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The Effect Of Utilizing The Natural Environment Of Kerinci Seblat National Park As A Science Learning Resource On Ecological Literacy And Environmental Awareness Of Elementary School Students

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Abstract

This research is motivated by the low ecological literacy and environmental awareness of elementary school students due to science learning that is still centered on textbooks and does not utilize the surrounding natural environment. This study aims to analyze the effect of using the natural environment of Kerinci Seblat National Park (TNKS) as a science learning resource on improving ecological literacy and environmental awareness of elementary school students, both partially and simultaneously. The study used a quantitative approach with a quasi-experimental method, conducted at SD Alam Muara Bungo in December 2025. The sample consisted of 48 fifth-grade students divided into an experimental class (n = 23) and a control class (n = 25). Data analysis included normality tests, homogeneity tests, independent sample t-tests, and MANOVA. The results showed that natural environment-based learning had a positive and significant effect on environmental awareness (t = 3.446; Sig. = 0.001; p < 0.05) and ecological literacy (t = 2.555; Sig. = 0.014; p < 0.05). Simultaneously, the MANOVA test showed a Pillai's Trace value of 0.309; F = 10.062; Sig. = 0.000 (p < 0.05). It was concluded that using the natural environment of TNKS as a science learning resource effectively increased ecological literacy and environmental awareness of

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elementary school students.

Keywords: National Parks. Science Learning Resources. Ecological Literacy. Environmental Awareness. Elementary School Students .

INTRODUCTION

Science education at the elementary school level plays a crucial role in developing students' scientific thinking skills and ecological awareness from an early age. The Indonesian government, through the Independent Curriculum (Curriculum Merdeka), strives to create learning that focuses on developing students' competencies and character holistically (Rasyid et al., 2024). Elementary school students are in the concrete operational stage, as proposed by Piaget, where children aged 7–11 understand concepts through direct experience and interaction with their environment (Suparno, 2020). Therefore, science learning in elementary schools must be contextual and oriented toward real-life experiences.

Elementary school students possess strong ecological literacy skills, namely an understanding of the interrelationship between humans and their environment and the ability to make environmentally friendly decisions (Utaya & Bachri, 2022). Furthermore, environmental awareness should be an integrated part of science learning to foster a caring attitude toward environmental sustainability (Mustofa, 2023). However, initial observations at Muara Bungo Natural Elementary School revealed that students' levels of ecological literacy and environmental awareness were still relatively low. Many students lacked a grasp of basic ecosystem concepts, and most teachers still employed a conventional, textbook-centered approach.

PISA 2022 data reinforces these concerns, with Indonesia's science literacy score reaching only 408, ranking Indonesia 70th out of 80 participating countries (OECD, 2023), far below the OECD average. One contributing factor is the lack of experiential learning and real-life contexts. One potentially valuable learning resource is Kerinci Seblat National Park (TNKS), a conservation area rich in biodiversity and natural ecosystems that serves as a natural laboratory for students.

Research by Kosta et al. (2022) shows that an outdoor activity-based environmental education program has a positive impact on students' ecological knowledge and connection to nature. Theoretically, John Dewey's principle of learning by doing and Piaget's constructivism theory support the idea that meaningful knowledge is built through direct interaction with the real environment (Husamah et al., 2025). This study aims to analyze the effect of utilizing the natural environment of the National Parks of West Nusa Tenggara (TNKS) as a science learning

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resource on improving ecological literacy and environmental awareness in elementary school students, both partially and simultaneously.

Based on the overall description, it can be concluded that utilizing the natural environment of Kerinci Seblat National Park as a science learning resource is highly relevant and strategic in efforts to improve ecological literacy and environmental awareness of elementary school students. The Kerinci Seblat National Park environment not only provides a rich and authentic learning resource but also serves as a vehicle for instilling the values of conservation, cooperation, and social responsibility. By integrating science learning into a natural context, students are expected to be able to connect theory with reality, think scientifically, and develop 21st-century skills.

Therefore, this research is crucial to assess how the natural environment of Kerinci Seblat National Park can be effectively utilized in science learning, and to what extent these activities can improve ecological literacy and environmental awareness among elementary school students. The results of this study are expected to serve as a reference for teachers, schools, and related parties in developing innovative, sustainable, and environmentally-based learning models that align with national education goals.

