

Environmental Literacy of Students at SMA Negeri 6 Wajo, South Sulawesi Province

Ayu Ashari^{1*}, Sjaeful Anwar¹, Omay Sumarna¹

¹ Department of chemistry education, Universitas Pendidikan Indonesia, Bandung, Indonesia

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Corresponding Author:

Ayu Ashari

ayuasharibarsyad@gmail.com

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Abstract: This study aims to determine the level of environmental literacy of students. Research using descriptive quantitative research methods. The respondents of this study were 110 class XII students at SMA Negeri 6 Wajo. The data collection technique uses environmental literacy instruments based on aspects of environmental literacy by NAAEE (North American Association for Environmental Education) consisting of cognitive aspects, attitude, and behavior. Measurement of cognitive aspects using questions while aspects of attitudes and behavior using a questionnaire with a scale *Likert*. The results showed that the environmental literacy of class XII students at SMA Negeri 6 Wajo as a whole (71.3%) was in the medium category with details of cognitive aspects (50.0%) being in the medium category, attitude aspects (84.1%) being in high category and behavior (78.7%) is in the high category.

Keywords: Environmental literacy; high school students

Introduction

Environmental problems are national and international issues. The current environment has various problems that are difficult to overcome (Johnson, 2016). These environmental problems arise as a result of human activities in the form of clearing land for residences and agricultural land causing deforestation and loss of biodiversity. The discharge of aerosols into the atmosphere causes ozone depletion and climate change (Dunlap, 2016). In addition, global environmental problems namely global warming and acid rain. The main cause of this environmental problem is the presence of CO₂ gas which is the result of waste from burning fossil fuels (Achmad, 2004). Some of these environmental problems have become an important concern in various countries in the world, including Indonesia.

Indonesia is a country that has complex environmental problems. Environmental problems in Indonesia are deforestation, sea pollution, air pollution and endangered flora and fauna (Prasetyo & Hariyanto,

2017). Based on an analysis of priority environmental problems, Indonesia has environmental problems in the form of waste, water resources in terms of quality and quantity, as well as environmental issues related to land (KLHK, 2020). Data from the Ministry of Environment and Forestry (KLHK, 2022) recorded that waste generation in Indonesia reached 19.5 million tonnes. Only 14.6 million tonnes of properly managed waste. The rest of the waste that has not been managed causes a decrease in water quality. Water in Indonesia is in the category of heavily polluted. In addition, waste also contributes to flood events which have increased from year to year (Badan Pusat Statistik, 2018).

Environmental problems will have a more complex impact if not handled properly. Environmental problems can be overcome by developing environmental literacy. Environmental literacy is an action based on concern for the surrounding environment. The existence of interaction between humans and their environment can make a person have environmental literacy. There are several components of environmental literacy, namely

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cognitive, competency, attitude, and environmentally responsible behaviour (NAAEE, 2011).

Environmental literacy is important because it allows someone to see environmental problems and understand these problems and believe that environmental problems can be solved (Patterson, 2012). Someone with good environmental literacy will be able to behave commendably and be responsible for their environment (Ramdas & Mohamed, 2014). In addition, according to Daniš (2013), someone who has good environmental literacy is someone who both individually and together with other people can make decisions about the environment; willing to act on decisions to improve the welfare of other individuals, society, and the environment globally and participate in the life of the nation. Based on the previous description, someone with high environmental literacy will have good knowledge, attitudes and behaviour towards the environment. Students are one of the parties who participate in solving environmental problems. One form of environmental literacy that can be applied to students at school is waste management (Rada et al., 2016).

It is important to develop students' environmental literacy, but students' environmental literacy skills in several regions of Indonesia still need to be improved. Research by Meilinda et al. (2017) on the environmental literacy of students at *Adiwiyata Green School* in Surakarta is included in the low category. Research by Hermawan et al. (2022) conducted at a school in Denpasar, Bali, showed that environmental literacy of high school students for the domain of cognitive knowledge was in the high category, while for the domain of attitudes and behaviour, it was in the medium category. Research by Nasution (2016) at Samboja Kuta Kartanegara High School also shows that students' environmental literacy has an environmental literacy level in the medium category. Research by Wardani et al. (2019) conducted at a high school in Karanganyar aimed at measuring and analyzing the environmental literacy of high school students, obtaining the result that 80% of students have less environmental literacy. Based on some of these studies, it can be concluded that in general students' environmental literacy is still in the medium and low categories.

