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Elevating Environmental Literacy via Inquiry-Based Science Learning Strategies in University-Level Pedagogy

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Abstract. This study aims to test the effectiveness of inquiry-based science learning strategies in elevating students' environmental literacy compared to conventional learning strategies. The pretest-posttest control group is the chosen research design design, involving 60 students divided into an experimental group and a control group, each consisting of 30 students. Data were collected through environmental literacy tests, affective assessment using ELSA questionnaire (environmental literacy scale for adults), and skill assessment rubrics. Data analysis was conducted using SPSS software version 31 through normality tests, homogeneity tests, and paired t-tests. The results showed that both groups experienced significant improvements, but the experimental group demonstrated higher achievements after the intervention in all aspects. N-gain score of the experimental group was 0.64 compared to the control group at 0.35. The average posttest score of experimental group was 83.90 and control group was 70.47. The affective score of experimental group was 87.20 and control group was 85.17. The skills score of experimental group reached 85.53, control group was 76.96. The integrated environmental literacy score calculated from knowledge, affective, and skill aspects, was 85.53 for experimental group and 76.96 for control group, shows that experimental group was more dominant in "very high" and 'high' categories, while control group was distributed across "very high," "high," and "moderate" categories. These results shows that inquiry-based science learning strategies are effective in elevating students' environmental literacy.
Keywords: Environmental literacy, inquiry-based science learning strategies, higher education

Introduction

Global environmental issues such as pollution, energy crises, and climate change require a generation with high environmental literacy. Environmental literacy is a structure of environmental-related abilities consisting of knowledge (cognitive), affective (attitude), and skill (psychomotor) aspects (Maurer & Bogner, 2020). In detail, environmental literacy not only involves mastering knowledge but also includes

caring attitudes, the ability to make decisions based on sustainability, and critical thinking skills. Various studies indicate that students' environmental literacy remains at a moderate category, as found in the study by Irawati et al. (2023), which revealed that the environmental literacy of students at the FKIP, Ahmad Dahlan University, is at a moderate level. The results of a study by Nasution (2021), which analyzed the environmental literacy levels of FKIP students at Mulawarman University, showed that they were also in the moderate category. Furthermore, it was found that the environmental literacy of science teachers about to be was in the moderate category based on the results of a study by Yusup (2021). Based on these study results, innovative learning strategies are needed to improve students' environmental literacy, particularly for prospective teachers, as they serve as facilitators of 21st-century skills and contributors to global sustainability. They will also produce students who are not only academically intelligent but also possess attitudes and behaviors that support positive contributions to environmental development and conservation (Damayanti et al., 2025). An individual's level of environmental literacy, including prospective teachers, influences their actions/ behavior toward the environment (Kuruppuarachchi et al., 2021). According to Ogunyemi & Ifegbesan (2022), while there is a sufficient foundation to promote environmental literacy, direct involvement of prospective teachers in environmental issues is also highly necessary.

Inquiry-based science learning is one of the learning strategies that can facilitate students in solving problems by finding solutions (Ong et al., 2020). This learning strategy is student-centered because it provides direct learning experiences, trains students to investigate issues related to science material, especially on topics related to the environment (Maknun, 2020). Several previous studies have confirmed the effectiveness of inquiry-based science learning in improving science learning outcomes, scientific skills, and environmental awareness (Iskandar, 2025; Aslamia et al., 2025; Muthalib et al., 2024).

However, research emphasizing learning strategies that directly aim to develop environmental literacy is still limited. This is in line with the opinion of Kidman & Casinader (2019), who stated that few studies have paid attention to optimizing the application of pedagogical strategies to develop environmental literacy. According to Telešienė et al. (2021), research related to pedagogical approaches and curriculum interventions to develop environmental literacy is still rare, even though these interventions play a crucial role in the student learning process. In addition, Perez et al. (2025) argue that the integration of discovery-based learning strategies in higher education, especially related to environmental literacy, is still rarely explored. Those gap serves as the basis for this research, which aims to investigate the effectiveness of inquiry-based science learning strategies in elevating students' environmental literacy, particularly among prospective teachers in education faculties.

Thus, this study aims to explore the extent to which the application of inquiry-based science learning strategies can improve students' environmental literacy, including knowledge, affective, and skills. The results of this study are expected to provide practical contributions in designing more effective environmental education to produce a generation that is ready to face global environmental challenges.

