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Student's Environmental Literacy Profile of Adiwiyata Green School in Surakarta, Indonesia

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Abstract

Environmental literacy refers to the knowledge of the mechanism of how the nature works and the roles of human to preserve the nature sustainably. The dynamic relation between human and environment can be seen from the life interaction along with all the components. One characteristic of society that has environmental literacy is highly concerned with environmental. This research aims to analyze students' environmental literacy in Adiwiyata Green School in Surakarta. Environmental literacy covers some components including environmental knowledge, attitude, and environmental concern. This research was developed through descriptive qualitative design to obtain data by employing classroom observation and questionnaire based on environmental literacy to the students in Adiwiyata Green School in Surakarta. The research finding shows that (1) students' environmental literacy in Adiwiyata Green School in Surakarta is categorized as low level. Data obtained from the instrument are 77,38% for environmental knowledge, 59,50% for attitude, 70,12% for environmental concern. The average percentage for all components is 68,97%. Based on the finding, it can be concluded that the environmental literacy is still low. It can be seen from (1) knowledge and concern aspects are higher than attitude aspect, (2) attitude aspect contains two components which are *anti anthropocentrism* and *anti-exemptionalism*, so that it is necessarily to increase students' concern toward the environment.

Keywords: *Environmental literacy, Adiwiyata Green School.*

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Introduction

The goal of the adiwiyata green school program is to create conditions which are Adiwiyata good for the school to be a place of learning and awareness of the citizens of the school, so that later on the citizens of the school can demonstrate its responsibility in an attempt – rescue efforts for the environment and sustainable development. The main activities of the Program Adiwiyata is embodying the institutional school cares and cultured environment for primary and secondary schools in Indonesia as a form of introduce value of environmental education.

The goal of environmental education is to improve the behavior of the responsibility to the environment so that it can make the students have an environmental literacy toward environment [1]. Environmental literacy is the knowledge about the working mechanism of the natural environment and the role of man to preserve a sustainable environment [2]. It is in accordance with the commitments of agenda 21 which seeks to realize the sustainable development of education (Education for Sustainable Development) [3]. Education for Sustainable Development (EfSD) is a result of the formulation of agenda 21 of the Earth Summit in Rio De Janeiro in Brazil in 1992 aims to strengthen literacy education environment sustainable development oriented [4].

EfSD has the concept of sustainable development to support and give awareness of human commitment, responsible, and contributing to the current environment and future [5]. Environmental literacy within the enclosing components; knowledge of the environment (the environmental knowledge), attitude (attitude), as well as concern for the environment (environmental concern) [6]. Reference [7] explain with the phrase characteristic of a citizen's responsibility to the environment, i.e. are able to use their knowledge to define and perform the appropriate action in solving environmental problems in the community. It outlines underlined that, reference [8] holds that environmental literacy has specific characteristics that said to be specific, because the literacy environment serves as an assessment in the educational environment [9]. Instructional design specific areas of study to enhance literacy learning in the environment being important in the class on the material relating to the environment.

This is related to the purpose of EfSD is environmental education to create students who have literacy toward the environment, as well as opinions [10] stating that environmental science has a great contribution to solving the environmental problems but because of a lack of good environmental in practice often restricts the application of this science. During this time, learning to increase environmental literacy only limited training in learning the syntax, and less stressed specifically on certain material. This was confirmed by the opinion [11] that the contribution to education at the high school level for environmental action related to environmental issues is still slow in the category due to the existing curriculum has not been designed as objectives EfSD.

Environmental Literacy

Environmental literacy is the knowledge about the working mechanism of the natural environment and the role of man to preserve a sustainable environment [12]. A very dynamic relationship between people and their environment, can be seen from how humans live together, side by side with all components in the vicinity. Environmental literacy is not a new discipline or even a new concept in examining human relationships to the environment, environmental literacy problem has caught the attention of many researchers and scientists an environment education [13].

