

GREENING THE CURRICULUM FOR SUSTAINABLE DEVELOPMENT

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by

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Abstract

With the harsh environmental problems the world is experiencing today, it is high time to enhance environmental education offered by schools. Hence, the main goal of this research study was to determine the effectiveness of the integration of environmental education to formal basic education curriculum in the Educational District I, Schools Division of Bulacan, Philippines. The research utilized the mixed- methods approach through document analysis, interview, SWOT analysis, and survey.

Accordingly, important environmental concepts like climate change, waste management, biodiversity, and disaster risk reduction are integrated in the Science curriculum. However, the concept of sustainable development is not yet included in the current curriculum. Co-curricular projects can be tapped to enhance the environmental integration. Likewise, the growing interest in environmental education among members of the community, and the possible cooperation and coordination with different agencies were viewed as opportunities for further improvement.

On the other hand, unclear sustainability of environmental projects, and lack of resources were the identified problems. In addition, there may be problems with mobility of various resources managed by residents, continuation of projects due to shifting of interest of community leaders, and sources of fund provided by the community members.

Therefore, the inclusion of the concept of sustainable development, and the enhancement of the integration of environmental concepts supplemented by co-curricular projects through the Youth for Environment in Schools Organization (YES-O), and community involvement are highly recommended to every school in the locality.

Introduction

Filipinos are blessed with the abundance of natural resources as reflected by the rich flora and fauna in various parts of the archipelago. In fact, the Philippines is one of the top biodiversity hotspots of the world. Even the culture and history are closely- tied with the natural environment.

Over the years, Filipinos depended on their natural environment for food, shelter and other necessities. The natural environment is apparently paramount not only for the well-being of people, but also for the sustainable development of society.

However, the development of coastal resources in the Philippines has been traditionally exploitative in nature. The policies of the government, which demanded progress in both the uplands and coastal areas, have been based mainly on profuse available resources without due consideration for sustainability (Melana, Melana and Mapalo, 2005). This can also be observed in the management of other natural resources in the country. The

unsustainable utilization of resources lead to the deterioration of the natural environment. Thereupon, Filipinos must act to save the natural environment.

Consequently, several environmental policies were legislated, and for the past decades, better environmental education expected to uplift the awareness and achievement of people especially students was recommended and promoted. In 2009, the Department of Education (DepEd) started to integrate in the basic education curriculum concepts on climate change and disaster risk reduction management in various subjects, and initiated co-curricular activities about environmental education (DENR, 2015). This idea was supported by Santos (2008) who suggested that the level of integration of environment related concepts in school has a significant effect on the students' awareness about the present day condition of the planet. The level of awareness of students is essential in their practices and attitudes toward environmental concerns. With this, the way a school is shaping future citizens of the country is at hand.

Nevertheless, the deterioration of the natural environment due to human activities continues. Hence, more effective implementation of environmental education in schools is urgently needed. Accordingly, David (2015) pointed out that it is high time that the education sector should amplify its emphasis on environmental education because of the harsh environmental conditions that the world experiences presently. He underscored that environmental education should be seriously promoted and implemented to all academic levels. In addition, an environmental education program should be catered on local communities, and that the education sector should aim to make every person environmentally empowered.

In the light of the pieces of information mentioned above, the researchers looked into the policy of the local educational sector with regard to environmental education. Using the mixed- methods approach, it sought to conduct the Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis using survey and narratology.

Empowering the youth is one of the keys in mitigating the effects of environmental problems, if not eradicating them. Through our youth, we can ensure that environmentally-concerned endeavors will continue in the future.

Research Problem

The central problem of this research study is “How effective is the integration of environmental education to formal basic education curriculum?”

Specifically, this research study sought to answer the following:

1. How can the integration of environmental education implemented in the basic education curriculum in terms of:
 - 1.1. climate change,
 - 1.2. disaster risk reduction,
 - 1.3. protection and conservation of biodiversity,
 - 1.4. waste management, and
 - 1.5. sustainable development?
2. How is the integration of environmental education be described based on its:
 - 2.1. strengths,
 - 2.2. weaknesses,
 - 2.3. opportunities, and
 - 2.4. threats?

