Establishing Environmental Education on Students' Environmental Literacy at Junior High School

Yanti Herlanti[1*], Dina Rahma Fadlilah[2], Fakhrotun Nisa[3] [ID]
[1,2,3] Biology Education Departement, UIN Syarif Hidayatullah, Jakarta, Indonesia
*Corresponding author: yantiherlanti@uinjkt.ac.id

Abstrak

Saat ini, beberapa kota menunjukkan kondisi tidak sehat berdasarkan pemantauan visual Indeks Kualitas Udara. Masalah ini tentu berdampak pada menurunnya kesehatan masyarakat. Penelitian ini bertujuan untuk mengukur literasi lingkungan sekolah yang berpartisipasi dalam proyek pendidikan lingkungan. Jenis penelitian ini adalah kuantitatif. Metode penelitian yang digunakan dalam penelitian ini adalah survey dengan desain penelitian kuantitatif. Pengambilan sampel dilakukan dengan cara voluntary response sampling. Populasinya adalah 24 SMA Negeri dengan jumlah siswa sebanyak 22.250 orang. Sampel penelitian adalah 1.058 siswa dari 19 sekolah. Metode yang digunakan dalam mengumpulkan data adalah tes. Instrumen yang digunakan dalam mengumpulkan data adalah lembar soal tes. Teknik yang digunakan untuk menganalisis data adalah analisis statistik deskriptif dan inferensial. Hasil penelitian menunjukkan bahwa rata-rata literasi lingkungan siswa berada pada kategori sedang. Aspek kesadaran dan sikap dalam pendidikan lingkungan menunjukkan capaian yang patut dicontoh. Aspek lainnya yaitu pengetahuan, keterampilan, dan partisipasi menunjukkan pencapaian yang cukup. Kemampuan mengidentifikasi dan menganalisis masalah lingkungan berada pada kategori kurang. Padahal kontribusi faktor kegiatan sekolah dalam proyek lingkungan terhadap literasi lingkungan sangat signifikan. Semakin aktif sekolah berpartisipasi dalam proyek, semakin tinggi literasi lingkungan siswa.

Kata kunci: Pendidikan, Lingkungan, Literasi, Proyek

Abstract

Currently, several cities show unhealthy conditions based on visual monitoring of the Air Quality Index. This problem certainly has an impact on declining public health. This study aims to measure the environmental literacy of schools participating in an environmental education project. This type of research is quantitative. The research method used in this research is a survey with a quantitative research design. Sampling was done by way of voluntary response sampling. The population is 24 public high schools with a total of 22,250 students. The research sample was 1,058 students from 19 schools. The method used in collecting data is a test. The instrument used in collecting data is a test question sheet. The techniques used to analyse the data are descriptive and inferential statistical analysis. The results showed that the average environmental literacy of students was in the moderate category. Aspects of awareness and attitude in environmental education show exemplary achievements. Other aspects, namely knowledge, skills, and participation, show sufficient achievement. The ability to identify and analyse environmental issues are in the less category. Even though the contribution of school activity factors in environmental projects to environmental literacy is very significant. The more actively the school participates in the project, the higher the students' environmental literacy.

Keywords: Education, Environmental, Literacy, Project

1. INTRODUCTION

This project for establishing environmental education subjects was made to contribute to overcoming environmental problems in Indonesia, especially in South Tangerang. In addition, since the founding of South Tangerang City until now, the main problem in South Tangerang City is the waste problem. The city government has made various efforts to address this problem, both community-based and education-based. Community-based activity programs that are promoted such as Waste Banks, Integrated Waste Disposal Sites Reuse Reduce Recycle (TPST 3R), simple organic waste management at the level of the community unit (RW), the formation of environmentally conscious groups (Kodarling) etc (Hakim, 2019; Pujaningtyas et al., 2019; Shahreza et al., 2020). In terms of education, the South Tangerang City government has launched the eco-schools (Adiwiyata) at all levels of education.

The eco-schools (Adiwiyata) program is an effort by the Ministry of the Environment of the Republic of Indonesia to continue to develop environmental education. Eco-schools are a good and ideal place to develop knowledge, morals, norms, and ethics towards prosperity and sustainable development (Nurwidodo et al., 2020; Spínola, 2015).There are four components of eco-schools, one of which is the aspect of environmental-based school curriculum. The project activities are firstly training in environmental education curriculum and materials in Japan and Indonesia, secondly making environmental curriculum and subject matter for junior high schools, thirdly socializing and distributing environmental education curriculum and books to schools, fourth environmental education training for teachers and supervisors, the fifth application of environmental lessons in the classroom through lesson study activities (Nomura, 2009; Nurwidodo et al., 2020).

The series of activities on the project in the long term are expected to be able to develop future generations who understand how to prevent environmental damage and resolve environmental problems in their city peacefully, prioritize moderation, and think humanely that humans must be able to maintain a comfortable and practical life, but still protect the environment (Igbokwe, 2016; Spínola, 2015). However, in the short term, it is expected to have an impact on the achievement of student environmental literacy. Environmental literacy is awareness and concern about the environment and its problems as well as knowledge, skills, and motivation to work on solving current problems and preventing new problems (McBride et al., 2013; Santoso et al., 2021). Environmental literacy aims to create a society that has an attitude towards the environment. This attitude allows a person to take an appropriate action to maintain and restore the environment (Duruk et al., 2017; Wong et al., 2017).