Other environmental literacy understanding expressed by Shamuganathan (2015) which defines the environmental literacy of people as a person who have basic skills, understanding and feelings about human relationships with the environment. Then Roth added that the environmental literacy of people understand the link between natural and social systems, the unity of man with nature, how technology influences the decision-making environmental problems and learning about the environment is a lifelong [13]. Hungerford & Volk (1990) explain with the phrase characteristic of a citizen's responsibility to the environment, i.e. are able to use their knowledge to define and perform the appropriate action in solving environmental problems in the community.

Environmental literacy within the enclosing components; knowledge of the environment (the environmental knowledge), attitude (attitude), and concern towards the lingkungan (environmental concern) [14]. Although there is a difference of definition and components of the literacy environment, solutions to address the problem of the environment is by developing community environmental literacy, be having in ways that are more environmentally responsible. A behavior is considered responsible for the environment when the actions of individuals or groups advocating the use of sustainable or efficient to natural resources. One of the form/shape of the community who have environmental literacy is a character who has to care for the environment, as described by [15] in the Theory of Planned Behaviour. In the theory explained that eco-friendly behavior is influenced by

attitudes, norms, behaviors and controls a moral obligation that will affect interest behave and form behavior.

Environmental literacy as a goal of EfSD can be measured using an instrument of environmental literacy according to Hesham (2011) and NEP of Dunlap (2000). Environmental literacy instrument consists of 3 components (Hesham & Dajeh, 2011) consists of a environmental knowledge, attitude, and concern towards the environment. The scale of the NEP was designed to identify the five components of the ecology (Kopnina, 2011). Among other ecological component of the limits to growth, anti anthropocentrism, the balance of nature, anti-exemptionalism, and eco-crisis.

Table 1: Environmental literacy aspects

Number	Dimension	Aspect
1	(<i>Knowledge</i>) (McBride, Brewer, Berkowitz, & Borrie, 2013) (NAAEE, 2011) (Ramdasa & Mohameda, 2014)	a. <i>Ecological knowlwdge</i> b. <i>Sosio politic knowledge</i> c. <i>Knowledge of Environmental Issues</i>
2	(<i>Attitude</i>) (Dunlap, Liere, Mertig, & Jones, 2000) (Erdogan & Marcinkowski, 2015) (Ajzen I. , 2001)	a. Environmental sensitivity - Attitude attention and environmental friendly - Participate actively in settlement directing and solving of environmental problems - Apply attitude attention in daily lifestyle - implementation environmental regulation b. Motivation and intention to act in participating actively towards environmental protection and improvement - participate actively towards environment improvement and protection - confidence to make decisions and assessing of environmental problem
3	(<i>Concern</i>) (Hesham & Dajeh, 2011) (McBride, Brewer, Berkowitz, & Borrie, 2013)	a. Response towards environmental problem - describe and present the facts about environmental problems - describe the factors that cause or contribute to the environmental problems - being able to distinguish the sorts of kinds of environmental problems

Adiwiyata Green School

Adiwiyata according to the regulation of the Minister of State for the environment is a good school and is ideal as a place to obtain all sciences and a variety of norms and ethics that can be the Foundation of man towards the creation of well-being life and ideals of sustainable development. The adiwiyata green school program is one of the case of national work program run by the State Ministry of the environment in order to realize the development of environmental education. In this program it is expected every citizen schools get involved in school activities towards a healthy environment and avoid negative environmental impacts. The goal of the Program is to create conditions which are Adiwiyata good for the school to be a place of learning and awareness of the citizens of the school, so that later on the citizens of the school can demonstrate its responsibility in an attempt – rescue efforts for the environment and sustainable development. The main activities of the Program Adiwiyata is the institutional school cares and cultured environment for primary and secondary schools in Indonesia.

1. Component of Adiwiyata Green School

To achieve the goal Adiwiyata there are four components of the program which is a unified whole. a). Policy development the school concerned and Cultured Environment to realize the school cares and cultured environment then needed some school policies that support the performance of the activities of environmental education by all the citizens of the school in accordance with the basic principles of the programme Adiwiyata green school that is participatory and sustainable. The development of school policies include:

- a. Vision and mission of the school is caring and cultured environment.
- b. The school's policy in developing the educational learning environment.
- c. Policy capacity building human resources (personnel educational and non-educational) in the field of environmental education.
- d. The school's Policy in an effort-saving natural resources.
- e. The school Policies that support the creation of a school environment clean and healthy.
- f. School Policy for allocation and use of funds for activities related to environmental issues.

