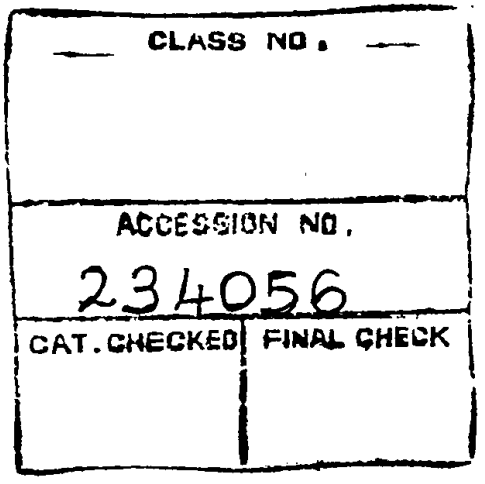
UNIVERSITY OF CAPE COAST

ENVIRONMENTAL EDUCATION IN SENIOR SECONDARY SCHOOLS IN THE SUNYANI MUNICIPALITY



BY

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A DISSERTATION PRESENTED TO THE CENTRE FOR DEVELOPMENT STUDIES, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF CAPE COAST IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS DEGREE IN ENVIRONMENTAL MANAGEMENT AND POLICY

JANUARY 2007

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

.....
RICHARDSON ADDAI

Date: 29TH JAN. '07

Supervisor's Declaration

I hereby declare that the preparation and presentation of this dissertation were supervised in accordance with the guidelines on supervision of thesis laid down by University of Cape Coast.

.....
Prof. S. B. Kendie

Date: 12/02/07

ABSTRACT

Concerns have been raised in recent times concerning the negative attitude of Ghanaians towards the environment. In spite of efforts being made to change behaviour, very little seems to have been achieved. All over the world, the most powerful tool, which is used to surmount environmental problems is Environmental Education (EE). EE has been made part of the Senior Secondary School curriculum in Ghana. One would wonder the benefits of EE if environmental problems keep rising day by day. The research therefore, sought to examine the extent to which the content of Environmental Education in the Senior Secondary School syllabus is able to impart knowledge on environmental issues.

To obtain useful data to help in achieving the objectives of the research, a Criterion Reference Test was conducted for final year students of four Senior Secondary Schools (SSS) in the Sunyani Municipality. Also a questionnaire was designed to elicit the views of teachers in the said schools on the topic. The Heads of the various schools used in the study were also interviewed.

The study revealed interesting results notable among which is the fact that, students who come out of SSS on the whole cannot be said to be knowledgeable in environmental issues. Among the reasons accounting for this were that, teachers were not using hands-on approaches in teaching EE. Again, the content of EE in the Social Studies Syllabus was also seen to be too small.

To solve these problems that hinder the teaching and learning of EE, a number of recommendations have been made which, when implemented to the letter, would change the face of EE in our Senior Secondary Schools.

DEDICATION

I dedicate this work to my parents: Pastor & Mrs. Addai-Mununkum.

ACKNOWLEDGEMENT

I am highly indebted to Prof. S. B. Kendie for the precious time he spent giving guidance and directions. His painstaking effort has yielded this work and I am indeed grateful.

My sincere thanks go to Theresa Patrine Enin (Lecturer - English Department, UCC) for her moral support which contributed in no small measure towards the successful completion of this work. To Mr. Eric Abbey and Isaac Amponsah (Shalom Publications), I say a big thank you for the typesetting and printing of this work. My siblings: Myrna, Astrid, and Fred Addai-Mununkum have been my source of inspiration and so I say "Ayekoo".

The following people also contributed towards the success of this work – Dr. Yaw Afari Ankomah (IEPA - UCC), Mr. and Mrs. Blankson Nsiah, Mr. and Mrs. Benjamin Oduro Barnie and Mr. Emmanuel Owusu.

I have certainly not forgotten Mr. E. Tenkorang (CDS - UCC) for his proofreading and guidelines. Finally to all my EMP course mates (2005 year group) and all environmentalists, I say a big "thank you" for reading this write-up.

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CHAPTER ONE

INTRODUCTION

Background of the Study

Environmentalists have too often advocated piecemeal approaches that cannot succeed in most ecological degradation settings. The U.S. EPA and World Resources Institute, for example, conducted a Delphi survey in 1992 asking experts to identify environmental trends, long-term problems, and suitable remedial measures. The joint report concluded that "the most powerful lever is education" and "improved education at all levels, has the greatest promise for the future of environmental quality and biodiversity. This includes providing people with a direct sense of connection between their everyday lives and environmental quality" (Ecovitality 2004 p1).

Environment is a common word used differently depending on the meaning the user wants to give. Park (1989) defined it as the sum total of the biological, chemical and physical status and character of the biosphere; and that it embraces both living (biotic) and non-living (abiotic) features along with processes, cycles and interrelationships, which influence these. According to Encarta Encyclopedia (2004), it refers to the thin layer of life and life-supports called the biosphere, including the Earth's air, soil, water, and living organisms. In this write-up, the term environment is used as the immediate social and physical surroundings, which consists of both living and non-living things.

Richard and Robert (1985) writing on Functionalism in Human Ecology reports Riley Dunlap as having identified three basic functions the environment performs for humans. These are: providing resources essential for life such as air and water; serving as waste repository; and housing human specie.

In the words of the UNESCO (1978), the natural environment performs for us, free of charge, basic services without which our species could not survive. The ozone layer screens out ultraviolet rays from the sun that harm people, animals and plants. Ecosystems help purify the air we breathe and the water we drink. They convert wastes into resources and reduce atmospheric carbon levels that would otherwise contribute to global warming. Biodiversity provides a bountiful store of medicines and food products, and it maintains genetic variety that reduces vulnerability to pests and diseases. But we are degrading, and in some cases destroying, the ability of the environment to continue providing these life-sustaining services for us. To ensure that the environment continues to provide these services, there is the need for a good relationship between humans and the environment.

Humans have viewed the environment as a free gift of nature and as such do not care about its sustainability. Humans have a free access to the environment and like every free gift its usage is without any care. Since it is free for everybody, no one monitors its use. Virtually everybody does what he likes with or to the environment. Poor farming practices like the slash and burn method, mining, fishing, industrial activities among others, have been identified to have

resulted in the depletion of environmental resources and heavy dumps of wastes, which are not being recycled.

The environment has become an issue of global concern as environmental problems become more apparent and grow wider in scope. The consequences of environmental problems are experienced by all around the globe, especially by those living in developing regions where there has been a chain of disasters, one after the other, as in Africa.

To correct this situation, calls have been made at international conferences to encourage humans to have a positive attitude towards the environment. Notable among these conferences are the United Nations Conference on the Human Environment - Stockholm 1972, Montreal protocol of 1987 on Substances that Deplete the Ozone Layer and the Earth Summit in Rio D'Jinero in 1992. The latest of such conferences has been the Johannesburg Summit of 2002 which others refer to as Rio + 10.

Among other things, these conferences and summits emphasized the need for sensitization of humans on environmental issues. This is evident in the statement of UEM(2004) which states among other things that, implementation of every environmental policy, programme, project and plan comes down to the same common denominator - environmental education (EE).

Emily (2004) had it right in stating that given the importance of global issues reinforced at conferences such as Rio and Johannesburg, it is necessary that action be taken through environmental education. Perpetuating the outcomes of the Johannesburg Summit will require education not only about water, energy,

health, agriculture, and biodiversity but also sustainable production and consumption. This will advance an additional resolve of the Johannesberg Summit to adopt a decade of education for sustainable development, starting in 2005.

Environmental Education (EE) has been defined and redefined over the last twenty-five years. Definitional issues are inherent in a field which is broad and encompassing as this. It is generally agreed that environmental education is a process that creates awareness and understanding of the relationship between humans and their many environments—natural, man-made, cultural, and technological. Environmental education is concerned with knowledge, values, and attitudes, and has as its aim responsible environmental behaviour.

The most commonly accepted definition worldwide was developed in 1975 at a United Nations Educational, Scientific, and Cultural Organization (UNESCO) meeting in Belgrade, Yugoslavia. This definition and its guiding principles were accepted by the twelve federal agencies that participated in a 1993 interagency review of the federal environmental education programmes. A report of this interagency group states that environmental education should increase public awareness and knowledge about environmental issues as well as provide the public with the skills necessary to make informed decisions and the motivation to take responsible actions (Engleson & Dennis, 1994).

This is not different from the UNESCO Tbilisi Declaration of 1978, which among other things defined Environmental Education as a learning process that increases people's knowledge and awareness about the environment and

associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (EPA, 2004).

EE, therefore, is about understanding the causes and effects, of positive and negative aspects, of global and local issues, of immediate and long-term issues, and of direct and indirect impacts (UEM, 2004).

Environmental Education as a learning process, therefore, aims at increasing knowledge and awareness about the environment and developing skills that enable responsible decisions and actions that impact on the environment.

The view that "human behaviour is best shaped when young" has caught up with many countries world over. This is why most countries have found the need to incorporate environmental education in the school system. The aim is to make sure that, students produced are made aware and conscious of the environment so that they can promote good relationship with the environment by their adoption of good environmental practices. This is evident in the objectives of EE programme in Mali dubbed Training and Information Programme on the Environment (TIPE), which are:

> ...to instill in young people—and through them the entire population—attitudes, values, abilities, and skills, as well as an active and aware participatory behaviour necessary for a rational management of the fragile resources of the Sahel, and in particular for finding solutions to the problems of drought and desertification (USAID, 2000 p6).

In Norway, environmental education in schools started as a separate course of study. Later, it found a home within the sciences and finally was taken up by the Science, Social Studies and Religious Education departments.

France maintains that, no new department should be created. Instead, a curriculum development project was instituted in 145 schools, which aimed at incorporating environmental education into the mainstream school curriculum (NAEE, 1973).

Zambia is home to one of the world's oldest environmental education programs for young children, the *Chongololo Clubs*. These emerged in the early 1970s as part of a public education effort by the National Parks Department to counter local resistance to the creation of protected areas. Since the inception of the Chongololo Clubs, they have enjoyed support from the nonprofit Wildlife and Environmental Conservation Society of Zambia (WECSZ) and grassroots volunteer efforts. They initially targeted children in the upper elementary grades. The clubs expanded to secondary schools in the 1980s and some clubs also target younger children. The Chongololo Clubs are a unique example of an EE program that has developed a national profile and has stood the test of time.

Efforts have been made in Mali, which is two thirds covered by desert, to introduce environmental education in the public schools. This is part of a 10-year programme in nine Sahelian countries. In the early 1990s, the Inter-State Committee for the Fight Against Drought in the Sahel (CILSS) launched the Training and Information Programme on the Environment (TIPE) with funding from the European Union. TIPE provides a basic curriculum and training

programme for public elementary schools in the member countries. About 320 schools are now involved. Emphasis is on awareness of the problems of desertification and critical drought prevention behaviours. One of the programme's stated goal is to improve practices within the community as well as within the school (USAID, 2000).

Environmental Education in schools gained roots in Ghana during the educational reforms of 1987. Environmental Studies was combined with Agricultural Studies to form a core subject in the Senior Secondary School curriculum. The subject dubbed Agric and Environmental Studies aimed at making people aware of the ongoing environmental degradation so that they can take action to stop and reverse it. (Awuku et al 1993). From this it is clear that, the purpose of the introduction of this course of study was to increase students' environmental knowledge in order to inculcate in them the culture of managing environmental resources prudently and working to reverse trends that contribute to environmental degradation.

In 1995 however, there were cries for a reduction in the number of subjects being studied in Senior Secondary Schools. Unfortunately, Agriculture and Environmental Studies was seen as a "less relevant" subject and hence was removed. To make up for a study of the environment, a new subject, Social Studies was introduced. This subject is to make up for all topics that are not dealt with in the other subjects. Schools are also encouraged to make good environmental practices part of the co-curricular activities in a bid to conscientize the youth to be environmentally conscious.

Statement of the Problem

Environmental Education (EE) may be formal and informal. Formal EE is where it is incorporated in the school syllabi whereas informal EE is what takes place during co-curricular activities. It is in view of this that the Ghana Education Service (GES) encourages that both the formal and informal forms of Environmental Education are carried out in schools to make students environmentally conscious. Consequently, a teacher who wins the best teacher award should be seen to have promoted good environmental practices in his school.

A visit to Senior Secondary Schools reveals that, in spite of the EE being carried out, the level of environmental consciousness is still too low. Second Cycle students do not show signs of concern for the environment. Students are forced before they help to keep school surroundings clean. An example is when the Minister of Education, Youth and Sports paid an unannounced visit to some schools and saw that, most schools were not being kept clean (Sam, 2004).

