The role of natural science courses to implement the environmental education in elementary school (curriculum 2013)

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Abstract. Human behaviour is strongly influenced by prerequisite knowledge, residential, working place, and schools/studying place situation as well as friend or companion’s behaviour. Soldiers have different behaviours compared to educators, doctors, farmers, traders, and so forth. To make students become environmentally friendly-human beings, they need to have knowledge on how to protect the environment. Since 1986, the Republic of Indonesia government has included environmental education into school curriculum; and the end is the 2013 curriculum (C-13). There are eight subject courses in elementary school's 2013 curriculum. Of the eight subjects, Natural Science is relevant subjects as a means to implement the environmental education (EE) concepts. Natural Science is taught in grades IV, V, and VI using thematic approaches for 9 x 40 minutes a week. However, the implementation of C-13 in elementary schools is still less optimal because there are still many prerequisite factors to be fulfilled, such as: infrastructure, learning resources, teachers' skills, and assessment systems. In conclusion, Natural Science subjects has a significant role to debrief the environmental education concepts especially in elementary school. Thus, learning model and media of natural science need to be further developed.

1. Introduction
Environmental education (EE) content has been the concern of the Government of the Republic of Indonesia that needs to be included in the school curriculum since 1986. In the beginning, EE content was unclear whether it should be school course or impart in the existing courses. The study conducted by Winanti [1] reported that EE content could be integrated and developed in several subjects, namely: Citizenship Education, Handicrafts, Natural Science, and Social Sciences in the 1994 curriculum. However, in the 2006 curriculum of elementary school, EE content was covered or integrated in seven subjects: Religious Education, Citizenship Education, Indonesian Language, Social Sciences, Cultural arts and skills, as well as Physical and Sports Education, with a total of more than 60 basic competencies [2,3].

In the 2013 curriculum of elementary school, there are eight courses which are divided into two groups. Group A consists of subjects that provide competency on cognitive and affective aspects, namely: religious education and character, Pancasila education, and citizenship education, Indonesian Language, Mathematics, Natural Sciences, and Social Sciences. Group B consists of subjects that emphasize on affective and psychomotor aspects, namely: cultural arts and crafts, physical and
physical education and health. Among those eight, only Natural Science and Social Science are given starting in grade IV [4].

The elementary school curriculum employs an integrative thematic learning approach from grade I to VI. Integrative thematic learning is a learning approach that integrates competencies from various subjects into themes. Integration is carried out in two ways, namely: the integration of attitudes, skills and knowledge in learning process, and the integration of various related basic concepts. The theme connects various basic concepts so that students will not learn those concepts partially. Therefore, learning provides full meaning to students as reflected in the various themes available. From a psychological point of view, lower class students (I, II, III) have not been able to think abstractly to understand the content of separate subjects, different from the upper classes (IV, V, and VI) who have begun to be able to think abstractly. Therefore, Natural Science is given in grades IV to VI.

The objectives of the 2013 curriculum include four competencies, namely (1) spiritual attitude competence, (2) social attitudes, (3) knowledge, and (4) skills. These competencies are achieved through the intracurricular, cocurricular, and/or extracurricular learning process. Formulation of the competency of spiritual attitudes, namely: respecting and living the teachings of the religion that adhered to the formulation of social attitude competencies is to show honest, disciplined, responsible, polite, caring, and confident behaviour in interacting with family, friends, teachers, and neighbours. Both of these competencies were achieved through indirect learning, namely exemplary, habituation, and school culture, taking into account the characteristics of subjects and the needs and conditions of students.

The third core competency of knowledge and the fourth core competency of skills include (1) understanding factual knowledge by observing and asking questions based on curiosity about him, God's creatures and activities, and objects found at home, at school and place play; as well as (2) presenting factual knowledge in clear, systematic and logical language, in aesthetically pleasing works, in movements reflecting healthy children, and in actions reflecting a children’ faithful behaviour.

In the 2013 curriculum, EE aim is to create people aware with their respective responsibilities to protect and develop the environment. It is expected to make them behave and act according to healthy environmental norms and have the initiative to participate in environmental protection efforts at the local, national and international levels.

The objectives of environmental education are: a) to develop a world population that has awareness and concern for the environment including various related problems and b) to develop a world population that has skills, attitudes, motivation, and commitment to find solutions both individually and collectively to existing environmental problems and prevent new arising problems [5].

2. Method
The 2013 curriculum employs thematic learning approach meaning that each subject is divided into several themes and subthemes. To find the role of Natural Science (NS) subject in Environmental Education (EE), a study of each theme and each subtheme found that EE content were covered in NS subject at grade IV, V, and VI in elementary school (see Table 1 and Table 2).

| Table 1. Grouping on Theme and Subtheme of Natural Science at Grade IV |
|------------------------|------------------------|
| Theme                  | Sub-theme              |
| 1: The beauty of togetherness | 1: Diversity of My Nation Culture |
|                        | 2: Togetherness in Diversity |
|                        | 3: Be grateful for diversity |
|                        | 4: Proud of my culture   |
| 2: Always Save Energy  | 1: Kind of Energy sources |
|                        | 2: Energy Usage         |
|                        | 3: Motion and Style     |
Table 1 shows that Natural Science (NS) subjects at grade IV has nine themes and 22 subthemes. Four of nine themes (3, 6, 8, and 9) have EE contents in all subthemes, while in theme two, two of three subthemes consist of EE content. Table 1 also shows that five of nine themes (55%) and nine of 22 subthemes (41%) on NS subject at grade IV consists of EE contents.