The instrument that is usually used to explore the environmental literacy of junior high school students is the Middle School Environmental Literacy Instrument (MSELI). This instrument was developed by the North American Association for Environmental Education (NAAEE), an institution active in strengthening environmental education. Since 2011 NAAEE has been actively developing a framework for assessing environmental literacy, this instrument has been widely used by various researchers in various countries (King & Franzen, 2017; Wood, 2013).

The development of environmental literacy instruments by the NAAEE was based on the results of Biogard environmental conference. This conference resulted in five goals of environmental education, namely awareness, attitudes, knowledge, skills, and participation (Izhar et al., 2022; McBride et al., 2013). NAAEE developed an environmental literacy assessment domain consisting of aspects of knowledge, competence, character, context, and acting responsibly in an environmentally responsible manner. The development of environmental literacy assessment carried out by NAAEE when compared with environmental education meets aspects of knowledge (ecological, socio-political, environmental issues), skills, environmentally responsible actions, and additional determination of environmentally responsible actions.

In this study, the MSELI instrument was used as a survey tool to determine the short-term impact of environmental education projects. The MSELI instrument contains measurements for aspects of awareness, attitude, knowledge, skills, participation, and the ability to identify and analyse environmental issues. The goal of the environmental education project is to strengthen aspects of awareness, attitudes, knowledge, skills, and participation according to the Tbilisi declaration. Therefore, this study aims to measure the environmental literacy of schools participating in an environmental education project.

2. METHODS

The research method used in this research is a survey with a quantitative research design. The independent variable in this study was school activity as measured by the activeness of principals and teachers in a series of project activities. The dependent variable is the environmental literacy of students.

Sampling was done by means of voluntary response sampling. The population is 24 public middle schools with a total of 22.250 students. The target population is students who have received environmental education lessons by teachers who have received environmental education training. The research sample was 1.058 students from 19 schools with the distribution map shown in Table 1.

Tabel 1. Population and Sample Ofresearch

No	Name of Public School	Location	Sum of Student Population	Sum of Student Sample
1	SMPN 1	Sepong	1.296	34
2	SMPN 2	Ciputat Timur	1.312	61
3	SMPN 3	Ciputat Timur	1.319	50
4	SMPN 4	Pamulang	870	88
5	SMPN 5	Pondok Aren	834	138
6	SMPN 6	Ciputat	1.200	116
7	SMPN 7	Serpong	880	21
8	SMPN 8	Setu	540	38
9	SMPN 9	Pamulang	1.284	41
10	SMPN 10	Ciputat Timur	1.285	-
11	SMPN 11	Serpong	1.228	37
12	SMPN 12	Pondok Aren	1.223	120
13	SMPN 13	Ciputat Timur	1.011	-
14	SMPN 14	Pondok Aren	1.138	-
15	SMPN 15	Serpong Utara	553	31
16	SMPN 16	Serpong Utara	915	23
17	SMPN 17	Pamulang	1.346	70
18	SMPN 18	Pamulang	896	-
19	SMPN 19	Serpong	723	38
20	SMPN 20	Setu	713	55
21	SMPN 21	Pamulang	890	-
22	SMPN 22	Serpong utara	579	-
23	SMPN 23	Ciputat	120	25
24	SMPN 24	Ciputat	95	72
	Total		**22.250**	**1.058**

The instrument was modified from the MSELS (High School Environmental Literacy Survey). The literacy instrument consists of 40 questions with six aspects. This instrument was tested to 69 junior high school students, obtained 37 valid questions and 3 invalid questions. The questions used in this study are questions that are valid in the tested. The used questions are shown in Table 2.

In the Table 2 it can be seen that the invalid questions are numbers 5, 13, and 29. The reliability test of each aspect was carried out using the Cronbach's Alpha test. The environmental knowledge obtained Cronbach's alpha 0.505; the attitude obtained Cronbach's alpha 0.361; the participation obtained Cronbach's alpha of 0.676; the awareness obtained

Cronbach's alpha 0.393; the skill obtained Cronbach's alpha 0.720; and aspects of the ability to identify and analyze problems obtained Cronbach's alpha 0.259. Based on the Cronbach's alpha test where the number obtained is greater than the table (r table 0.244), it can be concluded that this instrument is reliable as a data collection tool. Environmental instrument literacy can be seen at https://forms.gle/GoXGYUt9vEr8r2HJ8.

Table 2. Environmental Literacy Survey Instrument Map

No	Aspect	Number of Question
1	Knowledge	1,2,3,4,5,6,7,8,9,10
2.	Attitude	11,12,13,14,15,16,17,18
3.	Participation	19,20,21,22,23,24,25
4.	Awerness	26,27,28,29,30
5.	Skill	31,32,33,34,35
6.	Identification and analyses problems	36,37,38,39,40

Data was present by descriptive and inferential statistics. The independent variable (X) in this study is school participation in project activities. School participation in project activities can be seen from five things: first, teacher participation in schools in curriculum and environmental training in Japan; second, the participation of the principal or deputy principal in the socialization of environmental education curriculum and books; third, teacher participation in curriculum training, environmental books, and lesson study; fourth, teacher participation in implementing environmental education in the classroom through lesson study; and fifth, the presence of teachers in the reflection activity on the closing of the environmental education consolidation project. The dependent variable (Y) is the environmental literacy of students. The impact of the environmental project on literacy was measured by performing a regression test between variables X and Y.

