

Case Study the Environmental Literacy of Fast Learner Middle School Students in Indonesia

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Abstract: *Awareness in environmental ethics among students becomes a complex problem that is trying to be addressed through environmental education in schools. But it is considered difficult given many factors that affect, especially cultural factors. Parental, background, social life, and systems in developing countries such as Indonesia are still lack of concern for the environment. In fact there is occurred in group of fast learner students in middle school, their intelligence is above average, they also gain access to a lot of environmental knowledge, but none in implementation. To capture the phenomena, measured students environmental literacy levels by using the Environmental Literacy Instrument. The result, for all environmental literacy components, students were high in components of environmental knowledge and cognitive skills, but have not been satisfactory for the affective and responsible behavior components. Performed a correlation analysis between the components, demonstrate the behavior is not influenced by the environmental knowledge, but more influenced by his attitude towards the environment.*

Keywords: environmental education, environmental literacy, components of environmental literacy, Environmental Literacy Instrument.

1. Introduction

The explosion of population growth, industrialization and consumerism are increasing, causing a series of environmental crisis [5], [6]. Indonesia as a developing country with the fourth highest population in the world is also experiencing a similar issue. In addition to greed, lack of people environmental awareness makes the environmental problem more complicated. The habit of throwing garbage or waste into rivers, illegal logging, uncontrolled fishing, wasteful use of water and energy is a huge homework for government to prepare the citizens in protecting environment. The important role of environmental education could be a solution of these problems [1], [14].

2. Environmental Education and Environmental Literacy

Environmental education is a process that aims to improve quality life by empowering people to solve and prevent environmental problems [5]. It's important to environmental education get high attentions in order to prepare the citizen to participate in establish a sustainable environment [2]. The highest goal of environmental education is to make students environmental literate [1], [2], [4], [8], [11], [13].

2.1 Definition of Environmental Literacy

Environmental literacy is defined as the knowledge of the natural environmental mechanism, and the role of humans to preserve the environment [2], [5], [7], [13]. Environmental literacy has a purpose to assess the effectiveness of environmental education [1], [6].

2.2 Components of Environmental Literacy

Some components included in the environmental literacy are;

ecological knowledge, cognitive skills, affective, attitudes towards the environment [1], [5], [6], [7], [10]. These components used in the environmental literacy as a criterion in analyzing the environmental literacy level [1], [6], [9]. The component can be described as follows:

1. Ecological knowledge: knowledge and understanding of important concepts in ecology, principles and theories of how the system works and its interaction with the environment of social systems;
2. Cognitive skills: the ability to analyze, synthesize and evaluate information on the issues or environmental issues; (c). Affective: factors within the individual that reflects the level of interpersonal and action on issues or environmental issues;
3. Action environmentally responsible behavior: include active participation from the solution of environmental problems, also includes other actions such as environmentally responsible; actions consumption, environmental management, legal action, persuasive, and political action [1], [2], [5], [6], [11].

3. Case Study of Student's Environmental Literacy

3.1 Teacher Role in Environmental Education

In practice, the urgency of environmental education rests on the teacher as the spearhead education in school. The teachers' role when determining the environmental education program becomes very important in fostering caring, responsibility, respect, and students understanding to the importance of environment and human impact on natural environment [1], [2], [4], [6], [8], [10]. However this task is not easy as it seems.

A junior high school in Indonesia, which belongs to the

category upper public school, they experience many obstacles. Even with adequate school facilities and students input were good; it is very difficult to change the student's environmental behavior patterns. Generally, students had a bad habit for littering. Even is providing special bins with stickers that describe what kind of waste that must be disposed, still they ignored it. Air conditioning in each classroom stays on even though hour lesson was over. The lights lit class, whereas the sunny day. Plants in pots are disturbed, and there is garbage in the pots. The tap water which is available in front of each class is often found open without anyone caring. The low student involvement to keep their environment triggers the teachers to think hard find a way out.

Several drafted resolution strategy that introduces students closer to the environment. Various environmental activities programs were designed, such as composting, greenhouse, bio-pore, water purification, waste recycling. Students also reminded to the importance of environment continuously every Monday morning at the flag ceremony. Workers from the Environmental Government Agency were invited to educate students. But it seems the result is still far from expectation, the phenomena of low environmental awareness on students is still reflected from day to day.

3.2 Evaluating Student's Environmental Literacy

Therefore, it is necessary to do an assessment of student's environmental literacy as school policy inputs. Environmental literacy is recommended to be evaluated periodically to counter the environmental issues [1], and also to evaluate environmental education program, examine the effectiveness of the curriculum and allows exploring the variables that can affect [1], [11], [12].

An evaluation tool suggested by experts in assessing environmental literacy is a special instrument, for example a reference from Simmons framework criteria, using the Environmental Literacy Instrument [1], [11], [15]. This Instrument certainly covers all components of environmental literacy, including; environmental knowledge, attitude and awareness for the environment, skills in solving environmental problems, as well as environmentally responsible behavior [1], [11], [12], [15].