Methods

This study was conducted at the Science Education Study Program, Faculty of Teacher Training and Education, University of Jember, with 60 of 4th semester students taking the environmental education (EE) course separated into experimental and control groups, each consisting of 30 students. The research respondents were selected using purposive sampling, with the specific criterion of having taken the

environmental science (ES) course in the third semester. This study is a quantitative research using quasi experimental method, and pretest-posttest control group design, which compares the experimental group (intervention recipient) and the control group (not a recipient of intervention) by conducting a pretest (before the intervention) and a posttest (after the intervention) on both groups. The aim is to examine the cause and effect of an intervention by comparing changes between pretest and posttest in the experimental and control groups (Winarni, 2021). A directionality of the research, meaning the ability to directly compare the effects of an intervention on the sample groups is the advantage of pretest-posttest control group design (Stratton, 2019). In this study, the intervention took the form of applying inquiry-based science learning strategies to experimental group and conventional learning strategies to control group.

Table 1. Pretest posttest control group design

Samples	Initial conditions	Intervention	Final conditions
Experiment	O_1	X	O_2
Control	O_3	-	O_4

Remark:
O_1 : Pretest score of E group
O_2 : Posttest score of E group
O_3 : Pretest score of C group
O_4 : Posttest score of C group
X : Intervention (inquiry-based science learning strategies)
- : Non intervention (conventional learning strategies)

The comprehensive implementation process is shown in Figure 1.

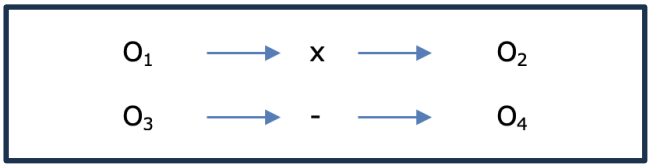

Figure 1. Research framework

The research procedure for the experimental group was inquiry-based science learning with stages of environmental problem orientation, hypothesis formulation, field investigation, data analysis, and presentation of results. The control group was given conventional learning based on lectures, discussions, and question and answer sessions.

The quantitative data collection instruments consisted of: 1) an environmental literacy test in the form of a pretest and posttest (knowledge scores); 2) an affective questionnaire (affective scores); and 3) a project assessment rubric (skills scores). The pretest and posttest data were analyzed statistically using SPSS software version 31, which included the Shapiro-Wilk normality test (per group < 50 samples), homogeneity test, and paired sample t test. The Shapiro-Wilk normality test aims to determine whether the collected data is normally distributed, indicated by a significance level (Sig.) > 0.05, while the homogeneity test is used to determine whether the variances between data groups are the same, indicated by a significance level (Sig.) > 0.05 (Nurhaswinda et al., 2025). Data that is normally distributed and has homogeneous variance is a requirement that must be met before conducting the paired sample t test. Through the paired sample t test, researchers can determine

whether the differences observed between two related samples are statistically significant (Nurba'id et al., 2024). sample yang berhubungan signifikan secara statistik (Nurba'id et al., 2024).

After statistical testing, an N-gain test was conducted to determine the effectiveness of the intervention based on a comparison of the proportional increase in pretest–posttest scores against the maximum potential that could be achieved in each group. The N-gain score increase categories can be seen in Table 2 and the determination of effectiveness levels in Table 3. Affective scores were obtained from an affective questionnaire, and skill scores were obtained through a project assessment rubric; both used a 1–5 Likert scale scoring technique. After obtaining the knowledge, affective, and skill data for each group, the next step was to calculate the scores to determine the environmental literacy categories for the experimental and control groups, as shown in Table 4.

N-gain formula:

$$\text{N-gain} = \left(\frac{\text{Spost - Spre}}{\text{Smax - Spre}}\right) \times 100 \quad (1)$$

Remark:

g : N-gain scores
Spre : Pretest score
Spost : Posttest score
Smax : Maximum score

Table 2. Categories of N-gain scores

Scores	Categories
0.70 ≤ g ≤ 100	High
0.30 ≤ g < 0.70	Medium
0.00 < g < 0.30	Low
g = 0.00	No increase
-1.00 ≤ g < 0.00	Decrease

(Source: Sukarelawan et al., 2024)

Table 3. Categories of effectiveness levels

Effectiveness levels (%)	Categories
<40	Ineffective
40-55	Less effective
56-75	Moderately effective
>76	Effective

(Source: Sukarelawan et al., 2024)

