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Examining the Effects of Ecoliteracy on Knowledge, Attitudes, and Behavior through Adiwiyata Environmental Education for Indonesian Students

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Abstract

The school is an educational institution that develops students' potential by improving the character of the educational process throughout the learning environment, including the environmentally conscious character. However, student behaviors have not reflected their concern for the environment. One of the Indonesian Ministry of Environment's efforts to increase students' environmental awareness involves the Environmental Excellence Program, consisting of the Adiwiyata Program. This study aims to analyze the impact of the Environmental Excellence Program on students' ecoliteracy in schools with Adiwiyata and non-Adiwiyata programs. The respondents were students from an Adiwiyata-based school (MTsN I Pesisir Selatan) and a non-Adiwiyata school (SMP Negeri 3 Painan) with a total of 40 students from each school, and the instrument used was the Nurhasan Syah Ecoliteracy Inventory (NSEI). Research data were analyzed using a descriptive approach and regression correlational tests. Meanwhile, the component in the Adiwiyata Program is the creation of a school based on environmental culture, which produces a generation that is ecoliterate in knowledge, attitudes, and behavior. The result showed that there is a relationship between knowledge and attitudes toward student behavior both inside and outside the school as well as significant differences between Adiwiyata-based schools and non-Adiwiyata-based schools in terms of students' knowledge, attitudes, and behavior. Therefore, the Adiwiyata Program has an effect on increasing the ecoliteracy in students.

Keywords: *Adiwiyata, Effectiveness, Ecoliteracy, Environment*

Introduction

This article examines the effect of ecoliteracy on student achievement. Ecoliteracy refers to environmental education, which is now demanding high attention in the Indonesian curriculum for secondary school students. Conde & Sánchez (2010) assert that environmental education is an essential step in changing society and the paradigm of global society toward sustainable development. The values contained in sustainable development are integrated directly into the learning aspect, which means that humans will be more responsible for sustainability in the future

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(Donohue, 2020; Morales et al., 2020). Integrating the principle of sustainability in school curriculums increases students' ecoliteracy (Bevins & Wilkinson, 2009). It produces students with good environmental knowledge, improving students' attitudes and behavior in environmental protection and management efforts in schools (Desfandi & Maryani, 2017; Kavaz et al., 2021; Legault & Pelletier, 2000; Spínola, 2015). Research shows that when environmental education alone is not effective enough in increasing awareness among students, it is necessary to include its materials in the curriculum to increase students' ecoliteracy (Daudi, 2008; Orr, 1992; Puk & Behm, 2003).

Ecoliteracy is defined as an understanding of the principles of organizing the ecosystem and the application of these principles to create sustainable human communities and societies (Capra, 2007; Capra et al., 2013; McBride et al., 2013). It seeks to introduce and renew people's understanding of the importance of global ecological awareness to create a balance between people's needs and the earth's ability to sustain them. Ecological intelligence is our ability to adapt to the ecological angle (Goleman, Bennett, & Barlow, 2012; Nurbaeti, Supriatna, & Zulfikar et al., 2017), and it is based on three domains of knowledge, attitudes, and behavior of living in harmony with the natural environment. In simple terms, ecoliteracy means knowing the conditions and interrelationships of life sciences. This is the fundamental understanding of the relationship between humans and nature (Martin, 2008).

This new paradigm challenges modernization through its empirical approach. Ecoliteracy is essential for every individual to improve the ecology of public awareness (Desfandi & Maryani, 2017). Monaghan and Curthoys (2008) emphasize that ecoliteracy measures a person's ecological knowledge and ability and willingness to apply this knowledge to a sustainable lifestyle. It leads to an individual's understanding of ecological concepts and their place in an ecosystem (Balgopal & Wallace, 2009). Ecoliteracy focuses on increasing our understanding of the earth's natural and human systems (Barnes, 2013). Although it is defined in various ways by experts, ecoliteracy has the goal of building an intelligent community necessary for sustainable development. To increase ecoliteracy is of fundamental importance (Barnes, 2013).

