



## The Effect of Problem-Based Learning Model-Local Wisdom with ELIKOSIS Media on Elementary School Students' Ecoliteracy Skills and Science Learning Outcomes

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**ABSTRACT:** This study aims to examine: (1) the effect of the Problem-Based Learning model with ELIKOSIS media on the IPAS ecoliteracy skills of elementary school students, (2) the effect of the Problem-Based Learning model with ELIKOSIS media on the IPAS learning outcomes of elementary school students. The background of this study is based on the importance of strengthening eco-literacy from elementary education and the need for contextual learning that integrates the local wisdom of the Edelweiss mountains with play activities that are appropriate for the characteristics of elementary school students. This study is a quasi-experimental study with a posttest-only control design. The research sample consisted of two classes, namely the experimental class that received the Problem-Based Learning-Local Wisdom model treatment with ELIKOSIS media and the control class that used direct learning. Data collection was carried out through an ecoliteracy test, an IPAS learning outcome test, and an observation sheet on the implementation of the Problem-Based Learning-Local Wisdom model with ELIKOSIS media. Data analysis in this study used inferential statistics, specifically the t-test technique, with the SPSS version 27 application. The results of the study showed that: (1) there was a significant effect of the Problem-Based Learning model with ELIKOSIS media on the IPAS ecoliteracy skills of elementary school students, (2) there was a significant effect of Problem-Based Learning with ELIKOSIS media on the IPAS learning outcomes of elementary school students.

**KEYWORDS:** Eco-literacy, Elementary School, ELIKOSIS, IPAS Learning Outcomes, Local Wisdom, Problem-Based Learning.

### INTRODUCTION

Science and Social Studies (IPAS) education in elementary schools plays a strategic role in equipping students with an understanding of natural phenomena and their relationship to social life. IPAS education aims not only to develop conceptual mastery, but also to shape scientific thinking skills, environmental awareness, and contextual problem-solving skills. In line with the direction of national education development policies and the vision of Indonesia Emas 2045, basic education is expected to foster a generation with ecological awareness and a focus on sustainability.

Ecological literacy is a term rooted in the ecological philosophy of Arne Naess through the concept of Deep Ecology (1995), which views humans not as entities separate from nature, but as an integral part of an interconnected system of life. Ecological literacy has become an important competency in 21st-century education because it places humans as part of an interconnected ecological system. Understanding ecological principles from elementary school age is considered crucial in shaping sustainable environmentally friendly attitudes and behaviors. A number of studies show that integrating eco-literacy into elementary school learning can increase students' environmental awareness and social responsibility. The Merdeka Curriculum, through the IPAS subject, provides an integrative space to link scientific concepts with environmental and social issues relevant to the lives of students.

However, various empirical findings show that elementary school students' eco-literacy skills and science learning outcomes are still relatively low. Based on the results of research by Yunita et al. (2025) in Lumajang Regency, the cognitive eco-literacy skills of elementary school students still need to be improved, with an average achievement of 48.01%, which indicates the urgency of contextual and meaningful pedagogical intervention. This condition was also found at Argosari 01 Public Elementary School and Argosari 02 Public Elementary School, where most students had not achieved learning completeness. Based on the data from the 2024/2025 IPAS Final Semester Examination (UAS) at SD Negeri Argosari 01, only 9 students (40.9%) obtained scores above the Learning Objective Completion Criteria (KKTP) of 70, while 13 students (59.09%) were still below that completion score. A similar situation was also found at Argosari 02 Public Elementary School, where only 4 students (33.33%) achieved scores above the KKTP,



while 8 students (66.67%) still did not meet the set standards. These low achievements are inseparable from the learning process, which is still dominated by conventional approaches, the lack of utilization of the surrounding environment as a learning resource, and the limitations of contextual and interactive learning media. As a result, IPAS learning tends to be abstract and meaningless for students.

One relevant alternative solution is the implementation of a Problem-Based Learning (PBL) model integrated with local wisdom. This model encourages students to actively engage in solving real problems that originate from the local environment and culture, making learning more contextual and meaningful. Vernon et al. (2022) argue that the application of a problem-based learning approach can encourage active student participation and develop their reflective abilities on issues relevant to their surroundings. The integration of local wisdom in PBL allows students to build scientific knowledge through experiences and cultural values that are close to their lives. Sukri (2023) states that the integration of local wisdom in PBL can create an enculturative learning process, in which students form scientific knowledge through their own cultural frameworks. The support of traditional game-based learning media, such as ELIKOSIS (Engklek Literasi Ekosistem), has the potential to strengthen student engagement through collaborative, enjoyable, and locally-oriented learning experiences. Costa et al. (2020) emphasize that game-based learning creates a fun and collaborative learning environment that encourages deep exploration of meaning.

