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Research Article



Analysis of environmental literacy and awareness to maintain environmental sustainability

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ABSTRACT

Environmental damage is the effect of negative impacts on the natural environment caused by human activities. The importance of empowering knowledge and caring for the environment in students so that they can participate in protecting and preserving the environment. The purpose of this research is to describe literacy and environmental awareness to preserve the environment and the relationship between environmental literacy and awareness to preserve the environment. This research method uses descriptive quantitative research and research techniques using a questionnaire with a sample of 50 students using a random sampling technique in the Adiwiyata school program, especially junior high school students. The instruments used were student characteristic sheets, environmental literacy, and environmental awareness questionnaires. Research data were analyzed descriptively and the relationship between literacy and environmental awareness used correlation analysis using SPSS. The results showed that students' environmental literacy was classified as moderate to high with a score of 1.6 – 3.20. The average value of students' environmental awareness is 73% indicating that students have a caring attitude toward environmental problems. Environmental attitudes and environmental awareness also have a significant relationship (sig <0.05). Through environmental literacy and awareness, students will have the potential to protect and preserve the environment.

Keywords: Awareness; education; environmental; literacy

22

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INTRODUCTION

The sustainability of life is currently threatened by significant environmental issues like global warming, ozone depletion, and species extinction. At this time, environmental concerns on a global scale are frequently discussed. Excessive exploitation of natural resources without sustainable conservation

causes a lot of environmental harm (Nasution, 2016). The consequences of environmental damage can be far-reaching and have severe implications for ecosystems, wildlife, human health, and the planet as a whole. All of this can happen because humans do not live in harmony with nature and take advantage of nature without thinking (Hassan et al., 2020).

Concern for the environment which is included in the environmental literacy of the Indonesian people is still relatively low (Santoso et al., 2021). This leaves various problems that do not care about the environment. The national average index is 0.57 so people have not behaved in caring for the environment in their daily lives based on the results of the 2012 Ministry of Environment Survey with a sample of 12 provinces (Subhan, 2017). Human behavior is a major factor causing environmental damage globally. This is due to the lack of environmentally caring behavior, especially in Indonesia (Ahmad, 2017).

Human behavior is the main factor causing environmental damage globally. This is due to the lack of environmental care behaviors, especially in Indonesia (Ahmad, 2017). Environmental care behavior needs to be empowered from an early age in schools so that all students have the habit of protecting and preserving the environment. This is important because students with high environmental literacy also have high environmental awareness. Based on the results of observations at SMPN 7 Tuban, show that students have knowledge and attitudes toward caring for the environment but are less active in carrying them out. (Susilastri & Rustaman, 2015). Lack of concern for the environment is a problem in the school life order, so that concern for the environment is no longer a necessity for them. So the attitude toward environmental literacy and environmental awareness needs to be improved because knowing the ability of environmental literacy and students' attitudes towards the environment can build a sense of love for the environment. This can be done by means of habituation activities carried out outside of class hours to help foster environmental awareness for students to the maximum so that they are trained to do actions that support environmental conservation (Saputra, 2017).

One of the efforts of the government in Indonesia to increase environmental care behavior is through the Adiwiyata school program which plays a role in developing knowledge about development and environmental balance (Iswari & Utomo, 2017). The existence of the Adiwiyata program is expected to increase students' understanding and concern for environmental problems. Education plays a strategic role as a means of changing human attitudes toward environmental issues. Environmental literacy analysis is one method that can be used to develop an attitude toward environmental care. Environmental literacy is the ability or skill to protect the environment now and in the future (Goldman et al., 2018). Environmental literacy can be interpreted as knowledge about the relationship between the natural environment and humans whose job is to preserve the environment (Erdogan, 2015; Karatekin, 2012). Environmental literacy can be used as a basis for assessing the effect of environmental education on students.