Ecologically literate people have a basic understanding of human ecology and sustainability (Orr, 1992; Palmberg et al., 2017; Wolff et al., 2017; Zulfikar et al., 2020). Ecological intelligence is essential because sustainable development through integrated education becomes interdisciplinary at all school levels. Therefore, education is needed to improve the community's ability to

overcome various environmental development problems. Environmental attitudes include behavioral goals, impacts, and beliefs of a person originating in environmental subjects or activities, and it is being used to predict behavior in the environment (Boutelier, 2019; Casaló & Escario, 2018; Cherdymova et al., 2018).

This way, environmental education is perceived as an effort to increase knowledge, skills, attitudes, and actions of caring individuals, communities, organizations, and various parties toward environmental problems (Lee & Kim, 2017; Sari et al., 2019; Wasino & Arsal, 2020; Wasino et al., 2020). Actions that combine learning with the process of educating students to partner with nature can give birth to a generation that is ecoliterate in terms of knowledge, attitudes, or environmentally friendly behavior (Geng et al., 2019; Law et al., 2019; Rauschert & Byram, 2018). Therefore, this has a positive impact on the school environment, families, and the surrounding community, and the idea was implemented through the Movement for the Environmental Care and Culture in Schools.

This study applies ecoliteracy to the environment via the Adiwiyata school program, which aims to establish responsible behavior in school to preserve environmental functions and improve the quality. The word *Adiwiyata* means a good and ideal place where all knowledge and various norms and ethics that are the basis of humanity work toward creating the welfare of our lives and the ideals of sustainable development (Fatimawati, 2018; Mahendrartha et al., 2020; Saputro & Widodo, 2018).The Adiwiyata Program, which has been developed since 2006, aims to promote and form schools that care and are environmentally cultured. The schools should participate in efforts to preserve the environment and sustainable development through various policies and real programs for the benefit of present and future generations (Fadlillah et al., 2018; Fernández et al., 2019; Meilinda, et al., 2017; Warju & Soenarto, 2017).

Environmental education is an essential component of environmental protection and management efforts, especially in instilling community behaviors to integrate decision-making (Elmagrhi et al., 2019; Varela-Candamio et al., 2018). In 2006, the Ministry of Environment of Indonesia launched the Adiwiyata Program as a follow-up to the MoU between the Indonesian Minister of Environment and the Indonesian National Minister of Education. The aim is to create a caring and sophisticated school environment through Adiwiyata training schools.

Ecoliteration for students must be implemented and developed properly and structured for schools that already use the Adiwiyata Program and those that do not define Adiwiyata in the inclusion of

their curriculum as their ecoliteration target. Ecoliteration seeks to introduce and renew students' understanding of the importance of global ecology so that it can meet the needs of students' lives later.

Currently, an evaluation of Adiwiyata programs in several schools is available in order to see its progress, impacts, and benefits, indicating that students become concerned or literate about the environment and enlightened about the importance of maintaining and preserving the environment. If students have realized the importance of the environment for their lives and the lives of all living things, they are ecoliterate. As a result, students and teachers will perform positive attitudes toward their environments in terms of lifestyle, behavior, and ethics.

This study focuses on observing the knowledge, attitudes, and behavior of students both inside and outside of Adiwiyata-based and non-Adiwiyata-based schools. Specifically, this study aims to describe and analyze the effect of ecoliteracy (Environmental Knowledge and Environmental Attitude) on student behavior both inside (Internal School Behavior) and outside (External School Behavior), as well as the differences between Adiwiyata-based and non-Adiwiyata-based schools.

Research Questions

The following two research questions guided the research process:

1) What is the description of students' knowledge, attitudes, and behavior in Adiwiyata-based and non-Adiwiyata-based schools?
2) Do students of the Adiwiyata Program perform better in ecoliteracy in terms of knowledge, attitude, and behavior than students of non-Adiwiyata programs?