Although a number of studies have proven the effectiveness of the PBL model and game-based media in improving learning outcomes and environmental literacy, studies that specifically integrate PBL-local wisdom with ELIKOSIS media in IPAS learning are still limited. Therefore, this study aims to analyze the effect of the Problem-Based Learning-Local Wisdom model with ELIKOSIS media on the ecoliteracy skills and IPAS learning outcomes of elementary school students.

## RESEARCH METHODS

This study is a quasi-experimental quantitative study with a posttest-only control design. According to Sugiyono (2014), quantitative research is research used to study a specific population or sample, with data collection techniques using research instruments and quantitative or statistical data analysis. This study was conducted in two public elementary schools located in the Senduro District, Lumajang Regency, namely SD Negeri Argosari 02 as the experimental group and SD Negeri Argosari 01 as the control group. These two schools were chosen as the research locations because they have learning environment characteristics that are relevant to the focus of the study, and they are located in a mountainous area that is still rich in local values, making them suitable for implementing a local wisdom-based learning approach. In addition, the availability of data and ease of access for researchers were also considerations in choosing these locations.

The research was conducted in the odd semester of the 2025/2026 academic year in September-October 2025. The learning activities in this study were conducted three times in each class. The learning activities in the experimental class used the Problem-Based Learning-Local Wisdom model with ELIKOSIS media, while the control class used direct learning activities.

In this study, the data collection techniques used consisted of three main methods, namely tests, observation, and documentation. The selection of these three techniques was tailored to the needs of measuring the research variables and their relevance to the type of data collected. The test technique was used to measure the two main variables in this study, namely eco-literacy skills and learning outcomes. Data collection through observation was conducted to determine the implementation of learning by teachers and students using the Problem-Based Learning (PBL) model based on Local Wisdom with ELIKOSIS Media. The observation sheet was compiled in the form of a closed questionnaire, in which observers were asked to respond to a number of statements related to learning, media appeal, understanding of the local context, and student motivation and attitudes during the learning process. Documentation techniques were used to supplement the research data with relevant written and visual sources. The documents collected in this study included teaching modules used in learning, student name lists, previous final exam score summaries, as well as photos of learning activities and other supporting documents that showed the research process and implementation.

The instruments used in this study were systematically designed to measure two main focuses, namely: (1) Students' ecoliteracy abilities in the dimensions of head (cognitive) and heart (affective). The instrument was designed in the form of 9 multiple-choice questions, which were compiled based on the ecoliteracy indicators from the Center for Ecoliteracy, covering the dimensions of head (ecological knowledge and understanding) and heart (attitudes and concern); (2) Students' learning outcomes in the cognitive domain, using a cognitive learning outcome test in the form of an essay test consisting of 9 questions. This instrument was compiled based on the IPAS learning achievement indicators formulated in the teaching module. This test was used to determine the level of



students' mastery of the material after participating in the learning process with specific treatments. The questions in this test require students to describe, analyze, and conclude information related to the learning topic, so that they can describe their level of conceptual understanding in greater depth.

All instruments in this study were developed through a validation process by experts (expert judgment) to ensure content validity and suitability for use in the field. The validation process involved assessing the suitability of the indicators to the research objectives, clarity of language, and relevance of the material. Furthermore, the instruments were tested on a limited basis to respondents who had characteristics similar to the research sample in order to obtain data for validity and reliability analysis. Data analysis in this study used inferential statistics, specifically the t-test technique, with the SPSS version 27 application.

**RESULT**

**A. Students' Ecological Literacy Skills**

The following is a comparison of the post-test results for the eco-literacy skills of students in the experimental class and the control class.