When students move out of their campuses, they join the numerous Ghanaians who litter the streets with wastes. In spite of the EE, students would not in any way attempt to educate their families on good environmental practices. One would wonder the benefit of Environmental Education if there seem to be no sign of its positive effect on the Society. Normally, it is expected that, students who undergo EE in schools should be very much conscious of the environment so that they could in turn serve as a catalyst to influence their peers and other family members positively. This ideal situation is not the case in most communities in Ghana and to be specific, Sunyani. Some have blamed the problem on the society

whereas others think the schools ought to do more in stimulating environmental consciousness. In the midst of these arguments, the need to examine the problem on a systematic basis becomes clear. There is the need to ascertain whether the students' lack of concern for the environment is due to a lack of sufficient environmental knowledge; hence the study.

Objectives

The study is aimed at examining the extent to which the content of EE in SSS syllabus is able to impart knowledge in environmental issues.

The specific objectives were to:

- Assess the level of inclusion of EE in the Social Studies syllabus.
- Examine the practical dimensions of EE lessons in Senior Secondary Schools.
- Examine the perception of teachers on students' attitude to EE.
- Test the environmental knowledge of SSS Three students.
- Analyse environmental knowledge of male and female Senior Secondary students.
- Examine the contribution of the programme of study and the school of study on students' environmental knowledge.

The study is aimed at answering the following research questions.

- What percentage of the Social Studies Syllabus is devoted to EE and how adequate is this in instilling environmental knowledge and awareness towards attitudinal change?
- How practical are EE lessons?
- Do students attach any seriousness to the study of topics on the Environment?
- Do students demonstrate mastery of the content of EE after the programmes of study?

Hypothesis

- There is no significant difference in the environmental knowledge of females and males.
- Programme of Study does not significantly influence students' environmental knowledge.
- Students' environmental knowledge is not influenced by place of study.

Significance of the Study

With the recent concerns of policy makers on the environment and the call for EE, a study into Environmental Education would be very much beneficial.

The study would inform policy makers on the effectiveness or otherwise of Environmental Education so that support could be given or modifications made for it to yield the expected fruits.

In a similar vein, Agencies and NGOs concerned about the environment would be informed of the effectiveness of EE so as to be able to make informed choices in the programmes they run to sensitize people on the environment.

To the Ministry of Education and the Ghana Education Service, the study would be very much beneficial in that, it would present a feedback as to the effectiveness or otherwise of EE in Secondary Schools. They would be informed after the study whether the aims for introducing or not introducing EE are being achieved. The recommendations given would go a long way to stimulate and influence future curriculum reforms in our school set-up.

Finally, the study would form the baseline for further studies that may be conducted on Environmental Education either in other districts, regions or countries.

Scope of the Study

As stated earlier, the need for EE in the current situation of lack of concern for the environment cannot be underestimated. EE is used by bodies concerned with the environment to sensitize and create awareness on the environment. EE could be for adults, children and adolescents as well.

The Study would focus on Environmental Education in Senior Secondary Schools with schools in the Sunyani Municipality of the Brong-Ahafo Region as the reference point.

CHAPTER TWO

LITERATURE REVIEW

Definition of Environmental Education

A continuing dilemma for those concerned with environmental education lies in the matter of definition. There are some who strive to achieve universal agreement as to a precise meaning and discreet set of descriptive parameters, but there are others who prefer not to expend energy on what they perceive as an inherently non-productive exercise. There also exists a third population, a potpourri of groups and individuals who have independently or semi-autonomously forwarded a variety of definitions and descriptive statements, on occasion demonstrating strong overlap and, on occasion, equally virulent disagreement (EETAP, 1997).

For the purpose of our discussion, we would look at some of these definitions.

> Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, 1978 p1).

> Environmental education should increase public awareness and knowledge about environmental issues as well as provide the public with the skills

necessary to make informed decisions and the motivation to take responsible actions (Engleson & Dennis, 1994).

The Wisconsin Environmental Education Board (WEEB) defines environmental education as a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions. By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment (WDPI, 1998).

EE, therefore, is about understanding the causes and effects, of positive and negative aspects, of global and local issues, of immediate and long-term issues, and of direct and indirect impacts (UEM, 2004).

A look at these definitions indicates a line of affinity between them. We would thus not be wrong in accepting the components of EE as stated by UNESCO as:

- Awareness and sensitivity to the environment and environmental challenges.
- Knowledge and understanding of the environment and environmental challenges.
- Attitudes of concern for the environment and motivation to improve or maintain environmental quality.
- Skills to identify and help resolve environmental challenges.

- Participation in activities that lead to the resolution of environmental challenges (UNESCO, 1978).

Importance of Environmental Education

All members of society depend on natural resources to survive. In view of the fact that the availability of these resources has limits, it is essential, therefore, that the public understand the importance of the environment to their quality of life and that they have the knowledge, tools, and ethic to live in ways that minimize the impact of their actions on the environment. In a more general sense, this is what Environmental Education does. There can be a thousand and one specific benefits of Environmental Education but for what space and time would allow, a few are discussed in the ensuing paragraphs.

Protecting Human Health

The link between environmental challenges and human health is a major cause of public concern about the environment. Lead poisoning from paint and pipes, air pollution, pesticides in water and food supplies, increased threats of skin cancer from depletion of the ozone layer, and other environmental and health issues are of growing concern to humans, especially effects on children and future generations. Environmental education can help prevent or mitigate environmental human health problems by providing the public with information on the causes of environmental pollution, how pollutants may affect health, how to assess real versus exaggerated risks, and how to make informed and responsible decisions that prevent or mitigate the effects of pollution on health (EPA, 1999).

Advancing Quality Education

Many educational scholars and practitioners agree that students are not doing well at thinking, reasoning, analyzing, or problem-solving. Many goals of education reform emphasize the need to strengthen core subjects such as Mathematics and Science: teach across subject areas: improve critical-thinking and problem-solving skills; and relate learning in the classroom to the needs and issues of the community. Environmental education has a tremendous potential to contribute to these goals of education reform. For example, it can strengthen teaching in many core subjects, especially Integrated Science, because science is the basis for solving many of our environmental challenges. At the same time, environmental education can promote interdisciplinary teaching because environmental topics can be addressed from many different perspectives, including scientific, historical, and cultural (EPA, 1999).

Michele (1999) supports this by stating that, EE programmes can be used to teach a variety of concepts and skills within disciplines. And, because environmental education is at its heart an integrative undertaking, it can help educators and learners cross disciplinary boundaries. Understanding environmental connections require that students are able to link methods and ideas from natural and social sciences, arts, mathematics, and humanities. Learning about the environment and environmental issues is a continuing lesson in interconnectedness that draws upon the core disciplines and provides a meaningful context.

Creating Jobs in the Environmental Field

Protecting the environment creates new jobs for humans. Employment opportunities in the environmental field cover the spectrum of careers from manual labour to high technology and management. For example, there is an increasing demand for individuals with specialized scientific and technical skills to develop more effective pollution prevention and control technologies in areas such as air pollution control, environmental energy sources, hazardous waste management, resource recovery, and instrument manufacturing. Environmental education and training can help ensure an adequate supply of well-trained environmental personnel to deal with the nation's increasingly complex environmental challenges.

Environmental education's emphasis on critical thinking and problem-solving skills equip learners in dealing with rapidly changing technologies in the workplace (EPA, 1999).

Promoting Environmental Protection along with Economic Development

Our future depends on the ability to use the Earth's resources sustainably. The United Nations World Commission on Environment and Development defines sustainable development as meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987).

Sustainable development poses two fundamental education challenges. One is to promote informed decisions that are conducive to sustainability. The

other is to teach the benefits of integrating conservation with the need for economic development. Environmental education contributes to sustainable development efforts by demonstrating ways to promote informed decision-making and teach the benefits of linking conservation and economic development.

Environmental education research has identified key strategies for developing education programmes that lead to responsible decision-making, and practitioners have developed programme models for incorporating a range of perspectives into the resolution of issues. These educational tools and strategies can be applied to efforts to ensure sustainable development (EPA, 1999).

In the words of Rauch (2000), EE within the school can have an appreciably positive effect on students with attention and behaviour problems, or who have a lack of desire to act in an environmentally responsible way. For example, changes in behaviour have been reported to include less vandalism, increased waste separation, and implementation of energy conservation strategies.

Encouraging Stewardship of Natural Resources

Interest in protecting the World's natural resources, including species and their habitats, arises from the respect that people hold for our nation's past and belief in its future. This interest also stems from a strong desire to protect and enjoy nature and to pass it on to our children. There is a need to increase understanding that the health of individual species can be strong indicators of the health of the entire environment and that biological diversity has ecological and economic importance. Environmental education enhances the public's

understanding of the need for healthy plant and animal life and biodiversity; it also educates the public about how their actions affect natural ecosystems and how positive steps can be taken to minimize impacts on these ecosystems and how it will translate into improvements in our overall environment (EPA, 1999).

Environmental Education in the Classroom

Teaching about the natural and built environment provides a real-world context for learning by linking the classroom to the students' community. Students are engaged in hands-on, active learning that increases their knowledge and awareness about the environment.

Because environmental education encourages inquiry and investigation, students develop critical thinking, problem-solving, and effective decision-making skills. Environmentally literate students become citizens who are able to weigh various sides of an environmental issue and make responsible decisions as individuals and as members of their community (EPA, 2003).

From the 1972 United Nations Conference on the Human Environment, the recommendation was made that every nation promotes and develops environmental education (EE) programmes (Engleson and Yockers, 1994). Since that time, many programmes have been implemented within schools worldwide. But how exactly is environmental education being done in the schools? What approaches and techniques are being used to bring environmental education to the students? The following will provide information on how EE is being done by

looking at methods, and by investigating into more specific techniques for environmental learning.

Incorporation of EE into the School Curriculum

Udo (1997) has said that the contribution of the school to environmental education can only be improved if leading environmental issues are incorporated in certain subjects and thus integrated in the curricula, if - together with the teachers - teaching materials are developed which make it possible to translate conceptual notions into practical instructions for action, and if teachers are accordingly trained and guided.

Consequently, in the 1990s, in many African countries, environmental subjects were incorporated in "Science" or agricultural instruction, or the former subject "Science" was turned into Environmental Education, Environmental Science or Environmental Studies.

In support of the incorporation of EE into the school curriculum, the Environmental Education Training and Partnership (EETAP) has identified four broad approaches to incorporating environmental education into schools, and more specifically, the curriculum. These include infusion, imposition, insertion, and framing.

Infusion

Infusion is the incorporation of environmental concepts, activities, and examples into existing curricular goals. An example of infusion can be seen in a

tenth grade Chemistry class in California (Monroe and Cappaert, 1994). The teacher had students investigate into current environmental issues such as a proposal to control hydrocarbon emissions and their effect on cars, dry cleaning, gas pumps, and other sources of smog. By infusing these environmental issues and concepts into his class, the teacher was able to help students understand processes such as oxidation and ionization, and also help them to see the connection between high school chemistry and Los Angeles air (EETAP 2004).

Imposition

Imposition refers to making environmental topics requirements within the curriculum. An example of this may be seen when a school district requires that the science classes within the districts' public schools include topics such as endangered species, water quality, and forest health within the curriculum.

Insertion

Insertion is the addition of an environmental unit or course to the class or curriculum (Monroe & Cappaert, 1994). In this case, something else is sometimes removed from the curriculum to make room for the EE unit. In Calvert County, Maryland, some middle school home-arts teachers developed a two-week-unit focusing on water conservation. Components of the unit included showing a film called "Down the Drain," reading "The Story of Drinking Water," and facilitating several different activities (Monroe & Cappaert, 1994).

Framing

Framing refers to eliminating the subjective boundaries of traditional disciplines and instead, creating a structure of study that integrates subject areas (Heimlich, 1992). In northern Wisconsin, a third-grade teacher used this approach when she decided to use loons as a unifying theme throughout her classes. Population numbers and graphs were incorporated into Mathematics. In geography, students put pins (on a map) on Wisconsin lakes that loons inhabit and measured their distance to nearby roads and towns. In language arts, students were asked to read articles about loons and write poems about a day in the life of a loon (Monroe & Cappaert, 1994).

Other Ways of Transmitting EE in Schools

A review of some existing environmental education programmes illustrates that beyond these general approaches, there are several specific techniques used to increase environmental education in schools.

The Use of Senses

One EE technique being used in schools is increasing learners' awareness of the environment by having them use their various senses. This is an especially effective technique with pre-school through grade two level students. Teachers who have used this technique remarked that important features include: a comfortable classroom environment, experience in the natural environment,

playfulness, imagination, storytelling, crafting with natural materials, breathing and voice exercises, and relating to water (Adedayo et al 1997).

The Use of School Sites

Another technique is using the school site or building as a place for ecological learning. Using the school for projects where students investigate, for example, energy issues, recycling, waste, and procurement, gives students hands-on experience dealing with real-world issues. Students are able to gain important exposure to the investigation and resolution of environmental problems, while improving their skills in working with a team, as well as individually (EETAP, 2004).