3. What is the perceived level of integration of environmental education of Science teachers?
4. Based on the SWOT analysis, what action plan can be formulated?

Conceptual Framework

Based on the concepts presented, the study determined the effectiveness of the integration of the environmental education. Accordingly, it is viewed as an important part of national strategies to promote sustainable development. Hence, the provision of meaningful environmental education is paramount to every school.

The paradigm of the study is presented using the C-I-P-O model shown below.

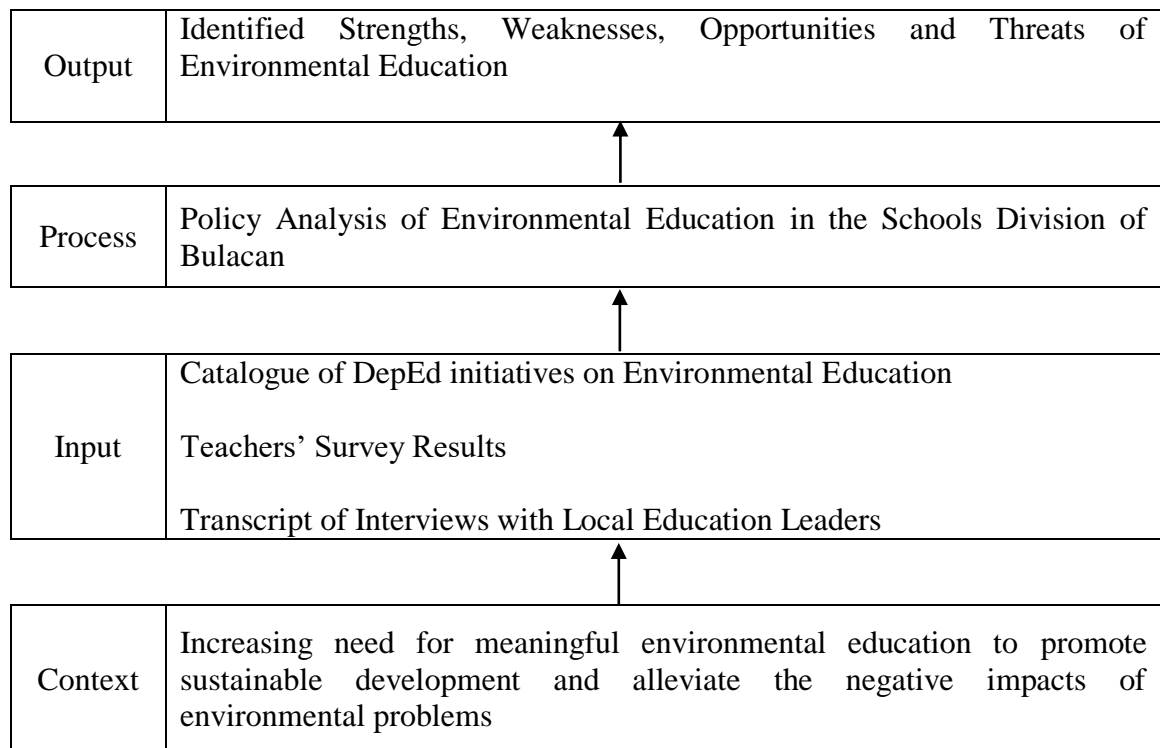


Figure 1. The Paradigm of the Study

Frame 1 represents the context of the study which is the great need for the implementation of environmental education in all levels.

Frame 2 represents the input of the study which include the catalogue of DepEd initiatives on environmental education, teachers' survey results and transcript of interviews with local education leaders.

Frame 3 shows the most crucial step to be undertaken in the study which is the SWOT analysis of the environmental education.

Frame 4 represents the output which is the identification of the strengths, weaknesses, opportunities and threats of the integration of environmental education.

Research Methodology

The research utilized the mixed- methods approach in determining the effectiveness of the integration of the environmental education in the formal basic education curriculum.

Accordingly, the study utilized document analysis in determining if important environmental concepts are integrated in the K to 12 Curriculum in Science for Grade 7 to 10. In addition, a one on one interview with the Education Program Supervisor in Science was conducted to create a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. There were supplemented by survey primary focused on the effectiveness of the integration. Hence, based on the principle of complementarity, it has a quantitative method in a qualitative study.

