugiyono [60], quantitative research is founded on the positivist ideology and is used to study specific populations or samples. The sampling technique is often random, data gathering is done with research instruments, and data analysis is quantitative or statistical, to test a preset hypothesis. The type of research used is quasi-experimental with a non-equivalent control group design. The experimental group received treatment in the form of a Local culture supplement book from Sidoarjo, while the control group was given a standard fourth-grade student book. The goal was to identify disparities in outcomes between the two groups. This study used a pretest-post-test control group design, which entails conducting studies with a comparison group. The design can be represented as follows:

Table 1

Nonequivalent Control Group Design (Source: [61])

O1	X	O2
O3	C	O4

Explanation:

O1: Pre-test in the experimental group.

O2: Post-test in the experimental group.

X: Treatment in the experimental group (local supplement book from Sidoarjo).

C: Treatment in the control group (student textbook).

O3: Pre-test in the control group.

O4: Post-test in the control group.

2. Participants and data collection

This study's population comprises fourth-grade kids from elementary schools in the coastal area of Sidoarjo. The sample for this study was drawn at random from the population, with no regard for stratification. Thus, three schools were selected as research samples, namely SDN Banjar Kemuning in Sedati District, SDN Gisik Cemandi in Sedati District, and SDN Balongtani in Jabon District, Sidoarjo. The experimental group comprises 29 students from fourth grade at SDN Banjar Kemuning and 27 students from fourth grade at SDN Balongtani, while the control group consists of 30 students from fourth grade at SDN Gisik Cemandi. Data collection in the experimental class used a supplement book that had been developed.



Figure 1 Cover of the book



Figure 2 Part of the typical food of the coastel area



Figure 3 Part of traditional ceremonies in the coastel area



Figure 4 Part of a typical dance in the coastel area

This study's data collection rules include tests and questionnaires. The test consists of 20 multiple-choice questions based on ecoliteracy indicators, which were designed to assess learners' thinking skills in relation to Sidoarjo's Local culture. The learning assessment test is broken into two sections: pre-test and post-test. The ecoliteracy understanding questionnaire is divided into five sections, each with its own set of indicators. Each indicator is intended to assess students' comprehension of Sidoarjo's local knowledge and its relevance to coastal locations.

Table 2

Ecoliteracy Understanding Indicators

No.	Ecoliteracy Aspects	Indicators
1.	Awareness of Coastal Fish Farming Areas	a. Understanding the concept of coastal ecosystems. b. Identifying components of coastal ecosystems. c. Explaining the relationship between local culture and coastal ecosystems.
2.	Connection with Special Foods of Sidoarjo	a. Knowing the special foods of Sidoarjo related to coastal areas. b. Understanding the impact of consuming special foods on the coastal environment.
3.	Occupation of People in Sidoarjo	a. Familiarity with various traditional livelihoods of the Sidoarjo community. b. Understanding the role of livelihoods in preserving coastal areas.
4.	Customs and Traditions of Sidoarjo Community	a. Knowing traditional customs and traditions still practiced. b. Understanding environmental conservation values embedded in customs and traditions.
5.	Traditional Culture of Sidoarjo	a. Recognizing traditional cultures originating from Sidoarjo b. Knowing the role of traditional cultures in educating the community about the environment.w

3. Data analysis

Prior to undertaking data analysis, the research instruments must first be tested for feasibility, which includes validity and reliability. The validity test uses the Pearson product-moment correlation calculation, whereas the reliability test uses the split-half Spearman Brown method. The data will be analyzed using an independent samples t-test with a significance threshold of 5%. Before hypothesis testing, assumptions will be evaluated, including normality with the Shapiro-Wilk test and homogeneity with Levene's test. Furthermore, the N-Gain test will be used to assess students' progress in ecoliteracy comprehension using the formula below.

$$g = \frac{(\text{posttest score} - \text{pretest score})}{(\text{maximum score} - \text{pretest score})}$$

Next, the score of N-Gain is classified into three variations of categories, as below:

Table 3

Classification of N-Gain

Index	Criteria
N-Gain > 0,70	High
0,30 < N-Gain < 0,70	Medium
N-Gain < 0,30	Low

STUDY RESULTS

Before conducting data analysis of the research results, the researcher conducted instrument testing. Instrument testing included validity and reliability tests. The validity test used the Pearson correlation formula with a total of N = 26 students, and a significance level of 5% was set at 0.388. At this stage, the 20 items were considered valid if the calculated r_{calc} was greater than the r_{table} . The results of the validity test are presented below.