2. Implementation of Environmental-based curriculum

The delivery of the material environment to students can be done via the integrated curriculum or monolithic. The development of the material, the model of teaching and learning methods vary, done to give understanding to the students about the environment that are associated with environmental issues to everyday (local issues). Curriculum development may be done include:

- a. The development of a model of cross-subject learning.
- b. Excavation and development of the material and the environmental problems that exist in the surrounding communities.
- c. The development of environment-based method of learning and culture.
- d. The development of curricular activities to increase knowledge and awareness of students about the environment.

The purpose of this research is to analyze the environmental literacy high school students Adiwiyata green school in Surakarta.

Research Method

This research is descriptive research utilizing survey method. The data were collected using two instruments, test and a questionnaire. Tests were used to measure environmental knowledge aspects on natural sciences subject in elementary school students. Meanwhile, the questionnaire is used to collect information about the environmental attitude and concern of students. The aspects of environmental research which are measured include (a) a knowledge attitude, (b), (c) concern. The place of research carried out in the three green school Adiwiyata in Surakarta. The population in this research is as much as 117 students, sampling in this research is done using Random Sampling techniques. As for other types of source data used in this research is the primary data and secondary data. The primary data source is a data source that derives directly from respondents using questionnaires or question form in data collection. Aside from the primary data source is also required of the secondary data i.e. the technique of observation and documentation. Data analysis was done with the analysis of the percentage is quantitative.

Results and Analysis

Environmental literacy within the enclosing components; knowledge, attitude and concern (Hesham & Dajeh, 2011). Although there is a difference of definition and components of the literacy environment, solutions to address the problem of the environment is by developing community environmental literacy, behaving in ways that are more environmentally responsible. A behavior is considered responsible for the environment when the actions of individuals or groups advocating the use of sustainable or efficient to natural resources. One of the form/shape of the community who have environmental literacy is a character who has to care for the environment, as described by (Ozsoy, Sibel, Ertepinar, Hamide, Saglan, & Necdet, 2012) in the Theory of Planned Behaviour. In the theory explained that eco-friendly behavior is influenced by attitudes, norms, behaviors and controls a moral obligation that will affect interest behave and form behavior.

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Environmental Knowledge

The participants environmental knowledge was rated against the number of correct responses to the 15 questions provided in section one of the questionnaire. If the respondents answered correctly, they were scored with a numeric value of one (1); but if they answered incorrectly, they received a zero (0). The highest score possible for section one on environmental knowledge was 15 while the lowest zero

Table 2: The Results Of The Environmental Knowledge

Number Of questions answered correctly	Score percentage range	Total students	Adequacy of score
14 ormore	90-100%	21 (17.94%)	Adequate
12-13	80-89 %	42 (35.89%)	Adequate
11	70-79%	17 (14.52%)	Adequate
9-10	60-69%	14 (11.96%)	Inadequate
8 orfewer	59% or less	23 (19.65%)	Inadequate

Environmental Attitude

From this figure can describe that:

1. Respondent statement use Likert Scale, and format of range from 1 (Very disagree) to 5 (Very agree)
2. The number of positively statement are 8 (1,3,5,7,9,11,13,15).
3. The number of negatively statement are 8 (2,4,6,8,10,12,14)
4. The majority of students statement disagree from this instrument is like : 1) Human ingenuity will ensure that we do NOT make the earth unlivable.. (54.60%), 2) The balance of nature is strong enough to cope with the impacts of modem industrial nations. (69.54%), 3) The so-called 'ecological crisis' facing humankind has been greatly exaggerated (65.52%), 4) Humans were meant to rule over the rest of nature (43.10%) 5) Humans will eventually learn enough about how nature works to be able to control it (50.00%). From this figure shows that standart deviation of environmental attitude is 16.17%. This indicates that student of senior high school in Surakarta have positive attitude to protecting and improvement environmental.