3. RESULTS AND DISCUSSION

Results
The Project For Establishing Environmental Education

The project activities can be asume as schools main target of this project. The project activities are described in Table 3.

Table 3. Project Activities

No	Project Activities	Target	Time
1.	Socialization project	Headmaster	August, 14 2017
2.	Training of environmental educatioan curriculumin Japan	University lecturer and a staf from center of curriculum Ministry of Education Indonesia	August, 27 - September, 2 2017
3.	Training of environmental education learning in Japan	University lecturer and a staff from center of curriculum Ministry of Education Indonesia, Middle school supervisors (4 person), Middle School Teachers (2 person)	September 9-17 2018
4.	Training of environmental	University lecturer and staff of centre curriculum Ministry of	January 19-25 2020

No	Project Activities	Target	Time
	education learning in Japan	Education Indonesia, Teachers (2 Person)	
5.	Dissemination environmental education student book for 24 middle schools in South Tangerang City	40 books for each school	January 2021
5.	Training of implementing environmental education book and lesson study	Teachers	July 20-23 2020
6.	Implementing environmental education through *lesson study*	Teachers, university lecturer, supervisors	August 10 – October 20 2020
7.	Closing dan reflection of implementing environmental education in South Tangerang City	Teachers, university lecturer, supervisors, and city government	March 29 2021

Base on Table 3, it shows that schools are the main target of this project. Teachers are always involved in activities ranging from socialization, training in Japan and Indonesia, implementation of environmental education in the classroom, and reflection seminars on the implementation of environmental education. The participation of the schools was shown in Table 4.

Table 4. Participating of Schools in the Project

No	Name of Public School	Project Activities					
		Socialization (Person)	Training in Japan (Person)	Training in Indonesia (Person)	Teaching Environmental Education Through Lesson Study (Person)	Reflection (Person)	Sum (Person)
1	SMPN 1	1	1	3	6	2	14
2	SMPN 2	1	0	5	0	2	6
3	SMPN 3	1	1	3	2	-	6
4	SMPN 4	1	0	4	8	-	13
5	SMPN 5	1	1	3	13	2	20
6	SMPN 6	1	1	2	1	2	7
7	SMPN 7	1	0	3	0	-	3
8.	SMPN 8	1	0	3	0	-	4
9.	SMPN 9	1	0	3	4	-	8
10.	SMPN 10	1	0	3	2	-	6
11.	SMPN 11	1	0	2	2	-	5
12.	SMPN 12	1	0	1	5	-	7

No	Name of Public School	Project Activities					
		Socialization (Person)	Training in Japan (Person)	Training in Indonesia (Person)	Teaching Environmental Education Through Lesson Study (Person)	Reflection (Person)	Sum (Person)
13.	SMPN 13	1	0	3	0	-	4
14.	SMPN 14	1	0	3	4	-	8
15.	SMPN 15	1	0	2	1	-	4
16.	SMPN 16	1	0	2	2	-	5
17.	SMPN 17	0	0	3	10	2	15
18.	SMPN 18	1	0	3	1	-	5
19.	SMPN 19	1	0	1	3	-	5
20.	SMPN 20	0	1	3	20	2	26
21.	SMPN 21	1	0	2	0	-	3
22.	SMPN 22	0	1	2	5	1	8
23.	SMPN 23	0	0	3	0	-	3
24.	SMPN 24	0	1	3	3	1	6
	Jumlah	**19**	**5**	**64**	**91**	**13**	**191**

Base on Table 4 shows that all middle school teachers aintouth Tangerang City have participated in environmental education training, even though the lesson study activities were not active and at the time of project reflection they were not present. Based on attendance in project activities, schools are divided into three groups, namely Group I, namely schools that are very actively participating with attendance > 10 (persons/time), group II with attendance 6-9, and group III attendance <5.

Students' Environmental Literacy

Environmental literacy measures the achievement of environmental education goals and the ability to identify and analyze environmental issues. The environmental literacy of students can be seen in Table 5.

Table 5. Environmental Literacy of Middle School Students

	N	Min Score	Max Score	Mean	Std. Dev	Eco School Standard
Environmental literacy		24	97	64.55	9.042	sufficient
Aspect of Environmental Literacy						
Knowledge		0	100	69.91	20.588	sufficient
Awareness		20	100	70.47	14.49	Good
Attitude	1.058	14	100	72.79	9.45	Good
Skill		25	100	58.03	13.635	Poor
Participation		21.4	100	66.19	15.83	Good
Ability of environmental issues identification and analysis		0	100	33.78	22.713	Very Poor

The Table 5 shows that the achievement of environmental literacy based on the category of eco-school achievement is in the sufficient category (values between 60-69).

Ecoschool achievement is said to be good if the average has reached more than 70, the table shows that there are two environmental education goals that have been achieved, namely awareness and attitude. Meanwhile, the achievements for the aspects of knowledge and participation are in the sufficient category. The achievements for the skills aspect are in the poor category (values between 50-59), and the ability of students to identify and analyze issues in the very poor category. The knowledge aspect has not reached the target, seen from nine valid questions that were answered by students as show in Table 6.

Table 6. Middle School Students' Knowledge of Ecology

	Question number								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Right (%)	79.02	82.42	61.15	85.92	71.55	60.68	78.92	65.40	43.01
Wrong (%)	20.98	17.48	38.85	14.08	28.45	39.32	21.08	34.60	56.99
Sum (%)	100	100	100	100	100	100	100	100	100

Table 6 showed that the number of questions 3, 6, 8, and 9 have not reached the target of 70% of students answering correctly. Aspects of skills and student participation, have not reached the expected target. The achievement of skills in each aspect is shown in Table 7.

