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Assessing Environmental Literacy: Comparative Analysis of Students in Environment-Focused and General Junior High Schools in Balikpapan

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Abstract: *The Adiwiyata program seeks to cultivate knowledge and awareness of ecological conservation among students. This study compared environmental literacy between ninth-grade students in Adiwiyata and non-Adiwiyata schools in Balikpapan City, Indonesia. Utilizing a questionnaire adapted from the Middle Schools Environmental Literacy Survey, data was collected across five domains: knowledge, attitudes, participation, awareness, and skills. An independent sample t-test gauged mean variations in both school types. Results indicated that Adiwiyata students achieved good environmental literacy, while non-Adiwiyata students reached an acceptable level. Noteworthy differences were observed across all domains, with the knowledge domain being particularly distinct. Strengthening environmental literacy requires schools to implement programs reinforcing environmental values. This study underscores the importance of educational initiatives fostering a sense of responsibility for the environment among students in both Adiwiyata and non-Adiwiyata schools.*

Keywords: *Adiwiyata, Balikpapan City, Environmental Literacy, Junior High School*

Penilaian Pemahaman Lingkungan: Analisis Perbandingan terhadap Siswa di SMP yang Berbasis Lingkungan dan Umum di Balikpapan

Abstrak: Program Adiwiyata bertujuan untuk membudayakan pengetahuan dan kesadaran tentang konservasi ekologi di kalangan siswa. Penelitian ini membandingkan literasi lingkungan antara siswa kelas IX di sekolah Adiwiyata dan non-Adiwiyata di Kota Balikpapan, Indonesia. Kuesioner yang digunakan diadaptasi dari *Middle Schools Environmental Literacy Survey*, data dikumpulkan meliputi lima domain: pengetahuan, sikap, partisipasi, kesadaran, dan keterampilan. Uji t independen digunakan untuk menilai variasi rata-rata di kedua jenis sekolah. Hasil menunjukkan bahwa siswa Adiwiyata mencapai tingkat literasi lingkungan yang baik, sementara siswa non-Adiwiyata mencapai tingkat yang cukup. Perbedaan yang signifikan teramati di semua domain, dengan domain pengetahuan menjadi paling signifikan perbedaannya. Penguatan literasi lingkungan memerlukan implementasi program di sekolah yang memperkuat nilai-nilai lingkungan. Penelitian ini menekankan pentingnya inisiatif pendidikan yang mendorong rasa tanggung jawab terhadap lingkungan di kalangan siswa baik di sekolah Adiwiyata maupun non-Adiwiyata.

Kata kunci: Adiwiyata, Kota Balikpapan, Literasi Lingkungan, Sekolah Menengah Pertama

INTRODUCTION

The population growth rate in Indonesia is very high, with an average population growth rate of 1.25% per year (Puspita et al., 2020). About 1.40% of the population in Indonesia lives in the East Kalimantan region. One of the cities in East Kalimantan is Balikpapan. The city's motto is Beriman, which means clean, beautiful, safe, and comfortable. This motto serves as a motivation for Balikpapan to obtain Adipura Awards consistently. The Adipura Award is an award given in the environmental field. Balikpapan City is included in 100 smart cities and is a buffer city for the prospective

National Capital (Ariyaningsih & Shaw, 2022). The population in Balikpapan City is about 688,318 million people (Lestari et al., 2023), with a population growth of 1.6% per year (Ulimaz et al., 2021). Rapid population growth can cause problems, including environmental problems. The problem occurs due to human activities with the environment (Hollweg et al., 2011). Human activities to meet their needs can decrease environmental quality (Manisalidis et al., 2020). In addressing these challenges, proactive measures and sustainable practices must be implemented to mitigate the adverse effects of rapid population growth on the environment, fostering a harmonious balance between human needs and environmental preservation.