Formula of affective score:

$$\text{Sa} = \left(\frac{\sum \text{Score}}{\text{Mscore}}\right) \times 100 \quad (2)$$

Remark:

Sa : Affective score
∑Score : Total score
Mscore : Maximum score

Formula of skills score:

$$Ss = \left(\frac{\sum Score}{Mscore}\right) \times 100 \quad (3)$$

Remark:
Ss : Skills score
∑Score : Total score
Mscore : Maximum score

Formula of environmental literacy score:

$$Se = \left(\frac{Sc + Sa + Ss}{3}\right) \quad (4)$$

Remark:
Se : Environmental literacy score
Sc : Cognitive score (posttest)
Sa : Affective score
Ss : Skills score

Table 4. Categories of environmental literacy

Scores	Categories
85-100	Very High
70-84	High
55-69	Moderate
40-54	Low
≤39	Very Low

(Source: Anggela & Rina, 2025)

Results and Discussion

The application of inquiry-based science learning strategies as a form of intervention in the experimental group is in line with the pedagogical level of students because it facilitates a deeper understanding of scientific topics and principles among students, particularly in relation to real-world challenges. This aligns with Kotsis (2024), who states that inquiry-based science learning creates a dynamic and participatory learning environment where students are given the opportunity to take control of their education and cultivate a lifelong love of learning through the integration of discovery, curiosity, and real-world applications. Data analysis was conducted to assess science literacy skills between the experimental and control groups using a pretest-posttest control group design.

Statistical data analysis was conducted sequentially, starting with the Shapiro-Wilk normality test, homogeneity test, and paired sample t-test using SPSS software version 31, followed by the N-gain test, calculation of affective scores, skills scores, and finally the calculation of environmental literacy scores to determine the environmental literacy categories of the experimental and control groups. In detail, the results accompanied by discussion are described as follows.

Shapiro-Wilk Normality Test

Performing a normality test on the data is the first step in determining the use of pretest-posttest scores of the experimental and control groups as representative scores or not. If they can be used, then the pretest and posttest scores are compared using a parametric test (Mishra et al., 2019). Since the number of samples per group

is less than 50, the Shapiro-Wilk test is more suitable to apply. The results of the Shapiro-Wilk normality test for the pretest and posttest scores of the experimental and control groups are shown in Table 5.

Table 5. Result of Shapiro-Wilk normality test

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	df	Sig.	Statistic	df	Sig.
Result	Pretest A (Experimental)	.099	30	.200*	.977	30	.738
	Posttest A (Experimental)	.157	30	.058	.932	30	.056
	Pretest B (Control)	.111	30	.200*	.947	30	.139
	Posttest B (Control)	.063	30	.200*	.988	30	.975

Based on Table 5, the significance (Sig.) of pretest A (experimental) is 0.738, posttest A (experimental) is 0.056, pretest B (control) is 0.139, and posttest B (control) is 0.975. The null hypothesis is accepted, and the data is declared to be normally distributed with all significance levels (Sig.) > 0.05. Next, a homogeneity test is performed on the normally distributed data.

Homogeneity Test

The main purpose of this test is to determine whether the data groups have the same variance (indicating homogeneity). According to Ojeda (2024), the data tested for homogeneity is data obtained before the intervention was applied in the experimental study. Therefore, in this study, a homogeneity test was conducted on the pretest scores of the experimental and control groups, the results of which can be seen in Table 6.

Table 6. Result of homogeneity test

		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	.974	1	58	.328
	Based on Median	.940	1	58	.336
	Based on Median and with adjusted df	.940	1	55.585	.337
	Based on trimmed mean	.942	1	58	.336

The pretest scores of the experimental and control groups based on Table 6 show significance (Sig.) Based on Mean of 0.328 > 0.05, so the null hypothesis is accepted and the data is declared homogeneous. This can be further interpreted to mean that the data has similar characteristics or variance. Based on the normality and homogeneity tests, the results indicate that the data are normally distributed and homogeneous, so the next test, the paired sample t test, can be conducted.

Paired Sample T Test

Paired samples t tests are used to compare the means of two related samples and see if there is a significant difference between them (Prameswari & Rahayu, 2020). The differences between paired values are calculated for each subject, forming a new data set containing the differences between paired data (Syafriani et al., 2023). In this study, the paired sample t test was conducted on the pretest and posttest data of the experimental group (Table 7 and 8) and the pretest and posttest data of the control group (Table 9 and 10).