Environmental literacy research has several very important urgencies, especially given the increasingly complex and urgent environmental challenges. Environmental literacy education for students can help create a generation that cares and is aware of the importance of maintaining and protecting the natural environment for the sake of the earth's sustainability. In addition, students who learn about the environment tend to imitate environmentally friendly behavior and contribute to finding solutions to environmental problems. However, students' environmental literacy at the junior high school level is in the moderate category (Santoso et al., 2021). The results showed that the students' cultural understanding profile and environmental literacy were in the medium category. Through this research, it can be seen the effect of the Adiwiyata school program on awareness of maintaining the student environment and student environmental literacy as a provision for living in the 21st century which is experiencing an ecosystem

imbalance. The difference between this environmental literacy research and other research is that the indicator of environmental literacy skills only consists of ecological knowledge, attitudes, and habits of protecting the environment without using other treatments. In this case, school students with the Adiwiyata program are the focus of research to determine the profile of environmental literacy and protect the environment.

Environmental literacy in students has many benefits and its importance is recognized in the context of education and environmental sustainability. With this knowledge, students become more aware of how individual and societal actions can impact the environment. They can learn about energy-efficient use, recycling, reducing waste, and other ways to protect the environment. They can be part of environmental groups in schools or communities that work to protect the environment. They will better understand the importance of caring for and protecting the environment for future generations. Therefore, environmental literacy helps students improve their critical skills and abilities in dealing with environmental challenges. This can inspire a sense of interdependence between humans and nature and form a more harmonious relationship. They can become agents of change in efforts to protect our planet. (Mitarlis et al., 2017). Someone who has good environmental literacy can become a more effective agent of change in an effort to protect the environment for current and future generations (Ramdas & Mohamed, 2014). Environmental awareness, also called ecological awareness, is the understanding and awareness of individuals or communities about protecting and preserving the natural environment. Environmental awareness involves understanding that our actions as humans have a major impact on the earth and the living things on it. Therefore, this study aims to describe environmental literacy and environmental awareness needed to maintain environmental sustainability and the relationship between environmental literacy attitudes and environmental awareness.

RESEARCH METHODS

This study is based on descriptive research. The population of this study consisted of 50 students of grades VIII C and VIII E SMP N 7 Tuban in the 2021–2022 school year and the study was conducted for 3 months August-October. The entire population, amounting to 50 students from classes VIII C and VIII E, was sampled in this study because students are less than 100. The research instrument was a literacy and environmental awareness questionnaire for preserving the environment which was adapted from Szczytko et al., (2019).

The environmental literacy test consists of indicators of ecological knowledge, attitudes, and behavior in the environment that have been declared reliable and can be seen in Table 1. The measurement of environmental literacy test results is based on each item: For ecological knowledge, which consists of 16 questions, each item is worth 1 and each wrong answer 0. For attitudes towards the environment and environmental protection behavior, it consists of 12 questions calculated based on Likert scale criteria. The environmental sustainability awareness questionnaire consists of 15 questions with the answer criteria "always, often, rarely, sometimes, and never." Environmental literacy indicators were tested by students then the results were explained descriptively then the data was transformed according to the environmental literacy categories described in Table 2. Awareness to maintain environmental sustainability is described in Table 3. Data analysis techniques are carried out by calculating the results of environmental literacy test assessments and environmental awareness questionnaire sheets. For the ecological knowledge test, it is calculated using the following formula.

Table 1. Validation Test Results

Scale	Cronbach's alpha
Ecological knowledge	0,71
Hope	0,75
Behaviour	0,62

The measurement of environmental literacy test results is based on each item. For ecological knowledge, which consists of 16 questions, each item is worth 1 and each wrong answer 0. For attitudes towards the environment and environmental protection behavior, it consists of 12 questions calculated based on Likert scale criteria. The environmental sustainability awareness questionnaire consists of 15 questions with the answer criteria "always, often, rarely, sometimes, and never." Environmental literacy indicators were tested by students then the results were explained descriptively then the data was transformed according to the environmental literacy categories described in Table 2. Awareness to maintain environmental sustainability is described in Table 3. Data analysis techniques are carried out by calculating the results of environmental literacy test assessments and environmental awareness questionnaire sheets. For the ecological knowledge test, it is calculated using the following formula.