THEORETICAL FRAMEWORK

Ecological Literacy.

Ecological literacy, or ecoliteracy, is a concept that combines ecological knowledge, environmental awareness, attitudes, and concrete actions to maintain the sustainability of life. According to Capra (in Utaya & Bachri, 2022), ecological literacy is the ability to understand the basic principles of living systems and apply them in everyday behavior so that humans can live in harmony with nature. Toharuddin (2019) defines it as an individual's ability to read, understand, and respond to the ecological conditions around them, encompassing cognitive, affective, and psychomotor aspects.

The scope of ecological literacy includes six aspects (Faediyah et al., 2024): (1) Ecological Knowledge, namely understanding the concepts of ecosystems, food chains, and biodiversity; (2) Environmental Awareness and Perception, including recognition of local and global environmental problems; (3) Environmental Attitudes and Values, including the formation of positive attitudes and ecological responsibility; (4) Ecological Skills, namely the ability to analyze problems and make decisions based on sustainability; (5) Environmentally Friendly Behavior, in the form of concrete actions such as waste management and energy conservation; and (6) Systemic Thinking, namely

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the ability to understand the interrelationships between ecosystem components.

Environmental Awareness.

Environmental awareness is defined by Kokkinen (2013) as a state of awareness, knowledge about the environment, and a tendency to influence the development and behavior of others. Potabenko (2014) calls it an individual's ability to recognize the relationship between human activities and the surrounding environmental conditions. Three main factors that influence environmental awareness are: (1) Motivation, namely the drive to improve the environment based on values and attitudes; (2) Environmental Knowledge, in the form of recognition of environmental facts and principles; and (3) Skills, namely the ability to act in an environmentally friendly manner in various areas of life (Kokkinen, 2013; Harju-Autti, 2013).

According to Emil Salim (Neolaka, 2018), environmental awareness is an effort to raise awareness so that people not only know about waste, pollution, reforestation, and the protection of endangered species, but more than that, raise the environmental awareness of the Indonesian people, so that they love a just, prosperous, and intact and sustainable homeland. Furthermore, it is said that this environmental awareness encourages humans to live in harmony with nature. Based on the definition explained above, it can be concluded that environmental awareness is a state of awareness in individuals to carry out actions in an environmentally friendly manner. A high level of environmental awareness allows individuals to make conscious choices when acting in an environmentally friendly manner (Olgyaiova, 2015).

Utilization of the Natural Environment as a Learning Resource.

Learning resources include all forms of sources, including data, people, and objects, that can facilitate student learning (AECT, in Kherid, 2018). The natural environment is one of the richest and most diverse learning resources because it provides a contextual and authentic learning context. Utilizing the environment as a learning resource aligns with the principles of Contextual Teaching and Learning (CTL), which relates subject matter to real-world situations to make learning meaningful.

The theoretical foundation of nature-based learning rests on constructivist theory. Piaget (in Husamah et al., 2025) asserted that meaningful learning occurs when students are directly involved in the process of discovering and constructing knowledge based on concrete experiences. Vygotsky (in Slavin, 2011) emphasized the importance of social interaction and the real environment in knowledge development. The place-based education model developed by Sobel

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(2018) is a relevant learning approach because it places the local environment as the primary learning resource and has been shown to increase students' ecological understanding and concern for the environment.

RESEARCH METHODS

Study This use approach quantitative with method experiment quasi- experiment with Pretest- Posttest Control Group Design . Variables free is learning based environment natural around (utilization of TNKS as source learning science), whereas variables bound is ecological literacy and environmental awareness of students .

Study held at Muara Bungo Natural Elementary School, Jalan Katik Marajo RT.15/RW.05, Sungai Mengkuang , District Rimbo Tengah, Bungo Regency , Jambi Province , in December 2025. School This chosen Because apply learning based environment and location near with TNKS area . Population is all over student Class V (N = 48), which is divided become class experiment (n = 23) and class control (n = 25) via purposive sampling technique .

Data collection using two instruments : (1) test objective (24 questions) choice double) for measuring ecological literacy based on six indicators — understanding principle base ecology , thinking systemic , awareness impact behavior human , attitude care environment , taking decision based sustainability , and behavior friendly environment ; and (2) questionnaires Likert scale (16 items , scale 1–4) for measuring environmental awareness through four dimension : consciousness to problem environment , attitude care and empathy , desire For involved , and behavior environment .

