



Profile of Students' Environmental Literacy: A Hypotetic Model to Perform Effective Environmental Literacy

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Abstract: Environmental literacy is a measurement of the people's knowledge about environment and its interaction with human life. One of the efforts to achieve environmental literacy is implementing environmental education. The research is focused on efforts to know 1) environmental literacy profile of students in green open space; 2) Hypothetical models for effective environmental learning based on student profile findings. This research is a type of descriptive research. The research subject is students of Junior High School (SMPN) 2 Suayan in the 2020/2021 school year. Total sample is 70 students. Test is used to measure students' environmental literacy for the domain of knowledge. Non-tests is used to measure attitude and behavior domains. The number of questions/statements is 45 items with 15 questions/ statements for each domain. The average score for environmental literacy for these 3 domains is 77,1 % and is interpreted high. Based on literature and interview, high environmental literacy scores of students are at least influenced by two factors, namely 1) the implementation of environmental education in schools 2) students who are always exposed to green open spaces. Furthermore, based on this result, it is proposed a hypothetical model for the effective implementation of environmental education..

Keywords: Environmental literacy, Hypothetical model, Environmental education

INTRODUCTION

The growing of population and enormous natural exploitation cause inevitable environmental damage and elimination of living thing habitat (Sya'ban,2018). Lately, environmental degradation and environmental damage issues increase the attention of various countries to implement environmental education (EE). In response to environmental education urgency is known from the design of the curriculum in many countries, including in the Republic of Indonesia (Maknun, 2011).

Adiwiyata program is implemented in Indonesia's schools as an effort to create sensitive society to the environment,.

Rezkita & Wardani (2018) stated that adiwiyata program is environmental education program in Indonesia which was implemented in elementary school in 2016. In this case, education itself means to build human beliefs, understanding, and ecological behavior (Maghfur, 2010), as well as incorporating affective aspects such as values, behavior, commitment to create sustainable life in future (Marliani, 2015).

Environmental education will create a green school if it is performed by using the school environment as a source of learning (Afandi, 2013). The success indicator of environmental education programs is the learners who have good environmental literacy. Environmental

literacy shows knowledge about mechanisms of nature works and knowledge about the role of humans in maintaining nature. Burchett (2015) stated that environmental literacy is a measurement of people knowledge about environmental issues, knowledge about interaction between human and environment, and knowledge of various connection among components of ecology. Maulaa et al. (2020) stated that the environmental literacy of 7th grade junior high school students on global warming materials is categorized moderate. This study suggested that the need for teacher efforts to make the learning process more interesting, more innovative, and environmentally oriented.

Teachers have an important role in creating individuals and communities that environmentally literate (Tosun & Gursakal, 2016). Science teachers must realize that science education has a huge effect on the environmental literacy of students (Gayford, 2002). To support students' environmental literacy, issues and topics related to the environment should be incorporated in the curriculum and textbooks and the extra-curricular activities related to environmental literacy should be implemented (Kaya & Elster, 2019). Then, teachers have to make the learning process more interesting, more innovative, and environmentally oriented.

Environmental attitudes and actions can be instilled to students through learning processes that emphasize on exploring, searching, investigating information, and planning actions to solve environmental problems (Susilowati et al., 2018). Wilujeng et al. (2019) stated that EESD (Education for Environmental Sustainable Development) approach will improve students' environmental literacy because students are directed to system thinking, action planning, future planning and thinking, strategy planning and collaborative lesson in learning process.

Researchers have conducted observations at Junior High School 2 in Suayan (a school located in the Akabiluru sub-district). The school is located in a green open space, down of hills and surrounded by forest areas and plantations. Furthermore, Suayan Junior High School 2 is a ex-adiwiyata school that ended in 2020. In learning process, as a ex-adiwiyata school, some teachers have integrated the environment issues in the learning process. However, not all teachers carry out the learning process by integrating the subject matter with the environment. Nowadays, junior high school 02 Suayan is no longer included in adiwiyata school. The teacher stated that to maintain the status as an adiwiyata school requires high fundings, while schools do not always have a large budget. Although a school is not Adiwiyata school anymore, the environmental education needs to be implemented and always developed. Research towards the development of learning, books/teaching materials, and assessment of environmental literacy needs always to be encouraged.

Researchers wonder that the potential of green open space can be fully used to perform environmental education. This study is to examine the profile of students' environmental literacy in green open space and to propose a hypothetical model to carry out effective environmental education. Green open space is very supportive to carry out environmental education, so then, researchers want to examine the environmental literacy of students in the area. Therefore, the study focuses on efforts to express 1) the environmental literacy profile of the students in green open space; 2) hypothetical model for effective environmental education based on student profile findings.

METHODOLOGY

This is kind of descriptive research that aims to reveal the environmental literacy profile of students and to propose a

hypothetical model to carry out effective environmental education. This descriptive research was conducted without giving any manipulation or treatment to the research subjects. The location of study is SMPN 2 Suayan, Akabiluru Sub-district, West Sumatra Province. The school is ex-Adiwiyata school. The sample was SMPN 2 Suayan students of the 2020/2021 school year. The sample was taken from grades I, II, and III by using purposive sampling technique. Sugiyono (2018) states that purposive sampling techniques are carried out by researchers with certain considerations. The sample consists of 70 students.

