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Research Article

Student's environmental literacy based on Adiwiyata and non-Adiwiyata at senior high school in Sleman, Yogyakarta

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ABSTRACT

Environmental problems in Indonesia increase the government's efforts in shaping students' environmental care character through the Adiwiyata program. This study was conducted to determine differences in environmental literacy between Adiwiyata and non-Adiwiyata schools in Senior High School (SHS) in Sleman Regency, Yogyakarta. This survey research using a conventional sampling technique. The sample involved in this study was 1,568 students from nine schools in Sleman Regency. The data collection instrument refers to the instrument developed by the North American Association for Environmental Literacy (NAAEE) and is supported by interviews and observations. Measurement of environmental literacy in this study was carried out in two domains: competence and disposition. Comparative data analysis used the Mann Whitney test assisted by SPSS 25 for windows. The results showed that students' environmental literacy in the Sleman Regency was included in the good category in the competency and disposition domain. Environmental literacy abilities in Adiwiyata and non-Adiwiyata schools differ, both in the competency domain which includes competence (sig <0.05) and environmental literacy (sig 0.002), and in the disposition domain with sig <0.05. These results concluded that there were differences in students' environmental literacy skills between Adiwiyata and non-Adiwiyata schools. This research recommends that schools initiate programs to strengthen environmental literacy through strengthening the character of caring for the environment.

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INTRODUCTION

The decline in environmental quality is currently a problem caused by an increase in population (Bellard, Bertelsmeier, Leadley, Thuiller, & Courchamp, 2012). The world's population in 2019 is estimated to reach 7.7 billion and is projected to continue to grow from 9.8 billion to 11.2 billion in 2050. In Indonesia, the BPS census results report that Indonesia's total population in 2020 is 270.20 million, or an increase of 32.56 million from the 2010 census (Badan Pusat Statistika, 2020). Furthermore, the data shows that 70.72% of the

population is in the productive age period with needs and high mobility. Some researchers say that an increase in population implies an increased need for a good environment and shelter (Hanjra & Qureshi, 2010; Martin, Maris, & Simberloff, 2016).

On the other hand, the increase in population is paradoxical with the increasingly limited availability of natural resources (Martin et al., 2016). The increased activity of the population has the potential to impact environmental problems (Karatekin, 2012; Rose, 2013). Furthermore, researchers believe that people with low environmental awareness increase the potential for environmental problems (Hollweg et al., 2012). Environmental problems that occur in the local and global environment with the rate of damage that continue to increase qualitatively and quantitatively encourage environmental management improvements, one of which can be done through education (Stoller-Patterson, 2012). Education is an essential step in changing people's behaviour towards the environment (Conde & Samuel Sánchez, 2010; Nastoulas, Marini, & Skanavis, 2017).

The main objective of developing environmental education is to develop environmental literacy (McBeth et al., 2011; McBeth & Volk, 2009; Saribas, 2015). A person is said to have a good mastery of environmental literacy if he has understanding, knowledge, character, values, ethics, and skills in preventing environmental problems and has the drive to protect and improve the quality of the environment for present and future generations (Alkaher & Goldman, 2018; Shamuganathan & Karpudewan, 2015). Environmental literacy consists of four aspects i.e. knowledge, competence, disposition, and environmentally responsible behavior (Hollweg et al., 2012; McBeth & Volk, 2009).

Many researchers believe that environmental education is an effective way to change behavior (Frisk & Larson, 2011; Hudson, 2001; Sawitri, 2016; Yu & Yu, 2017). A literate person is expected to develop understanding, skills, and awareness in treating the environment (Ichsan, Sigit, Miarsyah, Azrai, & Heryanti, 2019). In Indonesia, environmental education is one of the eighteen character values integrated with the 2013 revision of 2017 (Nurwidodo, Amin, Ibrohim, & Sueb, 2020). Besides, environmental literacy is also facilitated through the Adiwiyata program, which demands environmental education in every subject (Desfandi, Maryani, & Disman, 2017; Pradini, Sudjanto, & Nurjannah, 2019). The Adiwiyata program aims to encourage and form environmentally caring and cultured schools capable of implementing and implementing environmental conservation and sustainable development to create present and future. According to Adiwiyata Regulation No.5 of 2013, the program objectives to be achieved include four main components, namely environmentally friendly school policies, environmentally-based curriculum, participatory activities, and management of environmentally friendly school facilities and infrastructure.