$$\text{Environmental literacy (\%)} = \frac{\text{number of correct answers}}{\text{sum of all correct answers}} \times 100\%$$

Table 2. Range of Environmental Literacy Outcomes

Range of Environmental Literacy Outcomes	Information
3,21-4,00	Very high
2,41-3,20	High
1,61-2,40	Medium
0,81-1,60	Low

Table 3. The Range of Results of The Awareness Questionnaire to Maintain Environmental Sustainability

Average score (%)	Category
85-100	Very high
70-84,9	High
55-69,9	Medium
40-54,9	Low
25-39,9	Very low

The research data obtained will be analyzed descriptively. Furthermore, where is the relationship between literacy and environmental awareness will be tested through correlation analysis using SPSS for Windows.

FINDING AND DISCUSSION

This study was conducted at SMPN 7 Tuban with 50 participants, and the following student characteristics are presented which can be seen in Table 4. It can be seen that based on gender, women dominate with 27 and male students with 23 people, with an average age of 14 years, although there are other age ranges such as ages 13, 15, and 16. According to where they live, 70% of average students live in the village and 30% in the city.

Table 4. Student characteristics

No	Characteristics	Frequency	Percentage
1	Gender:	N=50	N=100%
	Male	23	46%

No	Characteristics	Frequency	Percentage
2	Female	27	54%
	Age:		
	13	5	10%
	14	39	78%
	15	5	10%
3	16	2	2%
	Residence:		
	Village	35	70%
	City	15	30%

The level of environmental literacy of students can be determined through administering tests which consist of indicators of ecological knowledge, attitudes and behavior in protecting the environment. The question items in this ecological knowledge test contain 16 question items that are in accordance with the indicators of ecological knowledge. The question items are multiple choice. From the results of this ecological knowledge. The average ecological knowledge of students gets an average score of 76% percentage which is presented in Figure 1.