The study measures students' environmental literacy profiles and formulates hypothetical models for effective environmental education. There are 4 environmental literacy domains (NAAEE, 2011) which are domains of knowledge, cognitive skills, attitudes towards the environment and behavior towards the environment. However, in this study, there are only 3 domains measured, namely the domain of knowledge, attitudes towards the environment and and behavior towards the environment. Test is used to measure students' environmental literacy for knowledge domain and non-test is used to measure environmental attitudes and behavior of students. The hypothetical model is a model proposed by researchers to carry out effective environmental education based on the findings of students' environmental literacy profiles. The number of questions/statements is 45 with 15 questions/statements for each domain.

The results are calculated in percentage form and interpreted by using interpretation category. Percentage calculation is using following formula,

$$NP = \frac{R}{SM} \times 100\% \quad \text{Purwanto (2013)}$$

Information:

- NP = Value (%)
- R = Score of students
- SM = Maximal score

Next, the results are interpreted by using following category.

Tabel 1. Category of students' environmental literacy

Score	Interpretation
22,2% – 48,1 %	Low
48,2% - 74,1%	Moderate
74,2% - 100%	High

RESULT AND DISCUSSION

Environmental literacy tests have been conducted on 70 students by using 15 items of questions, 15 items of environmental attitude questionnaires, and 15 items of environmental behavioral questionnaires. The results is shown in table 2.

Tabel 2. Students' environmental literacy score

NO	Domain	Percentage	Interpretation
1	Knowledge	66,6 %	Moderate
2	Attitude	83.3 %	High
3	Behavior	81.3 %	High
	Environmental Literacy	77.1%	High

The average score for environmental literacy is 77.1% in high category. Among the 3 environmental literacy domains discussed in the study, the knowledge domain was the lowest one with percentage 66.6%. Furthermore, the environmental literacy profile of students were discussed of 2 groups, namely the new student group (Grade VII) consisting of 34 students and old student group (Grade VIII & IX) consisting of 36 students. The group based on how long the students obtaining environmental education in the school. The environmental literacy score in the old student is lower than the new student, but there is no significant difference of both groups. Environmental literacy scores in both groups are shown in table 3.

Tabel 3. Environmental Literacy Score in Two Groups

NO	Sample	Domain	Percent age	Interpretation
1	New Student s	Knowledge	65,5 %	Moderate
		Attitude	81,9 %	High
		Behavior	79,6 %	High
	Average (Kelas VII)		75,7 %	High
2	Old Student s	Knowledge	67,6 %	Moderate
		Attitude	84,6 %	High
		Behavior	82,8 %	High
	Average (Kelas VIII & IX)		78,3 %	High

Second, the green open space in SMPN 2 Suayan also has a contribution in student environmental literacy. As discussed earlier that SMPN 2 Suayan is located in a green space, down of hills, surrounding by forests, plantations, and rice fields. This school was adiwiyata school before it was revoked in 2020. However, the school still maintains some facilities of adiwiyata school. Mulyana (2009) stated that environmental education and the provision of a green school environment support students in realizing, directing, and guiding towards the formation of environmental ethics. Clark et al. (2016) stated that to improve community environmental literacy, the understanding of green open space and the availability green open spaces are part of solution to achieve it.

The researchers formulated a hypothetical model for effective environmental education. The model based on findings on the environmental literacy profile of students in SMPN 2 Suayan. The results of this study show some improvement gaps in learning implementation. Although in general environmental literacy is high but the knowledge domain score is the lowest one compared to environmental attitude and behavior domains. The need on creative learning methods and models is important in learning. It should be underlined that in the curriculum 2013 is highly recommended to use a scientific approach, but teachers can choose the right method to use in learning process.

Then, there are positive things in SMPN 2 Suayan that need to be copied by other schools such as maintaining and improving the quality of the environment even though it is not labeled as an adiwiyata school anymore. Schools need to keep the environment in clean and green condition so that it can realize the community that the green environment is a healthy environment for life. Although not labeled as adiwiyata school, environmental

education must be implemented because the needs of environmental awareness are not for students in adiwiyata schools only but all students must be aware to environment.

Based on the finding, the researchers tried to design a hypothetical model in implementation of environmental learning. The design based on the principles of the curriculum 2013. Figure 1 is a diagram of the suggested environmental learning model in school. In the diagram, it can be concluded some explanations about implementation of environmental learning in schools. As found in this study that environmental learning in schools is performed by integrating material with the surrounding environment so that it supports high students' environmental literacy profile. Therefore, environmental education in schools urgently needs to be packed with the integration to daily life of students so that students are very familiar with learning materials. Then, the issues discussed in learning are the current social issues related to the environment in society.

Furthermore, the learning process is recommended with characterizing scientific inquiries. In this study, it was found that teachers have applied scientific approaches in learning and one of which is the application of inquiry methods in environmental learning. Anifah (1981) stated that the inquiry method is a way to train children and learners to present their own problems and then solve the problem. Learning through inquiry process is carried out by including the problem-posing steps where learners raise problems related to certain conditions.