Environmental problem strongly related to science content (Sulaeman et al., 2020). The knowledge of science divided to physics, biology and chemistry for junior high school level. In relation to these environmental problems, there is a need for a strategic effort to build a new paradigm that can foster awareness about the importance of protecting nature through the educational process (Yunansah & Herlambang, 2017). One of the ways that the government in Indonesia has done to increase the level of concern for the environment is through the existence of environmental education (Iswari & Utomo, 2017). Environmental education is not a stand-alone subject but can be integrated into all subjects in school, including science subjects (Sukarjita et al., 2014). Through science education, students are given an understanding of environmental issues that are part of their learning process (Santhyami et al., 2020). Learning can be done by examining issues of global problems. Global problems in learning are environmental issues, especially related to the consequences of human resource exploitation and management of earth resources: land, forests, and other elements. These global issues such as garbage problems, floods, air pollution, and global warming (Taufiq et al., 2014). Environmental education needs to be developed for students to improve environmental literacy (Santoso et al., 2021). This strategic investment in environmental education not only cultivates a deeper understanding of ecological complexities but also instills a sense of responsibility for the environment.

Environmental literacy consists of various knowledge about the environment. Environmental literacy refers to behavior, responsibility, care, and awareness of the environment (Nasution, 2021). An individual with environmental literacy can make effective decisions in various environmental contexts based on their knowledge and attitude about the environment. Having environmental literacy skills is defined as being able to take action on environmental issues (Kusumaningrum, 2018). As a result of the development of environmental literacy, humans will be able to better understand and overcome environmental problems, thus enabling the next generation to have a caring attitude towards the environment, as well as positive actions toward it (Afrianda et al., 2019). Adequate comprehension of the environment is anticipated to foster a heightened sense of concern and care for the environment.

If a school successfully implements the environmental care and culture movement in Indonesia, the environmental education program will be appreciated for the "Adiwiyata" award by the Minister, Governor, and Regent or Mayor according to their authority (Parker & Prabawa-Sear, 2019). This school is considered an environment-focused school. As part of its commitment to environmental management and protection, the Adiwiyata program seeks to educate the general public about the environment. Implementation of the program involves four main elements: environmentally friendly policies, curriculum planning based on environmental concerns, participatory activities, and the management of environmentally friendly support facilities (Bahrudin, 2017). In order to support sustainable development, the Adiwiyata program aims to create

responsible school citizens through the implementation of good school governance to encourage environmental protection and management (Afrianda et al., 2019). The fact is that the Adiwiyata component can affect the input obtained by students at school. According to the explanation above, the purpose of this study is to determine whether the Adiwiyata school program is effective in implementing environmental education by comparing the levels of environmental literacy found in Adiwiyata schools with those found in non-Adiwiyata schools.

METHOD

This research adopts a quantitative approach and employs an Ex Post Facto research design. The target population consists of ninth-grade students from junior high schools in Balikpapan City. The study encompasses four schools, namely two Adiwiyata schools (comprising one independent Adiwiyata school and one national Adiwiyata school) and two non-Adiwiyata schools. Sixty samples are collected from each school, with sample selection conducted through cluster random sampling. Data is gathered through the administration of questionnaires adapted from the Middle School Environmental Literacy Survey (MSELS), comprising 37 questions and complemented by observational data. The analysis of collected data employs the independent sample t-test method and is facilitated by the SPSS application for Windows 24. This comprehensive research design aims to explore and compare environmental literacy levels among ninth-grade students in different types of schools within Balikpapan City.

RESULT AND DISCUSSION

A research investigation was carried out to assess environmental literacy in both Adiwiyata and non-Adiwiyata junior high schools. The study involved examining and comparing the average environmental literacy scores between these school types. Figure 1 presents a visual representation of the mean environmental literacy values for various school types, obtained from the overall average across all dimensions of environmental literacy proficiency.

