



The relationship between learning experiences of the sub-topics of the benefits and efforts to preserve biodiversity towards environmental literacy

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Abstract

Keywords:
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Learning experiences are a series of activities designed to facilitate students in acquiring new knowledge and skills. Learning experiences have a strategic role in fostering environmental literacy. The purpose of this study was to determine the learning experience of the sub-material Benefits and Efforts to Preserve Biodiversity, to determine the results of environmental literacy level measurements, and the relationship between the two in phase E students of SMAN 1 Turi. This type of research is descriptive using the expository method with a correlational design. The data analysis approach used is quantitative descriptive. The average results of the learning experience of the sub-material, Benefits and Efforts to Preserve Biodiversity, tend to be in the moderate category of 39 or 73.58% of students. The average results of environmental literacy of phase E students are in the moderate category, of 53 or 100% of students. From the results of the simple linear regression test, the Sig. value is $0.000 < 0.005$ and the Pearson Correlation value is $0.60 < 0.625 < 0.799$. In conclusion, there is a positive and significant relationship between the learning experience of the sub-material Benefits and Efforts to Preserve Biodiversity and the environmental literacy of phase E students of SMAN 1 Turi, where both have a strong level of relationship.

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INTRODUCTION

Learning is a crucial part of the educational process because it focuses not only on cognitive mastery but also encompasses affective and psychomotor development. Through the learning process, students experience meaningful changes in knowledge, skills, and attitudes, leading to more meaningful character development (Widiastuti, 2022; Dendodi et al., 2025). Learning also involves active interaction with the environment, resulting in permanent changes and supporting the development of responsibility, discipline, and empathy (Setiawati, 2018; Dendodi et al., 2025).

One important concept in education is experiential learning, a series of activities designed to facilitate students' acquisition of new knowledge and skills. Experiential learning is not limited to conventional teaching methods but can also be realized through various

strategies that encourage creativity, critical thinking, and active student participation (Sanjaya, 2017; Nurnaningsih et al., 2023). With meaningful learning experiences, students not only understand the material theoretically but are also able to apply it in real-life situations, thereby increasing their self-confidence and motivation to learn.

In biology lessons, particularly in the sub-topic "Benefits and Efforts to Preserve Biodiversity," experiential learning plays a strategic role in fostering environmental literacy. Through field observations, case studies, and discussions of current environmental issues, students can connect the concept of biodiversity to real-world conditions. This not only strengthens understanding but also fosters ecological awareness and awareness of the importance of preserving the environment (Hasnawati, 2006; Dendodi et al., 2025).

Environmental literacy is the ability to understand, evaluate, and make decisions related to environmental issues. Individuals with good environmental literacy possess awareness, knowledge, skills, and behaviors that prioritize ecosystem sustainability (Nuri et al., 2023). Therefore, learning that emphasizes the benefits and efforts to preserve biodiversity is expected to improve students' environmental literacy, enabling them to play an active role in preserving nature.

Based on the description, this study focuses on the relationship between learning experiences in the sub-topic "Benefits and Efforts to Preserve Biodiversity" and the environmental literacy of Phase E students at SMAN 1 Turi. This study is expected to provide an overview of the contribution of learning experiences to environmental literacy and serve as input for the development of more contextual and meaningful biology learning strategies

METHOD

This research is a descriptive research type using the exposition method with a correlational design. This research uses a quantitative descriptive data analysis approach. The results of quantitative data obtained from questionnaires and tests will be processed using descriptive and inferential statistics with the IBM SPSS Statistics 25 program. This research was conducted at SMAN 1 Turi, Gununganyar, Gading Wetan, Donokerto, Turi, Sleman, DI Yogyakarta. This research was conducted in September 2025. The population in this study was all phase E students divided into four classes with a total of 145 students. The sampling used in this study was purposive. According to Arifin (2011, p. 224), if the number of population members is in the range of 101-500, then the sample can be taken at 30-40%. Thus, in this study, a sample of 53 students (36% of the total population) was taken.

In this study, there are three methods used as data collection techniques, namely: 1) observation with an observation sheet instrument for learning experiences; 2) questionnaire with an instrument for learning experience questionnaire sheet using four indicators, namely student interaction, student learning resources, student experience, and the implementation of the learning model as well as an environmental literacy level questionnaire sheet based on McBeth & Volk's (2009) competency indicators in the form of aspects of attitudes towards the environment and environmentally responsible behavior; 3) test with an instrument for environmental literacy level question sheets based on McBeth & Volk's (2009) competency indicators in the form of environmental knowledge and cognitive skills.