Method

Research Design

This study used an ex post facto design (Christensen, 2004) and quantitative approach to analyze data (Weardon & Chilko, 2004). An ex post facto design is considered quasi-experimental because the subjects are not randomly assigned, they are grouped based on a particular characteristic or trait. An ex post facto research design is a method in which groups with qualities that already exist are compared on some dependent variable. Although differing groups are analyzed and compared in regards to independent and dependent variables, it is not a true experiment because it lacks random assignment (Weardon & Chilko, 2004). The independent variable is ecoliteracy and the dependent variables are knowledge, attitude, and behavior in ecoliteration of the Adiwiyata

Program. Research was conducted in MTs Negeri and SMP Negeri Pesisir Regency, West Sumatra, Indonesia.

Population and Sample

The number of the whole sample is 160, selected from two schools, MTs N 1 Pesisir(80 students) and SMP N 3 Pesisir (80 students). MTs Pesisir represents an Adiwiyata school and SMPN 3 represents a non-Adiwiyata school. The sample was selected using cluster random sampling by considering the representation of the data at each grade class of students, which is 7th grade, 8th grade, and 9th grade. General characteristics of the sample appears in Table 1.

Table 1.

Demographic distribution of the sample

Characteristics	Adiwiyata School (MTsN I Pesisir Regency) N=80	Non-Adiwiyata School (SMP Negeri 3 Painan) N=80
Gender		
Men	17 (42.5%)	23 (57.5%)
Women	23 (57.5%)	17 (42.5%)
Grade		
7th Grade	13 (32.5%)	14 (35%)
8th Grade	12 (37.5%)	14 (35%)
9th Grade	15 (30%)	12 (30%)
Total	80	80

Table 1 shows that the distribution of demographic data in both schools tends to be equal, both in gender and class grade. This serves to maintain the generalization process when formulating conclusions. In addition, data collection from the sample went through a research ethics approval process, where students were asked to be willing to fill in data and were also equipped with permission from the family and school.

Data Collection Tools

The instrument used in this study was the *Nurhasan Syah Ecoliteracy Inventory* (NSEI) questionnaire, which was designed and formed based on the theory and the type of inventory used by a Likert scale model. The scales include Knowledge (Not at all aware–Extremely aware),

Attitude (Strongly disagree–Strongly agree), and Behavior (Never–Always). The questionnaire consists of 40 items.

The development and testing of the construct validity of this instrument were developed based on a grid built following the existing theoretical basis. The questionnaire was validated using an expert judgment approach and then distributed to respondents with a questionnaire sheet. The number of items on the NSEI consists of 40 statements which, when tested, produces a Cronbach Alpha reliability coefficient value of 0.953. Furthermore, the indicators for this variable are: Knowledge (understanding of the environment, natural resource management, environmental damage, health, and ethics), Attitude (maintaining cleanliness in the school environment and outside of school, managing water and energy, protecting the environmental life), and Behavior (disposing and sorting waste, saving water and energy, and caring for the surrounding environment).

Data Collection

Data were collected by distributing the 40-item NSEI questionnaire. As there are three clusters in each group, the researchers received help from two members of the research team: Rater 1 helped to share the questionnaire with grade 8, Rater 2 helped to share the questionnaire with grade 9, and the researcher himself acted as Rater 3 to share the questionnaire with grade 7.To ensure that the data collection was proper, the researchers worked in two weeks; the first week, the researchers and team collected data from the Adiwiyata school, and in the second week from the non-Adiwiyata school. After data collection was finished, the researchers and team administered the students' responses on the questionnaire. Respectively, the researcher scored students' responses from grade 7 of the Adiwiyata school and non-Adiwiyata school; the first rater scored responses of grade 8 of the Adiwiyata and non-Adiwiyata schools, and Rater 2 the responses of grade 9. After each grade had been scored, all responses and scores were crosschecked by three raters. Further, three raters prepared the tables for further analysis using SPSS software.

Data Analysis

The data were analyzed using software release 29 of the SPSS program. First, descriptive statistics to see the demographic features were analyzed using rate percentage. In addition, to see the normality and homogeneity, the researcher used inferential statistics. Finally, to test the hypothesis

regarding the differences between Adiwiyata programs and non-Adiwiyata programs on students' knowledge, attitudes, and behavior in the school environment, the researcher used t-test.