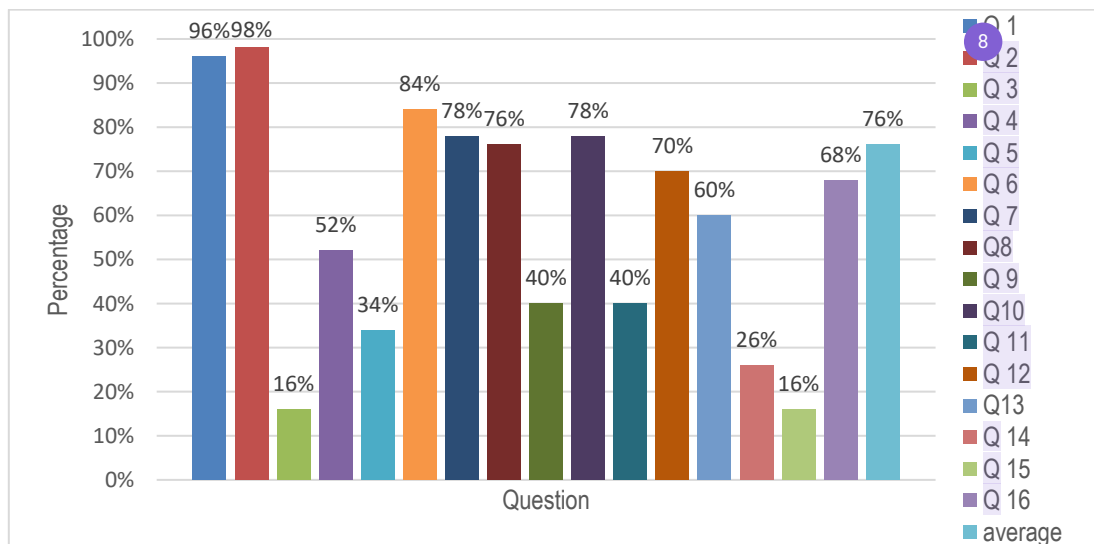


Figure 1. Percentage of Ecological Knowledge Test Results

Based on Figure 1, the average percentage of correct answers is 59.4%. with the lowest range of values being 16% to 98%. The existence of this low score is influenced by many things, especially the learning process that occurs in schools. When the proportion of correct answers obtained by students is considered, the aspects of students' ecological knowledge about ecology are classified as medium-high. This is because students do not get ecology lessons but get biology lessons in general. Factors that influence students' environmental literacy include educational curricula, committed teachers, field experience, relevant learning resources, strategies and models of environmental learning by utilizing technology. This causes science learning in schools to make a significant contribution to environmental or ecological knowledge (Sarbassova et al., 2021). Student ecological knowledge profile can be seen in Figure 2.

Based on Figure 2, ecological knowledge profiles show 36% of students are categorized as having high ecological knowledge and 64% are categorized as moderate. This percentage shows that students in general have understood the concepts of ecology and the environment. Students have good knowledge about plants and animals from different communities. Thus, the success of pedagogical activities in the

field of forming environmental literacy depends on the teacher's role in attracting students' interest (Sarbasova et al., 2021).

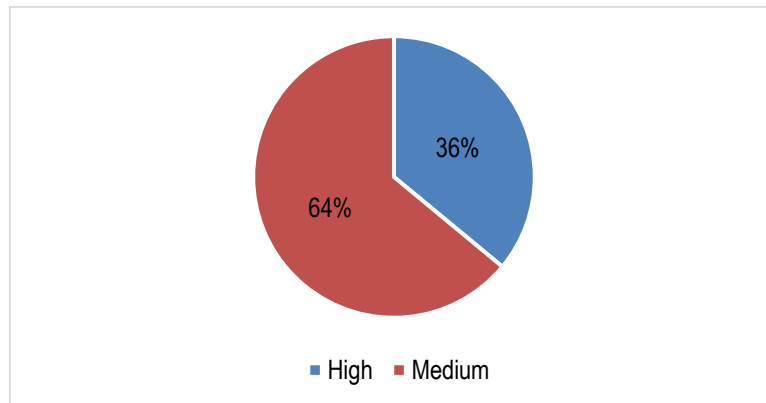


Figure 2. Student Ecological Knowledge Profile

Waqidah et al., (2020), the Adiwiyata program has the potential to create a positive impact in the long term. By involving students and schools in environmental activities, it is hoped that they will become a generation that is more concerned, aware and responsible for the environment around them (Nurwidodo et al., 2020). This positive impact strengthens the environmentally friendly school program in building and developing environmental literacy. The results of students' environmental attitudes can be presented in Figure 3.

Based on the Figure 3 in below, the attitude profile towards the environment based on the results of data analysis shows that students have a positive attitude towards the environment, with an average figure of 72% in the high category. The high attitude of students towards the environment in the Adiwiyata school program has an effect on environmental preservation (Febriani et al., 2020). From the results of this protective behavior test, this student obtained the value of the student's environmental attitude, which can be presented in Figure 4.