According to several previous studies, Adiwiyata school affects environmental literacy (Nurwaqidah, Suciati, & Ramli, 2019; Nurwidodo et al., 2020). (Deswari & Supardan, 2016; Pradini et al., 2019) added that the integration of environmental education in the Adiwiyata program is reported to foster student eco-literacy in the realms of knowledge, disposition, and habits. In Turkey, (Erdoğan, Kostova, & Marcinkowski, 2009; Gultepe, 2016; Ozsoy, Ertepinar, & Saglam, 2012) also shows the same thing. According to it, students in the school environment can be involved in environmental activities so that environmentally-based schools effectively increase environmental literacy students (Karatekin, 2012). However, schools' programs can be said only to have an effect of 30% in fostering environmental literacy in students (Susilastri & Rustaman, 2015).

Furthermore, there are no studies that reveal how environmental literacy is in non-Adiwiyata schools. This research needs to be carried out to map how students' environmental literacy compares to the two types of schools. This study aims to measure how the students' environmental literacy is based on the Adiwiyata type.

METHOD

This descriptive study uses a quantitative approach with a survey method. This study's population is a hypothetical population, namely the existing population, the present, and the future, while the sample in this study is a conventional sample. This study sample was 1568 grade X and XI students in nine schools consisting of five Adiwiyata schools and four non-Adiwiyata schools in Sleman Regency, Yogyakarta Special Region Province. This research was conducted from January to March 2020.

The instruments in this study were adapted from the North American Association for Environmental Literacy (NAAEE) (McBeth et al., 2011; Mcbeth et al., 2014). This study's data were obtained using a competency domain test instrument and a non-test instrument disposition domain questionnaire. As

supporting data, observations and interviews were conducted regarding the implementation of the Adiwiyata program in schools. This research instrument has been validated by expert judgment, material experts, and teaching experts. The instrument was tested on 60 students and empirically validated with the Quest program. The instruments used in this study were in Table 1.

Table 1. Research instrument

No.	Aspects	Instrument	Type of data
1.	Competencies	Essay questions	Primary data
2.	Disposition	Likert scale questionnaire	Primary data
3.	Adiwiyata Implementation	Interviews and observations	Secondary data

The data obtained in the study were tabulated using descriptive sentences, then statistically processed using the SPSS 25 for windows program. The Kolmogorov-Smirnov test results showed sig <0.05, which means that the data were not spread normally, while Levene's test showed sig 0.464 (>0.05), which means that the variance of the two groups is the same or homogeneous. The Mann-Whitney test followed up the prerequisite test results because the assumption of normality could not be fulfilled.

RESULTS AND DISCUSSION

The results showed that students' average environmental literacy in Adiwiyata and non-Adiwiyata schools were not much different. The average environmental literacy skills in Adiwiyata schools show a value of 67.01, while the environmental literacy skills in non-Adiwiyata schools are 63.70. Figure 1 shows students' environmental literacy skills in Adiwiyata and non-Adiwiyata schools with a score range of 0-100 in the two measured competency domains and the disposition domain.