**Table 1. Data on the Post-Test Results for the Eco-Literacy Skills of Students in the Experimental Class and the Control Class**

Statistical Data	Posttest	
	Experimental Class	Control Class
Highest Score	100	88,89
Lowest Score	66,67	33,33
Mean Rank	22,81	10,19
Sum of Ranks	365,00	163,00
Number of Students	16	16

Based on Table 1, the eco-literacy abilities of students in the experimental class showed higher achievements than those in the control class. The highest score in the experimental class reached 100, while the control class only scored 88.89. The lowest score in the experimental class was also better (66.67) than that in the control class (33.33), indicating an increase in the minimum achievement of students. The mean rank of the experimental class was 22.81, which was significantly higher than that of the control class (10.19), indicating a better distribution of ecoliteracy abilities in the treatment group. This difference is reinforced by the higher sum of ranks in the experimental class (365) compared to the control class (163). With an equal number of students in both classes (16 each), a comparison of learning outcomes can be made objectively. Furthermore, details of the posttest results for each dimension of the ecological literacy skills of students in the experimental and control classes are presented in the following table.

**Table 2. Posttest Data for Each Dimension of Eco-Literacy Ability of Students in the Experimental Class and Control Class**

Dimension	Posttest			
	Experiment	%	Control	%
Head (Ecological Knowledge and Understanding)	70	87,5	52	65
Heart (Attitude and Environmental Awareness)	61	95,31	36	56,25
Maximum Score	144		144	
Average	90,97		61,11	

Table 2 shows that the ecological literacy of students in the experimental class was higher than that of the control class in both dimensions measured. In the Head dimension, the experimental class achieved 87.5%, while the control class only achieved 65%. In the Heart dimension, the experimental class achieved 95.31%, far above the control class, which achieved 56.25%. Overall, the average ecoliteracy score of the experimental class (90.97) was higher than that of the control class (61.11).

These findings show that the PBL-Local Wisdom model with ELIKOSIS media applied in the experimental class was more effective in improving students' ecoliteracy skills than the learning in the control class.



Before conducting data analysis to test the hypothesis of students' ecoliteracy abilities, normality and homogeneity tests were first conducted as prerequisites for analysis. The following are the results of the normality test of students' ecoliteracy abilities.

**Table 3. Results of the Normality Test of Students' Ecoliteracy Ability**

Class	<i>Kolmogorov-Smirnov</i>			<i>Shapiro-Wilk</i>		
	Statistic	df	Sig.	Statistic	df	Sig.
<b>Eco-Literacy</b> <b>Experimental Class</b>	.331	16	<.001	.743	16	<.001
<b>Control Class</b>	.165	16	.200	.946	16	.429

Based on Table 3, the results of the normality test using the Shapiro-Wilk technique show that the data on the ecological literacy ability of students in the Control Class has a significance value of 0.429 ( $p > 0.05$ ), which means that the data is normally distributed. However, in the Experimental Class, a significance value of  $< 0.001$  ( $p < 0.05$ ) was obtained, indicating that the data is not normally distributed. Because one of the data groups is not normally distributed, the assumption of normality is not met. Therefore, testing the hypothesis of differences in students' ecoliteracy abilities between the two classes was carried out using non-parametric statistical analysis, namely the Mann-Whitney U test, and the results can be seen in the following table.

**Table 4. Results of the Mann-Whitney U Test of Students' Ecological Literacy Ability**

	<b>Eco-Literacy</b>
Mann-Whitney U	27.000
Wilcoxon W	163.000
Z	-3.861
Asymp. Sig. (2-tailed)	<.001
Exact Sig. [2*(1-tailed Sig.)]	<.001

Based on Table 4, the Mann-Whitney U test results show an Asymp. Sig. (2-tailed) value of  $< 0.001$  ( $p < 0.05$ ). This means that there is a significant difference between the ecoliteracy abilities of students in the Experimental Class and the Control Class. Thus, the PBL-Local Wisdom Model with ELIKOSIS Media applied in the experimental class has been proven to have a better effect on students' ecoliteracy abilities.

**B. Students' IPAS Learning Outcomes**

There is a comparison of posttest data on IPAS learning outcomes between the experimental class and the control class. The data is as follows.

**Table 5. Posttest Data on IPAS Learning Outcomes for Students in the Experimental Class and Control Class**

Statistical Data	<i>Posttest</i>	
	Experimental Class	Control Class
Highest Score	100	81,48
Lower Score	74,07	40,74
<i>Mean</i>	89,81	63,19
<i>Std. Deviation</i>	6,962	8,813
Number of Students	16	16

Table 5 shows a clear difference in IPAS learning outcomes between the experimental class and the control class. The experimental class had the highest score of 100 and the lowest score of 74.07, both of which were higher than the control class, which achieved a maximum score of 81.48 and a minimum score of 40.74. The average learning outcome of the experimental class was 89.81, which was also far higher than that of the control class, which was only 63.19, indicating a significant effect of the learning treatment. In addition, the lower standard deviation of the experimental class (6.962) compared to the control class (8.813)



showed that the achievements of students in the experimental class were more homogeneous. With the same number of students in both classes, namely 16 students, it can be concluded that the difference in results between the two groups was not caused by the number of participants but by the difference in learning treatment. Furthermore, the posttest data on student learning outcomes for each cognitive learning indicator in the experimental and control classes are presented in the following table.