Table 4

Results of the Validity Test

No. of Item	rcalc	rtable (5%)	Description
No. 1	0,528	0,388	Valid
No. 3	0,530	0,388	Valid
No. 3	0,599	0,388	Valid
No. 4	0,542	0,388	Valid
No. 5	0,634	0,388	Valid
No. 6	0,439	0,388	Valid
No. 7	0,503	0,388	Valid
No. 8	0,651	0,388	Valid
No. 9	0,795	0,388	Valid
No. 10	0,466	0,388	Valid
No. 11	0,467	0,388	Valid
No. 12	0,708	0,388	Valid
No. 13	0,498	0,388	Valid
No. 14	0,661	0,388	Valid
No. 15	0,599	0,388	Valid
No. 16	0,646	0,388	Valid
No. 17	0,630	0,388	Valid
No. 18	0,645	0,388	Valid
No. 19	0,599	0,388	Valid
No. 20	0,481	0,388	Valid

Based on the above-mentioned validity test results, all 20 items indicating ecoliteracy understanding are valid as the result of the rcalc exceeds the rtable.

Reliability testing was performed to assess whether the device is reliable enough for use as a data gathering tool. The researcher used the Spearman-Brown formula to assess the reliability of the pretest questions, which is appropriate for assessing the reliability of multiple-choice questions. The following are the findings of the reliability test:

Table 5

Reliability Test

Cronbach's Alpha	Part 1	Value	,795
		N of Items	10a
	Part 2	Value	,830
		N of Items	10b
	Total N of Items		20
Correlation Between Forms			,768
Spearman-Brown Coefficient	Equal Length		,869
	Unequal Length		,869
Guttman Split-Half Coefficient			,868

Based on the table above, the results obtained from the reliability test of the ecoliteracy understanding instrument show a reliability coefficient of 0.869. Referring to the clarification table of reliability coefficients according to Ruseffendi [62], it is known that the reliability test results of the

instrument indicate a very high-reliability level with criteria of $0.80 \leq 0.869 \leq 1.00$. Therefore, this instrument can be used in the research.

Research implementation phase follows. In this phase, the researcher executes actions based on the previously planned design. According to the research design, the researcher conducts a study using a non-equivalent control group design, where the experimental class receives treatment with the Local culture supplement book from Sidoarjo, and the control class serves as a comparative group receiving treatment with the standard student textbook used in fourth-grade learning. After conducting the research, the next step is to analyze the research data.

Assumption testing is performed to assess normality using the Kolmogorov-Smirnov test and homogeneity using the Levene test. The normality test aims to determine whether the data distribution used in the research is normal or not. The research data consists of the results of students' ecoliteracy understanding tests. The normality test used in this study is the Shapiro-Wilk test. The data distribution is considered normal if the significance result is greater than 0.05 [62]. The results of the normality test are presented as follows:

Table 6

Results on the Normality Test

Group	Data	Sig. Value	Level	Description
SDN Banjar Kemuning (Experiment)	Pretest	0,128	0,05	Normal
	Posttest	0,143	0,05	Normal
SDN Balongtani (Experiment)	Pretest	0,068	0,05	Normal
	Posttest	0,176	0,05	Normal
SDN Gisik Cemandi (Control)	Pretest	0,109	0,05	Normal
	Posttest	0,061	0,05	Normal

According to the table above, the normality test results using the Shapiro-Wilk formula show a normal distribution. This is because every data had a significance ratio comparison value greater than 0.05.