Respondents of the Study

The study involved respondent- schools from the Educational District (EDDIS) I, Division of Bulacan, Philippines. There are 17 large- sized school with more than 500 students, 2 medium- sized schools with 300 to 500 students, and 2 small- sized schools with less than 300 students. Out of the 21 schools, 2 small- sized, 2 medium- sized and 3 large- sized schools were selected through stratified sampling.

Table 1
The Respondent- Schools

School Size	Selected Respondent- Schools in the EDDIS I	Number of Science Teachers
Small	Sta. Cruz National High School	1
Small	Pinalagdan High School	2
Medium	San Miguel- Meysulao High School	1
Medium	Kapitangan National High School	3
Large	Caniogan High School	6
Large	Ramona S. Trillana High School	9
Large	Calumpit National High School	8
Total		30

Research Instruments

The study utilized a teacher-made interview guide concerning the strengths, weaknesses, opportunities and threats as well as the methods on how they integrate environmental education. In addition, a survey questionnaire was constructed based on DepEd Order no. 8, s 2015 entitled Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Curriculum.

Data Collection Procedure

With the approval of the Schools Division Superintendent, the researchers sought the assistance of the Education Program Supervisor in Science in gathering necessary information on the strengths, weaknesses, opportunities and threats in the integration of environmental education in the School Division of Bulacan through an interview. Accordingly, the survey was administered to selected Science teachers in the identified respondent- schools.

Ethical Considerations

Ethical considerations are paramount to the soundness of a research study. Hence, this section is one of the primary concerns before and after the data collection.

Consequently, the researchers consulted and sought permission from the proper authorities before any activity was conducted. Moreover, the researchers also ensured that all sources of valuable information were properly credited; acknowledged in in-text citations and bibliography.

Data Analysis

The research study utilized qualitative analysis for interview and documents about the current curriculum, and descriptive statistics in the form of frequency distribution and mean values pertaining to the level of integration of environmental education in the basic education curriculum.

Results and Discussion

Analysis of the data gathered yielded essential pieces of information concerning the integration of environmental education in the Junior High School

This section is divided based on the questions presented in the first part of the paper.

Part I. Environmental Concepts Integrated in the Junior High School

Table 2 presents the environmental concepts integrated in the science curriculum guide. It is noteworthy to mention that only the environment- related concepts are included in the table.

Table 2
Environmental Concepts Integrated in the Science Curriculum Guide

CONTENT	CONTENT STANDARD	Performance Standard	LEARNING COMPETENCY	CODE
<p><u>Climate Change</u></p> <p>Grade 7</p> <p>1. The Philippine Environment</p> <p>1.3. Protection and conservation of natural resources</p>	<p><i>The learners demonstrate an understanding of:</i></p> <p>The relation of geographical location of the Philippines to its environment</p>	<p><i>The learners shall be able to:</i></p> <p>Analyze the advantage of the location of the Philippines in relation to the climate, weather, and seasons</p>	<p>3. recognize the soil, water, rocks, coal, and other fossil fuels are earth materials that people use a resources.</p> <p>4. describe ways of using Earth's resources sustainability</p>	<p>S7ES-IVb-3</p> <p>S7ES-IVc-4</p>

<p>2. Interactions in the Atmosphere</p> <p>2.1 Greenhouse effect and global warming</p> <p>Grade 9</p> <p>Climate Change</p> <p>2.1 Factors that affect climate</p> <p>2.2 Global climate phenomenon</p>	<p>The different phenomena that occur in the atmosphere</p> <p>Factors that affect climate, and the effects of changing climate and how to adapt accordingly</p>	<p>Analyze the advantage of the location of the Philippines in relation to the climate, weather, and seasons</p> <p>Participate in activities that reduce risks and lessen effects of climate change</p>	<p>6. explain how some human activities affect the atmosphere;</p> <p>5. explain how different factors affect the climate of an area.</p> <p>6. describe certain climatic phenomena that occur on global level;</p>	<p>S7ES-IVe-6</p> <p>S9ES-IIIe-30</p> <p>S9ES-III f-31</p>
<p><u>Waste Management</u></p> <p>Grade 8</p> <p>4. Ecosystems</p> <p>4.3 Impact of human activities in an ecosystem</p>	<p>The one-way flow of energy and the cycling of materials in an ecosystem</p>	<p>Make a poster comparing food choices based on the trophic levels</p>	<p>10. Describe the transfer of energy through the tropic levels;</p> <p>11. analyze the roles of organisms in the cycling of materials;</p> <p>12. explain how materials cycle</p>	<p>S8LT-IVi-22</p> <p>S8LT-IVi-23</p>