The learning process also requires a supportive tool. For example, in this study is recommended the use of teaching materials (learning module) that accommodate the concept of ESD as a framework. The use of local wisdom-based teaching materials is one way to increase students' knowledge and concern to the

environment. In accordance to the findings of this study, integrating learning materials

with the surrounding environment will support environmental literacy of students.

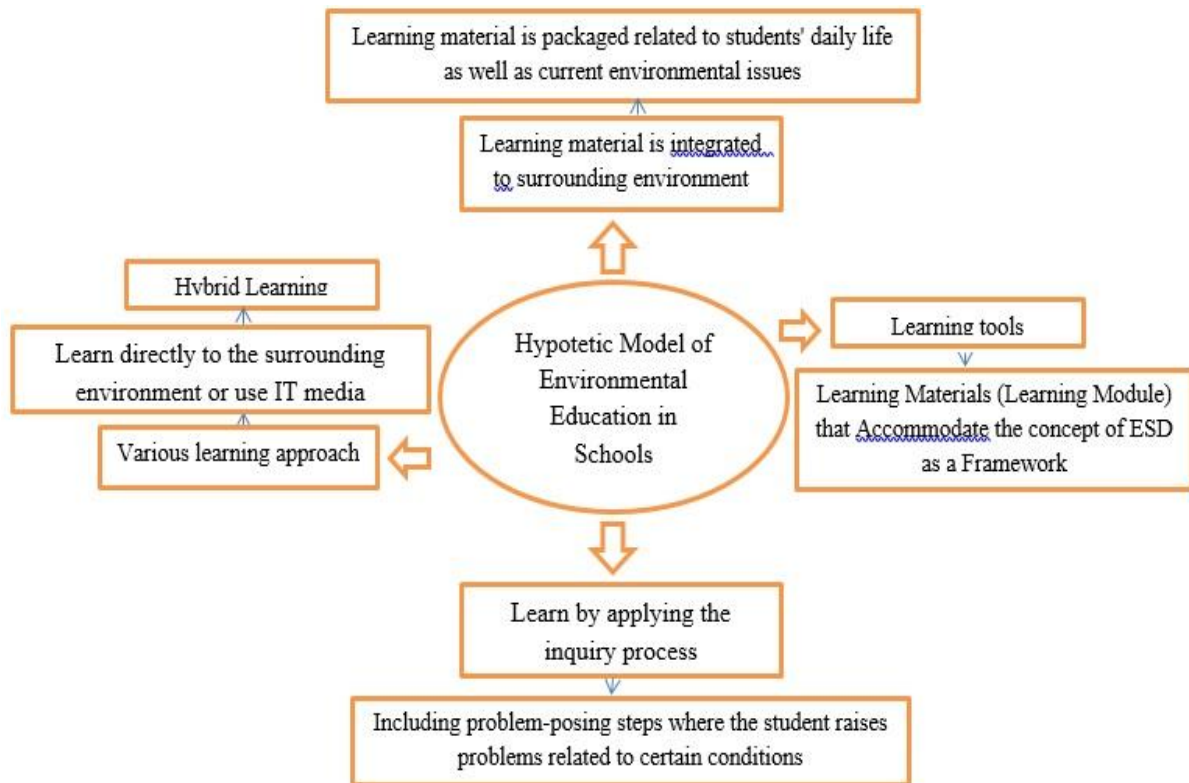


Figure 1. Hypotetic Model of Environmental Education in Schools

Subhan (2017) stated that the use of local wisdom-based teaching materials can improve students' environmental literacy significantly.

Currently, the pandemic certainly changed many sectors of life including the change on the education process. The impact of pandemic on education is the learning process turned to online class. In SMPN 2 Suayan, the learning process is carried out with hybrid learning, namely by online and offline learning.

So, to anticipate the post-pandemic learning process, hybrid learning methods can be performed in various schools. In addition, students also need to be accustomed to cooperate each other with group-assignments and to work individually with self-assignment. The group-assignment will familiarize students to solve problems together as well as self-assignment to train students to solve problems independently.

CONCLUSION

The study measures students' environmental literacy profiles and formulates a hypothetic model for effective environmental education. The average of students' environmental literacy is 77.1% in high category. In SMPN 2 Suayan, in science learning that teachers always try to insist environmental values in every learning

material. Based on the findings, it is formulated a hypothetic model that will greatly support the environmental learning process. To support environmental literacy of students, the learning process should be conducted by integrating learning materials with the surrounding environment. Furthermore, the learning process is recommended by applying the principles of scientific inquiry and by including the problem-posing steps. In addition, a supporting tool is important on learning in class. For example, in this study is

recommended the use of teaching materials (learning module) that accommodate the concept of ESD as a framework and base on local wisdom. Then, to anticipate the post-pandemic learning, hybrid learning methods can be implemented in various schools, namely with online and offline learning activities. This research can be a reference for all education stakeholders to plan environmental education in the future so as to create a literate society to the environment..

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