Findings

Description of students' ecoliteration between Adiwiyata-based and non-Adiwiyata-based schools

To analyze the condition of each student's ecoliteration achievement in the sample schools, descriptive details were carried out. The condition of ecoliteration is analyzed based on knowledge, attitude, and behavior aspects. The results of the data collection in the sample show that the average level of students' knowledge of the environment is high in Adiwiyata-based schools. Meanwhile, this condition is generally different in schools that are not based on Adiwiyata. This data description is shown in Table 2.

Table 2.

Recapitulation of student ecoliteration achievements

		Criteria				
		Very High	**High**	**Middle**	**Low**	**Very Low**
Knowledge	Adiwiyata School	20 (50%)	16 (40%)	4 (10%)	-	-
	Non-Adiwiyata School	8 (20%)	18 (45%)	14 (35%)	-	-
Attitude	Adiwiyata School	29 (72.5%)	11 (27.5%)	-	-	-
	Non-Adiwiyata School	9 (22.5%)	20 (50%)	11 (27.5%)	-	-
Behavior	Adiwiyata School	8 (20%)	13 (32.5%)	14 (35%)	4 (10%)	1 (2.5%)
	Non-Adiwiyata School	4 (10%)	10 (25%)	17 (42.5%)	9 (22.5%)	-

Based on Table 2 above, it is seen that students' knowledge of the environment at Adiwiyata-based schools is on average in the very high category, namely 50%, although on average, non-Adiwiyata-based schools are in the high category, namely 45%.

Table 2 also shows that, on average, students' attitudes toward the environment in Adiwiyata-based schools are in the very high category, namely 72.5%, although on average, non-Adiwiyata-based schools are in the high category, namely 50%.Data exposure shows that, in general, schools that implement environmental programs in the form of Adiwiyatahave higher ecoliteration values

in the attitude aspect. This attitude pattern is well developed as a direct impact of expanding students' environmental insight and competence.

The behaviors of students in both Adiwiyata-based and non-Adiwiyata-based schools are in the moderate category, which are 35% and 42.5%, respectively. As a form of expansion of knowledge and attitude, students show behavior related to ecoliteration. The implementation of the Adiwiyata Program also has an impact on the condition of student behavior, but in a more diverse proportion. In Table 2, it can be seen that the schools with the Adiwiyata Program showed higher data variability, with the highest distribution at the moderate level. Meanwhile, non-Adiwiyata schools show a data set that leads to low-moderate.

The difference between students' knowledge and attitudes toward student behavior of Adiwiyata schools

Based on the data obtained, there is a positive and significant relationship between the ability of ecoliteracy, namely Environmental Knowledge (correlation coefficient 0.438, significance 0.002, and determination coefficient 0.1918), and Attitude (correlation coefficient 0.411, significance 0.004, and determination coefficient 0.1689), as well as ISB (Internal School Behavior). The result means that there is an influence of Environmental Knowledge with 19.18% and Attitude with 16.89% in Adiwiyata-based schools that are individually influenced by ISB.

A closer examination shows a positive and significant effect between Environmental Knowledge and Attitude with ISB as well as a multiple correlation coefficient (R) 0.509, significance (α) 0.004, and coefficient of determination R Square 0.2590. This means that there is an effect of Environmental Knowledge and Environmental Attitude together on ISB of 25.90% in Adiwiyata-based schools. The description of Hypothesis Testing 1 is shown in the following figure:

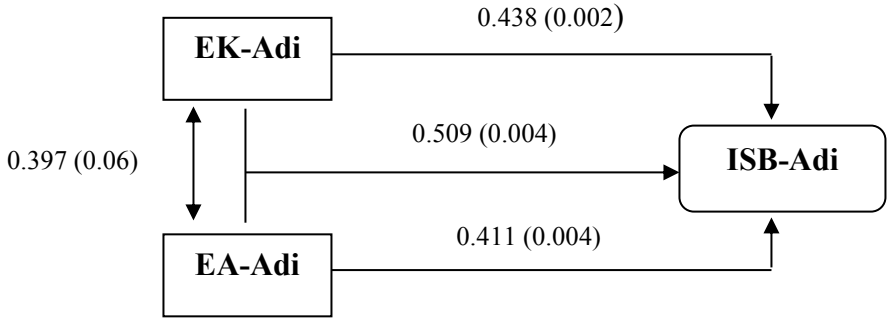

Figure 1. Hypothesis Testing 1

Notes:
EK-Adi: Environmental Knowledge Adiwiyata
EA-Adi: Environmental Attitude Adiwiyata
ISB-Adi: Internal School Behavior Adiwiyata

Based on the discovered data, there is a positive and significant relationship between the ability of ecoliteracy, namely Environmental Knowledge (correlation coefficient 0.423, significance 0.003, and coefficient of determination 0.1789), and Attitude (correlation coefficient 0.415, significance 0.004, and coefficient of determination 0.1722), and ESB (External School Behavior). This result shows that there is an influence of Environmental Knowledge and Attitude by 17.22% as well as 17.89%, respectively, individually toward ESB in Adiwiyata-based schools.

A closer examination shows a positive and significant effect between Environmental Knowledge and Attitude with ESB with a multiple correlation coefficient (R) of 0.502, significance (α) 0.005, and coefficient of determination R Square 0.2520. This means that in Adiwiyata-based schools, there is an effect of Environmental Knowledge and Attitude together on ESB of 25.20%. The description of Hypothesis Testing2 is shown in the following figure:

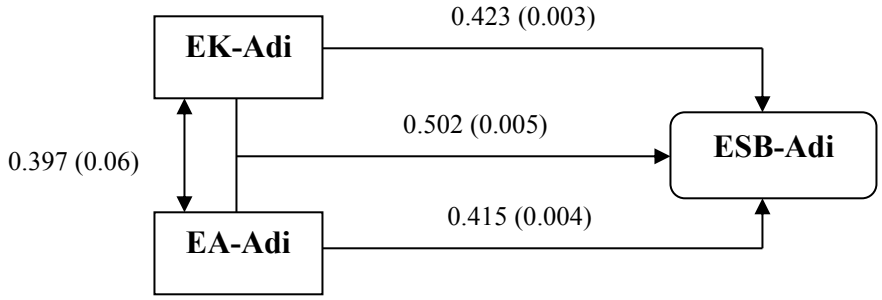

Figure 2. Hypothesis Testing 2

Notes:
EK-Adi: Environmental Knowledge Adiwiyata
EA-Adi: Environmental Attitude Adiwiyata
ESB-Adi:External School Behavior Adiwiyata

Relationship between students' knowledge and attitudes toward student behavior in non-Adiwiyata schools

Based on the data, it was found that there was no positive and significant relationship between the ability of ecoliteracy, namely Environmental Knowledge (correlation coefficient 0.306 and significance 0.127), and Attitude (correlation coefficient -0.186 and significance 0.125) with ISB, which means that there is no influence of Environmental Knowledge and Attitude individually on ISB in non-Adiwiyata-based schools.

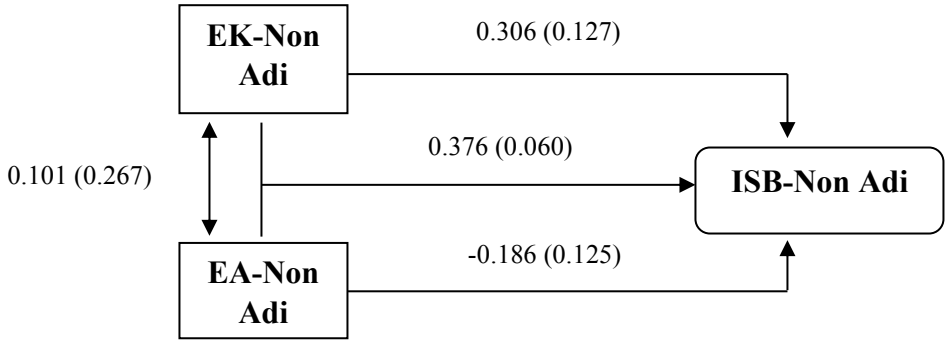

Figure 3. Hypothesis Testing 3

Notes:
EK-Non Adi: Environmental Knowledge Non-Adiwiyata
EA-Non Adi: Environmental Attitude Non-Adiwiyata
ISB-Non Adi:Internal School Behavior Non-Adiwiyata