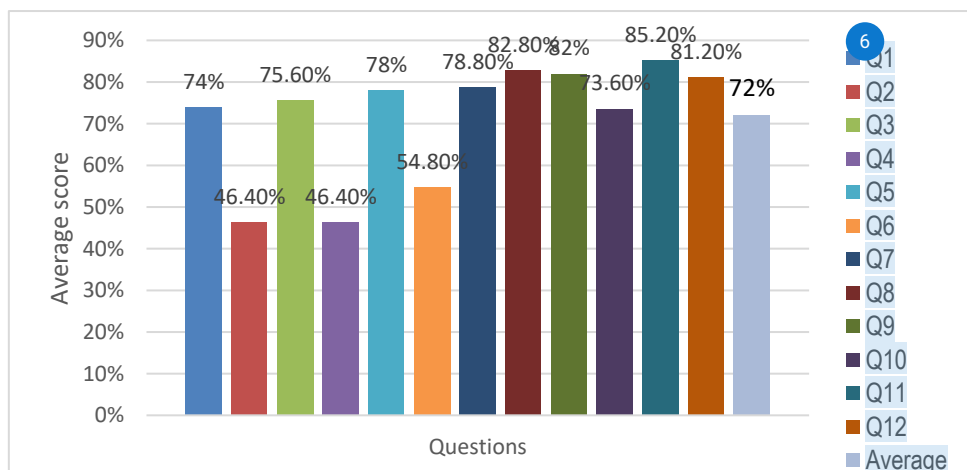


Figure 3. Average Score for Each Question

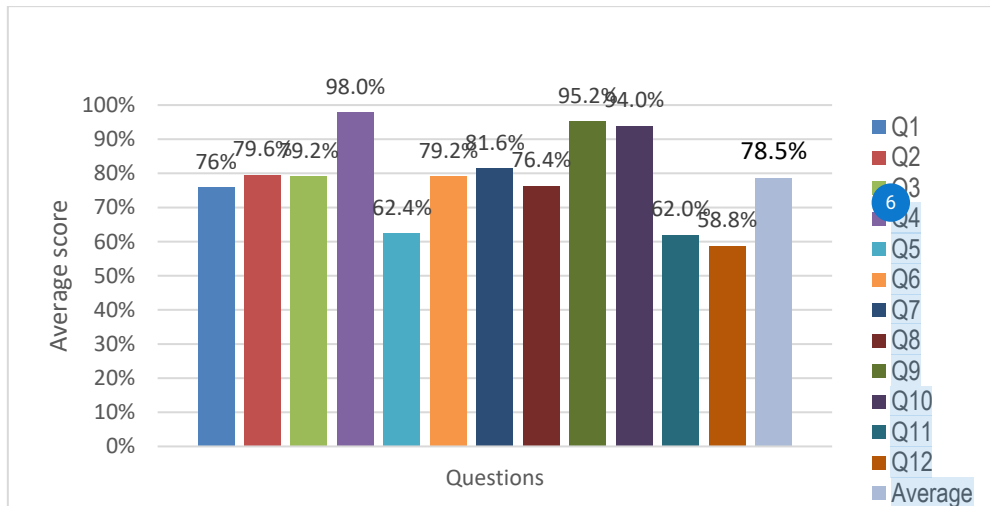


Figure 4. The Average Results of Environmental Protective Behavior

Based on Figure 4, shows that students have positive behaviors in protecting the environment, which shows an average figure of 78.50% in the high category. This shows that knowledge and awareness attitudes on the environment affect students' habits in protecting the environment. This is in accordance with research Munawar et al., (2019) which results in a high environmental knowledge score, then a high environmental awareness score. Environmental knowledge contributes to students' environmental awareness. The environmental literacy test consists of three indicators including ecological knowledge, attitudes and behavior. The results of this environmental literacy test analysis show that the average criterion is good. The environmental literacy profile is presented in the following Figure 5.

Based on Figure 5, it is known that ecological knowledge test shows high criteria, environmental protective behavior test shows high criteria, and attitudes towards the environment test show high criteria. This is consistent with Diarto et al. (2012) explain that explains that environmental knowledge has a relationship with attitudes towards the environment. Environmental knowledge and ethics are related to attitudes towards the environment. The attitude of protecting the environment is related to the behavior of protecting the environment. The greater one's understanding and awareness of the environment, the more likely one is to protect it.