			in an ecosystem; an	S8LT-IVi-24
			13. suggest ways to minimize human impact on the environment	S8LT-IVj-25
<p><u>Disaster Risk Reduction</u></p> <p>Grade 8</p> <p>I. Earth quakes and Faults</p> <p>1.6 Earth quake Preparedness</p> <p>1.7 How earth quake waves provide information about the interior of the Earth</p> <p>2. Understanding Typhoons</p> <p>2.1 Why the Philippines is prone to typhoons</p>	<p>The relationship between the faults and earthquakes</p> <p>The formation of typhoons and their movement within the PAR</p>	<p>1. Participate in decision making on where to build structures based on knowledge of the location of active faults in the community</p> <p>2. Make an emergency plan and prepare an emergency kit for use at home and in school.</p> <p>1. Demonstrate precautionary measures before, during, and after a typhoon, including following advisories, storm signals, and calls</p>	<p>Using models or illustrations, explain how movements along faults generate earthquakes</p> <p>2.3 active and inactive</p> <p>3. Participate in decision making on where to build structures based on knowledge</p>	<p>S8ES-IIa-14</p> <p>S8ES-IIa-15</p> <p>S8ES-IIa-14</p>

<p>2.2 How landforms and bodies of water affect typhoons within the Philippine Area of Responsibility (PAR)</p> <p>Grade 10</p> <p>1. Plate Tectonics 1.5 Mechanism (possible causes of movements) 1.6 Evidence of plate movement</p>	<p>The relationship among the locations of volcanoes, earthquakes epicenters, and mountain ranges</p>	<p>for evacuation given by government agencies in change</p> <p>1. Demonstrate ways to ensure disaster preparedness during earthquakes, tsunamis, and volcanic eruptions</p> <p>2. Suggest ways by which he/she can contribute to government efforts in reducing damage due to earthquakes, tsunamis, and volcanic eruptions</p>	<p>of the location of active faults in the community</p> <p>4. Make an emergency plan and prepare an emergency kit for use at home and in school.</p> <p>3. Describe the different types of boundaries</p>	<p>S8ES-IIa-15</p> <p>S8ES-IIId-19</p>
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<p><u>Biodiversity</u></p> <p>Grade 8</p> <p>3. Biodiversity</p> <p>3.3 Protection and conservation of endangered and economically important species</p>	<p>1. the concept of species</p>	<p>Report through a travelogue) on the activities that communities engage into protect and conserve endangered and economically important species</p>	<p>7. Explain the concept of species</p> <p>9. explain the advantage of high biodiversity in maintaining the stability of an ecosystem</p>	<p>S8LT-IVg-19</p> <p>S8LT-IVh-21</p>
<p>Grade 10</p> <p>3. Biodiversity and Evolution</p> <p>4. Ecosystem</p> <p>4.2 Biodiversity and Stability</p> <p>4.3 Population Growth and Carrying Capacity</p>	<p>How evolution through natural selection can result in biodiversity</p> <p>1. the influence of biodiversity on the stability of ecosystems</p> <p>2. an ecosystem as being capable of supporting</p>	<p>Write an essay on the importance of adaptation as a mechanism for survival of a species</p>	<p>7. explain how fossil records, comparative anatomy, and genetic information provide evidence for evolution.</p> <p>8. explain the occurrence of evolution;</p> <p>9. explain how species diversity increases the probability of adaptation and survival of organisms in</p>	<p>S10LT-IIIg-39</p> <p>S10LT-IIIg-40</p> <p>S10LT-IIIh-41</p>