**Table 6. Posttest Data on Student Learning Outcomes for Each Cognitive Learning Indicator in the Experimental Class and Control Class**

	Indicator (Cognitive Level)	Posttest			
		Experiment	%	Control	%
LOTS	C1	47	97,91	30	62,5
	C2	123	85,41	87	60,41
	C3	46	95,83	31	64,58
HOTS	C4	87	90,62	71	73,95
	C5	42	87,5	31	64,58
	C6	43	89,58	23	47,91
	Maximum Score	432		432	
	Average	89,81		63,19	

Table 6 shows that student learning outcomes at each cognitive level in the experimental class were consistently higher than those in the control class. In the LOTS category, the percentage of mastery of indicators C1, C2, and C3 in the experimental class ranged from 85.41% to 97.91%, while the control class only achieved 60.41% to 64.58%. Similarly, in the HOTS (C4–C6) category, the experimental class achieved a percentage of 87.50% to 90.62%, which was significantly higher than the control class, which ranged from 47.91% to 73.95%. Overall, the average learning outcome of the experimental class was 89.81, which was much higher than that of the control class, which was 63.19.

These findings indicate that the application of the PBL-Local Wisdom model with ELIKOSIS media in the experimental class was more effective in improving student learning outcomes compared to the control class.

Before analyzing the data to test the hypothesis of student learning outcomes, normality and homogeneity tests were conducted as prerequisites for analysis. The following are the results of the normality test of student IPAS learning outcomes.

**Table 7. Results of the Normality Test of Students' IPAS Learning Outcomes**

	Class	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcomes	Experimental Class	.260	16	.005	.899	16	.079
	Control Class	.203	16	.078	.920	16	.171

Based on Table 7, the results of the normality test using Shapiro-Wilk show that the student learning outcome data in the Experimental Class has a significance value of 0.079 ( $p > 0.05$ ), so the data is normally distributed. In the Control Class, a significance value of 0.171 ( $p > 0.05$ ) was obtained, which also indicates that the data is normally distributed. Since both groups have significance values above 0.05, it can be concluded that the normality assumption is fulfilled. Next, a homogeneity test was conducted to determine whether two or more data groups have the same variance (diversity) or not. The following are the results of the homogeneity test of students' IPAS learning outcomes.

**Table 8. Results of the Homogeneity Test of Students' IPAS Learning Outcomes**

Levene Statistic	df1	df2	Sig.
.146	1	30	.705



Based on Table 8, the results of the homogeneity test using Levene's Test showed a significance value of 0.705 ( $p > 0.05$ ). This means that the variance in learning outcomes in the Experimental Class and Control Class is homogeneous. Since the assumptions of homogeneity and normality are met, the analysis of the differences in learning outcomes between the two groups can be continued using parametric statistical tests. The following are the results of the parametric statistical test, Independent samples T-Test, for student learning outcomes in IPAS.

**Table 9. Results of Independent Samples T-Test Results of Students' IPAS Learning**

		Independent Samples Test								
		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar	Equal variances assumed	.146	.705	9.481	30	<.001	26.620	2.808	20.886	32.355
	Equal variances not assumed			9.481	28.474	<.001	26.620	2.808	20.873	32.388

Based on Table 9, the analysis was conducted through homogeneity and mean difference tests. In the homogeneity test (Levene's Test), a Sig. value of 0.705  $> 0.05$  was obtained, indicating that the variances of the two groups were homogeneous. Thus, the t-test was read using the Equal variances assumed row. The t-test results showed a t-value of 9.481 with a Sig. (2-tailed) of 0.000  $< 0.05$ , so  $H_0$  was rejected and  $H_a$  was accepted. The average difference of 26.620 confirms that the learning outcomes of the experimental class were much higher than those of the control class. Thus, it can be concluded that there is a significant difference between the experimental class and the control class. This shows that the PBL-Local Wisdom learning model with ELIKOSIS media applied in the experimental class had a significant effect on student learning outcomes.