FINDINGS AND DISCUSSION

Learning Experience Sub-Material: Benefits and Efforts to Preserve Biodiversity

Based on observations during the learning of the Benefits and Efforts to Preserve Biodiversity sub-topic, students actively analyzed articles discussing threats to biodiversity, such as land conversion, deforestation, poaching, environmental pollution, and climate change. Students not only identified problems but were also able to formulate solutions

through in situ and ex situ conservation approaches. The discussion activity went well because students exchanged opinions, presented arguments, and connected concepts with real phenomena in the environment. This activity showed that students did not simply receive material, but were also trained to think critically and find solutions to the problems they encountered.

Furthermore, the assignment of creating a poster containing solutions to prevent threats to biodiversity resulted in creative, engaging, and insightful work. Students were able to express their ideas visually, demonstrating a deep understanding of the importance of conservation. These results align with research conducted by Hasanah and Thobroni (2024), which confirmed that the application of problem-based learning and creative assignments, such as posters, can improve student engagement, critical thinking skills, and learning outcomes. Therefore, the learning experience integrating articles, discussions, and creative assignments has proven effective in fostering ecological awareness and students' understanding of biodiversity conservation efforts.

The data from the learning experience questionnaire for the sub-material on Benefits and Efforts to Preserve Biodiversity are briefly presented in Table 1.

Table 1. Average Results of Learning Experience

Category	Interval	Frequency	Percentage
Very Low	$X < 39$	0	0.00%
Low	$39 < X \leq 65$	2	3.77%
Currently	$65 < X \leq 91$	39	73.58%
Tall	$91 < X \leq 117$	12	22.64%
Very high	$X > 117$	0	0.00%

The learning experience has four indicators: student interaction, student learning resources, student experience, and the implementation of the learning model. The average learning experience of Phase E students at SMAN 1 Turi for each indicator is presented in Table 2.

Table 2. Average Results of Learning Experience for Each Indicator

	Category	Interval	Frequency	Percentage
Student Interaction	Very Low	$X < 8.5$	0	0.00%
	Low	$8.5 < X \leq 13.5$	1	1.89%
	Currently	$13.5 < X \leq 18.5$	33	62.26%
	Tall	$18.5 < X \leq 23.5$	19	35.85%
	Very high	$X > 23.5$	0	0.00%
Student Learning Resources	Category	Interval	Frequency	Percentage
	Very Low	$X < 8.5$	0	0.00%
	Low	$8.5 < X \leq 13.5$	2	3.77%
	Currently	$13.5 < X \leq 18.5$	35	66.04%
	Tall	$18.5 < X \leq 23.5$	16	30.19%

	Very high	$X > 23.5$	0	0.00%
	Category	Interval	Frequency	Percentage
	Very Low	$X < 14$	0	0.00%
	Low	$14 < X \leq 24$	2	3.77%
	Currently	$24 < X \leq 34$	38	71.70%
	Tall	$34 < X \leq 44$	13	24.53%
Student Experience	Very high	$X > 44$	0	0.00%
	Category	Interval	Frequency	Percentage
	Very Low	$X < 8.5$	0	0.00%
	Low	$8.5 < X \leq 13.5$	2	3.77%
	Currently	$13.5 < X \leq 18.5$	32	60.38%
	Tall	$18.5 < X \leq 23.5$	19	35.85%
Implementation of Learning Models	Very high	$X > 23.5$	0	0.00%

Based on Table 1, the learning experience category of phase E students of SMAN 1 Turi, with a sample of 53 students, is 2 or 3.77% of students have low learning experience; 39 or 73.58% of students have moderate learning experience; and 12 or 22.64% of students have high learning experience. After data analysis, the learning experience of phase E students of SMAN 1 Turi is not very low or very high, with a tendency for more students to have a moderate learning experience. This shows that efforts are still needed to improve the learning experience of the sub-material, Benefits and Efforts to Preserve Biodiversity.

Based on Table 2, the average learning experience of phase E students at SMAN 1 Turi for each indicator is in the low-high category with a moderate tendency. In the student interaction indicator, it can be supported by the observation results that students lack curiosity, so that there are rarely students who take the initiative to ask the teacher regarding parts of the sub-material that are not yet understood. In the student learning resource indicator, it can be seen that students have not fully utilized school facilities, such as the library, as a learning resource. From the observation results, learning of the sub-material Benefits and Efforts to Preserve Biodiversity is only carried out in the classroom and does not utilize the environment around the school (not using learning outside the classroom/outdoor learning approach).