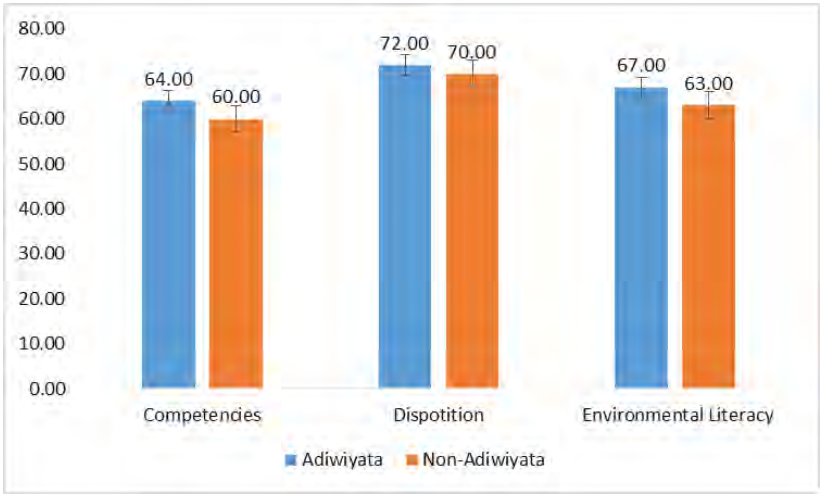

Figure 1. The result of environmental literacy

The competency aspect at Adiwiyata School shows an average score of 64, while non-Adiwiyata schools show an average score of 60. Furthermore, the student disposition domain in Adiwiyata School also shows higher scores than students in non-Adiwiyata schools. Overall, environmental literacy among students in Sleman Regency is better for students in Adiwiyata School than students in non-Adiwiyata schools. Descriptively based on the average value, there is only a slight difference in high school students' environmental literacy skills in Sleman Regency, but to see whether statistically, this data shows a difference can be seen from the results of the Mann-Whitney test (Table 2).

Table 2. The Mann-Whitney test results on environmental literacy mastery of students

Test statistics	Sig.
Mann-Whitney U	278,502.000
Wilcoxon W	541,677.000
Z	-3.031
Asymp. Sig. (2-tailed)	.002

Table 2 shows that students' environmental literacy is 0.002 (sig <0.05), which means that there is a significant difference in environmental literacy skills between schools with Adiwiyata and non-Adiwiyata status. However, descriptively the difference in grades between Adiwiyata and non-Adiwiyata schools was not large. Research conducted by (McBeth & Volk, 2009; Nunez & Clores, 2017; Wardani, Karyanto, & Ramli, 2019) also shows that the level of environmental literacy in students is at a sufficient level.

Coyle (2005) States that environmental literacy has three levels, namely the first (low) level of environmental literacy, which involves environmental awareness. The second level (sufficient) of environmental knowledge combines awareness and action based on knowledge. The third level (high) is the deepening of information and actual skills. In this study, it can be seen that students are at level two, where students have been able to integrate their awareness of environmental problems and act to respond according to their knowledge.

In this study, environmental literacy refers to Hollweg et al (2012) and McBeth and Volk (2009), which consists of four aspects, namely knowledge, competence, disposition, and environmentally responsible behaviour. This research was only conducted at the senior high school education level, while environmentally responsible behaviour is the highest expression of environmental literacy (Hollweg et al., 2012). Habits are awakened by repeated actions so that it is impossible to be observed one by one by everyone, so this is considered a limitation in learning. However, students' habits towards the environment are a continuum of knowledge, competencies, and dispositions. Someone who has useful competence about the environment will positively characterize the environment (Nunez & Clores, 2017). In line with that, increased environmental disposition and sensitivity significantly affect environmental behaviour (Zheng, Xu, Kong, Deng, & Lin, 2018) so that the measurement results in the domain of competence and disposition can be a picture of the domain of habitual student behaviour.

Table 3 shows that the seven indicators tested based on the Adiwiyata school variable in the competency domain show a higher percentage. Competence is related to students' skills in analyzing, synthesizing, and evaluating information about a problem using primary, secondary, and personal values about environmental problems (Maulidya, Mudzakir, & Sanjaya, 2014; Szczytko, Stevenson, Peterson, Nietfeld, & Strnad, 2019). Increased environmental knowledge and competence will encourage a positive environmental disposition (Ozsoy et al., 2012).