Table 7. Middle School Students' Skill Towards the Environment

Skills	Aspect	Skill Level				N
		Not Skilled (N. %)	**Slightly Skilled (N. %)**	**Already Skilled (N. %)**	**Fully Skilled (N. %)**	**(Person) Percent (%)**
Sorting trash	Organic and non-organic waste	191 (18.05%)	496 (46.88%)	318 (30.06%)	53 (5.00%)	1.058 (100%)
	B3 and non B3 waste	478 (45.18%)	367 (34.69%)	181 (17.11%)	32 (3.02%)	1.058 (100%)
	Sorting trash skill	31.62%	40.78%	23.58%	4.02%	100%
Protect the environment	Using cleaning tools	14 (13.23%)	208 (19.66%)	548 (51.80%)	288 (27.22%)	1.058 (100%)
	Planting and caring for plants	112 (10.59%)	414 (39.13%)	407 (38.47)	125 (11.81%)	1.058 (100%)
	Protect the environment skill	5.95%	29.40%	45.13%	19.52%	100%
Writing	Writing the idea about environmental issues	284 (26.84%)	506 (47.83%)	237 (22.40%)	31 (2.93%)	1.058 (100%)

Table 7 shows that the achievement of students is still less skilled in the aspects of sorting garbage and writing, in these two aspects it is seen that more than 70% of students feel unskilled and slightly skilled. The participation of students in environmental activities can be seen in Table 8.

Table 8. Middle School Students' Participation Towards the Environment

Participation	Activity	Frequency					N (Person) Percent (%)
		Never (N. %)	Rare (N. %)	Sometimes (N. %)	Often (N. %)	Not Filled (N. %)	
Environmental activities at home and school	Water saving	48 (4.54%) 0	77 (72.78%)	253 (23.91%)	680 (64.27%)	-	1.058 (100%)
	Sorting items for recycling	194 (18.24%)	288 (27.22%)	432 (40.83%)	144 (13.61%)	-	1.058 (100%)
	Inviting families to recycle items that are still fit for use	223 (21.08%)	208 (19.66%)	362 (34.22%)	264 (24.95%)	1 (0,09%)	1.058
	Take a friend to walk or ride a bicycle to school	121 (11.44%)	141 (13.33%)	344 (32.51%)	452 (42.72%)	-	1.058 (100%)
	Participate in environmental activities at school and home	13.85%	16.86%	32.88%	36.39%	0.02%	100%
Environmental activities in surrounding area	Together clean up the environment	193 (18.24%)	174 (16.45%)	344 (32.51%)	347 (32.80%)		1.058 (100%)
	Participate in Waste Banks	489 (42.23%)	150 (14.18%)	229 (21.64%)	190 (17.95%)		1.058 (100%)
	participate in environmental activities in the surrounding area	32.23%	15.31%	27.08%	25.47%		100%
Environmental activities in the city where they live	River cleaning	576 (54.45%)	178 (16.82)	168 (15.88%)	136 (12.85%)		1.058 (100%)

Table 8 illustrates that participation was distinguished by location, namely at home, school, the area where they live. In Table 8 it can be seen that the participation of students in environmental activities at home and at school is quite high, this can be seen from less than 30% of students stating that they rarely or never carry out environmental activities that can be done at home and school such as saving water, recycling waste, and reduce pollution.

Environmental activities in the surrounding area are also balanced based on the frequency of their activities. The attitude aspect is seen from several parameters shown in Table 9.

Table 9. Middle School Students' Attitudes Towards the Environment

Attitude	Willingness of Students to	Agreement				N (Person) Percent (%)
		Very Disagree (N. %)	Disagree (N. %)	Agree (N. %)	Very Agree (N. %)	
Energy saving	Reduce the use of air conditioning	262 (24.76%)	482 (45.56%)	246 (23.25%)	68 (6.43%)	1.058 (100%)
	Using a low-power lamp	39 (3.69%)	394 (37.24%)	497 (46.98%)	128 (12.10%)	1.058 (100%)
	Energy saving attitude	14.22%	41.40%	35.11%	9.27%	100%
Pollution reducing	Walking or bicycling	25 (2.36%)	181 (17.11%)	581 (54.92%)	271 (25.61%)	1.058 (100%)
	Promotion (write a letter)	17 (1.61%)	156 (14.74%)	665 (62.85%)	220 (20.80%)	1.058 (100%)
	Pollution reducing attitude	1.98%	15.93%	58.88%	23.20%	100%
Protecting wild animals	Donate from pocket money	19 (1.80%)	103 (9.74%)	638 (60.30%)	298 (28.17%)	1.058 (100%)
Reduce waste	Reduce plastic waste	16 (1.51%)	63 (5.95%)	613 (57.94%)	366 (34.59%)	1.058 (100%)
	Doing waste recycling	30 (2.84%)	102 (9.64%)	614 (58.03%)	312 (29.49%)	1.058 (100%)
	Attitude to reduce waste	2.17%	7.80%	57.99%	32.04%	100%

In Table 9 it appears that the commitment of students in reducing pollution, protecting lying animals, and reducing waste is very good, almost 80% of participants are committed to these attitudes. However, students have not been able to commit to reducing energy consumption from air conditioning and light sources.