In a recent article in the Early Childhood Education Journal, Rivkin (1997) outlined the schoolyard habitat movement and its importance to environmental education She noted that many older Americans still remember outdoor play as a treasured part of their early experiences. This is because to her, children are multi-sensory, physical beings and benefit physically, cognitively, and emotionally from interplay with wind and water, sights and sounds, plants and animals, running and shouting.

Schoolyard Garden

Schoolyard gardens are another hands-on approach to EE within schools. This out-of doors technique has become increasingly popular for many reasons, including its ability to give many students their first experience with nature, the

ability to beautify a school grounds, and the potential for it to be easily integrated as an EE component into each of a teacher's subjects, especially at the primary level ("Schoolyard Habitats...", 1996). The technique of giving the students increased control over and experience in the shaping of the project has been shown to reduce aggressive and destructive behaviours in children. "Teachers of a Vienna (Austria) inner-city school reported that children, who were inattentive otherwise, participated with a lot of fervor and perseverance...in planting a garden..." (Rauch, 2000 p245). This technique can be incorporated into all grade levels to varying degrees.

An example of a success in this approach has been that of Mrs. Bowman who practiced this method in Waynewood Elementary in Alexandria, Virginia. Every subject that Mrs. Bowman needed to cover in her curriculum was integrated into the school garden project at Waynewood. In the end, Mrs. Bowman's students were not only able to proudly share the garden bounty with the other students and staff of the school; they were also able to communicate the particulars of each fruit or vegetable being eaten and the environmental factors associated with them (Miller, 1999).

Relating EE to Culture

Focusing on local environmental issues and relating their connection to the respective culture is another technique of how EE is being used in schools. In Ethiopia, there are efforts underway to integrate pressing environmental problems

such as the impact of population growth and environmental degradation on the biological diversity of the area into the university curriculum (UNESCO, 1995).

Century (1988) and Little (1997) support this by stating that, when teaching students from diverse cultures, it is vital to understand students' cultures and history in order to give each child a worthwhile educational experience. It is also important not to stereotype, generalize, or hold certain expectations based on a student's ethnicity.

Citing an example, Kober (1993) opines that some cultures such as Native American are extremely sensitive to animal remains and may have a difficult time or be upset by viewing or dissecting dead animals.

Community Based Education Model

Another example of using local environmental issues as a focal point can be seen through the Community-Based Education Model (CBEM) at Santa Fe Indian School in New Mexico. Within the CBEM, Pueblo high school students focus on the Pueblo community through local field experience programmes on water quality and interaction with Pueblo community members and culture. A strength of the programme has been an increased level of student motivation to learn about environmental science (Enos, 1999).

Environmental Clubs

Establishing school environmental conservation clubs is a technique being used in many schools, beginning at the middle elementary level and continuing on at all higher levels (EETAP, 2004). Students, staff, or faculty members may

initiate school conservation clubs. Some of their goals are to increase student awareness and involvement in environmental issues. Activities that they may be involved in include: establishing or improving a recycling programme on the school grounds, conducting environmental education for younger grades, planning a local student environmental awareness action conference, fund-raising for environmental causes, participating in river/highway cleanups, and organizing guest lecturers to visit the school to discuss environmental issues.

Field Experience

Field experience is another EE technique being used in schools (EETAP, 2004). It is important because it provides students with experience beyond the traditional indoor school setting. Exposure to the outdoors can be an extremely effective method for increasing the level of student environmental awareness and knowledge, and for fostering or strengthening a desire to protect the environment. Examples of field experience include: field trips to nature centers, wildlife refuges, arboretums, and more; supporting components to the existing curriculum, such as taking a class outside to identify various vegetative species, or having a class investigate the impacts of erosion on a local stream or river and design and implement a strategy to stop or decrease the amount of erosion; and more. All grade levels can incorporate field experiences into their EE programmes. However, challenging logistics, such as money, transportation, and parental consent can sometimes prevent an extensive amount of field experience for students.

Technology

Technology is a tool used in many EE programmes within schools, and can be used to help combat limitations that traditional field experience may pose. One example is a multimedia programme called Science Vision. "Eco Ventures" is an element of this programme (Dawson, 1998). Its focus is on the increasing pressure on environmental resources in Florida, due in large part to the growing population. In "Eco Ventures", a fictional state park is created and lower secondary students (for which the programme is intended) pretend to be interns working with the Florida Department of Environmental Protection to develop a management plan for the new park. Thus, the students are able to gain some valuable experience investigating and trying to resolve real environmental issues. The use of technology in EE can be effective for middle elementary through higher learning levels.

Music in Environmental Education

Another useful way of educating people on the environment is by Music. According to Doug (2002), music can be a powerful tool to educators who are teaching young people about the breakdown between environmental conservation and human consumption, as well as the human and community crises that are created as a result of such breakdowns. He argues that music can be used to generate student interest in a topic that they may have otherwise disregarded.

Citing the work of Rogers (1977), Ramsey states that, Rogers wrote songs about rural life across Canada. Whether it was grain farming in Saskatchewan

("The Field Behind the Plow"), the migration of Atlantic Canadians to the western oil industry ("The Idiot"), or songs of the fishery ("Make and Break Harbour"). Rogers left behind rich resource documents from which educators can draw.

"Make and Break Harbour" (Rogers, 1977 p15) refers to a time when the cod were still "plenty," but the arrival of large-scale off shore fishing trawlers meant fewer fish and fewer people. In the first verse, the lines, ". . . Once more we tack home with a dry empty hold" and ". . . make and break, and make do, but the fish are so few" speak to changes in the fishery with small-scale inshore fishers returning home almost empty handed. This description leads into an explanation of why this occurred. The answer, according to Rogers, is to lay particular blame on the industrialized, large-scale offshore fishery of the post World War II era.

Ramsey stated further that, the stories that are told, and the emotion that is invoked in such songs, make them powerful tools in the classroom, particularly as introductions and conclusions to a unit on the Atlantic fishery or as a technique for fostering class discussion or facilitate a resource debate. The unit itself could be framed upon any number of general textbooks as well as further reading in a range of regional, sociological, and environmental journals.

To support this fact, Millitch (1999:625) comments on a stand of Margaret Mead who opined that folksong could save the world. He stated that, "it's my opinion that Mead knows what she is talking about. Music can influence values.

And since society's central problem in terms of environmental matters arises from values, music can have a profound influence..."

Limitations to Environmental Education

Impediments in the Classroom

The good intentions of the curriculum experts who, since the 1980s, have seen to it that environmental issues are integrated in the learning content of schools, have not always been implemented meaningfully in daily classroom instruction. The reasons for this are certainly to be found in the poor equipment of the schools, the large classes, the lack of teaching aids, and - not least - the inadequate training and remuneration of the teachers (Udo 1997).

Poverty

Education can seldom change self-interested choices in circumstances where people can obtain higher incomes through ecologically destructive activities than by conserving natural features. As one illustration, a recent article in The Undersea Journal decries the widespread practice of dynamite fishing, which is illegal in virtually all coastal states, and then quoted an Indonesian official conceding: "The people who obey the law live in glass houses. The people who don't, for now, live in concrete ones. It's a difficult argument." Fishermen can easily see the circle of devastation resulting from their use of explosives, but they can also catch more fish by using bombs than by adopting other low-technology fishing methods. Many governments and environmental groups have mounted

groups have mounted educational campaigns to describe the long-term harm resulting from this method, but the practice continues in many regions.

Consequently, an attempt in 1988 by marine scientists from Trent University in Jamaica and the Discovery Bay Marine Laboratory of the University of the West Indies to educate fishermen on the harmful ecological impacts of the use of small nets failed. The scientists concluded by 1991 that education was insufficient because the fishermen were reluctant to suffer the initial burden of reduced catches.

Selfish Attitudes

In the same vein, education can seldom overcome selfish or uncooperative behaviour arising from perceived self-interest, or sheer stubbornness. Education can seldom resolve "Tragedy of the Commons" problems in which communal ownership allows people to benefit from other's conservation efforts by taking a disproportionate share of the natural resources for themselves. Education can seldom remedy problems in which the continuation of environmentally harmful actions by some people will undermine conservation preferences by the majority. In all of these cases, environmental education may not be a necessary element in devising any practicable solution, but education cannot be a sufficient solution by itself. Combining environmental education with economic assistance or economic incentive mechanisms is likely to prove more effective than exclusive reliance on education programmes (Ecovitality, 2004).

Traditional Beliefs

The success of Environmental Education is often impeded by the cherished traditions of a group of people. Ecovitality (2004) reports that in Jamaica, hurricanes in the early 1980's badly damaged north-shore reefs and reduced fish abundance while the human fishing population increased; thus, there were more fishermen trying to catch fewer fish. The most common fishing gear is small-mesh traps that capture juveniles before they have a chance to mature into larger and more valuable fish. One marine scientist working in Jamaica noted and wrote: "It is a common belief that fishing pressure cannot affect the abundance of fish ('Fish can't done!'); that it is sacrilegious to presume otherwise ('If fish in my trap, is God put it there'); and that other factors are responsible for the decline in catches."

Environmental Concerns in Ghana

A review of environmental reportage in Ghana's major dailies over the first three months of 2004 revealed that 94 articles on the environment were published in the Ghanaian Times, Daily Graphic and the Mirror. Out of this number, 30% focused on educating the public about some activities that adversely affect the environment and steps that would be taken to avert the negative impact. About 44% was concerned about sanitation. 13 articles (13.8%) were on water pollution. The rest (12 articles) were on noise and air pollution, conservation and preservation of our forest and the destruction of the biodiversity (Nii-Okpe 2004).

In the January 16 2004 edition of the Daily Graphic, journalists and editors were advised to place much more premium on stories and features of the environment and poverty related subjects The editor of the Daily Graphic Mr Yaw Boadu Aye Boafo advised journalists and editors to lead a crusade for better, wise and prudent use of resources and practices for sustainable development. The UN commissioner on sustainable development (who is also the Norwegian minister of environment) was at a function where he lamented at the wanton destruction and loss of biodiversity, which posed a greater danger to the continuous existence of human beings on earth.

As part of activities marking environment day, students from two (2) Basic schools were sensitized by the Brong-Ahafo Regional Environmental Protection Agency office to plant trees in their compounds. The theme for the environmental week celebration was "Greening the Region; everybody's responsibility". By this act, the EPA hoped to sensitize adolescents on the need to protect and conserve environmental resources by rejuvenating our forest resources (Lokko, 2004).

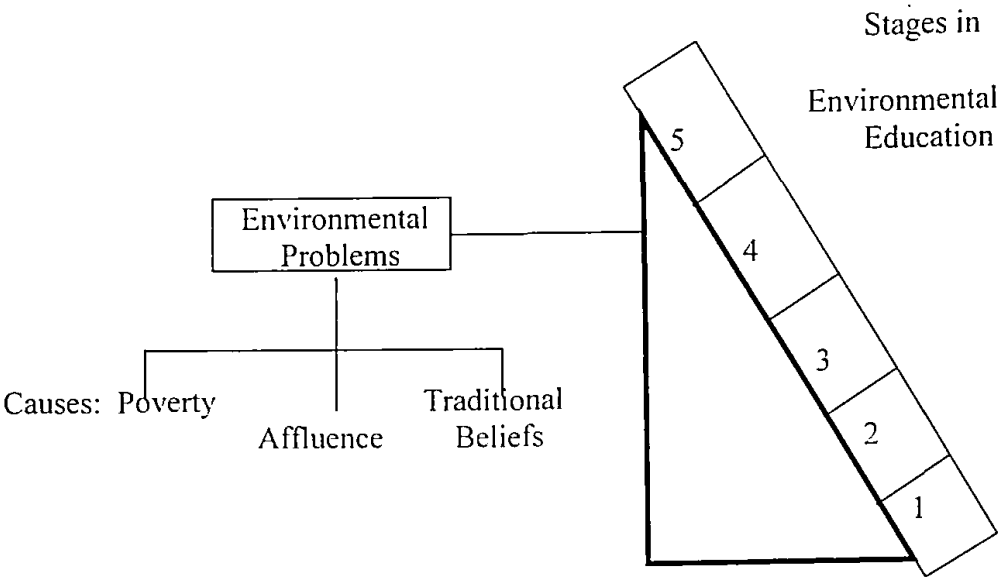
At the launching of the 30th anniversary of the Environmental Protection Agency the Vice President Alhaji Aliu Mahama advised Ghanaians to undertake a crusade to protect the environment; he said that as the nation strives to reduce the level of poverty, dependence on the environment would increase so EPA should give guidance and directions to safeguard a sustainable development. If most of the needs are derived from natural resources, they should monitor and implement preventive and control measures and propose necessary measures to government.

Osagyefo Amoatia Ofori Panin (Omanhene of Akyem) also noted that humans had damaged the environment with careless abandonment in their quest to satisfy their needs. He urged Ghanaians to invest in the environment by treating it with care so that people would have healthy lives as well as ensure that posterity benefited from it. He recommended that poverty reduction in the environmental enhancement programmes should be integrated into all development projects (Donkor, 2004).