The instrument's validity was tested through expert assessment (content validity) and Pearson Product Moment correlation (empirical validity, r-table = 0.632). All 24 test items and 16 questionnaire items were declared valid (r-count > r-table). Reliability was measured using Cronbach's Alpha: ecological literacy $\alpha = 0.955$ and environmental awareness $\alpha = 0.964$, both in the very high category.

Data analysis included: (1) prerequisite tests (Shapiro–Wilk normality test and Levene homogeneity test); (2) Independent Sample t-Test to test partial effects; and (3) Multivariate Analysis of Variance (MANOVA) to test simultaneous effects. All analyses were conducted using the SPSS application.

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RESULTS AND DISCUSSION

Data Description

This research was conducted at SD Alam Muara Bungo, an elementary school characterized by nature-based learning and the environment as part of its educational approach. The selection of this research location was based on the alignment of the school's vision with the research objectives: utilizing the natural environment as a learning resource to improve ecological literacy and environmental awareness in elementary school students.

Table 1 Descriptive Statistics of Ecological Literacy Test Results

Group	N	Min	Max	Average	Standard Deviation
Control Class	25	41.70	95.80	70.51	14.52
Experimental Class	23	50.00	100.00	80.98	13.81

Source: Primary data, 2025.

The experimental class showed a higher mean *ecological literacy score* (80.98) than the control class (70.51), indicating that natural environment-based learning provided a richer and more meaningful learning experience for students. The relatively more controlled distribution of scores in the experimental class (SD = 13.81 vs. 14.52) also indicated better uniformity of achievement.

Table 2 Descriptive Statistics of Environmental Awareness Questionnaire Results

Group	N	Min	Max	Average	Standard Deviation
Control Class	25	23.00	63.00	42.80	11.65
Experimental Class	23	32.00	64.00	53.61	9.92

Source: Primary data, 2025.

The experimental class also showed a higher average *environmental awareness (53.61) compared to the control class (42.80), reflecting the positive impact of direct interaction with the natural environment in fostering students' ecological concern and awareness.*

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Prerequisite Analysis Test

The Shapiro–Wilk normality test on the ecological literacy data showed that the data were normally distributed in both classes (control class: Sig. = 0.418; experimental class: Sig. = 0.363), both above 0.05. In the environmental awareness data, the control class was normally distributed (Sig. = 0.188), while the experimental class was not normally distributed (Sig. = 0.011). However , the homogeneity test Levene show variance second group homogeneous , good for ecological literacy (Sig. = 0.941) and environmental awareness (Sig. = 0.324). Considering size adequate sampling and homogeneity variance fulfilled , analysis parametric Independent Sample t-Test fixed can applied .

Hypothesis Testing

Hypothesis testing was conducted to determine the effect of environmental education on environmental awareness in elementary school students. This hypothesis testing used an independent two-sample t-test. The results of the hypothesis testing are presented in Tables 3 and 4.

Table 3 Independent Sample t-Test Results

Variables	t count	df	Sig.	Average Difference	IK 95%
Ecological Literacy	-2,555	46	0.014	-10.47	[-18.72; -2.22]
Environmental Awareness	-3,446	46	0.001	-10.81	[-17.12; -4.49]

Source: Primary data processed using SPSS, 2025.

Based on the t-test results, natural environment-based learning has a significant effect on *ecological literacy* (t = -2.555; Sig. = 0.014 < 0.05) and *environmental awareness* (t = -3.446; Sig. = 0.001 < 0.05). Both H_0 are rejected and H_1 is accepted, which means there is a significant positive influence on both variables. The mean difference value of *ecological literacy* is -10.47 and *environmental awareness* is -10.81, with a 95% confidence interval that does not exceed zero, further strengthening this conclusion.

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Table 4 MANOVA Test Results: Simultaneous Effect on Ecological Literacy and Environmental Awareness

Multivariate Statistics	Mark	F	Df	Sig.
Pillai's Trace	0.309	10,062	2; 45	0,000
Wilks' Lambda	0.691	10,062	2; 45	0,000
Hotelling's Trace	0.447	10,062	2; 45	0,000
Roy's Largest Root	0.447	10,062	2; 45	0,000

Source: Primary data processed using SPSS, 2025.