Homogeneity testing is used to determine the similarity of several sample sections. The Levene test is used to determine data homogeneity. Samples are considered homogenous if the probability is greater than 0.05, and non-homogeneous if the probability is less than 0.05. The following are the findings of the homogeneity test:

Table 7

Homogeneity Test

Data	Sig. Value	Description
Pretest	0,939	homogenous
Posttest	0,929	homogenous

According to the table above, the pretest's significance value is 0.939, while the posttest's is 0.929. If the significance value is less than 0.05, the data group variance is not homogeneous. If the significance value is greater than 0.05, the data group variance is homogeneous. Based on the pretest and posttest data shown above, all variables had homogeneous data variance.

Once the data has been determined to be normal and homogeneous, hypothesis testing is carried out to address the research problem and hypotheses given in this paper. The hypothesis testing approach utilized in this study is the independent samples t-test formula. The t-test is required to examine the level of significance of each independent variable's influence on the dependent variable in a partial manner.

Table 8

Independent Samples T-Test

Variable	t calculated	Df	Sig. (2-tailed)	Description
Ecoliteracy Awareness	8,486	84	0,000	Significant Value arises

Based on the data in the table, the Independent Sample t-test yielded a two-tailed significance (sig. 2-tailed) of 0.000 and a calculated t-value (t-value) of 8.486. The crucial t-value (t-table) for degrees of freedom (df) 84 at 5% significance is 1.663.

The hypothesis test using the independent samples t-test yields a significance value of 0.000 < 0.05 and an estimated t-value of 8.486, which exceeds the crucial t-value of 1.663. As a result, it can be determined that Sidoarjo's region-specific supplement book proves effective in raising students' ecoliteracy understanding, showing a substantial difference in scores between the control and experimental groups. The study in question used only one treatment, which was Local culture supplement book from Sidoarjo.

Table 9

Research Results Data

Group	Average Score		N-Gain	Criteria
	Pretest	Posttest		
SDN Banjar Kemuning (experiment)	66,4	83,6	0,57	Medium
SDN Balongtani (experiment)	64,6	84,1	0,59	Medium
SDN Gisik Cemandi (control)	66	74,7	0,27	Low

According to the table above, the average N-Gain values at SDN Banjar Kemuning (experimental class) are 0.57, which is considered moderate, while in SDN Balongtani (experimental class), the average N-Gain is 0.59, which is likewise classified as moderate. In contrast, SDN Gisik Cemandi (control class) has an average N-Gain of 0.27, which is considered poor. Based on the average pretest and posttest scores, the experimental classes outperformed the control class. As a result, the Local culture supplement book from Sidoarjo is successful in increasing students' ecoliteracy in coastal areas.

Table 10

Questionnaire on Students' Ecoliteracy Understanding

No.	Observation Aspects	Score		Percentage	
		Yes	No	Yes	No
1	I understand the content about the coastal ecosystem in the Supplement Book "Local Culture of Sidoarjo".	52	4	92,9%	7,1%
2	I am interested in identifying and learning about the components of the coastal ecosystem.	48	8	85,7%	14,3%
3	I can rewrite the content about the coastal areas.	45	11	80,4%	19,6%
4	I can identify the typical foods of Sidoarjo found in the coastal areas.	54	2	96,4%	3,6%
5	I know that the coastal area is influenced by typical foods of Sidoarjo.	50	6	89,3%	10,7%
6	I can explain that typical foods of Sidoarjo can serve as environmentally friendly practices.	49	7	87,5%	12,5%
7	I can mention the traditional livelihoods of the community in Sidoarjo.	52	4	92,9%	7,1%
8	I understand traditional livelihoods in Sidoarjo can contribute to coastal areas' conservation.	46	10	82,1%	17,9%