Based on the student experience indicator, it can be seen that students are less involved in biodiversity conservation efforts through the use of public transportation or walking when traveling. Generally, students still use motorized vehicles. Furthermore, observations support this finding, showing that students are less involved in maintaining the cleanliness of the school environment through class duty. Sometimes, the classroom environment appears slightly dirty during learning. Furthermore, student participation in competitions and outreach related to environmental conservation is minimal. Furthermore, students' reading literacy regarding environmental issues, such as threats to biodiversity, is lacking.

However, the teacher's learning included analyzing articles related to cases of threats to biodiversity and watching videos related to biodiversity conservation efforts. The learning model implementation indicator, supported by observations, showed that students received

guidance from the teacher to read learning resources containing data (articles related to cases of threats to biodiversity). Students used this data to generate ideas related to biodiversity conservation efforts. Students received guidance and direction from the teacher throughout the assignment. At the end of the lesson, students presented their assignments to the class.

Environmental Literacy of Phase E Students

Table 3. Average Results of Environmental Literacy

Category	Interval	Frequency	Percentage
Low	$X < 61$	0	0.00%
Currently	$61 \leq X < 123$	53	100.00%
Tall	$X \geq 123$	0	0.00%

Table 4. Average Results of Environmental Literacy for Each Aspect

	Category	Interval	Frequency	Percentage
Attitudes Towards the Environment	Low	$X < 23$	0	0.00%
	Currently	$23 \leq X < 45$	53	100.00%
	Tall	$X \geq 45$	0	0.00%
Environmentally Responsible Behavior	Category	Interval	Frequency	Percentage
	Low	$X < 23$	0	0.00%
	Currently	$23 \leq X < 45$	53	100.00%
Environmental Knowledge	Tall	$X \geq 45$	0	0.00%
	Category	Interval	Frequency	Percentage
	Low	$X < 5$	0	0.00%
Cognitive Skills	Currently	$5 \leq X < 11$	53	100.00%
	Tall	$X \geq 11$	0	0.00%
	Category	Interval	Frequency	Percentage
	Low	$X < 10$	1	1.89%
	Currently	$10 \leq X < 20$	44	83.02%
	Tall	$X \geq 20$	8	15.09%

Based on environmental literacy questionnaire data, the average overall score obtained by students was 95.74 with a standard deviation of 8.38; a minimum score of 74; and a maximum of 110. All respondents (100%) were in the moderate category (interval $61 \leq 123$). Looking more closely, in terms of environmental attitudes, environmental responsibility, and environmental knowledge, all students were in the moderate category. This indicates that they already have concern, a sense of responsibility, and a basic understanding of the environment. However, they have not yet reached a high level that reflects deeper mastery or consistent real application.

The differences found were only visible in the cognitive skills aspect. The average score for the cognitive aspect was 16.85 (out of a maximum score of 20), with a distribution of 83.02% of students in the medium category; 15.09% had reached the high category; and 1.89% were in the low category. This indicates that a small number of students have been able to think critically, analyze problems, and formulate solutions related to environmental issues, but the majority are still at the medium level. This condition indicates that although their understanding and attitudes are quite good, more complex cognitive skills, such as in-depth analysis, evaluation, and problem-solving, have not developed evenly.

These results align with research by Khoirunisa (2023) in Ardiansyah et al. (2025), which showed that the environmental literacy level of junior high school students was in the "sufficient" category, with cognitive skills being relatively lower than knowledge or attitudes. This finding is also supported by research by Hamidah & Dewi (2025), which stated that most students at Kebakkramat State High School also had an average environmental literacy level in the moderate category, with an average score of 17.6. Both studies indicate that environmental literacy among students in Indonesia is generally still at an intermediate level and is not evenly distributed across all aspects, particularly cognitive skills.

Thus, it can be concluded that students' environmental literacy is already at a fairly good level, but still needs improvement, especially in cognitive skills. Efforts can be made through strategies such as problem-based learning, projects, and field activities that allow students to apply knowledge while developing analytical and problem-solving skills. Real-world activities within the school environment can include waste management, reforestation, creating miniature gardens, and so on. Through these strategies, students not only understand basic knowledge and demonstrate a positive attitude, but also hone their critical thinking skills and take concrete action to protect the environment.