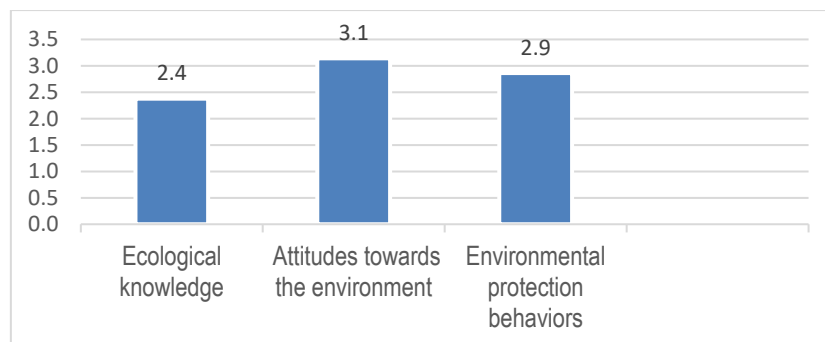


Figure 5. Environmental Literacy Test Profile

To find out students' environmental awareness by using a questionnaire consisting of 15 questions that are in accordance with environmental awareness indicators. From the results of this questionnaire, an average student environmental awareness score of 73% showed that students already had an attitude of concern for environmental issues. This can be seen by the proportion of the achievement value of the

attitude that students really want to participate in saving the environment. The results of the student's awareness gain are presented in the following Figure 6. One of the efforts to improve students' environmental literacy can use the PBL learning model in class and outside the classroom. The PBL learning model is predicted to be able to make learning effective, efficient, and get maximum results. Furthermore, empowerment of environmental literacy must be carried out in a sustainable manner (Febriasari & Supriatna, 2017).

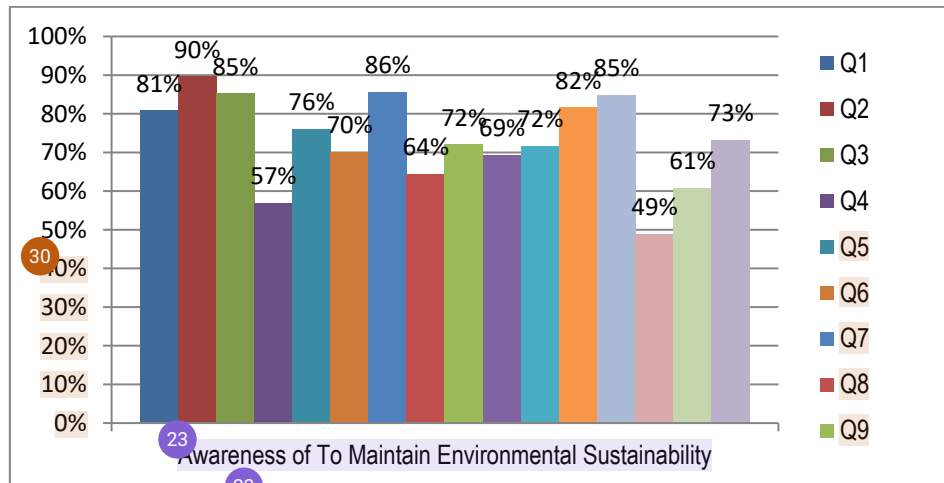


Figure 6. Awareness of To Maintain Environmental Sustainability

The results of the relationship between environmental literacy and awareness to maintain environmental sustainability show a very strong relationship. The correlation results are shown in Table 5. Table 5 explains that there is a significant relationship between environmental knowledge variables and awareness of environmental sustainability. The variables of attitudes towards the environment and behavior to protect the environment also have a significant relationship with a significance value of $0.00 < 0.05$ and $0.002 < 0.017$. The results of this research are in line with the statement Yudha et al. (2020) that there is an influence of the Adiwiyata program on environmental literacy.

