

Science Education in Primary School Towards Environmental Sustainability

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Abstract: Science education has become one of the core subjects in Malaysia primary schools and since 2003 it has been taught to students as early as year 1 (7 years old). The contents of science curriculum in the primary schools, consists the knowledge and facts of environmental education related factors. The objectives of this study is to find out the elements of environmentally related subject that is taught in science classes which concurrent towards environmental sustainability. To be able to become a developed country by year 2020, Malaysia must not only have a scientifically and technologically literate citizens but they must know and be aware of how to sustain the development. This can be accomplish if the children in schools today are prepared and geared towards an education that taught and shaped their thinking and behavior towards the important of a sustainable development. So, the knowledge of science must not only able to make them good inventors or creative innovators that can contribute to the development of science and technology but also must be able to make them aware and conscious of their actions that might give bad or negative influence to the environment.

Key words: Science education, primary school, environmental sustainability, citizens, development, Malaysia

INTRODUCTION

As a developing country, Malaysia needs to produce graduates who possess relevant skills to participate in the scientifically and technological development in the country. Education which include primary education in Malaysia is a continuing efforts towards further developing the potential of individuals in integrated and holistic approach thus, curriculum in schools especially primary school, today are structured so as to prepare them to be future leaders who are intellectually, spiritually, emotionally and physically balanced and harmonious (MOE, 2004; Lilia and Zakaria, 2009). Therefore, students beginning in the primary school should learnt something that can be use not only for passing exams but also as a preparation for a scientifically and technically literate manpower that can meet the demand of industries.

Education is an important aspect in the role of shaping the country needs and achieving sustainable development towards environmental sustainability. Thus, the researchers have seen that education system which include primary school in Malaysia has been implemented to coincide with the country's needs and aspiration. Before and after independent, unity was the main issue thus, the government concentrated mainly on how to unite multi-racial citizens and education is the important medium that can deliver it successfully. Now that the reseachers are competing in the world of science and technology with other nations, the government has

realized that science subjects and science related subjects are something crucial and students at early age must be exposed or made familiar with it so as to prepare them for a more advance study in the future.

SCIENCE EDUCATION IN PRIMARY SCHOOL

Part of the objective of science education in schools is to establish and to build a society that is culturally scientific and technological, caring, dynamic and progressive (MOE, 2004). Malaysia, like other developing nations, places great emphasis on science education. Competing in the era of a globalize world, science literacy plays major roles in influencing societies, policies, decision making and other crucial agenda of nation building. The science education in Malaysia is constantly changing the contents of its curriculum in order to improve the quality of science education, to meet the need of nation building and to support the country's development. In line with the 6th challenge of Malaysia's Vision 2020, establishing a scientific and progressive society, the contents of science education is more correlated to the needs of to the majority of the students as a foundation to prepare students in schools today as the desired group of workforce in science and technology for the developing economy of the country.

Science subjects are also taught during primary schools in Malaysian education system. In the 60's and

70's science subject was introduced since, year 1 in the primary level. In the 1980-1990's, science subject was introduced in the primary education level starting from year 3. During the primary schools years when science subject was not taught as a core subject, students still learnt science in subjects like man and environment. In this subject, science was taught as an integrated subject along with geography and history. In 2003, the government implemented that English should be used as the medium for all critical subjects and science and mathematics were two of the subjects that has been introduced to students starting in year 1 in the primary schools. Based on a study finding, every subject especially science subject did stress the environmental awareness factors in its curriculum contents. The contents of science curriculum in the primary schools, consists the knowledge and facts of environmental education-related factors. Thus, the objective of this study is to identify the elements of environmentally-related knowledge in Malaysia primary school science education.

SIGNIFICANCE

In order to achieve the goal of becoming a developed country by the year 2020, Malaysia must not only have scientifically and technologically literate citizens but they must also be equipped with knowledge that supports environmental sustainability. To ensure this support is achievable the role of the education system is very crucial thus, environmental sustainability knowledge must be part of the curriculum contents.

Primary schools students should be prepared and geared towards an education that taught and shaped their thinking and behavior towards the importance of environmental sustainability. Therefore, the science education must not only produce excellent scientists, brilliant doctors, expert engineers or creative architects who invents or create new innovations and technologies but must also able to equipped the scientifically literate manpower with environmental sustainability knowledge. This knowledge is quite essential because it should be able to make them aware and conscious of their actions that might leave bad or negative impact to the environment and society.