In the 17th February 2004 edition of the Ghanaian Times, Walter C. Lowdermilk published a paper with a heading "The Eleventh Commandment". He stated among other things that, the Decalogue in the Bible needs an extension to include an eleventh commandment, which he identifies to be:

> Thou shall inherit the holy earth as a faithful steward, conserving its resources and productivity from generation to generation. Thou shall safeguard the fields from soil erosion, the living waters from drying up, thy hills from overgrazing by the herds. Thy descendants may have abundant forever. If any shall fail in this stewardship of the land, thy fruitful fields shall become sterile, stony ground and wasting gullies and thy descendants shall decrease and live in poverty or perish on the earth.

Conceptual Framework



Source: Author's Construct

Figure: 1 Surmounting Environmental Problems with EE

Key to the Stages in EE

Stage 1: Awareness creation through infusion, insertion, imposition and framing of EE topics in the curriculum

Stage 2: Knowledge and Understanding of Environmental issues through the use of School sites, field experience and Community Based Education Model.

Stage 3: Participation in activities that lead to the solution of environmental challenges such as clubs, schoolyard gardening etc.

Stage 4: Attitudes of Concern for the environment.

Stage 5: Ideal Environment

What has been created to be the conceptual framework for the study is the diagram shown in Figure 1 and captioned "Surmounting Environmental Problems". Its development has been influenced by UNESCO's(1978) components of EE discussed in the previous pages.

Environmental Problems which are caused by Poverty, Affluence, and Traditional Beliefs are seen to have heaped up posing a big challenge for humans.

This heap of problems could only be overcome by going through the stages of Environmental Education.

The first stage is where an attempt is made to create awareness of the harm that we cause the environment. This could be done through infusion, insertion, imposition and framing of EE topics in the curriculum.

The Second Stage is where having created awareness, students are motivated to seek knowledge and understanding of the real issues involved in the environment. This could be done through the use of school sites and field experience.

Having gained knowledge and understanding, it is expected that, EE is taken to the third stage where Students participate in activities that lead to the solution of environmental problems. This could be realised through formation of clubs and schoolyard gardening among others.

The fourth stage is the stage where students get the intrinsic motivation to be concerned about the environment. A situation where people cannot help but to react in situations where others are seen to be abusing the environment.

When all these are implemented to the letter, it is expected that, our environment would become a "*Paradise*" which is used to mean an ideal situation where things are perfect.

CHAPTER THREE

METHODOLOGY

Research Design

The research is on Environmental Education in Secondary Schools in the Sunyani Municipality. The research design for the study was a descriptive survey. Gay, (1987) sees the descriptive survey as the process of collecting data in order to test hypotheses or answer questions concerning the status of the study. The researcher explored into both primary and secondary sources of information pertaining to Environmental Education. It was non-interventional, as no measure was put in place in the course of the study.

Data Collection Techniques

Secondary Sources

Secondary data that was useful in this study consisted of existing information, record of governmental institutions as well as Non-Governmental Organisations (NGOs) that are concerned with sensitizing the youth on environmental issues thereby stimulating their environmental consciousness.

To obtain this data, the researcher visited governmental institutions such as the Sunyani Municipal Assembly, Environmental Protection Agency as well as Ghana Education Service. Attention was paid to both published and unpublished

data either by these institutions or by other individuals. Such information was obtained from the dailies, journals, periodicals, policy

Primary Sources

Primary data in the study emanated from the participants in the study. It was obtained through interviews, structured direct observation, questionnaire and Criterion Referenced Test (CRT).

The researcher interviewed some heads of institution to obtain data on how EE is carried out in their Schools and what is being done to promote good environmental management. This was done with the aid of an interview guide shown in Appendix 'C'. These questions were however not rigidly followed since an answer given to a question could generate a new question which would not necessarily be in the interview guide.

A questionnaire (shown in Appendix 'B') was designed for teachers in the schools that were included in the study. This was to obtain data on how EE is done in the respective schools. It also gave data on the students' perception as well as bringing to the fore the impact EE is having on the students.

To confirm or reject the expected responses on the effectiveness and impact of EE, the researcher conducted a Structured Direct Observation in the schools of the study. This instrument is shown in Appendix 'D'.

Sampling Procedure

The survey objective was achieved by employing both probability and non-probability sampling techniques to obtain the required population for the study.

Due to the nature of the study, simple random as well as purposive sampling techniques was adopted to obtain the required data. This ensured that, data collected is the required ones and could be used to represent the entire population. Simple random sampling was used in selecting the second cycle schools as well as the respondents from these schools. The purposive sampling was useful in view of known officers who were interviewed.

Population

The anticipated population for the study was as follows:

- All SS 3 students from all the Second Cycle Schools in the Sunyani Municipality.
- All Social Studies teachers from all the Second Cycle Schools in the Sunyani Municipality.
- All Heads of Second Cycle Schools in the Sunyani Municipality.

Sample

Out of the anticipated population, the sample that was used for the study is:

- One Hundred and Sixty-nine (169) SS 3 students selected from four of the eight Secondary Schools
- Eight (8) teachers selected from four of the eight Secondary Schools

- Four (4) heads of selected Secondary School

Research Instruments

In view of the nature of the topic of study, it was realized that, Questionnaire, Criterion Referenced Test (CRT), Interview and Structured Direct Observation were the most appropriate and efficient instruments for obtaining data for the study.

Consequently, a thirty-two (32) item questionnaire (shown in Appendix 'B') was developed for teachers of the study area. This questionnaire had six (6) Modules. The first module elicited data of the background of respondents. Module two (2) was about EE in the school curriculum. Module three (3) sought to obtain data on how EE was carried out in the classroom and the role of the teacher. The fourth Module was concerned with students' attitude to EE lessons. Module five (5) was aimed at eliciting the effectiveness of EE in the Senior Secondary Schools from the teachers' perspective. In the sixth module, the teachers were given the chance to give general comments on EE and what could be done to improve the situation.

A Criterion Referenced Test dubbed "Environmental Knowledge Test" (EKT) was designed to seek data on students' achievement in EE. A 35 item EKT was used to determine the extent of attainment of the cognitive objectives spelt out in the syllabus of Social Studies (MoE, 2005). As shown in Appendix 'A', these questions were grouped under four main headings. To ensure conformity to the standards of educational assessment, the researcher decided not to set new

questions but selected them out of a set of multiple choice test found in the Social Studies Text Book (Social Studies for Senior Secondary School).

This instrument also requested for background information. The purpose was for the researcher to be able to compare the students categorized by sex, programme of study and school.

An interview guide, which contained seven open-ended questions, was also developed. These questions were directed at heads of the Senior Secondary Schools that were used for the study. It sought to obtain data on EE in the school curriculum and what the schools were doing to promote it. It was also to help in confirming or rejecting the responses of teachers on how EE was carried out in the schools.

The Structured Direct Observation was based on ten (10) guidelines. The purpose was to observe the environment of these schools in order to be able to link the responses of the respondents to what was visible in the compounds.

Administration of Instruments

In order to obtain data on the Secondary Schools in the Sunyani Municipality, the researcher as a first step visited the offices of the Municipal Directorate of Education. Based on information obtained, the researcher was able to select the schools to be used in the research through a Simple Random Sampling.

A visit was also made to the schools to seek permission from the various heads of institution and to arrange dates for the exercise. In the course of this, the

researcher had to make changes in the schools that were to have been used based on the simple random sampling. This was caused by the fact that one of the schools turned down the offer to be used for the study with the reason that, the students were scattered due to a strike action by the teachers. The researcher had to fall on Chiraa Secondary School, which was initially not part of the Schools sampled for the exercise.

On the scheduled dates, the researcher personally visited the four schools that were used. All the dates were in May 2005, a time when the SSS three students were assumed to have completed the syllabus and were revising to write their Senior Secondary School Certificate Examination (SSSCE).

In selecting the student respondents, a simple random sampling was used. In all the SSS three (3) classes, the class list was obtained and the respondents were selected from it. Initially most of the students were reluctant to participate. To them, it could be a ploy by their teachers to examine them and take the scores for something else. However, after the researcher had explained the purpose of exercise to them, majority of them agreed to participate. Others who were still not willing to take part gave the excuse that they were not prepared. As a result the gender and other background characteristics of the student respondents were not even.

During the EKT administration, the students were advised to be objective and honest in their responses and also to do independent work. There was no time limit set for the completion of the EKT thus allowing the respondents ample time to exhibit their highest possible levels of environmental knowledge.

The EKT was scored by awarding a point for each correct response and zero for an incorrect alternative. Thus, respondents could score a maximum of 35, while a minimum score could be zero. These scores were converted to percentages to aid easy comparison.

The teacher respondents were selected based on accidental sampling. The researcher visited the Staff Common Room of participating schools and any Social Studies Teacher that happened to be present and was willing to participate, was used.

Purposive sampling was used in the interview with the heads of the institutions. In one of the schools, the head was not available to be interviewed. As a result, the researcher had to fall on the Assistant Headmistress who was the next in command.

The observation of the school compound was done out of sight of the teachers who supported the exercise. This was to ensure that they do not influence it by giving reasons for why things were not happening normally. For example, in one of the schools, the teacher marched the students out of the classroom to do picking of rubbish that were just around their classroom upon realizing that a stranger (the researcher) was around. If this teacher were to have been aware of the observation, he would have explained why the cleaning was being done at that time.

Methods of Data Analysis

Data for the research was mainly obtained through the instruments used ie. questionnaire, Environmental Knowledge Test (EKT), Interview and structured direct observation.

The questionnaire designed provided data on the methods of teaching and students' attitude towards EE in the schools of study. These data were subjected to analysis with the aid of SPSS – statistical software.

Descriptive data (scores) were compiled for the Environmental Knowledge Test. To aid comparison and for easy analysis, the scores for each of the four (4) subheadings were noted. Having had these scores, it was easy to determine the means, standard deviations and percentages of the scores. Interpretation of the scores for the EKT was based on Grondlund's (1985) criterion of mastery for Criterion Referenced Test. Kendie and Donkor (2000) reports Groundlund (1985) as postulating among others that scores below 65 per cent in CRT indicate that students have mastered a few of the course's major and minor instructional objectives and that remedial work would be desirable in such situations.

CHAPTER FOUR

STUDENTS' ENVIRONMENTAL KNOWLEDGE

Introduction

In stating the goals of the research, it was stated that the research would obtain data on the mastery of students in EE. In this chapter, an analysis of data obtained from the Criterion Referenced Test (CRT) termed Environmental Knowledge Test (EKT) is made.

Background of Respondents

Participating in this research were 169 students drawn from 4 Secondary Schools in the Sunyani Municipality. Characteristics of the respondents which were obtained from the background data are discussed in the ensuing paragraphs.

Sex and Programme of Study of Respondents

Male student respondents used in the research numbered 88 whereas their female counterparts were 81. The 169 students were drawn from 7 different programmes of study. The distribution however was not even as some respondents from specific programmes outnumbered others. Specifically, it is evident from Table 1 that respondents from the General Arts Programme outnumbered those from the Agriculture, Business, Home Economics, Science, Technical and Visual Arts. In all, the General Arts programme had the highest

number of respondents (58). Following closely is Business with 40 respondents whereas Technical Students were 5, representing the programme with the lowest number of respondents. The results of data obtained on the sex and programme of study of student respondents is displayed in Table 1.

Table 1: Programme of Study and Sex of Respondents

Programme of Study	Sex		Total
	Male	Female	
Agricultural Science	10	5	15
General Arts	37	21	58
Business	17	23	40
Home Economics		10	10
Science	13	14	27
Technical	5		5
Visual Arts	6	8	14
Total	88	81	169

Source: Fieldwork (2005)

The reason for this uneven number of respondents is that all the schools included in the study offered the General Arts Programme. In some schools, like Sunyani Secondary School, there were three different streams of Arts students, while all the other schools had a two-stream Arts programme. On the contrary, 3

out of the 4 schools did not offer the Technical Programme. It is only in Twene Amanfo Secondary Technical School that the Technical Programme is offered.

Description of Respondents by Place of Study

Selection of students from the various schools was not even in terms of number and sex. While respondents from Chiraa Secondary (CHASS) were 46, those from Odumaseman Secondary were 38. In spite of this, it could be realized that the difference in the number of respondents with respect to schools was not so vast. The mean number of students selected from each school was 42. Table 2 illustrates the description of respondents by School.

Table 2: Description of Respondents by Place of Study

School	Sex		Total
	Male	Female	
Chiraa Secondary School	34	12	46
Odumaseman Secondary School	19	19	38
Sunyani Secondary School	16	24	40
Twene Amanfo Secondary /Tech.	19	26	45
Total	88	81	169

Source: Fieldwork (2005)

The difference in the gender representation could be explained by the fact that in the schools of study, the number of males and females were not even. As

the table clearly shows, with the exception of Odumaseman Secondary School which showed a balance in the gender, all other schools were biased. Reporting on this phenomenon of gender imbalance, Kwakofie (2004) said "in 1987, only one in 11 children at secondary school in Ghana was a girl - a figure that finally encouraged the country's government to do something about the educational gender imbalance endemic to many African countries" p2.