Table 10 shows students' awareness of the environment, it appears that very high awareness is obtained in disposing of waste in its place, when students do not find a trash can, more than 50% often store it first in pocket or bag.

Table 10. Middle School Students' Awareness Towards the Environment

Awareness	Activities	Frequency					N (person) Percent (%)
		Never (N. %)	Rare (N. %)	sometimes (N. %)	Often (N. %)	Not filled (N. %)	
Environmental problem solving	Discuss with parents	220 (2079%)	248 (23.44%)	338 (31.95%)	248 (23.44%)	4 (0.38%)	948
Love nature	Go camping	276	297	290	195	-	1.058

Awareness	Activities	Frequency					N (person) Percent (%)
		Never (N. %)	Rare (N. %)	someti mes (N. %)	Often (N. %)	Not filled (N. %)	
	with a group or organization	(26.09%)	(28.07%)	(27.41%)	(18.43 %)		
	Vacation in nature with family	106 (10.01%)	364 (34.40%)	400 (37.81%)	188 (17.77 %)	-	1.058
	Watching and reading nature life	49 (4.63%)	185 (17.49%)	383 (36.20%)	441 (41.68 %)	-	1.058
	Involvement in activities to raise awareness of nature	13.58%	26.65%	33.81%	25.96 %	-	100 %
Throw garbage in its place	Keep trash in your pocket until you meet the trash	85 (8.03%)	92 (8.70%)	262 (24.76%)	619 (58.51 %)	-	1.058 (100%)

Many students get environmental awareness from reading and watching shows, less students get from direct interaction with nature through camping and vacation activities in the wild, as well as discussing with parents. Some of the factors that lead to the acquisition of high attitudes and awareness aspects are due to habituation, providing advice and examples, as well as introduction to the positive and or negative impacts obtained through video viewing Table 10 shows students' awareness of the environment, it appears that very high awareness is obtained in disposing of waste in its place, when students do not find a trash can, more than 50% often store it first in pocket or bag. Many students get environmental awareness from reading and watching shows, less students get from direct interaction with nature through camping and vacation activities in the wild, as well as discussing with parents.

In the implementation of environmental education in the classroom through lesson study activities, teachers seem to strengthen aspects of attitudes and awareness through a learning process that activates the feelings of students (hearts on). The teacher shows a video about the impact of environmental pollution or disasters that can be caused by environmental damage. The teacher asks students "What do you feel after watching the video?". Next, the teacher asks what students should do when the impact of environmental damage occurs and invites students to determine and make solutions to environmental problems. The teacher also invites students to evaluate learning by confirming students return, what is obtained from learning, namely learning materials and what students must do in an effort to minimize environmental problems or damage. Although during this pandemic, students have limitations in gaining awareness of the environment from interactions with nature, but students still have experience to raise awareness of the learning process. Based on the ability to identify and analyze environmental issues, the average is very low as show in Table 11.

Base on Table 11, the results show that 77% of students have the ability to identify and analyze environmental issues from the available discourses (less than 50). Table 11 shows the ability to identify very low students in more detail for each question, it appears that most of the students' answers are wrong.

Table 11. Students' Answers to Each Question on the Ability to Identify and Analyse Environmental Issues

Answer	The Percentage of Students' Answers to Questions to:				
	Identify Environmental Issues		Analyze Environmental Issues		
	1	2	3	4	5
Right	11.3	29.6	52	58	16
Wrong	88.7	70.4	48	42	84
Total	100	100	100	100	100

The Impact of School Participation in the Project to Establishing Environmental Education on Environmental Literacy

School participation in the project is divided into three groups, the most active group to the least active group. The relationship between students' activeness and environmental literacy can be seen in Table 12.

Table 12. The Relationship Between School Activity and Environmental Literacy of Students

Participation in the Project	Environmental literacy										Sum
	Veri Deficient (score <50)		Deficient (Score 50-59)		Sufficient (Score 60-69)		Good (Score 70-79)		Veri Good (Score >80)		
	n	%	n	%	n	%	n	%	n	%	
Group I	15	4	78	20	160	42	109	28	23	6	385
Group II	15	3	124	28	184	41	109	24	18	4	450
Group III	8	4	68	30	86	39	50	22	11	5	223
Sum	38	100	270	100	430	100	268	100	52	100	1058

Base on Table 12 shows that the highest percentage of students who get scientific literacy in good categories is in group I, namely the school group that actively participates in environmental education projects. The results of the statistical inference test to determine whether there is an effect of school activity in environmental education projects on students' environmental literacy can be seen in Table 13.

Table 13. Regression Test Results of the Effect of School Activity on Students' Environmental Literacy

ANOVA	df	SS	MS	F	Significance F
Regression	1	343.58	343.58	4.27	0.04
Residual	1056	85028.98	80.52		
Total	1057	85372.55			

Base on Table 13, the results of the regression test show that although the contribution of school activity factors is less than 1% (Adjusted R2 0.003). Participating school in project has an impact significantly on student literacy (F=4.267 Sig. 0.04), the more active the school in environmental project, the higher the environmental literacy.