Table 7. Average pretest and posttest scores of the experimental group

	Mean	N	Std. Deviation	Std. Error Mean
Pretest_E	54.80	30	7.761	1.417
Posttest_E	83.90	30	4.054	.740

In Table 7, the average pretest score of the experimental group was 54.80, while the posttest score was 83.90. This shows a difference in the average scores before and after the intervention (inquiry-based science learning strategy).

Table 8. Results of the paired sample t-test (pretest and posttest of the experimental group)

	Paired Differences							Significance	
				95% Confidence Interval of The Difference					
	Mean	Std. Dev	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pretest_E – Posttest_E	-29.100	9.782	1.786	-32.753	-25.447	-16.295	29	<.001	<.001

Based on Table 8, the "Significance" column shows that (Sig. Two-tailed p) < 0.001, which means that $p < 0.05$, so it can be interpreted that there is a significant difference between the two means and the null hypothesis (which states that there is no difference) is rejected. These results indicate that there is a significant difference between the pretest and posttest scores of students in the experimental group after the implementation of the discovery-based science learning strategy. The difference between the posttest and pretest scores is 29.10.

Table 9. Average pretest and posttest scores of the control group

	Mean	N	Std. Deviation	Std. Error Mean
Pretest_C	54.67	30	9.444	1.724
Posttest_C	70.47	30	9.387	1.714

The control group did not receive any special intervention in the form of inquiry-based science learning strategies like the experimental group, but instead used conventional learning strategies where learning was centered on the educator. Based on Table 9, the average pretest score for the control group was 54.67 and the posttest score was 70.47.

Table 10. Results of the paired sample t-test (pretest and posttest of the control group)

	Paired Differences							Significance	
				95% Confidence Interval of The Difference					
	Mean	Std. Dev	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pretest_C Posttest_C	-15.800	6.504	1.187	-18.229	-13.371	-13.305	29	<.001	<.001

Based on Table 10, significance (sig. two-sided p) <.001, which means p-value < 0.05, it can be interpreted that there is a significant difference between the two means and the null hypothesis is rejected (which states that there is no difference). From these results, it is known that there is a significant difference in the pretest and posttest scores of the control group. Although no intervention was given, there is a difference in the mean posttest and pretest scores of the control group with a difference of 15.80.

Normalized Gain (N-Gain) Test

The calculation of N-gain scores in this study aims to determine the increase in environmental literacy knowledge based on the pretest and posttest scores of the experimental and control groups, as well as to determine the effectiveness of the intervention (inquiry-based science learning strategies) in the experimental group and the non-intervention (conventional learning strategies) in the control group on environmental literacy knowledge. The N-gain results for the experimental and control groups are presented in Table 11.

Table 11. Result of N-gain

Group	Intervention	$\bar{x}$ of pre	$\bar{x}$ of post	N-gain	Category	%	Effectiveness levels
E	Inquiry-based science learning strategies	54.80	83.90	0.64	Medium	64.38	Moderately effective
C	Non intervention (conventional learning strategies)	54.67	70.47	0.35	Medium	34.85	Ineffective

Table 11 shows that the pretest scores of the experimental and control groups did not differ significantly, which is in line with the requirement for the pretest-posttest control group design that the research subjects have the same initial abilities (Arib et al., 2024). The N-gain scores for the experimental group were 0.64 and for the control group 0.35, both of which fall into the "Medium" improvement category. A different result is shown in the effectiveness of inquiry-based science learning strategies and conventional learning strategies on environmental literacy knowledge. Based on Table 11, the inquiry-based science learning strategy applied to the experimental group resulted in a percentage of 64.38% with a "moderately effective" level of effectiveness. Conversely, a percentage of 34.85% was obtained from the application of conventional learning strategies in the control group with an effectiveness level of "Ineffective." The next step was to calculate affective and skills scores followed by the calculation of the overall final score to determine the environmental literacy abilities of the experimental and control groups.

Affective Scores

The affective questionnaire used in this study was adapted and modified from the environmental literacy questionnaire developed by Atabek-Yiğit et al. (2014), namely ELSA (environmental literacy scale for adults), which contains 20 items on environmental consciousness (9 items), environmental anxiety (6 items), and environmental awareness (5 items). The scoring technique uses a 1-5 Likert scale with answer options and their respective weights, namely Strongly Agree (SA)= score 5, Agree (A)= score 4, Undecided (U)= score 3, Disagree (D)= score 2, and Strongly Disagree (SD)= score 1. Students in the experimental and control groups checked (√) their answers for all items. The ELSA questionnaire can be seen in Table 12.