Table 3: The Results of Environmental Attitude

No	Statement	Very Agree	Agree	Undecided	Disagree	Very Disagree
1	We are approaching the limit of the number of people the earth can support.	94.83	5.17	0.00	0.00	0.00
2	Humans have the right to modify the natural environment to suit their needs.	1.15	1.72	4.60	33.33	59.20
3	When humans interfere with nature it often produces disastrous consequences.	56.32	38.51	2.30	2.87	0.00
4	Human ingenuity will ensure that we do NOT make the earth unlivable.	54.60	29.89	2.87	5.75	6.90
5	Humans are severely abusing the environment.	83.33	16.67	0.00	0.00	0.00
6	The earth has plenty of natural resources if we just learn how to develop them.	45.98	20.11	1.15	25.86	6.90
7	Plants and animals have as much right as humans to exist.	78.74	16.09	1.72	0.00	3.45
8	The balance of nature is strong enough to cope with the impacts of modem industrial nations.	69.54	22.41	4.60	1.72	1.72
9	Despite our special abilities humans are still subject to the laws of nature.	65.52	18.97	0.00	10.34	5.17
10	The so-called 'ecological crisis' facing humankind has been greatly exaggerated	0.00	0.00	0.00	72.41	27.59
11	The earth is like a spaceship with very limited room and resources	86.78	13.22	0.00	0.00	0.00
12	Humans were meant to rule over the rest of nature.	39.66	43.10	0.00	11.49	22.99
13	The balance of nature is very delicate and easily upset.	91.38	8.62	0.00	0.00	0.00
14	Humans will eventually learn enough about how nature works to be able to control it.	50.00	35.63	1.72	6.90	5.75
15	If things continue on their present course, we will soon experience a major ecological catastrophe	90.80	9.20	0.00	0.00	0.00
	SD	30.11	13.28	1.67	19.66	16.18
	Average	16.17				

Environmental Concern

From this figure describe that participants were asked about the global environment issues and standar deviation is 17,25%. This indicates that the most students have concern about 15 issues.

Number	Statement	Very Concern	Concern	Undecided	Little concern	Not at all concern
1	Having a car is part of a good lifestyle	16.67	18.39	0.00	16.67	48.28
2	Restriction of chemical fertilizers can loss farmers comodity	65.52	14.94	0.00	5.75	13.79
3	If my work field poses environmental problems, I better look for another job alternatives	56.90	36.21	0.00	5.17	1.72
4	In the shopping daily, we can use the plastic for the containers of groceries	6.90	4.02	0.00	53.45	35.63
5	I will be friendly environment if others do it too	22.99	14.37	0.00	60.34	2.30
6	Human activity does not have a significant impact on global temperature change	10.34	23.56	0.00	52.30	13.79
7	I prefer to hand over the task of in print than in the form of soft file	1.72	13.79	0.00	36.21	50.00
8	I will use the recycle paper despite the costs that higher	0.00	2.87	0.00	5.17	91.95
9	Limitations on the availability of natural resources is a concept that is not real	0.00	9.20	0.00	14.37	76.44
10	Technology will always provide the right solution to the problem of the availability of resources	10.34	6.32	0.00	29.31	54.02
11	The loss of one species will not disturb the balance of the ecosystem as a whole	12.07	16.67	0.00	11.49	59.77
12	Increasing the abundance of polar ice caps are melting because of the thinning of the ozone layer is a common phenomenon	0.00	9.77	0.00	38.51	51.72
13	The Government should bring in foreign investors to manipulate the natural resources of Indonesia to boost the country's foreign exchange	5.17	12.64	0.00	33.33	48.85
14	The industry requires modern equipment to process residual smoke production despite having to spend the cost of an expensive	7.47	9.20	0.00	48.28	35.06
15	In the area of dense population , need for water installation processing for drinking water even though the cost is expensive	98.28	1.72	0.00	0.00	0.00
	SD	29.15	8.84	0.00	20.36	27.88
	Average	17.25				

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Environmental Literacy Aspects

According to (Hesham & Dajeh, 2011) the literacy environment has three dimensions, namely knowledge, attitude (attitude), and concern (concern).