**DISCUSSION**

**A. The Effect of the Problem-Based Learning Model-Local Wisdom with ELIKOSIS Media on Students' Ecoliteracy Skills**

The results of the study indicate that the application of PBL-Local Wisdom with ELIKOSIS media has a significant effect on students' ecoliteracy skills. This is particularly evident in the third syntax of PBL, namely guiding inquiry, where students are given space to actively explore environmental phenomena around them. At this stage, students construct ecological knowledge through direct experience, thereby contributing to the dimensions of eco-literacy that include ecological knowledge and understanding (head) as well as attitudes and concern for the environment (heart).

The role of inquiry as a reinforcement of conceptual understanding is emphasized by Arends (2012), who explains that PBL facilitates deeper cognitive engagement through information-seeking and problem-solving activities. A similar view is expressed by Bransford, Brown, and Cocking (2000) in *How People Learn*, that the investigation process allows students to construct new knowledge schemas meaningfully through interaction with real contexts. Furthermore, Tilbury (1995) states that environment-based learning experiences and direct exploration are important foundations in the formation of eco-literacy because they encourage emotional connections and a sense of responsibility towards the environment.

The integration of ELIKOSIS media, which combines the concept of hopscotch with the visualization of edelweiss as local mountain wisdom, further strengthens the effectiveness of learning. The motor-local nature of the engklek game and its closeness to the world of children serve as a pedagogical bridge that aligns with the developmental characteristics of elementary school students, who are in the concrete operational stage and have a need to learn through play activities (Piaget, 1964; Berk, 2015). Thus, the game activities in ELIKOSIS not only increase students' emotional and social engagement but also facilitate the internalization of Edelweiss conservation values as a symbol of mountain ecosystem sustainability.

The integration of inquiry-based learning in PBL, the characteristics of play in elementary school students, and the reinforcement of local wisdom values through ELIKOSIS media make the learning process more meaningful. This is in line with Tilbury's (1995) view that environmental education that links local contexts and direct experiences can increase ecological awareness and encourage concrete actions to preserve nature.



In the context of local wisdom-based learning, investigating ecological issues around students, namely the use of local wisdom regarding Edelweiss flowers, which are protected plants known as “eternal flowers” and an important symbol in the culture of mountain slope communities, strengthens the relationship between cultural values and ecological understanding. This is in line with Orr's (1994) opinion in *Earth in Mind*, which emphasizes that environmental learning rooted in local culture can produce deeper ecoliteracy because it is directly connected to the ecological identity of the students.

Discussions about the ban on picking Edelweiss, the impact of tourists on its conservation, and local community efforts to maintain its sustainability foster ecological awareness and environmental responsibility. This strengthens ecoliteracy in terms of ecological knowledge and attitudes. These findings are consistent with Kahn's (2010) research, which confirms that learning that directly links ecological issues with local culture increases students' ecological literacy capacity. Similarly, Esposito's (2009) study emphasizes that learning approaches that encourage understanding of the relationship between humans and nature have been proven to improve students' ability to make responsible ecological decisions. In addition, research by Royani & Junaidi (2024) shows that learning based on local wisdom can strengthen environmental literacy because it is relevant to students' daily lives. Therefore, the results of this study support previous findings that PBL and local wisdom are an effective combination in improving students' ecoliteracy skills.

## **B. The Effect of the Problem-Based Learning Model-Local Wisdom with ELIKOSIS Media on Students' IPAS Learning Outcomes**

The results of the study indicate that the application of PBL-Local Wisdom with ELIKOSIS media has a significant effect on improving students' IPAS learning outcomes. This improvement is evident at all cognitive levels (C1–C6), which is in line with the syntactic characteristics of PBL designed to activate multi-level thinking processes. In the first syntax, namely orientation to the problem, students are introduced to real issues related to mountain ecosystems and the preservation of Edelweiss, thereby stimulating basic cognitive abilities such as remembering and understanding concepts (C1–C2). According to Arends (2012), presenting authentic problems from the outset can trigger a focus on learning and facilitate the activation of prior knowledge that is important in understanding new material.

In the second stage, organizing students for learning, students are directed to formulate steps to solve problems. This activity develops application and analysis skills (C3–C4) because students need to determine strategies and divide roles within the group. Joyce & Calhoun (2024) mention that the process of organizing groups in problem-based learning can encourage cognitive elaboration, which has an impact on improving conceptual understanding.