Table 3. Average of environmental literacy competencies

Indicator of competensies	Environmental literacy competencies (%)	
	Adiwiyata	Non-Adiwiyata
Identify environmental issues	61.87	56.41
Ask relevant questions about environmental issues	65.66	59.86
Analyze environmental issues	66.94	65.70
Investigate environmental issues	64.99	62.00
Evaluate and make personal judgments	63.50	60.25
Use evidence and knowledge	62.63	54.55
Create and evaluate plans at various scales	67.21	60.40

Statistically, through the Mann-Whitney test, it is known that the Adiwiyata School has significant differences affecting students' environmental literacy competencies. The results of the Mann-Whitney test on the competency domain can be seen in Table 4.

Table 4. The Mann-Whitney test results of environmental literacy competencies

Test statistics	Sig.
Mann-Whitney U	241,465.500
Wilcoxon W	504,640.500
Z	-7.185
Asymp. Sig. (2-tailed)	.000

Disposition is a complex psychological process that includes perceptual, emotional, and behavioural tendencies equipped with enduring and consistent characteristics (Zheng et al., 2018). This study's domain of environmental literacy disposition was measured through 16 questionnaire statements spread over three

indicators: responsibility, locus of control, and intention. To find out how the differences in environmental disposition abilities at Adiwiyata school and grade levels can be seen in Table 5.

Table 5. Average of environmental literacy disposition

Disposition aspects indicators	Environmental literacy disposition (%)	
	Adiwiyata	Non-Adiwiyata
Responsibility	72.52	70.30
Locus of control	70.89	69.13
Intentions	73.95	71.96

Based on Table 5, it can be seen that the average disposition domain indicator shows a higher score in Adiwiyata schools compared to non-Adiwiyata schools. The Mann-Whitney test (Table 6) shows that the Adiwiyata school shows a significance (<0.05), which means that the Adiwiyata school has a significant effect on students' environmental literacy disposition. Disposition is a person's response to an object as a result of thoughts and assessments based on the knowledge possessed by students. Based on the previous explanation, it can be concluded that students in Adiwiyata School have a better environmental disposition than students in non-Adiwiyata schools in Sleman Regency.

Table 6. The Mann-Whitney test results of environmental disposition

Test statistics	Sig.
Mann-Whitney U	261,386.500
Wilcoxon W	524,561.500
Z	-4.955
Asymp. Sig. (2-tailed)	.000

Environmental disposition is an important predictor because it often determines behaviour that increases or decreases environmental quality. Disposition to the environment has a significant relationship with environmental behaviour (Abun & Racoma, 2017). All scales in environmental literacy are important, but disposition is the most important in this study for truly responsible environmental behaviour (Gifford, Steg, & Reser, 2012; Keshavarz & Karami, 2016). Djuwita and Benyamin (2019) Determined that the pro disposition in environment-based schools, it was found that students who attend environment-based schools have a more positive disposition. Furthermore, this is presumably because students are accustomed to intensively carrying out pro-environmental behaviour such as reducing waste, sorting waste, and recycling waste. Schools need to involve students to participate in activities related to the environment (Pratiwi, Rusdi, & Komala, 2019). In the end, the Adiwiyata program must be implemented in its entirety and cannot be implemented partially to maximize students' environmental literacy skills (Desfandi et al., 2017).

CONCLUSION

The results showed that the environmental literacy of high school students in Sleman Districts was categorized as sufficient in the domain of competence and attitudes. And there are significant differences between students in Adiwiyata and non-Adiwiyata schools. Based on the results of this study, there is a need for efforts to maintain environmental literacy of students in Adiwiyata schools, the Adiwiyata program is proven to have a role in the formation of environmental literacy of students in the school environment.

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