Similar to grade IV, at grade V, NS subjects has nine themes and 27 subthemes (see Table 2). Six of nine themes (2, 3, 4, 7, 8, and 9) have EE contents in all subthemes, while in theme 1, one of three subthemes have EE content. Table 2 shows that in Natural Science subjects at grade V, seven of nine themes (77%) have Environmental Education (EE) contents, and 19 of 27 subthemes (70%) have Environmental Education (EE) contents as well. Thus, more than half of Natural Science subjects in elementary school level has Environmental Education (EE) basis. If government wants to implement EE further, then the EE contents on Natural Science subjects need to be intensified.

**Table 2. Grouping on Theme and Subtheme of Natural Science at Grade V**

| Theme                     | Subtheme                                                                 |
|---------------------------|---------------------------------------------------------------------------|
| 1: Objects in the neighborhood | 1: The form of objects and their characteristics  |
|                           | 2: Changes in the objects’ form                                           |
|                           | 3: Human and Environment                                                   |
| 2: Events in life         | 1: Kind of events in life                                                  |
|                           | 2: Important events                                                        |
|                           | 3: Human and Natural event                                                 |
| 3: Harmony in society     | 1: Types of harmony                                                        |
|                           | 2: Advantages of living in harmony                                         |
|                           | 3: How to maintain harmony                                                 |
| 4: Health is important    | 1: The importance of individual and environmental health                   |
|                           | 2: Healthy lifestyle                                                       |
|                           | 3: Healthy environment                                                     |
| 5: Proud to be Indonesian | 1: My Indonesia, a rich nation                                             |
|                           | 2: My Indonesia, a cultural nation                                         |
|                           | 3: My Indonesia, a nation that love peace                                   |
3. Analysis

Study conducted by Titiek Winanti et al. [7] on the implementation assessment of the 2013 curriculum (C-13) in elementary schools in Surabaya indicated that C-13 has been applied at elementary school in Surabaya, although not yet comprehensive. Study also indicated that more than 50% of elementary teachers in Surabaya implemented the C-13. As explained previously, C-13 is good to create human beings to be spiritual meaning that they implement the religion teachings, being social creature, honest, disciplined, responsible, polite, caring, and confident in interacting with family, friends, teachers, and neighbour. However, it should be noted that the current condition of the school is less optimal for running C-13 according to its ideals. Some important things that need priority are: (1) completing the provision of facilities/infrastructure to support learning, (2) providing books and resources other learning is still minimal, (3) the need for training for many teachers who do not understand the various learning tools in C-13, (4) it needs an improvement in the assessment system so teachers will be easily making evaluation.

Regarding the facts, it is important to remember that EE is a cross-curriculum approach to learning that helps individuals or groups of individuals to understand the environment. The main goal is to build a caring attitude and responsibility that will foster the desire and ability to act responsibly in the environment. Environmental Education is not only related to the environment but also with instincts and feelings, attitudes, skills, and relevant social actions [8].

Environmental Education is an effort to prepare humans for their lives as members/parts of the biosphere. This education is to understand, appreciate, cooperate, and support environmental systems comprehensively. Environmental Education is an essential education on philosophical problem solving for continuity, improvement, and guarding. The goal is not only to solve the problem with a narrow focus which worsen the problems as well as correct and restore a status quo, but also to make things better. Because EE is implemented as a process of reorganizing values and for explaining concepts to develop various skills and attitudes to understand and appreciate the interrelationship between humans and their socio-cultural environment as well as biophysical environment [9].

Environmental Education is a way to implement and achieve environmental protection goals. It is not a branch of science or a subject of independent study. The educational process on EE should be carried out according to the principle of lifelong education integrally. EE involves teaching about value and the ability to think clearly about complex environmental problems bearing political, economic, philosophical, and technical characteristics. [10]

The fundamental goal of Environmental Education is a constructive attitude towards the environment in a philosophical and pragmatic sense, which should be the basis for every person in thinking and acting. Environmental Education is an educational process about the relationship between
humans and the natural environment and built environment, including human relations with pollution, allocation and management of natural resources, conservation, transportation, technology, urban and rural planning. The resolution of the Belgrade International Conference on Environmental Education (1975) mentioned that there were six environmental education targets, namely, awareness, knowledge, attitude, skills, evaluation ability, and participation [11].

4. Conclusion
To answer the challenge given by Environmental Education, it is important to strengthen and develop the learning process, especially in natural science subjects in elementary schools.

For grade IV, themes and subthemes in Natural Science subjects that need to be strengthened are: invitation for energy saving in every activity, awareness of all living creatures, responsibility to maintain the beauty of the country including neighborhood, healthy and nutritious foods consumption.

For grade V, themes and subthemes that need to be added or strengthened are: invitation to foster love for environment by recognizing the nature and potential of any surrounding objects, responsiveness to symptoms and events in life, awareness to create harmony in society, efforts to maintain health, cultural and historical understanding of Indonesian civilization, ecosystem balance to create a friendly environment.

As for grade VI, themes and subthemes that need to be improved are: concrete examples on how to realize ecosystem balance by maintaining forest integrity, no overlogging (either legally or illegally), efforts to prevent hunting of endangered animals and protected animals, chemical fertilizers reduction by changing to organic fertilizers, regulations compliance for wastewater treatment.

There are ways to preserve the population of rare animals and vegetation such as protecting their living place (habitat), breeding, prohibiting wild animals' games, promoting the quality of animals' and vegetations' habitat by creating wildlife sanctuaries, national parks, great forest parks, etc [12]. By strengthening several themes as described as well as added with optimal learning facilities and resources, teachers' training, and assessment system improvement, achieving goals on environmental education are possibly realized.

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