The third syntax, namely guiding inquiry, provides space for students to develop their analytical and evaluative skills (C4–C5) through observation, discussion, and exploration of environmental phenomena. This stage is very important because students not only receive information, but also construct knowledge independently through the investigative process. Bransford, Brown, and Cocking (2000) emphasize that context-based investigation allows students to build deeper and more meaningful cognitive structures.

The fourth syntax, developing and presenting work, encourages students to communicate their findings and formulate solutions based on their investigations. This activity contributes to the development of evaluation and creation skills (C5–C6). According to Lie et al. (2020), the presentation process in problem-based learning enhances higher-order thinking skills because students must integrate, reorganize, and present arguments based on the evidence obtained.

The fifth syntax, which is analyzing and evaluating the problem-solving process, strengthens students' metacognitive abilities in reflecting on the effectiveness of strategies and understanding gained. This stage greatly influences the achievement of HOTS (C4–C6) because it involves self-assessment and concept refinement activities. This opinion is in line with the view of Slavin et al. (2025) that reflection is a key component to ensure that learning truly forms deep and sustainable understanding.

The effectiveness of PBL in this study was further enhanced by the support of ELIKOSIS media, which is a game-based media modified with the context of the Edelweiss ecosystem. Engklek, as a motor and socio-educational activity, is highly relevant to the developmental characteristics of elementary school students who are in the concrete operational stage, where the learning process occurs optimally through play, movement, and direct experience (Piaget, 1964; Berk, 2015). Thus, ELIKOSIS not only provides physical and visual stimuli but also creates enjoyable, contextual, and meaningful learning experiences that positively impact learning outcomes.



In addition, the integration of Edelweis local wisdom into learning media provides a rich context that deepens students' understanding of ecosystem material. Edelweis, as an "eternal flower" and a symbol of mountain culture, introduces the values of conservation, sustainability, and ecological responsibility into the learning process. Orr (1994) explains that context-based learning can strengthen scientific concept understanding by connecting knowledge with the identity of the place and the cultural experiences of learners. Thus, IPAS learning not only improves cognitive achievement but also builds ecological sensitivity and environmental conservation values.

Overall, the integration of PBL syntax that encourages multi-level thinking processes, ELIKOSIS media that is tailored to students' developmental characteristics, and the context of Edelweis local wisdom makes the learning process more effective and meaningful. The results of this study illustrate that this innovative approach contributes significantly to improving IPAS learning outcomes at various cognitive levels.

## CONCLUSION

Based on the data analysis and discussion conducted regarding the Effect of the PBL–Local Wisdom Model with ELIKOSIS Media on Students' Ecoliteracy Skills and IPAS Learning Outcomes, the following conclusions can be drawn.

- a. There is a significant effect of the PBL–Local Wisdom Model with ELIKOSIS Media on the Ecoliteracy Skills of Elementary School Students.
- b. There is a significant effect of the PBL–Local Wisdom Model with ELIKOSIS Media on the IPAS Learning Outcomes of Elementary School Students.

## SUGGESTIONS

Based on the results of the study on the Effect of the PBL–Local Wisdom Model with ELIKOSIS Media on Students' Ecoliteracy Skills and IPAS Learning Outcomes, the researchers offer the following suggestions.

- a. For elementary school students, it is recommended to increase independence in exploring IPAS material through reading, observing the environment, and actively discussing in groups. In addition, developing an attitude of caring for the environment and fostering awareness to preserve culture and local wisdom, especially related to the conservation of Edelweiss flowers as a symbol of mountain ecosystem preservation, must be maintained and preserved together.
- b. For elementary school teachers, it is recommended to integrate the PBL model with local wisdom more regularly in IPAS learning, as it has been proven effective in improving students' conceptual understanding and ecological awareness. In addition, ELIKOSIS media can be used as an alternative active learning medium to increase student engagement and motivation.
- c. School policymakers are expected to provide space and facilities for the development of learning media based on local culture. In addition, there is a need for environment-based school programs (eco-schools) so that the values of eco-literacy learned by students can be reinforced through real activities. Creative media development workshops such as ELIKOSIS are also important so that teachers have the ability to design media based on local wisdom.
- d. For future researchers, it is hoped that they can develop this research at different grade levels or in other science subjects by adding other variables such as environmental awareness, ecological intelligence, and critical thinking skills. In addition, ELIKOSIS media can be developed into a digital version or interactive application so that it can be used more flexibly in 21st-century learning.

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