9	I am familiar with several traditional customs still practiced by the community in Sidoarjo.	49	7	87,5%	12,5%
10	I can identify traditional customs that reflect an awareness of the importance of preserving the coastal ecosystem.	48	8	85,7%	14,3%
11	I am not sure that traditional customs are still relevant in current efforts to preserve the environment.	15	41	26,8%	73,2%
12	I know various types of traditional arts that are still preserved by the community in Sidoarjo.	50	6	89,3%	10,7%
13	I understand that traditional arts can emphasize the importance of preserving the coastal ecosystem.	46	10	82,1%	17,9%
14	I am unsure if traditional arts in Sidoarjo can convey a message to young generations about preserving the environment.	12	44	21,4%	78,6%
Percentage of Average Score				78,6%	21,4%

Based on the data table above, students' responses regarding their understanding of the coastal areas have shown a positive trend. According to the questionnaire results, 78.6% of students agreed, while 21.4% of them disagreed with the statements related to their comprehension. This indicates that the supplemental book «Local Culture of Sidoarjo» provides a good learning experience and is well understood by the students.

DISCUSSION

Environmental education is crucial for students, starting from a young age, to maintain environmental balance [63]. This aligns with Bowker's statement that scientific communities recognize lifelong science literacy and respect for nature, which are based on values and attitudes developed in early learning, typically between the ages of three and seven [64]. Instilling environmental awareness early on helps build character in children that lasts into adulthood, making them more sensitive to their surroundings, including the natural environment where they live. Addressing environmental issues caused by humans in the future can be prevented.

Introducing ecoliteracy to young children can be achieved through school-based learning. Research indicates that school policies, curriculum implementation, school culture, and infrastructure management have a positive impact on students' ecological literacy [65]. Providing ecoliteracy understanding to elementary school students is a solution to these problems. Environmental damage caused by humans. Understanding ecoliteracy for students is a necessity based on the principle of allowing students to learn happily.

Teaching materials need to be developed and organized properly to ensure that learning does not deviate from the intended goals. Designing learning materials as materials that can be presented and used in the learning process. Well-designed learning materials will facilitate students in learning. Learning is the activity of developing learning materials. The development of learning materials aims to further increase effectiveness and efficiency. The effectiveness of learning is seen from the learning outcomes achieved [63; 64]. The design form of the Local culture supplement book of Sidoarjo is made in the form of an interesting picture storybook to be read by students. The components of the book consist of typical Indramayu food, customs in Sidoarjo, traditional arts in Sidoarjo, and livelihoods of the community of Sidoarjo and are equipped with exercise questions.

In the complexity of today's life problems, environmental problems provide a foundation for students to respond positively to them. This attitude will guide students to have ecological morals, which provide a picture of themselves by their true self (real self). Attitude is not a static form, but always develops dynamically and is influenced by various factors. For this reason, attitudes related to environmental morality need to be formed continuously so that awareness and concern for the environment are formed [68]. Ecological awareness must be an important part of achieving educational goals. Education must be able to build educated people who have character and awareness of the environment [69].

Improving students' ecoliteracy through Local culture supplements shows that integrating local knowledge into formal education curricula can enhance environmental learning effectiveness [67; 68]. This supplement book not only provides new information, but also serves as a tool for students to strengthen their cultural identity and environment [72]. Local culture used in the supplement book gives a real-world context for students to connect theory and practice. This is consistent with the constructivist perspective, which points out the importance of context and experience in learning. Students can better understand abstract concepts and apply them in their daily lives if they use real-world examples from their own community. Furthermore, this strategy encourages the creation of sustainable education that takes consideration of environmental, economic, and social concerns. Understanding and valuing Local culture informs students about the environment, as well as the significance of sustainability and ecological balance..

CONCLUSION

This study shows that regionally produced Local culture supplements improve students' ecoliteracy in coastal areas. This has been shown by higher average scores and N-Gain values in the experimental classes compared to the control group. The hypothesis test employing the independent sample t-test formula yielded a significance value of $0.000 < 0.05$ and a t-value greater than the t-table ($8.486 > 1.663$). The use of this supplement book not only improves students' environmental understanding, but also inspires them to be more loving and responsible for the ecosystems that surround them. Integrating local culture into formal education can serve as an effective framework for environmental education in many other local contexts.

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