Further testing together showed no positive and significant effect between Environmental Knowledge and Attitude with ISB with a multiple correlation coefficient (R) of 0.376, significance (α) 0.060. This means that Environmental Knowledge and Attitude do not affect ISB in non-Adiwiyata-based schools. The description of Hypothesis Testing 3 is shown in Figure 3.

Based on the discovered data, there is a positive and significant relationship between the ability of ecoliteracy, namely Environmental Knowledge (correlation coefficient 0.244 and significance 0.020), with ESB, which means that there is an influence of Environmental Knowledge on ESB in non-Adiwiyata-based schools. Furthermore, there is no significant relationship between the ability of ecoliteracy such as Environmental Attitude (correlation coefficient -0.088 and significance 0.295) with ESB, which means that there is no effect of Environmental Attitude on ESB in non-Adiwiyata-based schools.

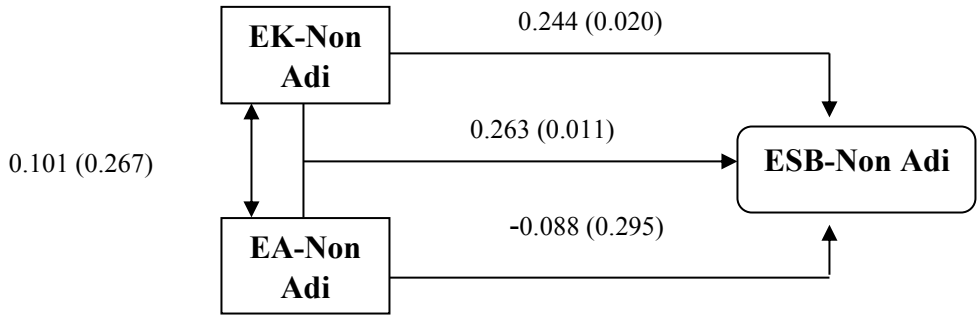

Figure 4. Hypothesis Testing 4

Notes:
EK-Non Adi: Environmental Knowledge Non-Adiwiyata
EA-Non Adi: Environmental Attitude Non-Adiwiyata
ESB-Non Adi:External School Behavior Non-Adiwiyata

Further testing together shows that there is a very low influence between Environmental Knowledge and Attitude with ESB with a multiple correlation coefficient (R) of 0.263, significance (α) 0.011, and coefficient of determination R Square 0.0691. This means that there is an effect of Environmental Knowledge and Attitude on ESB of 6.91% in non-Adiwiyata-based schools with very low criteria and which is neglected. The description of Hypothesis Testing 4 is shown in Figure 4, and the exposure of hypothesis testing is described in the Table 3.

Table 3.
Recapitulation of Hypothesis Testing Results

			Adiwiyata-Based		Non-Adiwiyata-Based	
			Int. Behavior	Ext. Behavior	Int. Behavior	Ext. Behavior
Ecoliteration	EK	Rxy	0.438	0.423	0.306	0.244
		Sig.	0.002	0.003	0.127	0.02
		Determ.	0.1918	0.1789		
	EA	Rxy	0.411	0.415	-0.186	-0.088
		Sig.	0.004	0.004	0.125	0.295
		Determ.	0.1689	0.1722		
	EK and EA in line	R	0.509	0.502	0.376	0.263
		Sig.	0.004	0.005	0.06	0.011
		Determ.	0.259	0.252		0.0691
			Significant	Significant	Not Significant	Not Significant

Notes:
EK: Environmental Knowledge
EA: Environmental Attitude

Discussion

According to the results of the previous section, there is an influence between students' knowledge and attitudes toward behavior both inside and outside of the Adiwiyata-based school environment, and this is shown in the influence of each variable separately or together. Different conditions are seen in schools that are not based on Adiwiyata where students do not show good behavior toward the environment.