The Relationship of Learning Experiences in the Sub-Material on the Benefits and Efforts to Preserve Biodiversity to the Environmental Literacy of Phase E Students

Previously, prerequisite tests were conducted for the learning experience (X) and environmental literacy (Y) variables, using IBM SPSS Statistics 25. The prerequisite tests were normality tests using the Kolmogorov-Smirnov method and linearity tests using the Test of Linearity method. The results of the prerequisite tests showed that the data were normally distributed and had a linear relationship. Furthermore, a hypothesis test was conducted using a simple linear regression test using the Pearson Product-Moment method.

Hypothesis Formulation

- Ho: There is no positive and significant relationship between the learning experience of the sub-material Benefits and Efforts to Preserve Biodiversity and the environmental literacy of phase E students at SMAN 1 Turi.
- Ha: There is a positive and significant relationship between the learning experience of the sub-material Benefits and Efforts to Preserve Biodiversity and the environmental literacy of phase E students of SMAN 1 Turi.

Table 5. Simple Linear Regression Test ($\alpha = 0.05$)

		Environmental Literacy	Learning Experience
Environmental Literacy	Pearson Coorelation	1	0.625**
	Sig (2-tailed)		0.000
	N	53	53
Learning Experience	Pearson Coorelation	0.625**	1
	Sig (2-tailed)	0.000	
	N	53	53

Based on Table 5, it can be seen that the Sig. value is $0.000 < 0.005$. This indicates that H_0 is rejected, while H_a is accepted. It can be said that there is a positive and significant relationship between the learning experience of the sub-material Benefits and Efforts to Preserve Biodiversity and the environmental literacy of phase E students of SMAN 1 Turi.

Table 6. Interpretation of Correlation Coefficient

Coefficient Interval	Relationship Level
0.00 - 0.199	Very Low
0.20 - 0.399	Low
0.40 - 0.599	Currently
0.60 - 0.799	Strong
0.80 - 1,000	Very strong

Based on Table 5, it can be seen that the Pearson Correlation value is $0.60 < 0.625 < 0.799$. This indicates that the relationship between the learning experience of the sub-material on Benefits and Efforts to Preserve Biodiversity and the environmental literacy of phase E students of SMAN 1 Turi has a strong level. Learning experiences play an important role in developing students' environmental literacy levels, especially in the context of biology learning. Learning experiences are defined as student activities carried out to obtain new information and competencies in accordance with the learning objectives to be achieved (Leny, 2022).

The results of the regression analysis indicate a positive relationship between learning experiences and students' environmental literacy levels. A positive regression coefficient indicates that increased learning experiences contribute positively to increased environmental literacy levels. The decision to reject H_0 in the significance test indicates a significant influence between learning experiences and students' environmental literacy levels. Furthermore, the interpretation of the correlation coefficient indicates a strong relationship between learning experiences and students' environmental literacy levels. It can be said that the more diverse students' learning experiences, the stronger their environmental literacy levels.

These findings are supported by previous research. Based on the research results of Yusriana et al. (2023), the implementation of the PBL learning model can improve students' environmental literacy in biology learning. Likewise, the results of the research of Yusriana et al. (2024) showed that the average environmental literacy score of students in the experimental class with the PBL learning model was higher than that of students in the control class with the Discovery Learning (DL) model in biology learning. Furthermore, the results of

research by Lana et al. (2025) showed that the implementation of the PBL learning model has a positive impact on environmental literacy.

CONCLUSION

Based on the research results, it can be concluded that the learning experience in the sub-material Benefits and Efforts to Preserve Biodiversity has a positive and significant relationship with the environmental literacy of phase E students of SMAN 1 Turi. The majority of students showed a moderate learning experience category with a low tendency in the utilization of learning resources, participation in environmental activities, and initiative to ask questions. Meanwhile, the students' overall environmental literacy was in the medium category, with the main weakness in the cognitive skills aspect. The results of the simple linear regression analysis showed a significance value of $0.000 < 0.05$ and a correlation coefficient of 0.625, which is at the strong relationship level. These findings indicate that the better the learning experience obtained by students, the higher the level of environmental literacy they have. Therefore, more contextual, varied, and applicable learning strategies are needed, such as PBL, project-based learning, and field activities, so that students can develop attitudes, knowledge, skills, and real behavior in maintaining environmental sustainability.

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