Discussion

The knowledge aspect has not reached the target, some of question have not yet reached the target 70% of students answering correctly. Although the questions about the concept of ecological balance (number 3 and 8 are questions) that was studied in science subjects at the elementary and also in junior high school. The two questions posed on the environmental literacy instrument require high order thinking skills of question number three. This question asks students to analyze and conclude in Bloom's taxonomy including cognitive level 4 (C4). Question number eight is a question asks students to predict the possibility that occurs after analyzing the phenomenon (C4). The low ability of students in Indonesia in answering hots questions was also expressed by the Indonesian Ministry of Education and Culture after analyzing student answers in National Examination (Harta et al., 2020; Hidayah et al., 2021; Nasution et al., 2021).

Question number six (6) and question number nine (9) are simple questions related to factual knowledge with cognitive level C2. The water cycle has been studied by students in the 5th grade elementary science subject with the basic competencies being, this material does not exist in junior high school, only repeated in yunior high school biology class IX with basic competence. The material for sorting waste is studied in elementary level environmental education books with competencies and in environmental education at the junior high school level with competence. Although it has been studied, students still do not understand factual knowledge on the concept of the water cycle and the types of waste that are categorized as organic and non-organic.

Students' skill are still poor for sorting trash, protect environment, and writing. Many students are involved in environmental cleaning activities around the house, but for waste bank activities around the house, student participation is still lacking. The participation of students in environmental activities in the city where they live is still lacking, more than 50% of students have never been involved in cleaning the river in the city where they live. In South Tangerang City, there is an activity called "Young Environmental Warriors" consisting of elementary to high school students and the equivalent, one of the activities is cleaning rivers and sewers from garbage.

Skills and participation of students will achieve the target if they learn at school within hands-on activities, environmental observations, habituation assignments, and assignments to participate in environmental activities in their sorunding. Hands on activity is defined as an activity designed to involve students in exploring and finding information, asking questions, collecting data, analyzing and making their own conclusions (di Fuccia et al., 2012; Ekwueme et al., 2015; Kartono, 2010). Hands-on activities allow students to gain knowledge with their experience of interacting directly and manipulating objects around them, the results of the activity orientation test show that students who learn with the hands-on approach are significantly better than the control group (Ekwueme et al., 2015; Holstermann et al., 2010). Hands-on activities also have an influence on students' interest in the difficult learning.

Students' attitudes and environmental awareness have reached the target. This means that most students have a good concern and attitude in protecting the environment. In other studies in Indonesia, the results shown are also the same, the attitude and awareness aspects of students are good (Rokhmah & Fauziah, 2021; Santoso et al., 2021). Some of the factors that lead to the acquisition of high attitudes and awareness aspects are due to habituation, providing advice and examples, as well as introduction to the positive and or negative impacts obtained through video viewing. Recognizing the impact of something can lead students to examine their own feelings and actions, thereby increasing awareness of the values that are self-defined by students (Harahap, 2019; Munawar et al., 2019). In other words, awareness can also be influenced by perception. Students' awareness of the

environment can form responsible attitudes and behaviour in maintaining and preserving the school environment. Recognizing the impact of something can lead students to examine their own feelings and actions, thereby increasing awareness of the values that are self-defined by students (Azrai et al., 2017; Munawar et al., 2019). In other words, awareness can also be influenced by perception. Students' awareness of the environment can form responsible attitudes and behavior in maintaining and preserving the school environment.

Some of the students (77%) failed to identify and analyze environmental issues from the available discourses. This question asks students to conclude from the available reading, what environmental issues are in the reading. In this passage, it is stated: (1) Changes in the 'dry and rainy season' weather occur in Indonesia. (2) Changes in weather due to the influence of global warming. (3) Global warming occurs due to carbon dioxide pollution. (4) Changes in weather result in fishermen finding it difficult to go to sea, decreasing fish supply. Students was given four options: (a) The weather has changed in recent years, (b) Changes in weather occur due to monsoons, (c) Changes in the weather make it difficult for fishermen to go to sea, (d) .Changes in weather caused by global warming. Most of the students' answers (52.5%) answered that weather changes caused global warming (d). The second largest answer, which is 30.5%, answered that weather changes have occurred in recent years (a). Most of the students fail to understand that weather changes have an impact on humans, in this case making it difficult for fishermen to go to sea. Most of the students understand the reading only in the first and second sentences, not linking the entire paragraph, so they cannot answer correctly environmental issues that occur as a result of weather changes caused by global warming.

Integrating the 'greening' of the school settings (grounds, infrastructure, management) within the curriculum enhances the potential of the school environment to function as an authentic learning-place which supports meaningful learning, since what the students experience in school reflects authentic situations and thus enables them to practice Sustainable Development (SD). Consequently, chances are greater that students will transfer what they learn in school to their personal lives. Such complex changes cannot be driven or maintained by a single, even if highly dedicated, individual; they require ongoing initiative and support of the whole school community by addressing all stakeholders- administration, teachers, families and wider community. This brief overview highlights the whole-school approach as a model of education that seeks to addresses two immense and related challenges: enabling SD and providing quality education (Goldman et al., 2018; Nurellah et al., 2018). The findings of previous study suggest that many existing Environmental Education programs, which occur across a range of settings and in various configurations, have positive outcomes in terms of environmental knowledge, attitudes, dispositions, and skills (Ardoin et al., 2017). This means they are Environmental Literacy aspect based on MSLEI.