Table 12. Affective assessment instrument (ELSA questionnaire)

Indicators		Items
Environmental consciousness	1	I assume that government must support the sustainable energy sources (sun, geothermal, water and wind)
	2	Environmental education (EE) should be provided from elementary school onwards in order to instill environmental awareness
	3	I, along with others, have a responsibility to protect the environment
	4	I support the use of solar power for street lights and traffic lights in order to maintain the quality of life for all present and future generations
	5	I support the use of energy sources such as natural gas and solar power because the gas produced by stoves is more dangerous
	6	I will use the recycling boxes if there is one
	7	I will use electronic bills to protect the environment
	8	I participate in environmental conservation activities
	9	I feel it is important to conserve water and energy in everyday life
Environmental anxiety	10	I feel responsible for maintaining the cleanliness of the environment wherever I am
	11	I think everyone should plant a tree in their lifetime
	12	I think seeds should be saved for the future of life
	13	I will throw empty glass and plastic bottles, used paper, and cans into the recycling bin
	14	I think illegal and indiscriminate hunting can cause environmental problems
	15	I will warn people if they damage and endanger the environment
Environmental awareness	16	When I read the news on broadcasting platforms, I pay attention to topics related to the environmentt
	17	For environmental protection from waste, I watch video-sharing platforms, TV programs, or broadcasts that provide information about waste recycling
	18	I want to learn about environmental issues
	19	I prefer to buy environmentally friendly products rather than economical ones
	20	I prefer to use public transportation rather than private transportation to protect and preserve the environment
∑Score (Total score)		

After ensuring that all members of the experimental and control groups had completed the questionnaire, calculations were performed to obtain the affective scores according to formula (2). The average affective score for the experimental group was 87.20 and for the control group was 85.17. The distribution of individual scores can be seen in Figure 2.

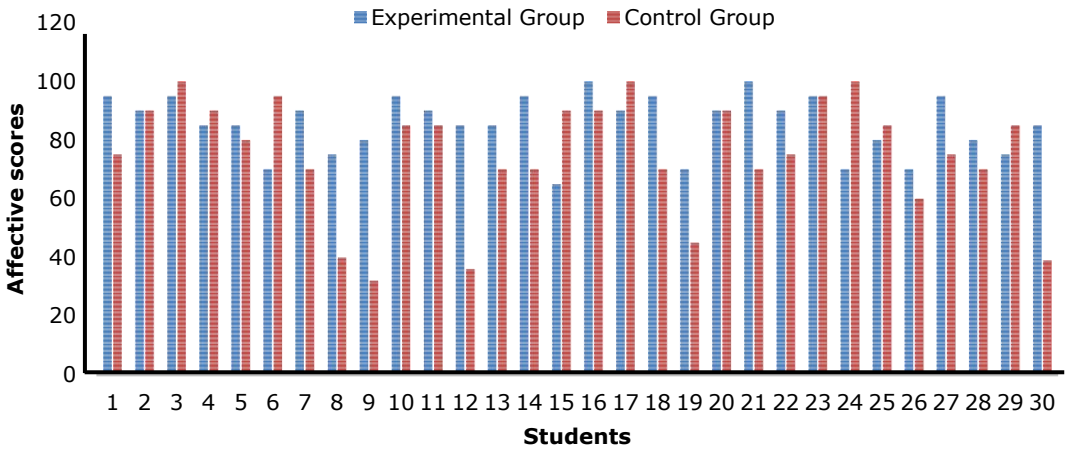

Figure 2. Affective scores of experimental and control groups

Skills Scores

The ability and willingness to participate in solving environmental problems are expressed in the form of project assignments. According to Fikri (2021), there are several things that become the focus of project skill assessment, namely planning, data collection, data processing, and data presentation skills, which are expressed in the assessment rubric. The skill assessment rubric is presented in Table 13.