Again the gender imbalance in the respondents from the schools could be seen as emanating from the voluntary nature of participation in the study. Since participation in the test was optional, some students decided to opt out and that could have contributed in no small measure to this finding.

The Environmental Knowledge Test

The Environmental Knowledge Test (EKT) contained a thirty-five (35) Multiple Choice questions which were grouped into four (4) main headings namely:

- General Knowledge on the Environment,
- Land Resource and Its uses,
- the Atmosphere and Air Pollution, and
- Water and Sanitation.

Questions under the General Knowledge on Environment category were based on topics such as: Meaning of Environment, Ecology, Ecosystem, and the food chain. Eight (8) out of the 35 questions were from these topics. Examples of questions asked under this section are:

The relationship between organisms of the same species is called

A. Intraspecific effect
B. Interspecific effect
C. Biotic effect
D. Abiotic effect

Which of the following is not a primary consumer of the environment?
A. Mice
B. Grasshopper
C. Grasscutter
D. Lion

"Land Resource and its use" made 10 out of the 35 questions. The questions were based on topics which included: Desertification, Deforestation, Bush Fires, Effects of Mining on the Environment and Land Degradation. Examples of questions asked included:

All the following are causes of desertification except
A. Bush Burning
B. Poor irrigation methods
C. Wrong application of agro-chemicals
D. Soil conservation

Which of the following describes the sequential order of soil erosion by water?
A. Splash – Sheet – rill – gully erosion
B. Sheet – splash – gully – rill erosion
C. Rill – sheet – splash – gully
D. Gully – rill – sheet – splash erosion

The third category of questions was captioned atmosphere and air pollution. Under this section, students were asked 10 questions based on selected

topics. These topics were: The atmosphere, atmospheric or vehicular pollutants, The Ozone Layer Depletion, and air pollution. Some of the questions asked under this section were:

Global warming is caused by

A. the sun increasing its ray on the earth
B. the depletion of the ozone layer
C. death of water bodies
D. absorption of radiation by gases such as carbon dioxide.

The commonest source of Chorofluorocarbons (CFCs) is

A. Exhaust from Cars
B. Air conditioners and Refrigerators
C. Liquefied Petroleum gas
D. Industrial Wastes

The last section comprised questions on water and sanitation. This section included questions based on topics such as: Sources of Water, Water Pollution, Drainage and Waste Management. Eight questions made this section. Some of the sample questions include:

Improper disposal of rubbish can cause

A. Sedimentation
B. Dehydration
C. Pollination
D. Epidemic

One of the harmful ecological problems created by the formation of artificial lakes is

A. River blindness
B. Sleeping sickness

C. Bilharzia

D. Tuberculosis

Environmental Knowledge

The raw scores of the students in the Environmental Knowledge Test (EKT) found in Appendix 'E' showed the maximum EKT score as 28 (80%). Two students obtained this score. The minimum EKT score was shown to be 9 (25.7%), which was obtained by one student. The mean score was 18.4 (52.9%) with a standard deviation of 11.6 (40%). The Descriptive analysis of scores in the EKT is shown in Table 3.

Table 3: Description of EKT Scores

Mean	52.98394
Standard Error	0.892416
Maximum	80
Minimum	25.7
Median	54.28571
Mode	57.14286
Standard Deviation	11.60141
Skewness	-0.14746

Source: Fieldwork (2005)

Scores obtained in the EKT were applied to Grondlund's (1985) "Criterion of Mastery". In line with this theory, students who obtained less than 65% are

seen to have mastered only a few of the subject's objectives. Inferring from Appendix 'E', twenty (20) out of the one-hundred and sixty-nine (169) respondents had scores of 23 (65%) and above. This figure represents 11.8% of the respondents. This implies that, 149 representing 88.1% of the respondents could be said to have mastered a few of the Social Studies Syllabus and hence EE. We would thus not be wrong in describing the results as abysmally poor.

A similar test conducted by the National Environmental Education Training Foundation (NEETF) in 2001 revealed analogous results. In an environmental quiz (12 multiple choice questions about recent environmental topics) conducted, most Americans did not do so well. If the public were graded on the quiz, just one third (32%) would receive a passing grade of "C" or better (9 or more correct answers). Moreover, just one in ten adults (11%) in the U.S. would receive a grade of "A," answering at least 11 of the 12 simple questions correctly (NEETF, 2001).

It could be argued that, if the results for a parallel test in the US (with a literacy rate of 99.5 %) (Encarta 2004) did not yield any outstanding result, much should not be expected of Ghanaians with comparatively low literacy level of 54%. On the other hand, this argument is challenged by the fact that whilst the participants in the study in the US were "the general public", this study was conducted among "students" who were supposed to have learnt what they were examined in.

Analysis of students' performance in EKT under the various sub-headings reveals that students scored more in the area dubbed Land Resource and its use.

The mean score in this area was 66.5%, which is above Gronlund's cut off point of 65%. On the contrary, 39.7% was the mean score in the area that dealt with Atmosphere and Air Pollution. Surprisingly, three (3) of the students failed to be able to score a point in this area. Description of scores under the subheadings is shown in Table 4.

Table 4: Students' Performance Classified Under the Various Subheadings

Area	Mean Score	Standard Deviation
General Knowledge on Environment	57.3	18
Land Resource and its use	66.5	15.3
Atmosphere and Air Pollution	39.7	19.7
Water and Sanitation	46.6	19.5

Source: Fieldwork (2005)

A pictorial view of this is shown in Figure 2.

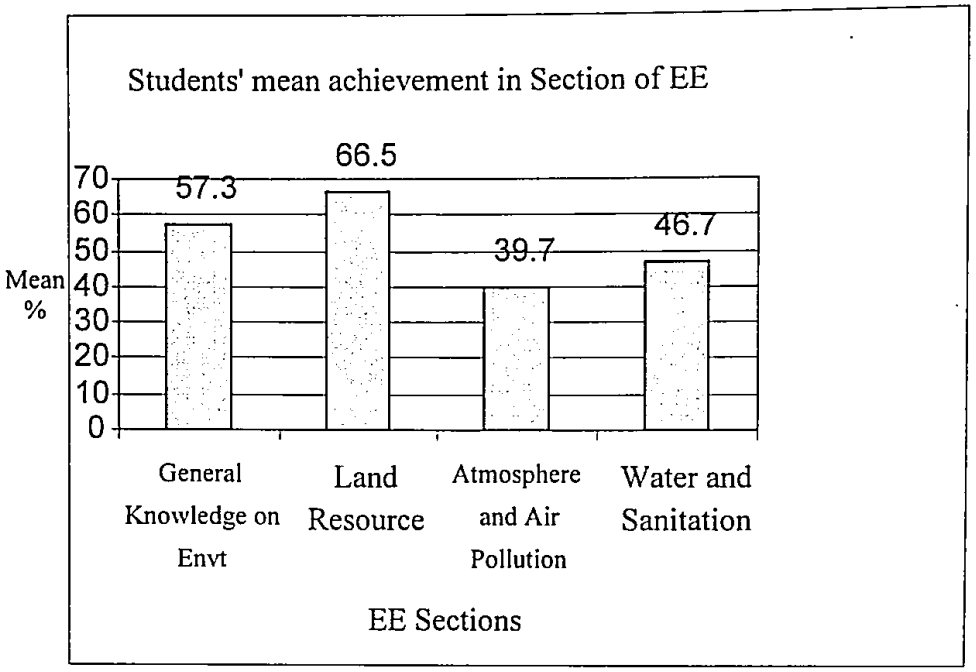


Figure 2: Students Mean Achievement in Various Sections of EE

Source: Fieldwork (2005)

The poor performance of students in the EKT is not surprising. As reviewed in Chapter Two, Udo (1997) blamed the poor performance of students in Environmental Education on poor equipment, large classes, lack of teaching aids and inadequate training and remuneration of teachers. Similarly, Betts et al (2003) identified the class' learning culture and time spent in schools as being determinants of students' performance.

This assertion is true in its entirety. The Schools for study could be clearly seen to be suffering the same fate. During the time of data collection, teachers were on a sit down strike to press home their demand for improved conditions of service. This clearly confirms the fact that teachers are not well motivated to

undertake the teaching of EE. Similarly, the minimum class size observed for the schools for the study was forty-five (45) which is far above the normal class size of thirty (30). It should therefore not be surprising that teachers are unable to ensure full participation by all the students during teaching. In Germany, the normal class size is fifteen (15) students and a teacher (Encarta 2004). Compared to the situation in the study area, it is three times better. No wonder Environmental consciousness is very high. The large class size therefore, might have contributed in no small measure to the low performance of the students.

On the other hand, it could be argued that since at least two (2) of the participants obtained an 80% score, the problem of low performance could not be blamed on the teachers. The reason that could be given in the case is that, such students might have been gifted.

The United States Department of Education describes "giftedness" as exceptionally advanced performance or the potential for outstanding performance in intellectual, creative, leadership, artistic, or specific academic fields. Children who demonstrate outstanding talents come from all social, cultural, and economic groups. They learn more rapidly and are able to understand more abstract and complex ideas. They are also able to transform existing knowledge into new and useful forms, and create new knowledge recognized for its originality, complexity, and elegance (Encarta 2004).

Gender and Students' Environmental Knowledge

Results of the EKT, which provide data on Students' Environmental Knowledge (SEK) are analysed, based on gender of students. The Table below displays the results.

Table 5: Gender and Students' Environmental Knowledge

Gender	No. Of Respondents	Mean Score	Standard Deviation
Male	88	55.4	11.7
Female	81	50.1	10.9
Total	169	52.9	11.6

Source: Fieldwork (2005)

From the Table, it could be recognized that Male students had a mean score of 19.4 (55.4 %), while the females obtained a mean score of 17.5 (50.1). This shows that, generally, male students are expected to be more knowledgeable in issues about the environment than their female counterparts. On the other hand, the deviation of the female students from the mean (10.9) is not as wide as that of their male counterparts which was 11.7. This indicates that, the scores of the females were better placed around the mean than their male counterparts.

To test the hypothesis that 'there is no significant difference in the environmental knowledge of females and males, a 't' test was conducted. The results of the t-test is shown in Table 6.

Table 6: Results of T Test

Independent Samples Test

	Levene's Test for quality of Variance		t- test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence interval of the Difference	
								Lower	Upper
Equal Variance assumed	.004	.950	2.910	167	.004	5.0870	1.7479	1.6361	8.5379
Equal Variance not assumed			2919	66.96	.004	5.0870	1.7430	1.6459	8.5281

Source: Fieldwork (2005)

Our statistic of concern from the table is the computed 't' value which is 2.91. This figure when compared with the value of 't' from the statistical table, reveals that it is much bigger than the critical 't' value of 1.98. Therefore, the null hypothesis is rejected at .05 significance level. This means that, the alternate hypothesis which is "there is a significant difference in the performance of males and females" is accepted in place of the null.

Arnot et al (1998) writing on Gender and educational performance stated among other things that there are no simple explanations for the gender gap in

performance nor any simple solutions; in any one context several factors are likely to have an influence. For example, the ways in which pupils are grouped, the ways in which their work is assessed, the curricula they encounter, the teaching styles they experience, the role models they are offered, the expectations teachers have of boys and girls and the ways teachers reward and discipline them can all affect the size and nature of the gender gap.

Programme of Study and Students' Environmental Knowledge

Table 7 illustrates a descriptive analysis of students' performance according to programmes.

Table 7: Classification of Students' Performance in EKT according to Programme

Programme	Number of Respondents	Mean Score	Skewness	Standard Deviation
Visual Arts	14	51.0	0.40	13
Technical	5	56.5	-1.29	3.1
Science	27	59.2	-0.09	11.9
Home Economics	10	44.5	0.43	4.7
Business	40	51.6	0.33	11.8
Arts	58	53.3	-0.58	11.2
Agriculture	15	50	-0.21	10
Total	169	52.9		11.6

Source: Fieldwork (2005)

From the Table, it could be seen that, students in the Science programme performed better than those of the other programmes. The mean score of the students pursuing science was 59.2% with a standard deviation of 11.9. However, the skewness of the performance graph was negative indicating that, the majority of the respondents pursuing science scored marks above the mean of their group.

Students pursuing Home Economics on the other hand had a mean score of 44.5% which is far below the group average of 52.9%. Though deviation from the mean in this group was not as wide as in the other groups, the skewness of the graph is positive. This indicates that, students pursuing Home Economics were

the least knowledgeable in Environmental issues as the majority of them fell below the mean of their group.

To confirm or reject the hypothesis that, programme of study does not significantly influence students' environmental knowledge, a "One-way Analysis of Variants (ANOVA)" was used. The results of the ANOVA Test is shown in Table 8.