Malaysia has made it a policy not only to have scientifically and technologically literate citizens (Lilia and Zakaria, 2009) but they must know and be aware of how to sustain the development. If the environmental sustainability knowledge can be instill since primary school years, hopefully their way of thinking will always be geared towards sustaining the environment when

producing or making something new and modern. Development for the benefit of mankind must not endanger the environment but should be able to maintain and support its original purpose. The other reason why this research is focusing on science education in the primary school is because of these factors: Good values are also taught in other subject like moral education or Islamic education but in science education, students get to know directly the process and facts because science knowledge can give the explanation and thus, students can understand what the consequences are if the environment is not treated accordingly. If students are aware of the importance of environmentally safe surroundings or sustainable development since, the early years, their way of life or actions can be shaped and molded to accommodate the environmentally friendly life style when they became grown-ups themselves. They in future can influence the future-generations to continue this way of life.

ENVIRONMENTAL SUSTAINABILITY KNOWLEDGE IN MALAYSIA

The Ministry of Education in Malaysia has played an important role in enhancing environmental awareness to support sustainable development in all schools in Malaysia. In line with the National Education Policy, Environmental Education across the Curricular' has been introduced in both primary and secondary schools since 1998.

It is recognized that environmental awareness should be nurtured as it is very crucial more so with the escalating environmental problems that require immediate attention (MOE, 2004). Malaysia as a developing country is facing serious environmental problems such as deforestation, air and water pollution, extinction of wildlife species on and depletion of natural resources due to increasing rates of urbanization (Sulaiman *et al.*, 2011; Zainal *et al.*, 2011). The need for environmental sustainability knowledge becomes all the more urgent. Thus, as a developing country, Malaysia must ensure, its citizen beginning with those in primary schools are educated about the concept of environmental sustainability. In this context, environmental sustainability refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987; Emrizal *et al.*, 2011).

The education system should place the learning about the environmental sustainability as important as the learning of other basic skills such as reading, writing and mathematical literacy. It should be a continuous learning

process where individuals become aware of their environment and acquire knowledge, values, skills and experiences to handle environmental problems for the present and future generations.

In the science education of primary schools, the objectives do include to the nurturing of environmental awareness among students. These consist of:

- Create an awareness on the need to love and care for the environment
- Stimulate pupils' curiosity and develop their interest about the world around them
- Inculcate scientific attitudes and positive values (CDC, 2003)

To stress these objectives, the syllabus also states the Scientific Attitudes and Noble Values that must be acquired by students at the end of each lesson. These attitudes and values are also listed in the syllabus. They include:

- Having an interest and curiosity towards the environment
- Being responsible about the safety of oneself, others and the environment
- Realizing that science is a means to understand nature
- Appreciating and practicing clean and healthy living
- Appreciating the balance of nature (CDC, 2003)

In Malaysia, the learning of science is not limited to classroom teaching only. The syllabus also specifies outdoors activities that could be carried out to make the lessons more interesting and realistic. Outdoor activities are not restricted in the vicinity of the school compound. Field trips to zoo, museums, science centers, research institutes, mangrove swamps and factories are also recommended.

Through this real life experience, students are brought into contact with nature and apply the knowledge they learn. This is a good way for students to learn about nature and the environment by placing themselves in the real condition. Through these activities, students became more alert to their environmental surroundings.

ENVIRONMENTAL SUSTAINABILITY IN PRIMARY SCHOOL CURRICULUM

Several environmental problems occurred from the result of humankind interaction with the environment. Peoples' ignorance even in the name of development can cause landslides, flashfloods or forest burning as shown in Table 1. These damages are directly or indirectly

Table 1: Anecdotal evidence

Date	Newspaper	Event
Feb. 19, 2005	Utusan Malaysia	Taman Pertanian Bukit Cahaya Seri Alam hadapi kemusnahan ekologi. Apa sudah jadi?
Feb. 19, 2005	Utusan Malaysia	Pembangunan tidak terancang boleh berlaku
Feb. 22, 2005	The star	City council blamed uncontrolled work on U10
Mac 13, 2005	Utusan Malaysia	Rosak minda, musnah alam
Mac 17, 2005	Utusan Malaysia	Sikap peladang mencemarkan alam
Julai 17, 2003	Daily express Sabah	Negative attitude of villagers contributes to river pollution
Sept 19, 2000	Singapore straits times	Breathing polluted air can kill

caused by the abuse of environment and unconsciousness of the society about environmental awareness. The environment is not the only element effect by the damages but also to the human's health. Thus, teaching environmental issues through scientific literacy is crucial in contributing the environmental awareness because science courses epitomize the scientific and technological issues surrounding the environmental problems (Lilia and Zakaria, 2009). The Malaysian science curriculum for primary schools is developed with eight objectives to achieve:

- Stimulate pupils' curiosity and develop their interest about the world around them
- Provide pupils with the opportunities to develop science process skills and thinking skills
- Develop pupils' creativity
- Provide pupils with basic science knowledge and concepts
- To provide learning opportunities for pupils to apply knowledge and skills in a creative and critical manner for problem solving and decision-making
- Inculcate scientific attitudes and positive values
- Foster the appreciation on the contributions of science and technology towards national development and well-being of mankind
- Be aware the need to love and care for the environment (CDC, 2003)

The 8th objective directly refers to the environment with the aim to inculcate the love and care for the environment. This signify that the government is showing concern about what is happening to the environment and is hoping that present generation in school will acquire more knowledge about the environment and will than interact positively with the knowledge.

The content of the science syllabus for primary schools is organized around themes. Positive attitudes towards the environment are listed as noble values to be achieved as a science learning experiences along with the scientific values (MOE, 2004).

**ENVIRONMENT-BASED CONCEPTS IN MALAYSIA
PRIMARY SCHOOL SCIENCE SYLLABUS**

A document analysis of Malaysian primary science education syllabus was done. Primary school education does not offer environmental education as a subject but the contents of environmental education-related knowledge and facts can be found throughout its syllabus.

In level 1 (year 1-3) two themes are introduced only the 1st theme contains the environmentally-related knowledge. In the level 2 (year 4-6) the syllabus contents are organized around five themes and only one theme contains the environmentally-related knowledge.

When the content of the science syllabus are investigated as shown from the Table 2 and 3, the subjects related to environment can only be traced in the themes which included the topic of living things. Even though for the level 2, the syllabus does have the theme of Investigating the Earth and the Universe, the content is more related to the understanding of the Earth, Moon, Sun and Solar System as a whole.

Twenty scientific attitudes and noble values are also listed in the syllabus and only five are related to the environment as stated:

- Having an interest and curiosity towards the environment
- Being responsible about the safety of oneself, others and the environment

Table 2: Themes content in the science syllabus

Themes in level 1 (year 1-3)	Themes in level 2 (year 4-6)
Learning about living things	Investigating living things
Learning about the world around us	Investigating force and energy
	Investigating materials
	Investigating the earth and the universe
	Investigating technology

CDC (2003) and MOE (2004)

Table 3: Themes related to environmental knowledge

Years	Themes	Environmentally-related contents
Level 1	Learning about living things	The theme introduces Living things and non-living things
Year 1		About human beings, animals and plants
Year 2		-
Year 3		-
Level 2	Investigating living things/Environments	The theme introduces pupils to the basic understanding about the basic needs of living things, life processes and interactions among living things and how living things survive and create a balance in nature. This theme also focuses on life processes in man for pupils to understand themselves. It also explains why man is special compared to other living things
Year 4		
Year 5		

CDC (2003) and MOE (2004)

- Realizing that science is a means to understand nature
- Appreciating and practicing clean and healthy living
- Appreciating the balance of nature

Based on the brief analysis, Malaysian primary school science syllabus do contains knowledge about the environment. The syllabus in upper classes, year 4-6 (age 10-12) contains a specific topic in environment, Investigating the Living Things/Environment. But it is still not enough to ensure the environmental knowledge can contribute to the desired environmental awareness which support the sustainable development. Nevertheless, at the early stage it did introduce the elements of knowledge and good values towards the environment. Maybe the syllabus should also add some more themes and good values that can really make the student link their daily life with the environmental knowledge they acquire in science education. It should exceed the across curriculum aims and goals and should be introduced as a chapter by itself if not as a single different subject as a whole.

CONCLUSION

Science should be taught not only for the sake of passing exams or memorizing facts but also must include the knowledge of environmental sustainability. This is to ensure the development of the country is parallel to the concept of environmental sustainability which is crucial in the agenda of sustainable development. Hence, when undertaking policy reform, the contents of science education in primary school must also contain the knowledge of environmental sustainability that can produce scientifically literate citizens and environmentally friendly citizens. Without proper knowledge and understanding of causes and effects of environmental issues, school students when they venture into the society as an adult will not be able to produce correct decisions in the future when confronted with dilemma occurred because of environmental problems.

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