The form of this instrument must be adjusted to the children development level, environment and local cultural context [1], for example, middle school students is used MSELIS (Middle School Environmental Literacy Instrument/ Survey) [12]. In this study refers to MSELIS instruments that have been adapted to the local culture, which tested on an upper class (28 students) of grade seven (12-13 years old).

3.3 Result

Summary descriptive results on the students environmental literacy level is presented in Table 1. The results is identified in detail each part of MSELIS.

Table 1: Descriptive Results on Parts of MSELIS

Parts of the MSELIS	Number of Item	Range	Mean	Std. Dev.	% of Points
II. Ecological Foundation	17 items	0-17	13.68	1.79	80.47%
III. How You Think About Environment	12 items	12-60	47.50	6.14	79.17%
V. You and Environmental Sensitivity	11 items	11-55	31.57	4.71	57.40%
VI. How You Feel About the Environment	2 items	2-10	9.39	1.13	93.90%
VII.A. Issue Identification	3 items	0-3	1.54	0.84	51.30%
VII.B. Issue Analysis	6 items	0-6	4.93	1.46	82.17%
VII.C. Action Planning	8 items	0-20	14.61	4.25	73.05%
IV. What You Do About the Environment	12 items	12-60	44.07	5.46	73.45%

Because there are various in item numbers and the range scores on part of MSELIS, so the acquisition using a percentage points to interpret the data tabulation. Percentage points obtained, it appears that the mean scores MSELIS quite varied. The order from the highest points to the lowest in any part MSELIS are; feeling to the environment (93.90%), analysis of issue (82.17), ecological foundation (80.47%), thoughts on the environment (79.17%), to-do list for the environment (73.45%), action plan (73.05%), and for the lowest score on the matter of the environmental sensitivity (57.40%) and identification issues (51.30%).

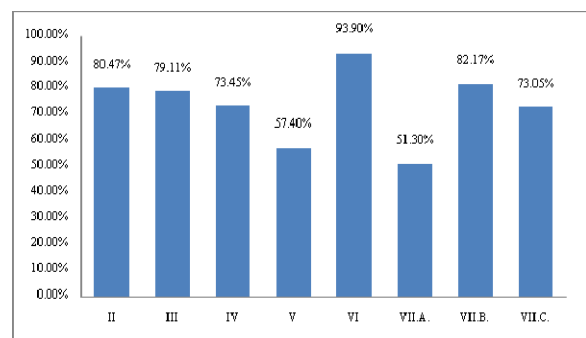


Figure 1: Obtaining Points on Part of MSELIS

The figure above visualizes the comparison points for each part of MSELIS. For the part I (one) was not included because it is item of demographic data, such as age, gender, and ethnicity. To determinate student's environmental literacy level, then the descriptive results of MSELIS above must be classified into units of its components (ecological knowledge, cognitive skills, affective, and behavioral responsible for the environment). After that, the scores obtained can be categorized into the environmental literacy level; *high, moderate or low* [12]. Composition scores for each component of environmental literacy disclosed in Table 2.

Table 2: Environmental Literacy Component and Composite Mean Scores

Components and Measures of Environmental Literacy	Range of Possible Scores	Means Scores (n=28)	Std. Dev.	Category
Ecological Knowledge	0-60	48.28	6.30	High
Ecological Foundation				
Affective	12-60	42.46	10.15	Moderate
Environmental Sensitivity				
Environmental Feeling				
Verbal Commitment				
Cognitive Skills	0-60	43.60	4.74	High
Issue Identification				
Issue Analysis				
Action Planning				
Environmental Behavior	12-60	44.07	5.46	Moderate
Actual Commitment				
Environmental Literacy Composite Scores	24-240	178.41	16.41	High

*Notes: For scores on Ecological Knowledge and Cognitive Skills, *Low* = 0-20, *Moderate* = 21-40, and *High* = 41-60; scores on Affective Environment and Behavior, *Low* = 12-27, *Moderate* = 28-44, and *High* = 45-60; while for Environmental Literacy Level (total scores of four components), *Low* = 24-96, *Moderate* = 97-168, and *High* = 169-240.

Components of ecological knowledge and cognitive skills are in the high category while components of environmental affective and responsible environmental behavior in the range of moderate category. The total scores of the literacy environment listed in the table above in the high category, its received donations points from the ecological knowledge and cognitive skills components. Determination of the student's environmental literacy level in this study was explored through analysis for each component.

3.3.1 Ecological Knowledge

Ecological knowledge component is prepared on the Ecological Foundation, resulted high category. Students obtained high scores (80.47%) because they have learned the prerequisite knowledge. Prerequisite knowledge is assumed to have a basic concept of ecology, such as the components of the ecosystem, interactions in ecosystems, dynamics population.

Moreover the research subject is fast learner students. Seventh grade students sampled in this study is the best academic class in the school. With good cognitive potential input, then the student will not be considered to have difficulty working on cognitive skills item.