Table 8: Results of 'F' Test

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2185.973	6	364.329	2.890	.011
Within Groups	20425.525	162	126.084		
Total	22611.569	168			

Source: Fieldwork (2005)

The F value, which is of most concern for discussion, is given in the Table as 2.890. The Critical value of 'F' from a statistical table reveals the value of 2.18. When these two figures are compared, it becomes clear that, the calculated 'F' is bigger than the critical 'F'. Therefore, our null hypothesis that programme of study does not significantly influence students' environmental knowledge, is rejected at .05 significance level. This consequently implies that, the programme that one pursues significantly influences knowledge on environmental issues.

The reason for this influence is not far fetched. Environmental Education through its evolution has been recognized by and large as a science subject. We might refer to the work of Udo (1997) which was reviewed in Chapter 2 and which asserts that many African countries in the 1990s incorporated, environmental topics in "Science" or "Agricultural" instruction. In some other cases "Science" was turned into Environmental Education, and the names changed into Environmental Science or Environmental Studies.

This reason is supported by USAID(2000) which has stated that since the 1970s, environmental education has been characterized by the development of implicit and explicit interconnections with science and technology.

In line with this, it is therefore not surprising that the students pursuing Science performed generally better than their colleagues from all the other backgrounds. Those pursuing Technical followed closely because of the interconnectedness of Science and Technology. Though no programme can be ruled out as not having a link of some sort with the Environment, the relationship between Environmental topics and the Home Economics programme is not straightforward. This might also explain why students pursuing Home Economics performed poorly.

Another possible reason for the difference in the performance levels could be due to the quality of students in the various programmes of study. In an interview with the heads of the schools of study, all the four (4) heads confirmed that the students in the various programmes do not have the same academic prowess. In an answer to the question of whether "Excellent Students" and "Weak

Students" were evenly distributed in the various programmes of study, the Headmistress of Twene Amanfo Secondary Technical School had this to say:

> By the time students complete JSS, they have the erroneous impression that the Vocational Subjects are for 'weak students'. Therefore during admission, students with excellent grades refuse admission into the Home Economics and Visual Arts Programmes. Much as we try to convince them, we are unable to succeed. Judging by their BECE results, the excellent students end up in the Science and Arts Classes whereas their weaker counterparts pursue the Home Economics and Visual Arts Programmes (Interviewed on 12th May 2005).

It is clear therefore that the students used in the study were operating from different levels of academic ability and that could have influenced the results of the study very much. The statement of the headmistress supports the finding of the research to the extent that, since the "excellent students" pursued the Science programme, they performed better than their colleagues from the "Home Economics" classes.

Schools and Students' Environmental Knowledge

As indicated earlier, respondents were selected out of different places of study. An attempt is made in this section to determine whether place of study and for that matter tuition, has any influence on students' environmental knowledge.

To confirm or reject our hypothesis Students' environmental knowledge is not influenced significantly by place of study, once again, a One-Way ANOVA is used. The results of this is shown in Table 9.

Table 9: Results of One-Way ANOVA Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2936.865	3	978.955	8.210	.000
Within Groups	19674.704	165	119.241		
Total	22611.569				

Source: Fieldwork (2005)

From the Table, the value of computed F is 8.210. Reference from a statistical table reveals the value of 'F statistic' i.e. the critical value of F for the degree of freedom 3 and 165 is 2.68. A comparison of the two figures shows the computed 'F' to be bigger than the critical value of 'F'. Therefore, the null hypothesis is rejected at .05 significance level.

This, therefore, implies that, place of study or tuition has an influence on students' environmental knowledge. Students' knowledge in EE is influenced by the school he attends. A school with well experienced and motivated staff is likely to have its students doing very well and vice versa.

The researcher did not investigate the schools that performed best and worse for ethical reasons. In seeking the consent of the respondents, they were assured of their anonymity being protected. It would thus be a betrayal of trust to report the weakness of their students in this report.

Again, to publish this write-up with the names of the schools and their performance might trigger the negative notions some individuals may have about some schools. In other words, people might use this research as the reference point in describing some schools as "Good Schools" and others as "Bad Schools". There is the need to guard against this because this research is too small a reason to brand a school's products as "Bad Students".

The most important finding is the fact that the school one attends can affect their Environmental Knowledge either positively or negatively.

Summary

In this chapter, we have looked at the environmental knowledge of Senior Secondary students and have come to the realization that on the whole, low marks were obtained in the EKT. This implies that, the efforts being made by teachers, curriculum experts and environmentalists to make students of Senior Secondary Schools obtain an amount of environmental consciousness through EE are not yielding the desired impact. In the next chapter, data obtained on the teaching of EE in Secondary Schools in the study area would be analysed. This might give a clue as to the reasons for low mastery of topics on the environment.

CHAPTER FIVE

ENVIRONMENTAL EDUCATION IN SECONDARY SCHOOLS

Introduction

With the generally low level of students' mastery of EE, a lot of questions are raised about how lessons of EE are carried out. In this chapter, an attempt is made to analyse data on the school curriculum and the extent of EE's influence in it. There would also be an analysis of the various methods of imparting EE as well as the student factor.

EE in the School Curriculum

In Chapter 2, it was realised that, there are various ways of representing EE in the school curriculum. It could be done by: framing, infusion, imposition or insertion. Data obtained on the way EE has been incorporated in the curriculum is discussed in the ensuing paragraphs.

In an interview with the heads of institutions, all (4 out of 4) confirmed that EE is not taught as a separate course of study, but as a section of Social Studies. Inferring from the ways of incorporating EE in the Curriculum, what is happening in our schools as regards EE is an *infusion* (EETAP, 2004). This is because teachers are expected to teach topics about the environment as Social Studies lessons.

A research question posed in Chapter 1 was whether EE is in the curriculum of Senior Secondary Schools. From the data gathered, EE has been infused into the Social Studies syllabus. Social Studies is one of the four (4) main compulsory subjects which every student is expected to study. It is believed that by making EE part of this subject, students would be able to achieve mastery of content of topics about the environment to affect both their cognitive and affective domains.

Data obtained from the syllabus of Social Studies – the parent subject of EE reveals the following. In all, there are 27 general topics which have been subdivided into five (5) broad headings namely:

- Procreation
- Sense of Purpose
- Education
- Government
- Economy

Under these subheadings come other topics. The topics that come under each of these sections are contained in Table 10.

Table 10: Social Studies Topics and their groupings

Procreation	Sense of Purpose	Education	Government	Economy
• The institution of Marriage • The Family • Adolescent Reproductive Health • Responsible Parenthood • Population Issues	• Self Identity • Rights and Responsibilities • Science and Technology • Productivity in Ghana	• Socialisation • Education and Social Change • Socio-cultural Problems • Our Social Environment • The Youth and National Development • Ethnic Groups in Ghana	• Our Culture and national identity • National Independence and Self-Reliance • Challenges of Democracy in Ghana • Co-operation among Nations • The Constitution and Nation Building	•Our Physical Environment •The World of Work •Entrepreneurship •The role of Individual in Community Development •Resource Development and Utilisation in Ghana •Our National Economic life

Source: MoE (1995)

From the Table, it is clear that, "Our physical Environment and Resource Development and Utilisation in Ghana" topics under the "Economy" Section, as well as "Our Social Environment", are the topics that have actually been put in to cover lessons on the environment. This represents a percentage of 11.5% of the total content of the Social Studies Subject. Consequently, a teacher and a student can choose to disregard it and would still be able to pass an examination in Social Studies. Certainly, a country with a myriad of environmental problem should have more than what it is in the Social Studies Syllabus. It is doubtful if the aim of

"making people aware of the ongoing environmental degradation so that they can take action to stop and reverse it" set out during the educational reforms of 1987 could be achieved.

In answering a question posed to a teacher as to whether the lessons about the environment are enough to help students appreciate the need to adopt positive attitudes towards the environment, a pessimistic answer was received. The reason given was:

> This is because students are taught about the environment in just a single lesson or 2.

This goes to confirm the fact that the topics given for EE in the Social Studies Syllabus is dolefully inadequate.

By comparison, the old move which saw "Agriculture and Environmental Studies" as a subject was better. More lessons on the environment were covered and that element of mastering topics outside the "Environment" area to write exams would have been reduced. Even with this arrangement, Kendie and Donkor (2000), had observed that there was the possibility of regarding "Environmental Studies" as a second-class subject and thus, teachers and students could devote less time and effort to it. Hence they called for a separate exam paper for the "Environmental studies" component of the Subject. If this was the case then, it tells the seriousness of the problem in compressing all the "Environmental Studies" lessons into just a topic.

Background Variables

Sex of Teacher Respondents

Teachers involved in the study were categorised according to gender. Figure 3 illustrates the sex of the teacher respondents.

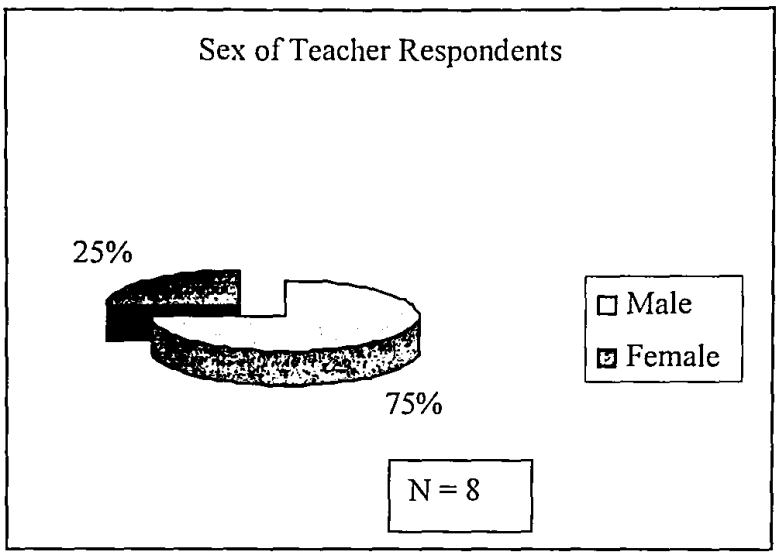


Figure 3: Sex distribution of Teacher Respondents

Source: Fieldwork 2005

From the chart, it could be realised that, the majority of the respondents (6 representing 75%) were males whereas 2 out of the 8 teacher respondents (representing 25%) were females. This gives an idea of the extent to which males dominate the teaching of Social Studies in the study area.

Sex of Respondents and Number of Years Taught

The sex of the teacher respondents was again observed alongside the number of years taught. Table 11 displays the results of the relationship between the sex of the teacher respondents and the number of years taught.

Table 11: Sex of Respondents and Number of Years taught.

Sex of	No. of Years Taught				Total
Respondents	0-5	6-10	11-15	16+	
Male	1	2	1	2	6
Female	1	1			2
Total	2	3	1	2	8

Source: Fieldwork (2005)

As shown in Table 11, the male teachers seemed to have taught for a long time as compared to their female counterparts. All the female teachers had taught for less than 11 years. On the other hand, 3 out of the 6 male teachers had taught for more than 10 years. From this it could be inferred that, since male teachers had taught for a long time, they were more informed, owing to their experience, to be able to provide down to earth information on the teaching of EE. This shows that the gender biasness of the teacher respondents would not negatively affect the research; but instead was going to tilt the findings to an affirmative direction.

Years of Teaching and the Teaching of EE

Contrary to common sense assumption that teachers who had taught for more years are likely to have taught topics relating to the environment, the reverse was seen to be the case. The Table below illustrates this finding further.

Table 12: Years of Teaching and EE

No of Years Taught	Taught a topic on Environment?		Total
	Yes	No	
0-5	2		2
6-10	3		3
11-15	1		1
16+	1	1	2
Total	7	1	8

Source: Fieldwork (2005)

The Table makes it clear that teachers who had taught for a comparatively few years (less than 10) seemed to have taught topics on Environment more than those who had taught for more years. Surprisingly, 1 out of the 8 respondents admitted that he had never taught a topic on Environment for the sixteen or more years that he had taught. This shows that a teacher's longer years of teaching Social Studies would not necessarily mean teaching the topic.

A possible explanation that could be given for this phenomenon is that "Social Studies" as a subject was introduced in 1995. It is barely a decade since its inception. As a result, teachers who had taught for more than 10 years might have been teaching subjects other than Social Studies for the period before 1995. Therefore, since the majority of the respondents (5 out of 8) have a maximum of 10 years of teaching experience, they were in a better position to have taught Social Studies and consequently, topics relating to EE.

Methods of Teaching EE

In Chapter two, a review of some of the methods of imparting EE was done. Among others, it was realised that Field trips, School Gardens, Clubs, and Music were very useful in EE. The research sought to obtain data on how some of these methods were being utilized in teaching EE in the study area.

Use of Field Trips in EE

As reviewed in the second chapter, EETAP (2004) averred that exposure to the outdoors can be an extremely effective method for increasing the level of student environmental awareness and knowledge, and for fostering or strengthening a desire to protect the environment. It is therefore important that field trips are organized by teachers to places of concern to help their students obtain first hand information on the environment.