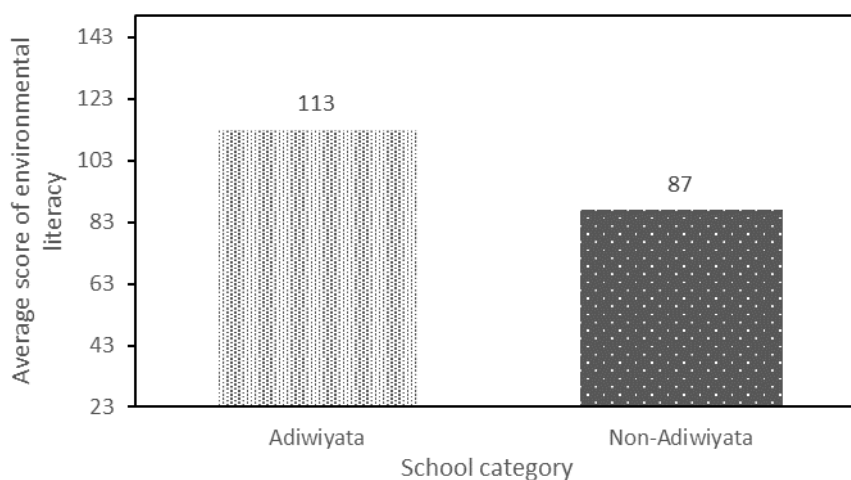


Figure 1. Average Score of Environmental Literacy

Figure 1 reveals that Adiwiyata schools exhibit a superior average score compared to non-Adiwiyata schools. Specifically, Adiwiyata schools fall within the 'good' category of environmental literacy, while non-Adiwiyata schools are categorized as 'sufficient'.

Adiwiyata schools implement the Adiwiyata program, which aims to become an environmentally minded and cultured school. Environmental cultured schools have an essential role in providing changes in the environment that occur and as one place in increasing the knowledge and ability of students about the environment (Muhajir & Hidayatin, 2016). The primary objective of the Adiwiyata program is to foster responsible and environmentally conscious individuals within schools, achieved through effective school governance that promotes environmental protection and management in alignment with sustainable development goals (Afrianda et al., 2019). Consequently, the implementation of the Adiwiyata program is anticipated to cultivate a generation with a heightened sense of environmental concern and significant environmental literacy.

Environmental literacy encompasses five crucial aspects—knowledge, attitude, participation, awareness, skill, and literacy—that collectively influence students' proficiency in understanding and engaging with environmental issues. The outcomes for each of these aspects in both Adiwiyata and non-Adiwiyata schools are depicted in Figure 2. This visual representation provides insights into the comparative performance of these schools across the various dimensions of environmental literacy, aiding in a comprehensive assessment of students' environmental awareness and competencies.