Dimensions of Environmental Knowledge

Dimensions of knowledge is the understanding of the human relationship with nature which aims to build awareness of the environment. Dimensions of knowledge consists of several aspects, namely ecological knowledge, knowledge of the socio-political, knowledge of environmental issues.

a) Ecological knowledge is the concept of a knowledge base that is associated with the physical and ecological understanding of biosfer namely air, water, and soil that serves as a buffer for the life of all organisms to live and survive and how organisms interact with each other [18].

b) Socio politic knowledge is the knowledge about the response to environmental issues that affect our understanding of the basic structure and the scale of the social system and the relationship between beliefs, political structure, and environmental values of different cultures. geographic understanding at the local level, regional, and global recognition of cultural patterns and changes in society [19]. Knowledge of environmental issue it is the understanding of a range of environmental issues and related issues and how they are influenced by political institutions, education, economy, and Government. Understanding air quality, water quality and quantity, the quality and quantity of land, land use and the management of wildlife habitat, and human population, health, and waste [20].

Dimension of Environmental Attitude

Attitude is the point of view of the environmental conditions that arise because of the motivation and real evidence of human treatment of the environment that will have an effect on environmentally friendly behavior (Ajzen i., 2001). Aspects of attitude covering sensitive to environment and motivation keep environment (Erdogan & Marcinkowski, 2015). Environmentally sensitive attitudes designed to obtain individual has feelings pro or con, favorable or unfavorable, against certain aspects of the environment or objects related to the environment (Dunlap, Liere, Mertig, & Jones, 2000). Dunlap (2000) develop a New Ecological Paradigm Scale to measure human concern towards the environment. From this figure shows that the standard deviation of the environmental attitude is 12%. This indicates that the student of senior high school in Surakarta have positive attitude to protecting and environmental improvement. The scale of the NEP was designed to identify five components of ecological possibilities or called with dimensions in NEP (Kopnina, 2011), among other things: Limit to growth, giving the point of view of restriction against someone to grow which has limitations in accommodating a population and exploitation of human beings. Anti-anthropocentrism, gives a point of view against someone on pro-environmental stance if it does not put forward the ego as a human being. The balance of nature, providing a point of view against someone about rentannya balance of nature and human vulnerability to damage and sometimes contribute to damage to nature. Anti-exemptionalism, gives a point of view against a person regarding the rejection of thought which says that man as a creature who has a responsibility to the environment. Eco-crisis, giving the perspective of ecological crisis on to someone or damage to nature as the impact of the Act is not friendly toward the environment.

Dimensions of Environmental (concern)

Environmental concern is a concern against various environmental problems that became a trend at the moment and there are efforts to participate actively to problem solving as well as action associated with environmental issues. (Hesham & Dajeh, 2011) Aspects of the attitude that is a response to environmental problems, the response shown is through the chosen lifestyle activities, including the purchase of environmentally friendly products, a variety of ways to conserve resources, help with enforcement of environmental regulations, using personal and interpersonal way to encourage environmentally friendly practices; and support of environmentally friendly policies (McBride, Brewer, Berkowitz, & Borrie, 2013).

From this figure describe that participants were asked about the global environment issues and the standard deviation is 17.25%. This indicates that the most students have concern about 15 issues.

The third dimension of environmental literacy have linkages to develop human-aware, have concerns about environmental problems, have the knowledge, attitudes, skills, motivation and commitment that is able to provide solutions and the prevention of the threat environment that is the goal of environmental education for sustainable development or known as the Education for Sustainable Development (EfSD).

Conclusion

In reference to the research results and discussion, some conclusions are drawn:

1. In spite of student's limited environmental knowledge about environmental issues
2. They had positive attitudes towards the environment
3. Environmental attitudes involve readiness to behave towards environment, for instance readiness to help, support, get close to, and accept surrounding environment to raise concerns for the balance in environment.

3. Environmental knowledge, attitudes and environmental concerns are associated to create humans who realize, have concerns about environmental problems, have thoughts towards a situation, possess skills, motivation, and commitments enabling them to give solution and to carry out preventive measures towards environmental threats. This is in accordance with the purpose of *Education for Sustainable Development* (EfSD).

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