To this end, an item in the questionnaire for teachers sought information on whether they have been organizing such trips. In response, 4 out of 8 (50%) of

the respondents admitted that they had used field trips to a very little extent while the remaining 50% claimed they had never organized such a trip before. In other words, many teachers do not take their students outside the classroom for observations.

A reason given to explain this occurrence is that organizing such trips is discouraged by the operational difficulties. When asked to give a general comment on the teaching of EE, two of the respondent remarked:

> Lessons about the environment could have been very interesting if excursions were organized, but our school has no bus which could be used for such trips. Organizing such visits with Commercial Vehicles is not only expensive, but also dangerous...

> In our school ... the periods are such that, you cannot go with them anywhere to observe some of these things. They do not also have means of transports. (Interviewed on 12th May 2005)

It is clear from these comments that teachers are reluctant to organize field trips because of lack of vehicles and short duration for EE lessons. A quick observation made in the schools for the study also confirmed that, only 2 out of the 4 schools had a "road worthy" bus which could be used for such trips. Short duration of EE lessons is explained by the fact that if the class is allotted 40

minutes on the time table, it would not be enough to take students round to observe things that might even be close to them.

On the other hand, the "lack of vehicle reason" for not organizing field trips could be challenged by the fact that environmental problems are so common to the extent that, students should not necessarily move miles beyond their schools to observe them. In fact the school compounds could provide such observable sites. Such sites in the school compound might even be more effective since students would see themselves as either part of the problem or part of the solution. Moreover, the Social Studies Syllabus (page 43) states among other things that, teachers should make "students take note of degraded areas in their locality and report on what they observe" (MoE, 1995).

Again, short duration of periods for EE could be solved internally if teachers are all that committed to organizing such trips. Arrangements could be made with other teachers to swap periods to give ample time for such trips.

By and large, the facts still remain that the use of field trips is very low in Secondary Schools. It is imperative to recognize the need for field trips which EETAP (1998) identifies as including the following.

- Children are multi-sensory, physical beings and benefit physically, cognitively, and emotionally from interplay with wind and water, sights and sounds, plants and animals, running and shouting.
- According to the 'biophilia hypothesis' humans have an inherent need for affiliation with natural environments, just as they have an inherent need for contact with other humans.

- Research has shown that children who do not play in natural habitats are unaware of and possibly do not care about the plants and animals that live around them.
- Children have more positive social relationships and more creative play in natural environments.
- Nearly every major subject matter can be taught in a schoolyard setting and much of the learning takes on an experiential aspect.

The absence of field trips therefore implies that the benefits provided by these in augmenting EE are not being realized.

Music in EE

In reviewing the work of Doug (2002), Rogers (1977), Millitch (1999) it became evident that Music can be a powerful tool to educators who are teaching young people about the breakdown between environmental conservation and human consumption. Music can also be used to generate students' interest in a topic that they may have otherwise disregarded. Again it was made clear that the stories that are told and the emotion that is invoked in songs make them powerful tools in the classroom, particularly as introductions and conclusions. Item 3.9 in the teacher's questionnaire solicited the use of Music in their lessons. The results of this question is displayed in Figure 4.

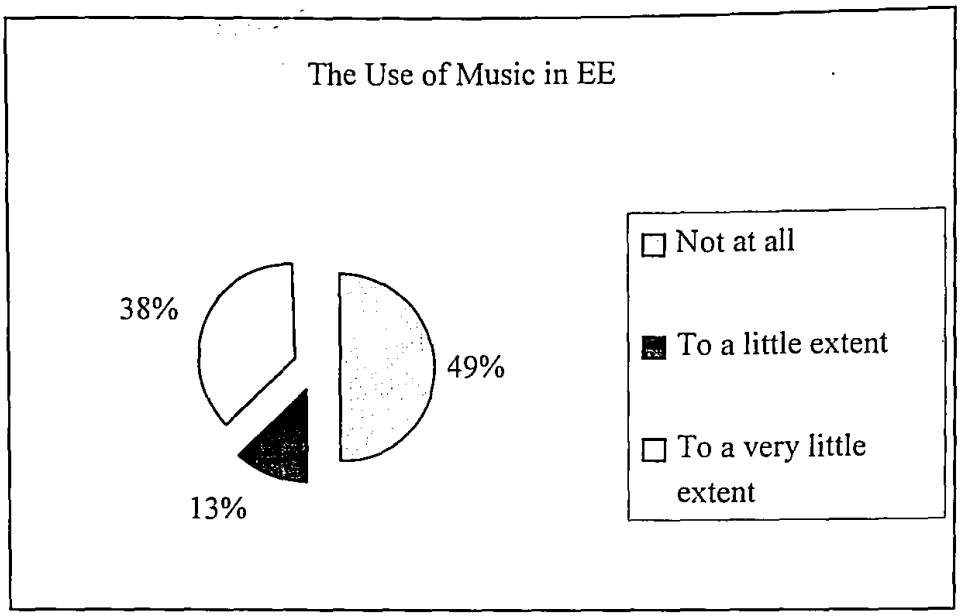


Figure 4: Use of Music in Environmental Education

Source: Fieldwork (2005)

It could be recognized from the information displayed in Figure 4 that teachers' response on the use of music shows that none of the respondents revealed ever using music in an EE lesson. Forty-nine per cent (49%) of respondents admitted never using music in EE at all while 38% admitted using it to a very little extent. This indicates that this method of imparting EE is not being utilised.

Although Music has been seen to be a very useful tool, its practicality could be called to question in the Ghanaian environment. No wonder this finding. It is rare to find a teacher singing in Ghanaian schools. Such a teacher who might be found could possibly be a Music Teacher and not a teacher of any of the other subjects. Not every teacher has the ability to sing. While some could sing to attract audience, others would put their students off if such an attempt is made. To

put much emphasis on Music would mean that every teacher of Social Studies and for that matter EE should be able to sing. This would be a very tall order.

In spite of shortcoming of this method of imparting EE, it should not be written off. In situations where it is practical, teachers could engage some of the students in singing a song that has environmental lessons. Teachers could also play recorded music after which he could lead the students to discuss the message of the music. "Wherever there is a will, there is a way". An effort could still be made to benefit from what Music has to offer.

Use of School Gardens

As discussed earlier in the second chapter, Schoolyard Garden has been used by teachers in Vienna (Austria) and Mrs. Bowman of Virginia (US) to give many students an experience with nature. The success stories in these places where it was used indicate that the destructive behaviours of students were reduced paving way for a friendly attitude towards nature. Again, students did not just become aware of the environmental factors responsible for the growth of the products from the garden but also the need to appreciate the environment.

By observation, the study revealed that, 3 out of the 4 schools involved in the study had school gardens. When interviewed, the heads of the various schools indicated that the school gardens were for use by the students pursuing Agricultural Science programme. It was therefore not surprising that the only school that had no school garden was not running the Agricultural Science programme.

When quizzed further whether the garden was for use by all the students, the respondents in the schools where school gardens existed accepted the fact that it was only for the use of students pursuing the Agricultural Science Programme. The Senior Secondary School Certificate Examinations (SSCE) required that students do practical work in Agriculture in order to pass hence those gardens.

From the forgoing therefore, it could be said that although school gardens were found in most of the schools involved in the study, the purpose for their inception was to facilitate the study of Agricultural Science and not to promote EE. It would therefore not be wrong in indicating that school gardens for teaching EE were not present in the schools of study. It is for this reason that it is clear that the benefits of having gardens to promote EE as testified by Mrs. Bowman and teachers in Vienna is yet to be taken advantage of.

Use of Environmental Clubs

Item 3.8 of the questionnaire for teachers solicited response on their use of Environmental Clubs to promote interest in environmental issues among their students. Respondents were given the options "Not at all", "To a very little extent", "To a little extent" , "To a large extent" and "To a very large extent" to choose from. These options as listed indicate the degree to which Environmental Clubs were being used beginning from the least to the highest. Table 13 displays the results of the responses.

Table 13: Use of Environmental Clubs

Response	Frequency	Percentage
Do not use Environmental Clubs at all	4	50.0
Use Environmental Clubs to a little extent	3	37.5
Use Environmental Clubs to a very large extent	1	12.5
Total	8	100.0

Source: Fieldwork (2005)

Inferring from the Table, 7 out of the 8 respondents had either not made use of an environmental club or had done it to a very little extent. One (1) of the respondents representing (12.5%) came clean as having used an Environmental Club to promote the Environment.

A confirmation of the results was obtained in the interview with the Headmasters/mistresses. Three (3) out of the 4 heads indicated that there was no such club in their schools. In one of the schools however, the headmistress did indicate that there used to be a club of such nature some few years back. When asked the strength of this club, she emphasized that it used to be very strong when its founder was around but since he went on transfer, it was virtually non-existent.

In an attempt to increase student awareness and involvement in environmental issues, EETAP (2004) advised that Environmental clubs be established to improve a recycling programmes on the school grounds, conduct environmental education for peers, participate in cleanups, and organize guest

lecturers to visit the school to discuss environmental issues. All these would go a long way to help students appreciate the environment better and develop a positive attitude towards it. The element of peer education is also very useful because children listen to their peers more than their teachers or parents Ayeetey (2002).

From the findings of this research, Environmental Clubs are non-existent and so all its derivatives of promoting interest in environmental issues are yet to be felt.

Students' Attitude to EE

As stated earlier in chapter 1, in spite of the EE being carried out, the level of environmental consciousness is still too low. The possible cause of this situation that quickly comes to mind is that students are not interested in EE lessons. An attempt was made by the researcher to ascertain the validity or otherwise of this thought.

Data used in this section were obtained from the questionnaire for teachers. Students were not asked to give their own assessment of their way of life because it could lead to pretense. Students might not be candid in their response owing to their desire to give a good testimonial about themselves. Their teachers were instead asked question about the attitude of their students towards EE. Having stayed with their students for a period, they were better placed to give the right picture.

Students' Interest in Environmental Lessons

In item 4.1, the teacher respondents were asked if their students demonstrated interest in the study of topics about the environment. They were given a range of options to choose from which were: "Strongly Agree", "Agree", "Disagree" and "Strongly Disagree". In Table 14, response obtained from this question is displayed.

Table 14: Students' interest in Environmental Lessons

Response	Frequency	Percent	Cumulative Percent
Disagree	1	12.5	12.5
Agree	4	50.0	62.5
Strongly Agree	3	37.5	100.0
Total	8	100.0	

Source: Fieldwork (2005)

From the Table, it could be observed that 87.5% of the respondents shared the opinion that their students were interested in Environmental lessons as their responses ranged from Agree to Strongly Agree. One out of the 8 respondents disagreed with the view that students demonstrate interest in Environmental issues.

A follow up question was whether students would desire for more lessons on the Environment. The response of this item as illustrated in the Table below (Table 15) shows that, again, 7 out of the 8 respondents confirmed that, students would be delighted to learn more on the environment.

Table 15: Students' desire for more lessons on Environment

Response	Frequency	Percent	Cumulative Percent
Disagree	1	12.5	12.5
Agree	4	50	65.5
Strongly Agree	3	37.5	100.0
Total	8	100.0	

Source: Fieldwork (2005)

This interest in EE could be explained by the fact that environmental lessons are practical and very interesting. They see the issues raised in environment lessons to be close to them and thus it becomes easier to answer questions on them better than other topics which might be abstract.

Another possible reason for this interest in EE could be seen in a statement ascribed to the American general public by National Environmental Education Training Foundation (NEETF) which states among other things that: "fully half of the American public believes that environmental education has a great deal of effect in teaching children to respect the people and places around them and in

encouraging children to be involved in community service projects". This reason might have informed the interest of the students since as Mrs. Bowman stated "using the hands-on approach helps students to see themselves not only as part of the problem, but also part of the solution".

The teachers also called for the expansion of the time allotted for the lessons about the environment. This is seen in the statements they made which include:

> It would be better if more time and periods are given to environmental issues.
>
> The duration is less therefore making it barely adequate to digest the topics about the environment.

It is clear from the statements above that even with the current provision, they need more time to deal with the topic about the environment. To allow for an in-depth discussion of the subject-matter and brainstorming to come out with possible solutions to some environmental problems, they called for the extension of the duration. As a teacher remarked, the topic about the environment has been compressed into a single lesson or two.

Students Attitude towards the Environment

In Chapter 4, it was established that students' performance in the EKT was nothing to write home about. Though their teachers claim students are very much interested in environmental issues, these interests are not translated into environmental consciousness. In an interview with the heads of the schools of

study, they were asked to assess their students' attitude towards the environment. Out of the ranges of "Excellent", "Very Good", "Good" and "Bad", 3 out of the 4 heads representing 75% rated their students as having a "Good" attitude towards the environment. One (25%) rated his students as having a "Bad" attitude towards the environment.