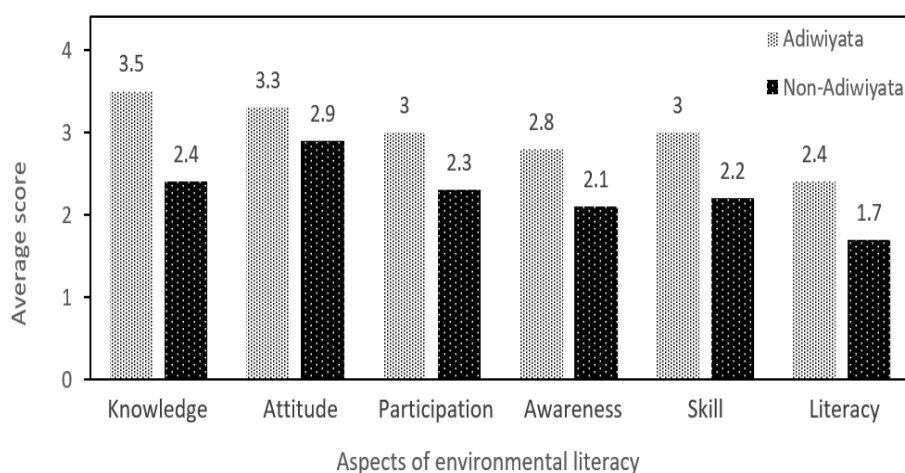


Figure 2. Average Each Aspect

Figure 2 shows the average score of each aspect. The aspect of knowledge assessed in this study is ecological knowledge, which includes interdependent relationships in ecosystems, material cycles, and energy transfer in ecosystems (Hollweg et al., 2011). Environmental knowledge is knowledge in the form of information that a person has related to the fields of nature and ecology (Fryxell & Lo, 2003). The aspect of attitude is the unity of opinions and beliefs about a relatively fixed object or situation, accompanied by certain feelings that form the basis for determining a response or behavior (Fauzi et al., 2018). It is known that the results of Adiwiyata schools are included in the very high category, while non-Adiwiyata schools are in the high category. In the aspect of participation, it provides motivation to each individual to play an active role in problem-solving. Furthermore, the aspect of awareness can encourage each individual to gain awareness and sensitivity to the environment, and then the skill aspect, which can help each individual to gain the ability to identify and solve environmental problems (Hollweg et al., 2011). Figure 2 shows that Adiwiyata schools have higher scores than non-Adiwiyata schools in all aspects of environmental literacy. According to Table 1, in all aspects of environmental literacy scores, the differences between students from

Adiwiyata schools and non-Adiwiyata schools were significant, indicated by sig 2-tailed values below 0.05.

Table 1. Independent Samples T-Test

Total Environmental Literacy	Levene's Test for Equality of Variances		t-test for Equality of Means			
	f	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Equal variances assumed	5.662	0.000	3.332	18	0.000	25.916
Equal variances not assumed			3.332	100.684	0.000	25.916

As part of this study, observations have been made to determine why Adiwiyata schools have a greater level of environmental literacy than non-Adiwiyata schools. Observation activities were carried out using an observation sheet to determine the realization of the four observed components. The average realization score of the observation results can be seen in Table 2.

Table 2. Observation Results

Observed components	Average Realizable Score	
	Adiwiyata	Non-Adiwiyata
Insightful policies environment	2	2
Implementation of an environment-based curriculum	2	2
Participatory-based environmental activities	2	1.5
The state of advice and infrastructure related to the Adiwiyata program	2	1

Based on Table 2, the results obtained show that the Adiwiyata school has realized all observed components, starting from the vision, mission, and goals of the school to the facilities and infrastructure facilitated by the school for students. This greatly supports students in increasing their knowledge about the environment (Rushayati et al., 2022). Furthermore, Adiwiyata schools have environmental programs, such as environmentally friendly canteens, waste banks, and schools that link the environment with the Pancasila Student Profile Strengthening Project (P5). Learning about the environment is associated with all lessons, especially science subjects. In non-Adiwiyata schools, the average score of environmental literacy is below that of Adiwiyata schools. Based on the observations, it was found that non-Adiwiyata schools have visions, missions, and goals that are environment-based but have shortcomings in aspects of participatory-based activities, such as student concern for the environment and surroundings. Moreover, there is a deficiency in facilities, infrastructure, and school programs related to the environment. This shortfall hinders the development of an environment-conscious mindset among students (Rufaidah et al., 2020).

CONCLUSION

After conducting research and analyzing data at the junior high schools in Balikpapan City, comparing the environmental literacy of Adiwiyata and non-Adiwiyata schools, it

can be deduced that Adiwiyata schools exhibit a higher average literacy score than their non-Adiwiyata counterparts. The overall environmental literacy scores for Adiwiyata and non-Adiwiyata schools stand at 113 (categorized as good) and 87 (categorized as sufficient), respectively. Additionally, the independent sample t-test results indicate significant differences in all aspects of environmental literacy between Adiwiyata and non-Adiwiyata schools.

The study findings highlight notable distinctions, revealing that non-Adiwiyata schools lack activities and facilities rooted in environmental participation. This research offers valuable insights into the realm of environmental literacy within Adiwiyata and non-Adiwiyata schools, serving as a crucial reference for the development and refinement of environmental education programs, particularly in the context of Balikpapan.

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