Table 13. Skill assessment instrument (assessment rubric)

	Evaluated elements	Components	Score				
			1	2	3	4	5
1	Planning skills	Participation in providing holistic scientific and contextual ideas and concepts in the selection of project themes, designs, and locations. Participation in preparing tools, materials, and other project requirements.					
2	Data collection	Participation in the field and active involvement in every stage of data collection.					
3	Data processing	Participation in data analysis, providing ideas, concepts, and contributions to the process.					
4	Data presentation & verbal expression	Participation in the preparation of activity documents, presenting activity results with clear and accurate communication, supported by relevant scientific evidence, and demonstrating a strong grasp of concepts.					
∑Score (Total score)							

Skill assessment is individual in nature, meaning that the performance and work of all members of the experimental and control groups during the project task were observed and scored on the four assessment elements in Table 13. The total score obtained was then calculated using the skills score (formula 3). The average skills score for the experimental group was 85.50 and for the control group was 75.23. The distribution of individual scores can be seen in Figure 3.

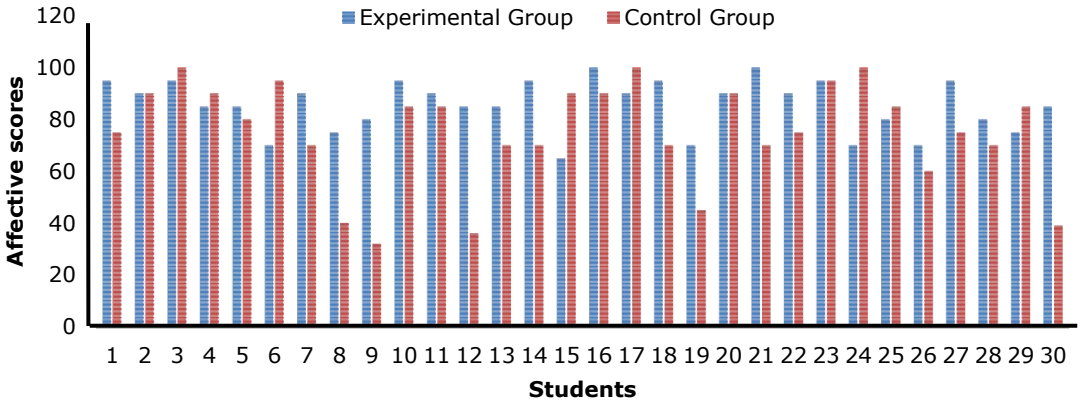

Figure 3. Skills scores of experimental and control groups

Environmental Literacy Scores

An individual's environmental literacy skills can be measured based on aspects of environmental literacy, namely knowledge, affective, and behavior (Panjaitan et al., 2021). Furthermore, according to Liang et al. (2018), the assessment of these three aspects has specific purposes in the process of determining environmental literacy skills, namely: 1) the knowledge aspect aims to assess the extent of an individual's understanding of natural systems, environmental issues, and the formulation of action strategies; 2) the affective aspect aims to evaluate sensitivity and awareness so that individuals are motivated to take environmentally friendly actions, anxiety or concern about environmental damage, and awareness or understanding of environmental conditions; and 3) the behavior aspect focuses on the involvement of individuals and groups in efforts to initiate strategies and actions to overcome environmental problems. In this study, the score of the knowledge, affective, and skill aspects obtained were then processed using formula (4) to determine the final environmental literacy ability score, as well as the category determination referred to in Table 4. The average environmental literacy score for the experimental group was 85.53 and for the control group was 76.96. Next, graph to provide a detailed overview of the distribution of environmental literacy categories in the experimental and control groups are shown in Figure 4 and Figure 5.