Research on the analysis of environmental literacy of students in the Wajo district, South Sulawesi Province has not been carried out, even though Wajo the district is one of the districts with a high threat of flooding (BPDB, 2021). Floods occurred in Lake Tempe, Wajo district due to environmental problems in the form of lake sedimentation caused by the accumulation of garbage, water hyacinth growth, land conversion, and water hyacinth cultivation for fish breeding (Zamzani et al., 2022). Apart from the area around Lake Tempe, flooding

also occurred in several sub-districts in the Wajo district (BPDB, 2021).

Based on this description, it is necessary to analyze the environmental literacy of high school students in the Wajo district. Therefore this study aims to determine the environmental literacy level of class XII students at SMA Negeri 6 Wajo. The results of the research can be used as a basis for making decisions related to education by the government. In addition, research can be done to develop teaching materials that can support the development of students' environmental literacy.

Method

This research is a type of descriptive quantitative research. This research was conducted at SMA Negeri 6 in Wajo Regency, South Sulawesi Province. The research respondents were 110 class XII students. The collection of environmental literacy data was carried out using questions and questionnaires based on aspects of environmental literacy by NAAEE (2011). The data collected is in the form of cognitive data, attitude, and behaviour. Cognitive questions were adapted from Yeh et al. (2021), the attitude questionnaire was adapted from Alemari (2016) and behaviour was adapted from Szczytko et al. (2019). The instrument has been validated by two expert lecturers. Cognitive questions are given a score according to the rubric. Attitude and behaviour questionnaire using a scale *Likert*. The results of environmental literacy data are processed in percentage form using the following formula:

$$NP = \frac{R}{SM} \times 100\% \tag{1}$$

(Purwanto, 2013)

- Information:
- NP: Value (%)
- R: Scores obtained by students
- SM: Maximum test score

Then the results of environmental literacy scores are categorized into three categories. Environmental literacy categories are shown in the following table:

Table 1. Environmental Literacy Categories Score

Range score	Interpretation
22.2% - 48.1%	Low
48.2%-74.1%	Medium
74.2%-100%	High

(Putra et al., 2021)

Overall, the research process can be seen in the scheme in Figure 1.

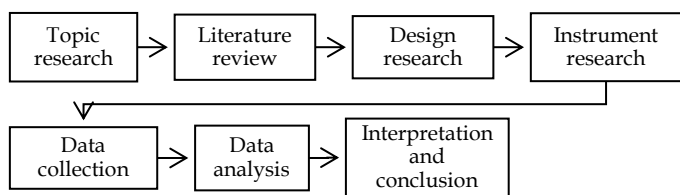


Figure 1. Research Process Scheme

Result and Discussion

Environmental literacy is important because it allows someone to see environmental problems and understand these problems and believe that environmental problems on earth can be solved (Patterson, 2012). Someone with high environmental literacy will be able to behave commendably and be responsible for the environment (Ramdas & Mohamed, 2014). The results of students' environmental literacy in this study are shown in Table 2 and Table 3:

Table 2. Scores and Categories of Students' Environmental Literacy Aspects

Aspect	Score	Interpretation
Cognitive	50.0 %	Medium
Attitude	84.1 %	High
Behaviour	78.7 %	High
Environmental literacy	71.3%	Medium

Table 3. Frequency and Categories of Students' Environmental Literacy Aspects

Environmental literacy aspects	The number of students		
	High	Medium	Low
Cognitive	16	43	51
Attitude	105	5	0
Behaviour	83	27	0

Based on the results of the research data analysis shown in Table 2 for each aspect of student environmental literacy, it was found that the cognitive aspect had a score of 50.0% in the medium category, the attitude aspect had a score of 84.1% which was in the high category and the behavioural aspect had a score of 78.7% are in the high category. Overall, the environmental literacy of SMA Negeri 6 Wajo student is a score of 71.3% in the medium category.

Cognitive aspects of students are in the medium category. The cognitive aspects of environmental literacy that are measured include three things, namely the identification of environmental problems, analysis of solutions to environmental problems, and choosing the most feasible solution accompanied by an action plan. In Table 3 it can be seen that the number of

students in the low environmental literacy category has a large number of 51 students but in the attitude and behaviour aspect, there are no students in the low category. Based on students' answers on the measurement of cognitive aspects, it shows that overall students have been able to identify environmental problems, but they have not been able to analyze solutions and choose the most likely solutions to solve environmental problems. The aspect of attitude and behaviour of students shows a high category. This shows that students already have a good attitude and behaviour toward the environment.