The Madrasah Tsanawiyah Negeri I Pesisir Selatan has implemented a school program that is environmentally cultured. Furthermore, the implementation is supported by the achievements obtained by the school from the AdiwiyataProgram and various other awards related to environmental schools such as clean, green, and healthy schools. Many programs and activities have been developed related to plant conservation, ranging from Green Houses, Family Medicinal Plants, and Mini Forests. Therefore, planting and maintaining has become routine for students at MTsN I Pesisir Selatan, so this activity becomes a habit and needs to be performed outside the school environment. The habit of good behavior in maintaining and protecting the environment, which is performed continuously, affects a person's character and attitude at any location. Likewise, MTsN I Pesisir Selatan, as an environmentally cultured school that has implemented environmental protection and management programs, dramatically influences the formation of student behavior outside the school environment.

The implementation of four Adiwiyata components by schools are the criteria for the success of the Adiwiyata Program, namely environmentally friendly policies, implementation of environmental-based curriculum, participation-based activities, and environmentally friendly supporting infrastructure (Desfandi & Maryani, 2017; Hollstein & Smith, 2020; Nurwidodo, Amin, Ibrohim, & Sueb, 2020; Irlansari & Hardati, 2019). This is manifested in several interrelated roles that work together in schools, namely school leaders, educators, parents, the local school community, and students in particular.

The commitment of the school leaders is also very influential on the formation of character and the environmentally friendly culture of the schools, because this condition is created through the provision of values, perceptions, habits, educational policies, and the behavior of the people in it, and is directly integrated with the environmental nature (Biasutti & Frate, 2017; Desfandi & Maryani, 2017; Setiawati et al., 2020; Varela-Candamio et al., 2018). When students have the ability and understand the importance of protecting the environment and all its contents, it is said

that these students have good ecoliteracy (Adela et al., 2018; Capra, 2007; Capra et al., 2013; Harmawati & DS, 2020; Stone, 2017). Ecoliteracy is not only to increase the knowledge of environmental issues but also has an understanding of the importance of global ecological awareness to create a balance between people's needs and the earth's ability to sustain them (Kim et al., 2017; Stone, 2017).

The implementation of participation-based environmental activities, supported by environmentally friendly facilities and infrastructure, plays an essential role in creating environmentally friendly and cultured schools (Alnajdawi, 2019). Environmental attitude, behavior, and ethical values will take root and become a habit for students wherever they are, in the school environment, family, and community (Hilmi et al., 2021; Sigit et al., 2021). To achieve the purpose of Law Number 20 of 2003 concerning the national education system, which is to shape the character and develop the potential of students to create to a knowledgeable, moral, creative, independent, and responsible generation, knowledge is a fundamental domain in shaping one's behavior and actions (Graveland, 2020). The result of several studies shows that behavior based on knowledge is the strongest.

Knowledge is a result of curiosity through sensory processes, especially in the eyes and ears of particular objects (De Sousa et al., 2017; Mouton-Odum & Golomb, 2021; Pangalo, Sapiun, Ischak, Goi, & Hartati, 2020). Furthermore, it is also the most crucial domain in shaping behavior (Behrens et al., 2018; Rhee & Choi, 2017). A person's knowledge is influenced by several factors, including education level, occupation, age, and environmental and socio-cultural factors (Menardo, Balboni, & Cubelli, 2017; Sovacool et al., 2018; Zhang et al., 2020).

Knowledge is understanding obtained formally and informally through one's experiences and learning outcomes, including fear (Šūmane et al., 2018; Toruntju, 2020; Yurkofsky et al., 2019). The deeper the knowledge obtained, the wiser the student will be in perceiving something and making decisions. Behavior-based knowledge is extended or continuous compared to behavior based on compulsion (Freeman et al., 2018; Melin et al., 2020; Pan et al., 2017).