	a limited number of organisms		changing environment 10. explain the relationship between carrying population growth and carrying capacity, and 11. suggest ways to minimize human impact on the environment	S10LT-IIIi-42 S10LT-IIIj-43
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As indicated in the table, environmental education is integrated in the Junior High School as per K to 12 Curriculum Guide in Science for Grade 7 to 10 as of August 2016. Accordingly, climate Change is a common topic for Grades 7 and 9. Concepts in waste management are found in Grade 8, while concepts in disaster risk reduction are included in Grades 8 and 10 Science. In addition, biodiversity is found in Grades 8 and 10. Unfortunately, sustainable development is not found in any grade. These concepts make up the environmental education since teachers are required to impart them to learners under the current curriculum. Standards for these environmental concepts are also indicated in the curriculum guide.

Part II. SWOT Analysis of the Integration of Environmental Education to Junior High School

The figure below shows the SWOT analysis of the integration of environmental concepts.

Internal Factors	Strengths Clear integration of environmental concepts in the curriculum guide Inclusion of relevant competencies in prototype lesson plans Relevant co-curricular environmental projects can be conducted through YES-O	Weaknesses Lack of support of other members of the school Unclear sustainability of environmental projects Lack of resources

External Factors	<p>Opportunities</p> <p>Adequate number of possible partners</p> <p>Possible coordination with other agencies (ex. DENR)</p> <p>Growing interest in environmental education among community members</p> <p>Existing programs in the community which can be tapped (MB clean up, ecobricks)</p>	<p>Threats</p> <p>Problem with mobility of various resources by community members (ex. Collection of local junkshop of recyclables)</p> <p>Possible discontinuation of community environmental projects (ex. Clean up drive)</p> <p>Unstable resources (assistance from the community)</p>
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Figure 2. SWOT Analysis of the Integration of Environmental Education

It can deduced from the figure that the strengths of the integration of environmental education are clear integration of environmental concepts in the curriculum guide, inclusion of relevant competencies in prototype lesson plans, and the conduct of relevant co-curricular environmental projects that can be conducted through the Youth for Environment in Schools Organization (YES-O). YES-O is a school-based co-curricular organization which serves as a significant venue for students’ actions and movements toward safeguarding, protecting and conserving the environment for future generations (DepEd Order no. 72, s. 2003). All of its mandated programs, projects and activities promote the care for the environment (DepEd Order no. 93, s. 2011).

Accordingly, there is an adequate number of possible partners for environmental projects like community members’ organization. There is also possible coordination with other agencies with the same goal of protecting the environment like the Department of Environment and Natural Resources (DENR). Moreover, there is also a growing interest in environmental education among members of the community. Likewise, there are existing programs conducted by communities that can be tapped like clean- up drive and recycling.

On the other hand, the lack of support of other members of the school, unclear sustainability of environmental projects, and lack of resources were the identified weaknesses. In addition, problems concerning the mobility of various resources by community members like recyclables in local junkshops, possible discontinuation of projects due to shifting of interest of community leaders, and unstable resources were viewed as threats in the integration of environmental education in the basic education.

Part III. Perceived Level of Integration of Environmental Education

Teachers play crucial role in promoting environmental education. Accordingly, the table on the succeeding page presents the perceived level of integration of the identified environmental concepts.