The results of the study as a whole show that students' environmental literacy is in the medium category. This is in line with research by Nasution (2016) and Hermawan et al. (2022) found that students have an environmental literacy level in the medium category. The results of the environmental literacy score are displayed graphically in Figure 2.

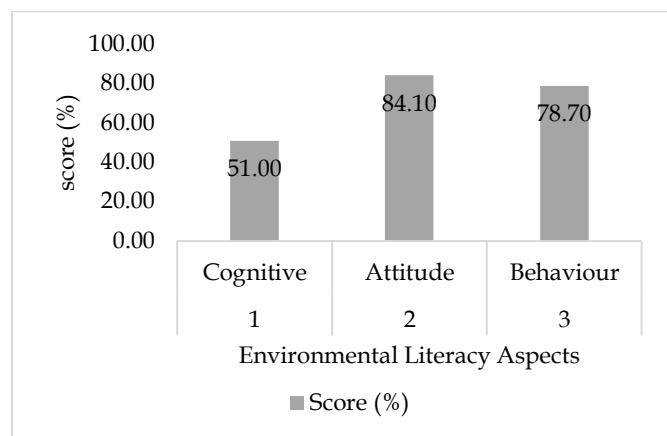


Figure 2. Student's Environmental Literacy Score

The moderate category on the cognitive aspect shows that some students do not have good environmental literacy. This can be described using the data in Table 3. In this table, the number of students with low and medium environmental literacy categories in cognitive aspects is greater than students with high environmental literacy categories. The cognitive aspect of low environmental literacy can indicate that the quality of students' learning experiences is lacking. According to Rokhmah & Fauziah (2021) and Santoso et al. (2021) students' environmental literacy is low because students do not get the opportunity to interact with environmental problems that surround them. Class-centred learning so that students' opportunities to learn outside the classroom are limited, resulting in a lack of student learning experience. In addition, low cognition is also caused by several factors from several aspects, namely students, teachers, and school facilities and infrastructure (Santoso et al., 2021).

The attitude aspect is in the high category. This indicates that students have a good attitude toward the environment. This can be described using the data in Table 3. In this table, students with high environmental literacy categories in the attitude aspect have the most number. Students' attitudes toward the environment can be influenced by environmental education obtained from the family and the surrounding environment (Afrianda et al., 2019). The social environment of students also has an important role in forming attitudes toward the environment. The social environment includes the school environment, family, and community (Tamara, 2016). A good attitude of students towards the environment is influenced by the school environment, family, and the surrounding community. The behavioural aspect is in the high category. This indicates that most students have good behaviour toward the environment. This can be described using the data in Table 3. In this table, students with high environmental literacy categories in the behavioural aspect have the most number. The behaviour in question is related to the extent to which students are involved in protecting the environment, for example, by recycling or saving water (Szczytko et al., 2019). Several factors influence students' responsible behaviour towards the environment, namely family, habits, environment (friendships, school or surroundings), and information (Istiana et al., 2020).

The same category is for aspects of attitude and behaviour, namely the high category. This happens because there is a positive relationship between attitudes and behaviour. A high attitude toward caring for the environment is in line with high environmentally responsible behaviour (Azhar et al., 2016) and (Sujana & Hariyadi, 2018). Students with good environmental care attitudes will have good behaviour towards the environment. Overall aspects of students' environmental literacy are still in the medium category. This indicates that there is still a gap between aspects of environmental literacy. Therefore, students' environmental literacy still needs to be improved, especially in the cognitive aspect.

Students' environmental literacy can be improved through the implementation of teaching materials containing aspects of environmental literacy. Implementation of teaching materials is effective in increasing students' environmental literacy Septiani et al. (2020) and (Suryanti et al., 2018). In addition, students' environmental literacy can also be improved through the application of learning models. Students' environmental literacy is improved through a problem-based learning model (Febriasari & Supriatna, 2017).

Conclusion

The environmental literacy of class XII students of SMA 6 Wajo as a whole is in the medium category.

Cognitive aspects are in the medium category, and attitudes and behaviour aspects are in the high category. Recommendations for further research are the need for teaching materials that can develop students' environmental literacy.

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Author Contribution

Conceptualization: A.A., S.A. and O.S.; methodology: A.A., S.A. and O.S.; validation: S.A. and O.S; investigation: A.A.; resources: A.A.; formal analysis: A.A.; data curation: A.A.; writing – review and editing: A.A., S.A. and O.S; supervision: S.A. and O.S. All authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The author declares that there is no conflict of interest in this research.

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