The level of knowledge is determined based on formal and informal education, life experience, and information obtained from the mass media. Knowledge is more of an objective recognition of particular objects or things (Clark & Watson, 2019; Simeonova, 2018). In addition, it also comes from certain experiences that someone has obtained from formal and informal learning outcomes (Toruntju, 2020).

Behavior is a person's responses, actions, and reactions to stimuli that are studied and observed (Donsu, 2019; Kunde et al., 2018; Van Dessel et al., 2019). However, one factor that influences human behavior or society is knowledge (Akram et al., 2020; Donsu, 2019; Yanti et al., 2020). Therefore, a student's behavior inside and outside the school is better and more focused when the student knows the educator or school.

Based on observations, students' knowledge of environmental care still needs to be improved to maintain good and healthy environmental conditions that support the learning process. Some students still consider that healthy environmental conditions do not build healthy thinking patterns. Therefore, education is needed to improve students' perceptions that are still inaccurate (Aldemir, Celik, & Kaplan, 2018; Tomlinson, 2017). Also, professional education is needed to increase knowledge, change negative attitudes, and improve learning outcomes and appropriate behavior (Aldemir et al., 2018; Olum et al., 2020; Tomlinson, 2017).

According to the Attitude-Behavioral Knowledge Model theory, knowledge is an essential factor that influences behavior change, and individuals acquire knowledge and skills through the learning process (Liu et al., 2016; Saiednejad et al., 2018). Thus, public knowledge still needs to be straightened out and negative community behavior corrected through educational activities. In the community, village health forums or the like play a role in implementing these activities.

In the ecoliteracy aspect of knowledge, the results showed that the level of students' ecoliteracy was in the medium category (Abdulkarim et al., 2018). This is because not all study programs have learning related to the environment. Therefore, environmental education is needed to increase ecoliteracy and essential aspects of environmental education (Barnes, 2013; Darmawan & Dagamac, 2021). The results show that integrating the principle of sustainability in the curriculum increases the level of students' ecoliteracy (Bevins & Wilkinson, 2009; Martínez-Rodríguez et al., 2018). Meanwhile, the implementation of education related to the environment is essential to increase students' ecoliteracy from knowledge. Based on the results, it is determined that students' knowledge and discipline attitudes influence student behavior. However, students are still under the supervision of teachers, so behavior outside the school environment without supervision becomes less optimal, especially without parental and community support (Hu & Wu, 2020; Ömür, 2020; Syah & Edinov, 2019).

Conclusion

In summary, this research shows a specific impact of implementing environmental awareness programs in the Adiwiyata Program on students' ecoliteration condition. With the sustainable implementation of the Adiwiyata Program, students at the sample locations can implement environment-based activities, both in terms of knowledge, attitude, and behavior. In addition, Adiwiyata's success manifests the comprehensive application of an environment-based curriculum to the learning process. This application impacts students who care about the environment and realize the importance of preserving it. The research findings also show that the implementation of the Adiwiyata Program also has a significant impact on aspects of ecoliteration (knowledge, attitude, and behavior). In other words, this program is one of the school's efforts under the supervision of an authorized environmental agency to increase students' environmental awareness. This study emphasizes that novelty has been achieved in theoretical novelty, methodological novelty, and novelty in findings. The findings of this study show theoretical novelty in that ecoliteracy on knowledge, attitude, and behavior is indicated in this study as a new finding. The use of ecolitercy theories is new in this research. The methodological novelty is indicated by the use of the NSIE questionnaire, devised by the researcher. The novelty of the findings is presented in terms of the relation and difference on ecoliteracy in terms of knowledge, attitude, and behavior on sustainable ecosystems.

This study acknowledges the limitation of the small sample size. Future research is suggested to apply a larger sample using an ex post facto design, or implementing a case study design using a qualitative approach whereby research samples can be increased in hundreds and quantitative and qualitative analyses can be implemented.

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