Table 3
Perceived Level of Integration of Environmental Concepts

Concepts	Frequency Distribution				Mean	Descriptive Interpretation
	4	3	2	1		
1. Learners acquired essential knowledge and understanding of concepts about the environment. Content Standards	9	19	2	0	3.23	Moderate Achievement
2. Learners demonstrated abilities and skills in relation to the content standards (environmental awareness) and integration of 21 st century skills. Performance Standards	4	18	7	1	2.83	Moderate Achievement
3. Learners demonstrated learning competencies (knowledge, understanding, skills, and attitudes) in every lesson about the environment. Learning Competencies	5	19	6	0	2.97	Moderate Achievement
4. Learners can recall information and retrieve relevant knowledge on environmental concepts from long- term memory. Remembering	6	16	8	0	2.93	Moderate Achievement
5. Learners can construct meaning from oral, written, and graphic messages about important environmental concepts. Understanding	6	13	10	1	2.80	Moderate Achievement
6. Learners can use information to undertake a procedure that can lessen the negative impacts of humans to the environment and/or solve environmental problems. Applying	8	13	8	1	2.93	Moderate Achievement
7. Learners can distinguish environmental principles and determine how they relate to one another, and to their overall structure and purpose. Analyzing	5	17	7	1	2.87	Moderate Achievement
8. Learners can make judgments and justify decisions on important environmental concerns like climate change, disaster risk reduction, sustainable development, and waste management. Evaluating	8	20	2	0	3.20	Moderate Achievement
9. Learners can put elements together to form a functional whole, create a new and helpful product or point of view about environmental issues and problems. Creating	3	16	10	1	2.70	Moderate Achievement

10. The integration of environmental education in Junior High School is sufficient in promoting essential environmental knowledge, skills, and attitudes. Sufficiency of Integration	7	1 5	5	3	2.87	Moderate Achievement
Grand Mean					2.93	Moderate Achievement

It can be deduced from the table that all the standards under the K to 12 curriculum as per DepEd Order no. 8, s 2015 were moderately achieved by the selected secondary schools.

Hence, there is a great opportunity for improvement in the integration of environmental education in the Junior High School. Teachers must strive to enable learners to attain the required competencies for their respective levels.

Part IV. Action Plan

Based from the results presented in the previous sections, the action plan below was formulated.

Component	Persons Involved	Time Frame	Materials Needed	Expected Outcome	Possible Challenges
Enhancement of Integration of Environmental Concepts	Science Teachers Students	Year round	Learning materials	Enhanced proficiency level of students	Lack of interest Time constraint
Co-curricular Environmental Projects through YES-O	YES-O adviser Students	Year round	Contextualized learning materials	Better appreciation of the environment Acquisition of environmental KSA	Time constraint Lack of resources
Community Involvement	Local officials	Year round	Community resources	Better community involvement	Time constraint Lack of resources Lack of cooperation

Conclusions

Most environmental concepts are included in the Science Curriculum. There is also a clear integration of the identified concepts in the JHS Science curriculum as based from the SWOT analysis. Moreover, the moderate achievement in the integration of the given

concepts have opportunities for enhancement through co-curricular environmental projects.

Recommendations

1. The concept of sustainable development should be clearly integrated in the Science curriculum.
2. School- community support must be established.
3. The unclear sustainability of environmental projects must be checked. Proper monitoring and evaluation must be conducted.
4. The lack of resources must be addressed by looking for possible partnership with groups in the community.
5. The problem with the mobility of various resources must be addressed. School administrators should ensure the sustainability of resources and projects through proper coordination with the members of the community. This may also avoid discontinuation of environmental projects.

References

- David, A. (2015). Community- Based Environmental Learning Program: A Step to Uplift the Youths' Level of Environmental Education. Unpublished Master Thesis, Bulacan State University
- Department of Environment and Natural Resources. (2015). Environmental Education: Towards a Sustainable Future.
- Department of Education. (2011). DepEd Order No. 52, series of 2011 "Strengthening Environmental Education Public and Private Schools".
- Department of Education. (2011). DepEd Order No. 93, series of 2011 "Mandated Programs, Projects and Activities, Various Forms, and Targets Pertinent to the Youth for Environment on Schools (YES) Program.
- Santos, M.C.O. (2008). Effects of the Extent of Integration of Environment-Related Concepts in Science Teaching on the Students' Awareness on Environmental Issues. Unpublished Master Thesis, Bulacan State University. City of Malolos, Bulacan.
- Thomson, G. and Hoffman, J. (2015). Measuring the Success of Environmental Education Programs. Canadian Parks and Wilderness Society, Sierra Club of/du Canada BC Chapter, and Global, Environmental, and Outdoor Education Council.
- Melana, D.M., Melana, E.E., Mapalo, A.M. (2005). Mangroves management and development in the Philippines. Department of Environment and Natural Resources Region III, Cebu City.