

# Low Carbon Education:

## How Students from Lower Level Education Pertain the Good Environment Practices

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**Abstract**—The discussion pertaining environmental issues is closely related with the notion of low carbon. The research has been done to investigate how the students in elementary schools understand how to practice the environmental issues. The descriptive analysis method is carried out to capture students' views on environmental practices that are closely related to their daily lives. The subject involved were 60 students from third and sixth grades of one elementary school. The students were asked to read 24 statements about environmental practices, and responded by choosing one of the three answer choices: do, sometimes do, never do. The research shows that most of student sometimes do the good environmental issues, but there are quite a lot of students who never do these. The teacher confessed that they have not been intensely engaged in learning about good environmental practices. They really expect the existence of teaching materials that can be used as guideline. They also hope for the availability of special learning models.

**Keywords:** *low carbon education, lower level student, environment literacy*

### I. INTRODUCTION

Environmental issues are one of the biggest issues faced by many nations all over the globe. Problems associated with environmental issues such as the excessive use of fossil fuel and the need to have a greener emission has been studied by some researchers [1-4]. One of visible consequences of the environmental issues is the fact that at the moment, the world is confronted with the climate changes [5].

The discussion pertaining environmental issues is closely related with the notion of low carbon. The concept of low carbon itself carries multiple meanings, each depends on the theoretical and pragmatic framework. However, it is agreed that despite of different interpretation of the notion of low carbon, it aims to “reduce GHG emissions, exploited low-carbon energy, and ensure economic growth [6].

The awareness for the low carbon development is commenced with the Kyoto Protocol. The Kyoto Protocol provides an international framework for working on GHG emissions reduction [7]. The Protocol regulates 37 industrialized countries and the European community for reducing emissions of the six main greenhouse gases (GHG) [8].

There has been previous research on low carbon development. Most of the research however conducted in the Global North countries such as in the UK [4] (or in Japan [9,10]. Similar research in Indonesia is still very limited in spite of the fact that Indonesia has produced 1,453 gigatonnes of carbon dioxide equivalent (GtCO<sub>e</sub>) in 2012 [11]. Even though the government has launched The Low Carbon Development Framework, but the issues caused with lack of people awareness to use low carbon materials remain persists [12].

Previous research on low carbon is also mostly approach from an economic perspective. This is understandable since the aim of low carbon development is argued to promote a country's economic development [6]. However, there is also a need to see low carbon development from an education perspective. One of the failures in low carbon initiatives is often resulted in people's lack of understanding regarding the issues of low carbon itself [13]. This is where education can play its roles because education can act as a vehicle to build and develop people's awareness.

There has been actually research on low carbon education within educational setting. A development a low-carbon education model within higher education setting has been conducted [4]. Similar research is also conducted within the university [14]. Another research has been conducted within high-school setting, both for junior and senior high school level [15-18]. These researches use the term environmental issues rather than low-carbon issues, however they all aim to unpack students' understanding and attitudes pertaining low-carbon issues.

Research that specifically aims to explore and develop low-carbon education model in lower level education remains very limited. Only few research such as the ones conducted in kindergarten [19,20]. Similar research in the primary school setting is also still very scarce. Hence, the purpose of this research is to explore low-carbon issues within the lower level education.

### II. METHODS

The research tried to profile the children understanding pertaining environmental issues. The method used was a design based research. Prototypically, design experiments entail both

“engineering” particular forms of learning and systematically studying those forms of learning within the context defined by the means of supporting them. This designed context is subject to test and revision, and the successive iterations that result play a role similar to that of systematic variation in experiment [21]. The subjects involved were 60 3rd grade students and teachers of elementary schools, the private and state schools. The quantitative and qualitative approaches were used where the researchers would be interested in identifying teachers’ and students’ attitudes toward low-carbon issues. The attitudes would be measured using self-constructed questionnaire for teachers and primary school children, followed by in depth interviews with selected teachers and children. The data for this research would be collected using self-constructed questionnaire, observation, non-formal interview and focus group discussion.