'Green-school certification' in Israel, as a whole-school sustainability program, integrates: changes in school operations, incorporating sustainability content in the curriculum and building links with local communities; aiming that sustainability become the students' mindset and the school's organizational culture (Goldman et al., 2018). In Czech Republic, the researchers revealed significant differences between respondents who participate in residential outdoor environmental education programs (Cincera et al., 2022). In addition, the perceived holistic, emancipatory, and community-based Environmental and sustainability Education (ESE) approaches were among the significant predictors of environmental literacy. The findings support the relevance of the ESE strategies examined in shaping environmental literacy of young students. In Kampar-Riau, Indonesia, the teacher implemented Local Environmental Problem Based Learning for Student Worksheets. It is effective in increasing action and sensitivity to the environment through mediating variables

of thinking skills and strengthen students' environmental literacy (Suryawati et al., 2020). This research show that involving teachers act in Environmental Education was able increasing Environmental Literacy. Furthermore, in USA, teacher's role evidently support student's environmental literacy as well (Kinslow et al., 2018).

The implication of this study providing the overview related to environmental education. So that this activity has an impact not only on knowledge but holistically on awareness, attitudes, skills and participation, as well as literacy. The Researcher give some suggestion, first for the local government to activate the teacher community on environmental education and encourage school principals and teachers to actively participate in the community. For teachers to optimize the achievement of environmental education goals which consist of knowledge, attitudes, awareness, skills, and participation and literacy of students, it is necessary to design environmental education learning strategies that activate the minds, skills, and feelings of students (minds on, hands on, hearts on).

4. CONCLUSION

The impact of environmental education projects can be seen from the environmental literacy of students who are in a fairly good category. The achievement of environmental education targets for the awareness and attitude aspects has been achieved, but for the knowledge aspect it is necessary to increase mastery of concepts, especially in the water cycle and sorting organic and non-organic waste, besides that it is also necessary to continue to train students' high-level thinking skills. However, the Covid-19 pandemic condition causes hands-on activities and collaborative participation cannot be carried out optimally. Environmental literacy also measures the ability of students to identify and analyse the environmental issues through available discourse. The results showed that the ability of students in this aspect was very weak. The factor of school participation in environmental utilization projects has a significant impact. Schools that actively participate in environmental project, the students' score of environmental literacy is getting higher.

5. REFERENCES

Ardoin, N. M., Bowers, A. W., Roth, N. W., & Holthuis, N. (2017). Environmental education and K-12 student outcomes: A review and analysis of research. *Journal of Environmental Education*, *0*(0), 1–17. https://doi.org/10.1080/00958964.2017.1366155.

Azrai, E. P., Sigit, D. V., & Puji, M. (2017). The Correlation between Environmental Awareness and Students Participation in Go Green School Activity at Adiwiyata'S School. *Biosfer: Jurnal Pendidikan Biologi*, *10*(2), 7–11. https://doi.org/10.21009/biosferjpb.10-2.2.

Cincera, J., Kroufek, R., & Bogner, F. X. (2022). The perceived effect of environmental and sustainability education on environmental literacy of Czech teenagers. *Environmental Education Research*, 1–18. https://doi.org/10.1080/13504622.2022.2107618.

di Fuccia, D., Witteck, T., Markic, S., & Eilks, I. (2012). Trends in practical work in German Science Education. *Eurasia Journal of Mathematics, Science and Technology Education*, *8*(1). https://doi.org/10.12973/eurasia.2012.817a.

Duruk, U., Akgün, A., Dogan, C., & Gülsuyu, F. (2017). Examining the Learning Outcomes Included in the Turkish Science Curriculum in Terms of Science Process Skills: A Document Analysis with Standards-Based Assessment. *International Journal of Environmental and Science Education*, *12*(2), 117–142. https://eric.ed.gov/?id=EJ1137380.

Ekwueme, C. O., Ekon, E. E., & Ezenwa-Nebife, D. C. (2015). The Impact of Hands-On-Approach on Student Academic Performance in Basic Science and Mathematics. *Higher Education Studies*, 5(6), 47. https://doi.org/10.5539/hes.v5n6p47.

Goldman, D., Baum, D., Ayalon, O., & Weiss, B. (2018). Influence of 'Green School Certification' on Students' Environmental Literacy and Adoption of Sustainable practice by Schools. *Journal of Cleaner Production*, *183*, 1300–1313. https://doi.org/10.1016/j.jclepro.2018.02.176.

Hakim, M. Z. (2019). Pengelolaan dan Pengendalian Sampah Plastik Berwawasan Lingkungan. *Amanna Gappa*, 111–121. https://journal.unhas.ac.id/index.php/agjl/article/view/9673.

Harahap, A. C. P. (2019). Character Building Pendidikan Karakter. *Al-Irsyad: Jurnal Pendidikan Dan Konseling*, *9*(1), 1–11. https://doi.org/10.30829/al-irsyad.v9i1.6732.

Harta, J., Rasuh, N. T., & Seriang, A. (2020). Using HOTS-Based Chemistry National Exam Questions to Map the Analytical Abilities of Senior High School Students. *Journal of Science Learning*, *3*(3), 143–148. https://doi.org/10.17509/jsl.v3i3.22387.

Hidayah, I. R., Kusmayadi, T. A., & Fitriana, L. (2021). Minimum Competency Assessment (AKM): An Effort To Photograph Numeracy. *Journal of Mathematics and Mathematics Education*, *11*(1), 14–20. https://doi.org/10.20961/jmme.v11i1.52742.

Holstermann, N., Grube, D., & Bögeholz, S. (2010). Hands-on Activities and Their Influence on Students' Interest. *Research in Science Education*, *40*(5), 743–757. https://doi.org/10.1007/s11165-009-9142-0.