3.3.2 Cognitive Skills

The result for cognitive skills components scores is in the high category. The parts which include in this component are; Issue Identification, Issue Analysis, and Action Planning. The percentage scores for the parts on Cognitive Skills are presented in Figure 2.

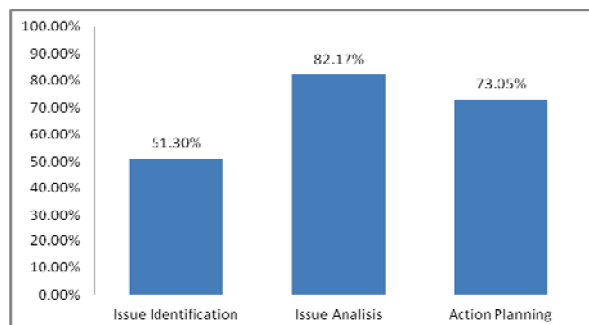


Figure 2: Percentage Scores for the Parts on Cognitive Skills Component

The graph appears that in Issue Identification gain low points, because the item question needs reading literacy skills [15]. On the other side the low reading interest of students is still a major obstacle in this country. To solve the problem needs concern and supported by all subject teachers to improve students reading literacy. In the part of Issues Analysis, students are asked to analyze the values contained in the articles of environmental issues, such as; economy, politic, or cultural values. For the Action Planning part, the form is quite unique, consisting eight number items, and each item contains an environmental action strategy. Students are only allowed to choose two strategies which they considered to be the best action to protecting the environment. Students had no difficulties for last two parts.

3.3.3 Affective

Student's affective components obtained scores in the moderate category. This component consists of parts; How You Think about the Environment, You and Environmental Sensitivity, and How You Feel about the Environment.

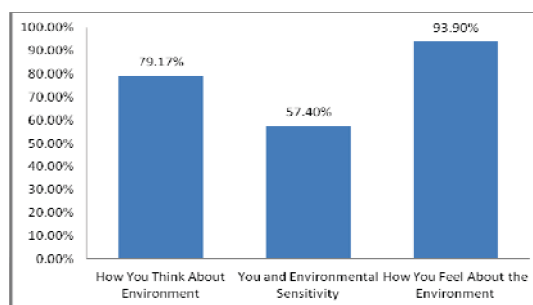


Figure 3: Percentage Scores for the Parts on affective Component

The low scores on the acquisition of environmental sensitivity seem to be associated with this question item. From eleventh number of items about environmental sensitivity, six were represented by the question of how often students doing outdoor activities, such as; fishing, hiking, camping, or bird observation, which are performed either independently, with a peer group, or with family member. Students rarely to do these activities for several reasons, such as; just a little member in the scouting community, the time consumed for private lesson and school assignment or homework, parents are less supportive, and it's about interested or not interested. Probably this is one of answer why they feel uninvolved with environment. For How You Think about the Environment part obtained 79.17%, students theoretically understand about many environmental issues which are encountered in their daily

life, both delivered in schools, or electronic media. The results on How You Feel about the Environment, pure soul of the students have chosen to love the environment as much as 93.9 %.

3.3.4 Environmental Behavior

The fourth component, responsible to the environment is the culmination of environmental literacy goals. This component consists of part What You Do for the Environment. The items contain about how confident the students have done for environment, for example, saving water and energy and reduce pollution. The result is 73.45% at the moderate category, has not been satisfactory as in knowledge and cognitive components.

4. Correlation between Environmental Literacy Components

In this study analyzed the correlation between environmental literacy components; ecological knowledge, cognitive skills, affective, and environmental behavior. The results are presented in Table 3.

Table 3: Correlations between Environmental Literacy Components

<i>Environmental Literacy Component</i>	<i>Cognitive Skills</i>	<i>Affective</i>	<i>Environmental Behavior</i>
Ecological Knowledge	-0.105	-0.092	-0.176
Cognitive Skills		0.405*	0.220
Affective			0.718**

Notes: *Correlation is significant at 0.05 levels

**Correlation is significant at 0.01 levels

The results of correlation analysis in the table above using criteria of correlation coefficient [3], it can be concluded that the components of ecological knowledge does not indicate a positive relationship with any other components. For cognitive skills component has significant correlation with affective component, and weak correlation with environmental behavior. On responsible behavior component indicate very strong correlation with affective component. This result is quite similar with the other researchers who believe that the behavior is not influenced by knowledge of the environment, but more influenced by the attitude towards the environment [1], [4], [8], [13].

5. Recommendations

In changing student environmental behavior need extra efforts where students had habits that attached since they are young. Unsuccessful the environmental school program probably due to the top-down methods that have been applied [4], [7]. Moreover, involving students, parent, and community to support the environmental education school program is very important [15]. The implication of this study is a change of paradigm, that to foster environmental responsible behavior must begin by building environmental awareness, does not too much emphasize on knowledge. It could be a reflection for teacher and school to look inside, and start to plan an approach which covering all the environmental literacy components [8].

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