Table 5. Results of Correlation Analysis

		Ecological Knowledge	Attitudes Towards The Environment	environmental protective behavior	Awareness of To Maintain Environmental Sustainability
Ecological Knowledge	Pearson Correlation	1	-,170	-,087	-,339*
	Sig. (2-tailed)		,237	,550	,016
	N	50	50	50	50
Attitudes Towards The Environment	Pearson Correlation	-,170	1	,439**	,598**
	Sig. (2-tailed)	,237		,001	,000
	N	50	50	50	50
environmental protective behavior	Pearson Correlation	-,087	,439**	1	,336*
	Sig. (2-tailed)	,550	,001		,017
	N	50	50	50	50
Awareness of To Maintain Environmental Sustainability	Pearson Correlation	-,339*	,598**	,336*	1
	Sig. (2-tailed)	,016	,000	,017	

	Ecological Knowledge	Attitudes Towards The Environment	environmental protective behavior	Awareness of To Maintain Environmental Sustainability
N	50	50	50	50

Based on the results of this study shows that there is a significant correlation between environmental literacy and awareness of to maintain environmental sustainability. The environmental literacy profile shows good results. When students have good knowledge, the attitudes and habits of students will be good for protecting the environment. Because there is a correlation between environmental awareness and student participation to support Go Green School activities in the school environment. A person who has good environmental awareness will influence his attitude and participation in environmental conservation. A positive relationship between environmental awareness and attitudes towards the environment. SMPN 7 Tuban as one of the Adiwiyata schools in Tuban Regency has provided knowledge about the environment to school residents, especially students to increase student awareness in maintaining and preserving the school environment. Proper understanding of environmental knowledge in school makes students aware. will environment. Students who have environmental awareness will be sensitive to environmental problems at school and strive to maintain and maintain the school environment with positive actions.

In addition, the existence of the Adiwiyata program also has a big impact on students. The adiwiyata program instills a desire in children to protect and improve the environment. Schools that successfully implement measures to promote environmental education in accordance with established criteria are recognized as adiwiyata schools. The Adiwiyata program can help create better awareness and understanding of environmental issues among students and school staff and encourage the adoption of environmentally friendly behaviors. In addition, the Adiwiyata program can also help build stronger relationships between schools and local communities, which can support sustainable development outside the school environment (Rachmawati, 2023).

Environmental literacy is becoming increasingly important given the enormous challenges facing our planet, including climate change, loss of biodiversity, and pollution. Increasing environmental literacy in students at school is one of the active efforts in protecting the environment for future generations (Liu et al., 2015). The results showed that there were no students who had low environmental literacy. This is in line with the research of Liang et al. (2018), high levels of environmental knowledge correlate with high levels of pro-environmental behavior, and a high level of environmental knowledge correlates with a better attitude.

It is known that students' awareness gets a high score with positive criteria, meaning that students have a high level of awareness. This can happen because of the motivation and concrete evidence of students' actions towards the environment (Sörqvist & Langeborg, 2019). If students have sufficient environmental knowledge and a positive attitude towards the environment, they will be more sensitive to environmental issues, and aspects of positive attitudes include being sensitive to the environment and having the motivation to protect the environment (Erdogan & Marcinkowski, 2015). Solving environmental problems is a complex task and requires the collaborative efforts of the whole society, government, industry, and other organizations. Educational campaigns, seminars, and environmental education programs can help communities understand the impact their activities have on the environment. Included in this policy are environmental protection rules, emission limits, ecosystem protection, and sustainable natural resource management. This includes afforestation, sustainable forest management, and

biodiversity conservation. Reducing the use of fossil fuels, plastic waste and electronic waste is an important step in overcoming greenhouse gas emissions and waste problems in the environment. Reducing emissions from industry, automobiles, and burning waste are some of the steps that can be taken (Al-Dajeh, 2012).

CONCLUSION

Environmental literacy and awareness to preserve the environment for students is good and the relationship between the two is very strong, so students there will have the potential to protect and preserve the environment. Awareness to preserve the environment among students is relatively high. There is a relationship between environmental literacy and awareness to preserve the environment so the higher the level of student knowledge, the greater the impact on increasing student environmental awareness which in turn has an impact on environmentally friendly behavior.

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