### III. RESULTS AND DISCUSSION

Questionnaires about Low Carbon Activity were given to students in grade 3 in two different schools to portray the awareness of the elementary students about low carbon lifestyle. The schools were chosen to represent the school with good environmental education (School A) and with middling environmental education (School B).

The questionnaire was in closed-ended questions around topic of energy saving, effective use of energy source, and environmental waste management. The questionnaire for the 3 grade was presented in three respond choices (Yes=3, Sometimes=2, and No=1) while the questionnaire for 6 grade was presented in four respond choices (Yes=4, Sometimes=3, No=2, Do not know=1).

The data shows that overall, the students from School B scored higher than students from School A, with the mean score for Grade 3 of School A and B are 68% and 80.8% respectively, and mean score for Grade 6 of School A and B are 69.9% and 80% respectively. This surprisingly means that the students from School B, which has middling environmental education, has better awareness of low carbon lifestyle compared to students from School A which has good environmental education.

The data was later statistically tested to see the distribution of data using Shapiro-Wilk test. The normality test for school A are  $P=0.718$  respectively, meanwhile School B are  $P=0.494$  respectively. This indicates that all of the data are normally distributed as can be seen in the Table 1.

The result led to the significant test that defines the degree of difference between classes. The significant test used is independent T-test and was done to test the significance of School A and School B. The result shows that the awareness of 3rd Grader on School A and B is significantly different ( $\text{sig.}=0.000$ ). This is in accordance with the result of mean score, in which the students from School B scored generally higher in the awareness of low carbon lifestyle than students in School A. the research result are surprising us, because based on teacher explanation (from School A), the school has consistently implemented green school. Teacher stated that low

carbon education principles has accommodated in the curriculum. The school environment supported the curriculum implementation.

TABLE I. STATISTIC TEST RESULT.

Parameters	School A	School B	Indicator	School A	School B
Mean	68.0%	80.8%	Energy saving	64.6 %	81.3 %
Standard Deviation	10.83	7.30	Effective use of energy source	74.4 %	79.7 %
Normality (Shapiro-Wilk)	Sig. 0.718 (Normally distributed)	Sig. 0.089 (Normally distributed)	Environmental waste management	66.1 %	80.7 %

The analysis of response on each statement items was done to see how student’s responses towards each statement. Among the 3rd grader, the statement that the most negative response is in the indicator of environmental waste management on the statement “Giving away the no-longer use clothes for charity” and indicator of effective use of energy source on the statement “Closing the water tap when brushing teeth”. Meanwhile, the analysis of statement with the most positive response from students in grade 3 from both schools lied within the indicator of effectively use of energy source. The students from school A mostly gave positive response to statement “Closing the water tap when brushing teeth” while the student from School B gave most positive response to statement “Collecting rain water for watering the plant”.

However, when the responses on all of the statement items were calculated, the result shows that overall students gave the most positive responses on the indicator of environmental waste management, followed by the effective use of energy source, and energy saving. The data seems contradictory with the result of analysis on each statement. This is because, although some statements in the indicator of effective use of energy source got the most positive response, some of the statement also got the most negative response. While in the indicator of environmental waste management, the students generally responded with positive responses for all statements. This is means that the students have good awareness in environmental waste management and the effective use of water source. This results also in line with other research that shown children’s capabilities to understand multifaceted issues [22]. Other researches were also yield children’s understanding of the environmental issues as well as their ability to disrupt the relationship between human and non-human beings [23, 24].

### IV. CONCLUSION

The students of School B, with middling environmental education, have better awareness in Low carbon lifestyle awareness compared to students of School A with good environmental education. However, there is a significance differences in awareness between students of school A and School B. Generally, students give most negative response in the question about energy saving, especially saving electricity, while the students gave the most positive response in the

effective use of energy source, especially in effective use of water, and have general positive response to all the statements about environmental waste management.

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