The MANOVA test results show that learning about the natural environment has a significant influence simultaneously on both variables (*Pillai's Trace* = 0.309; F = 10.062; df = 2; 45; Sig. = 0.000 < 0.05). Consistency across all multivariate statistics confirms the reliability of these findings.

DISCUSSION

The results of the study show that learning that utilizes the natural environment as a science learning resource has a significant impact on improving elementary school students' ecological literacy. Quantitatively, the average (mean) ecological literacy score for students in the experimental class was 80.98, while in the control class it was 70.51. The difference in the averages reinforced by the results of the independent t-test which shows mark significance of 0.014 (<0.05) with a mean difference of 10.47. Findings This indicates that students who follow learning based environment natural own higher levels of ecological literacy tall compared to students who follow learning conventional .

The results of the study also showed that learning about the natural environment had a positive and significant influence on elementary school students' environmental awareness. Quantitatively, the average environmental awareness score for students in the experimental class was 53.61, while in the control class it was 42.80. Statistical test results using Independent Sample t-Test shows mark significance of 0.001 (< 0.05) with a mean difference of 10.81, which indicates existence significant difference between second class .

Findings that learning based environment natural improve ecological literacy significant in line with research by Kosta et al. (2022), which concluded that the education program

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environment based activity outside room influential positive to understanding ecology and connectivity student with nature . Theoretically, this is supported by Orr, who states that ecological literacy cannot be developed solely through classroom learning but must involve direct experience with nature, and by Capra, who emphasizes that ecological literacy demands a holistic understanding of life systems that is more effectively achieved through direct interaction with the natural environment (in Faediyah et al., 2024).

Improvement significant impact on environmental awareness is also supported by research previous . Hungerford and Volk (in Mustofa, 2023) stated that awareness environment develop optimally when participant educate involved direct in learning that is experience and reflection . Tilbury emphasized that education effective environment must put student as subject active in understand , feel , and respond condition surrounding environment . Involvement student in observe ecosystem , getting to know flora and fauna, and experience activity conservation in TNKS in general direct stimulate awareness , empathy , and motivation they For guard environment .

Influence significant simultaneous effects on both variables , as shown MANOVA results , support UNESCO's framework on Education for Sustainable Development which advocates integration knowledge , attitudes , and actions in One unity learning (in Rannikmae , 2019). Capra more carry on state that understanding good ecology push awareness and responsibility answer individual to environment , while Palmer emphasized that experience directly in nature is foundation important building ecological literacy and environmental awareness since age early . This is also in line with with Sudjana (2019) who is of the opinion that outdoor learning class give experience richer learning because student can see , hear , feel , and interact direct with object learning .

These findings align with various studies that suggest that ecological literacy and environmental awareness are interrelated and mutually reinforcing. UNESCO emphasizes that education for sustainable development must integrate knowledge, attitudes, and actions within a single learning environment. Rickinson's research also demonstrates that outdoor learning can enhance ecological understanding and foster positive attitudes toward the environment.

Theoretically, Capra states that a sound ecological understanding will foster individual awareness and responsibility for the environment. Meanwhile, Palmer emphasizes that direct experience in nature is a crucial foundation for developing ecological literacy and environmental awareness from an early age. Therefore, learning about the natural environment has proven effective in simultaneously improving ecological literacy and environmental awareness in

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elementary school students.

CONCLUSION

Based on the research results and discussion, it can be concluded that the use of the natural environment of Kerinci Seblat National Park as a source for learning science has been proven to: (1) have a positive and significant influence on the ecological literacy of elementary school students (t = -2.555; Sig. = 0.014); (2) have a positive and significant influence on the ecological literacy of elementary school students (t = -2.555; Sig. = 0.014); positive and significant towards students' environmental awareness school basis (t = -3.446; Sig. = 0.001); and (3) has an effect positive and significant in a way simultaneous to second variables (Pillai's Trace = 0.309; F = 10.062; Sig. = 0.000). Students who took the learning based environment natural show understanding ecological and caring a better environment Good compared to students who follow learning conventional .

Environment nature of TNKS is proven provide source rich, authentic , and contextual learning , which supports achievement objective science learning in schools base optimally . It is recommended that teachers be more optimize utilization environment natural around as source learning science; party school develop policies and programs that support learning based environment ; and study furthermore expand variables , subjects , and approaches learning For more results comprehensive .

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