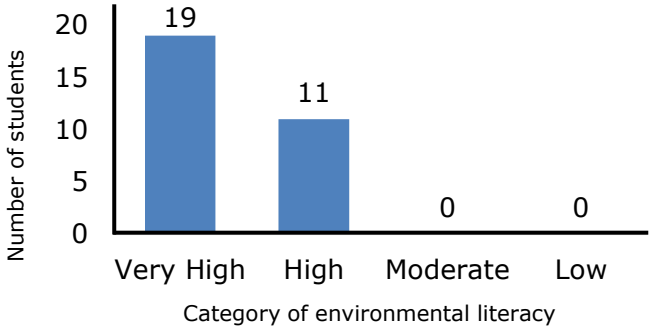

Figure 4. Distribution of environmental literacy in the experimental group

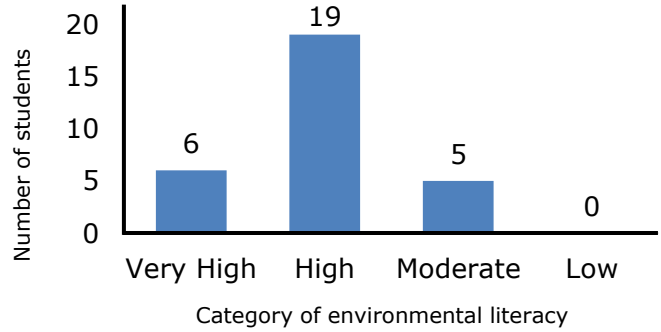

Figure 5. Distribution of environmental literacy in the control group

Referring to Figure 4, in the experimental group, there were 19 students in the "very high" environmental literacy category and 11 students in the "high" category, for a total of 30 students. Different results are shown in Figure 5, where the control group, with a total of 30 students, had a varied environmental literacy category, with 6 students in the "very high" category, 19 students in the 'high' category, and 5 students in the "moderate" category.

The Effect of Inquiry-based Science Learning on Environmental Literacy

The results of the pretest analysis indicate that the experimental and control groups have relatively equivalent initial abilities, as evidenced by the pretest scores, which do not show significant differences. Both groups were at a homogeneous starting point, as statistically proven by the homogeneity test, which showed Sig. 0.328 > 0.05. This condition is crucial to ensure that the differences in posttest results are due to the intervention rather than differences in initial abilities. The paired sample t-test between the two groups showed a significant improvement, with the main difference seen in their posttest scores. The experimental group achieved an average posttest score of 83.90, while the control group only reached 70.47. The N-gain for both the experimental and control groups fell into the "medium" improvement category; however, the inquiry-based science learning strategy applied to the experimental group resulted in a percentage of 64.38% with an effectiveness level of "moderately effective." Furthermore, a percentage of 34.85% with an effectiveness level of "ineffective" was obtained from the application of conventional learning strategies in the control group. This indicates that although the results of the paired sample t-test

showed a significant improvement, the intervention using inquiry-based science learning strategies resulted in a higher improvement compared to conventional learning strategies.

The difference in results is also shown in the average affective scores, with the experimental group scoring 87.20 and the control group scoring 85.17. Although not significant, there is still a noticeable difference between the two scores. Students involved in inquiry-based science learning strategies demonstrated a more positive attitude toward environmental care, such as responsibility for sustainability, awareness of maintaining cleanliness, and active participation in discussions about solutions to environmental problems. This aligns with the findings of Baierl et al. (2021), who noted that personal engagement with complex topics like global environmental issues and a sense of dependence on nature enhance personal commitment to environmental well-being.

In addition to affective, the skills of students in the environmental problem-solving project in the experimental group also showed superior values compared to the control group. Based on data analysis, students in the experimental group were more skilled in planning project design (ideas, concepts, and preparation of necessary tools and materials), collecting/gathering data, processing/analyzing data, and presenting data along with its presentation methods, with an average skills score of 85.50, while the control group scored 75.23. Students who received inquiry-based science learning strategies intervention had higher scientific skills, consistent with Majeed et al. (2023), who found that inquiry-based learning helps students improve their understanding of science process skills by giving them opportunities to apply those skills through practice. In contrast, in the control group, students' skills tended to be limited because conventional learning strategies through lectures and simple assignments emphasized knowledge and theoretical mastery, leaving little room for students to develop investigative skills or complex problem-solving abilities.

The three aspects of environmental literacy (knowledge, affective, and skills) were added together and then divided by three, resulting in an average environmental literacy score that shows a striking difference between the two groups. The experimental group was in the "very high" and 'high' categories, while the control group was in the "very high," "high," and "moderate" categories. This finding confirms that inquiry-based science learning strategies are more consistent in producing high achievements compared to conventional learning. Engaging students in scientific inquiry activities is one way to develop their environmental literacy regarding their surroundings and the global environment, particularly for prospective science teachers (Safkolam et al., 2023). When learning focuses on inquiry, it can serve as a useful tool to support the enhancement of environmental literacy (Kidman & Casinader, 2019).

Conclusion

This study shows that both the experimental and control groups experienced an increase in environmental literacy. However, the experimental group that received inquiry-based science learning strategies obtained higher scores in all aspects (knowledge, affective, and skills) and environmental literacy scores than the control group that used conventional learning strategies. The distribution of literacy levels also shows that the experimental group was more dominant in the "very high" and 'high' categories, while the control group was distributed across the "very high," "high," and "moderate" categories. Based on these results, it is clear that inquiry-based science learning strategies are effective in improving students' environmental literacy, thereby elevating environmental literacy at the university level-pedagogy.

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