Igbokwe, B. A. (2016). Environmental Literacy Assessment: Assessing the Strength of an Environmental Education Program (EcoSchools) in Ontario Secondary schools for Environmental literacy Acquisition. In *Electronic Theses and Dissertations*. University of Windsor.

Izhar, G., Wardani, K., & Nugraha, N. K. (2022). The Development Enviromental Literacy Media Learning for Elementary School Student. *Journal of Innovation in Educational and Cultural Research*, *3*(3), 397–404. https://doi.org/10.46843/jiecr.v3i3.116.

Kartono. (2010). Hands On Activity Pada Pembelajaran Geometri Sekolah Sebagai Asesmen Kinerja Siswa. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *1*(1), 21–32. https://doi.org/10.15294/kreano.v1i1.219.g228.

King, J. A., & Franzen, R. L. (2017). Environmental Literacy in Environmentally Themed Higher Education Courses. *Journal of Sustainability Education*, *13*. https://minds.wisconsin.edu/handle/1793/81828.

Kinslow, A. T., Sadler, T. D., & Nguyen, H. T. (2018). Socio-scientific reasoning and environmental literacy in a field-based ecology class. *Environmental Education Research*, 388–410. https://doi.org/10.1080/13504622.2018.1442418.

McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere*, *4*(5). https://doi.org/10.1890/ES13-00075.1.

Munawar, S., Heryanti, E., & Miarsyah, M. (2019). Hubungan Pengetahuan Lingkungan Hidup dengan Kesadaran Lingkungan pada Siswa Sekolah Adiwiyata. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *9*(1), 22–29. https://doi.org/10.24929/lensa.v1i1.58.

Nasution, M. I. S., Lubis, H. S. D., Tanjung, Y., & Nasution, A. A. B. (2021). Development of Infographic-Based Minimum Competency Assessment Instruments For High School Students In Medan City. *International Journal of Educational Research & Social Sciences*, *2*(6), 1439–1450. https://www.ijersc.org/index.php/go/article/download/198/208.

Nomura, K. (2009). A perspective on education for sustainable development: Historical

development of environmental education in Indonesia. *International Journal of Educational Development*, *29*(6), 621–627. https://doi.org/10.1016/j.ijedudev.2008.12.002.

Nurellah, A., Sumantri, M. S., & Purwanto, A. (2018). Analisis Penerapan Karakter Peduli Lingkungan Melalui Program Sekolah Berbasis Alam. *Jurnal Sosial Humaniora*, *9*(2), 90. https://doi.org/10.30997/jsh.v9i2.1206.

Nurwidodo, N., Amin, M., Ibrohim, I., & Sueb, S. (2020). The Role of Eco-School Program (Adiwiyata) towards Environmental Literacy of High School Students. *European Journal of Educational Research*, *9*(3), 1089–1103. https://doi.org/10.12973/EU-JER.9.3.1089.

Pujaningtyas, S. W., Kartakusumah, B., & Lathifah, Z. K. (2019). Penerapan Model Experiential Learning Pada Sekolah Alam Untuk Menciptakan Pembelajaran Yang Menyenangkan. *Tadbir Muwahhid*, *3*(1), 40. https://doi.org/10.30997/jtm.v3i1.1653.

Rokhmah, Z., & Fauziah, A. N. M. (2021). Analisis Literasi Lingkungan Siswa SMP pada Sekolah Berkurikulum Wawasan Lingkungan. *Pensa E-Jurnal : Pendidikan Sains*, *9*(2), 176–181. https://ejournal.unesa.ac.id/index.php/pensa/article/view/37765.

Santoso, R., Roshayanti, F., & Siswanto, J. (2021). Analisis Literasi Lingkungan Siswa SMP. *JPPS (Jurnal Penelitian Pendidikan Sains*, *10*(2), 1976–1982. https://doi.org/10.26740/jpps.v10n2.p1976-1982.

Shahreza, M., Sarwoprasodjo, S., Arifin, H. S., & Hapsari, D. R. (2020). Komunikasi Lingkungan Pengelolaan Sampah pada Bank Sampah di Tangerang Selatan. *Jurnal Penelitian Komunikasi*, *23*(2), 113–128. https://doi.org/10.20422/jpk.v2i23.721.

Spínola, H. (2015). Environmental Literacy Comparison between Students Taught in Eco-schools and Ordinary Schools in the Madeira Island Region of Portugal. *Science Education International*, *26*(3), 392–413. https://digituma.uma.pt/handle/10400.13/1361.

Suryawati, E., Suzanti, F., Zulfarina, Putriana, A. R., & Febrianti, L. (2020). The implementation of local environmental problem-based learning student worksheets to strengthen environmental literacy. *Jurnal Pendidikan IPA Indonesia*, *9*(2), 169–178. https://doi.org/10.15294/jpii.v9i2.22892.

Wong, C. A., Afandi, S. H. M., Ramachandran, S., & Lian, J. C. K. (2017). Environmental Literacy AmongYear 5 Primary School Children In East Coast Division , Sabah , Malaysia. *World Applied Sciences Journal 35 (Service Experience and Innovation in Hospitality & Tourism)*, 20–26. https://doi.org/10.5829/idosi.wasj.seiht.2017.20.26.

Wood, L. S. (2013). *Environmental Literacy of Sixth Grade Students in Arkansas: Implications for Environmental Education Reform*. University of Arkansas.