When asked why they gave those ratings, these were the statements they made:

> They learn and appreciate the need for a good environment but do not put into practice.
>
> They see litter and pass by; unless someone tells them to pick, they wouldn't.
>
> They always have to be prompted to do the right thing.
>
> They don't really have the habit of promoting the environment.

From the data provided, it is obvious that, the heads were very outspoken in giving the true picture of their students as regards their attitude to the environment. There is a missing link between what students learn about the environment and what they put to practice.

This finding confirms the observation of the Minister of Education Youth and Sports that a Secondary School was very dirty when he paid an unannounced visit to the school (Sam 2005). Secondary School Students are not environmental conscious.

Summary

In this chapter we have looked at the extent of EE's influence in the Social Studies Syllabus and have observed that it is insignificant. In addition to this, teachers complained about short duration given for EE lessons and wished it would be extended. Students showed much interest in learning about the physical environment but their desire to learn more is not translated into action. Though teachers try to give off their best under the circumstances they found themselves, tried and tested methods of imparting EE were not seen to be used in the schools of the study area. All these factors might have contributed to the poor performance of students in the EKT.

CHAPTER SIX

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

Introduction

In the previous chapters, an attempt was made to discuss the data obtained from the study. Consequently, an analysis of scores in students' environmental knowledge as well as data elicited from teachers, heads and through observation was done. In this chapter, we conclude the presentation by looking at the main findings, and give appropriate recommendations to concerned outfits.

Summary of Findings

The analysis of the data done in the previous chapters opened up the following:

1. Environmental Education is an integral part of the curriculum of Secondary Schools in the Sunyani Municipality specifically and Ghana as a whole. It does not exist as a subject of study but has been infused into the Social Studies Syllabus.
2. Although it had been widely expected that this arrangement would help in inculcating in students the needed environmental knowledge to help in arousing environmental consciousness, the research shows that the reverse is the case. This is because students generally performed poorly in the

Environmental Knowledge Test conducted. With a mean score of 52.9%, the students' performance could be seen to be abysmal when rated using the Groundlund's criterion of Mastery. As many as 149 out of 169 would need to undergo remedial tuition.

3. A possible reason accounting for this is the comparatively small percentage of topics on environment in the Social Studies syllabus. With only 11.5% of the Social Studies Syllabus devoted to EE, students are not serious in learning topics on environment because they can still pass without that.
4. The study revealed that students recorded the least knowledge in the area of Atmosphere and Air Pollution where the mean score was 39.6%. This means that they are not abreast with environmental problems associated with atmospheric change. Understanding Ozone layer depletion and its implications, as well as global warming caused by excessive carbon gases in the atmosphere is a problem to our students.
5. The study also made known the fact that there is a significant difference in the environmental knowledge of male and female students. Whiles the mean score for the Males was 55.4%, their female counterparts recorded 50.1% as their average score. This goes to conclude that male students were seen to be more knowledgeable in EE than their female counterparts.
6. Similarly, the programme of study was seen to have a significant influence on the environmental knowledge of students. Students pursuing Science and Science related programmes were seen to be more knowledgeable in EE than their counterparts from the Vocational programmes. Reasons for this were

seen in the interconnectedness EE has with Science related subjects and the fact that brilliant students normally follow science related programmes in Secondary Schools.

7. Again, the study discovered that the school one attends significantly influences their achievement in EE. Schools with enough facilities, motivated staff and comparatively brilliant students are likely to turn out graduates who are knowledgeable in EE whereas the same cannot be said of students from the other side of the divide.
8. Although the use of field trips has been seen to be very useful in the teaching of EE, the study made bare the fact that this method is not used in Secondary Schools. This is largely because most of the Secondary Schools do not have vehicles which would facilitate the trips.
9. Moreover, the use of school gardens for EE is virtually non-existent in Secondary Schools in the Sunyani Municipality. Although a few of such gardens were observed, their purpose was not to augment the teaching of EE. The students are thus not exposed to the hands on approach to EE.
10. Environmental clubs are virtually missing in Secondary Schools. Although some schools have attempted to establish such clubs in the past, the idea seems to have died out because commitment on the part of students and staff is nothing to write home about. Consequently, the enthusiasm for the environment which could have been whipped up by the presence of these clubs is absent in Secondary Schools.

11. Contrary to the belief that students were not interested in environmental issues, the study reveals that students are very much interested in environmental issues and learning about the environment. If the appropriate methods are adopted to make EE lessons livelier, EE could be used to surmount the numerous environmental problems confronting us.
12. Finally, judging environmental education in Secondary Schools by our conceptual framework in chapter 2, it becomes obvious that EE is still at the first stage. This is the stage where awareness is created about the environment through the infusion of EE topics in the curriculum. The second stage where students demonstrate knowledge and understanding of environmental issues is yet to be reached in Secondary Schools. Consequently, students in SSS neither participate in activities that lead to the solution of environmental problems nor show any attitude of concern for the environment.

Recommendations and Policy Implications

With human survival being threatened by deteriorating environment owing to its poor management, we need not be told the fact that environmental studies should reign supreme in our school curriculum. The current arrangement where EE has been relegated to the background only leads to pretense. We should therefore not be surprised at the bad attitude our students have for their ambient environment. Policy makers and curriculum experts should as a matter of urgency revise the Senior Secondary School Curriculum to give EE its rightful place.

Clearly EE deserves to be a subject of study and not a subset of a parent subject. This is the only way to salvage the bad situation.

Continuity of contact with students from grade to grade increases the impact of a programme many fold. Conservation messages are reinforced over time among both children and adults. Linkages across different educational levels—primary, secondary, and tertiary institutions can greatly increase EE's public profile and improve its chances of sustainability (Bruce, 1999). It is thus recommended that EE should be extended to include students in the Tertiary level so that there could be the continual reminder of protecting the environment. It could be made a liberal course of study at our universities.

The need for school hierarchy to back the activities of Environmental Clubs is paramount but often overlooked. As Bruce (1999) puts it, the Training and Information Programme on Environment strategy used in Mali was effective because it assured the clients of the fact that the programme belongs to the school as an institution, rather than to just a group of students or teachers, or a particular curriculum. From the data obtained from the study, in places where the clubs existed, they collapsed when the organizers left the scene. Administrators of our schools should personally involve themselves in activities of environmental clubs and make the school see it to be part of its programme. This would help such clubs survive the test of time.

Non-governmental Organisations (NGOs) devoted to the course of environment should note the importance of Environmental clubs and the need to support them. Apart from sponsoring the activities of such clubs, seminars,

symposia and lectures could be organized for such clubs. These would invigorate these dying clubs.

Women have been found to have contact with the environment more than men. This means that they contribute greatly to either its conservation or deterioration. The result of the study showing females students as having a comparatively low Environmental Knowledge is therefore alarming. It means that our girls are going to grow up to add salt to the injuries of the already ailing environment. It is therefore necessary that special programmes are designed for girls to increase their Environmental Knowledge. It wouldn't be out of place if a programme like the "girl-child programme" is designed for this cause. Teachers should also be mindful of this finding and involve the girls more in EE lessons and programmes to whip up their enthusiasm for knowledge on the Environment.

Again to the teachers who serve as the pivot around which EE revolves, there is the need to see EE as something more than just a course of study. EE is not meant to be studied just to pass examinations. Teaching EE should aim at behavioural change. Hence, it should be more of a discussion than lecture using the hands-on-deck approach. This approach involves the use of field trips, school gardens and music as well as short stories to get the attention of students.

Moreover, teachers should also note the finding that the programme one offers greatly influences their environmental knowledge and give students in the Vocational programmes extra tuition. Much effort should be devoted to the "weaker" students in the programmes that are not Science biased.

In view of the finding that the school one attends significantly influences his environmental knowledge, it is recommended to the government to ensure that all Secondary Schools have the basic facilities that promote learning. The present situation where a wide gap exists between "good schools" and "bad schools" does not allow for the integration of brilliant and weaker students. In other words, brilliant students do not attend the "bad schools" and are always found in the "good schools" while all their "bad" colleagues end up in the "bad schools".

Conclusions

There is no gainsaying the necessity of the environment to human survival. It is therefore not surprising that concern for the environment has dominated world discussions of late. The greatest disservice man can do to future generations is to forget to use the resources available sustainably. We should constantly be reminded of the need to protect, preserve and conserve the environment. The most useful tool in this regard has been seen to be EE. It was therefore not out of place when the researcher decided to work in this area.

The research among other things aimed at making an assessment of environmental education in Ghana with special emphasis on Senior Secondary Schools. It looked at the place of EE in the school curriculum, how it was being taught and whether or not it was on course to achieving the set goals.

The researcher employed the use of a questionnaire, interview and a Criterion Referenced Test in soliciting data on the topic. In all, 181 respondents

drawn from the Sunyani Municipality were used. The number was made up of 169 students, 8 teachers and 4 heads of Senior Secondary Schools.

The study revealed that although Environmental Education (EE) has been made an integral part of the Senior Secondary School Syllabus, it was yet to achieve its set goals of making students environmentally conscious. Student's knowledge on Environmental issues on the whole is very low and has greatly contributed to the lack of concern for the environment. Looking at the cause of this, it was realized that teachers taught EE as any other subject /topic of the curriculum and thus only the cognitive domain of learning is targeted leaving the affective and psychomotor domains. Teachers do not use the hands-on approach in teaching the students. Thus, the use of field trips, schoolyard gardening and environmental clubs is absent.

It is therefore imperative that, we have a second look at what we want to achieve as regards environmental consciousness and put in pragmatic measures to put EE in its rightful place in the school curriculum. This may include making EE a subject of Study; resourcing our schools to be able to undertake fieldtrips; re-orienting teachers to aim at teaching EE to change behaviour and not teaching for students to pass examinations etc.

Recommendations for Further Study

The research generally looked at environmental education but was specific in choosing EE in the school set-up. From this study it was observed that there are a lot more areas needing research in connection with EE. For example, a research

could be undertaken on EE in the traditional education set-up. There can also be one on how environmental NGOs are helping in EE.

It is also recommended that similar researches are conducted outside the study area used for this study to ascertain whether the findings are prevalent in those areas. This would help in generalizing the findings for the entire population.

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APPENDIX 'A'

CRITERION REFERENCED TESTS FOR STUDENTS

UNIVERSITY OF CAPE COAST

CENTRE FOR DEVELOPMENT STUDIES

Dear Student,

You are being asked to participate in a research project entitled, "Environmental Education in Secondary Schools in the Sunyani Municipality." The purpose of this research is to look at the extent to which Environmental Education (EE) is carried out in Secondary Schools and whether the ineffectiveness of it is the cause of lack of concern for the environment by Senior Secondary students. Your participation is voluntary. Your candid response to each of the questions would go a long way to provide data that gives a true reflection of the situation on the ground. Your anonymity would be much secured.

NAME: ---------- SEX: .....

SCHOOL: ----------

COURSE OF STUDY: ----------

You SHOULD respond to ALL of the following questions by circling the correct answer.

GENERAL KNOWLEDGE ON THE ENVIRONMENT

1. The study of living things, how they interact with each other and with the other non-living things is known as

   A. Ecosystem

   B. Biodiversity

   C. Ecology

   D. Biosphere

2. The relationship between organisms of the same species is called

   A. Intraspecific effect

   B. Interspecific effect

   C. Biotic effect

   D. Abiotic effect

3. Which of the following is not a primary consumer of the environment?

   A. Mice

   B. Grasshopper

   C. Grasscutter

   D. Lion

4. Environmental Education is important for everybody because it helps us to

   A. keep our environment clean

   B. understand ways of putting out fire

   C. understand the implications of destroying the environment

   D. understand the implication of having large population

5. Which of the following resources is renewable?

A. Natural gas

B. Petroleum

C. Hydro-electricity

D. Coal

6. In an ecosystem, the term "food chain" refers to

A. different forms of food animals eat

B. food provided by the environment

C. the various stages in which energy is obtained from the form of food.

D. The various energies that are obtained from food

7. Which of the following best defines environmental degradation?

A. the gradual process by which the natural state and quality of the environment is destroyed.

B. The release of harmful amounts of substances into the atmosphere as a result of human activity.

C. The changing of grades given to the environment

D. The release of carbon monoxide into the atmosphere by vehicles

8. Which of the following is not a form of environmental degradation?

A. Desertification

B. Poor Drainage

C. Re-afforestation

D. Noise

9. The process through which plants prepare their food is known as

A. Dehydration

B. Hydration

C. Photosynthesis

D. Photoshop

10. The science of managing forest resources; which includes planting trees, caring for trees and the maintenance of forest products is known as

A. Afforestation

B. Forestry

C. Agro-Forestry

D. Agriculture

11. Which of the following statements is <u>not</u> a way of promoting Agro-Forestry?

I. Public Education

II. Appointment of Forest Rangers

III. Sand-winning

IV. Licensing chain-saw operation

A. I and II only

B. II and III only

C. III and iv only

D. All of the above

12. The process by which the plant life of an area is destroyed, resulting in the infertility of a land is called

A. Desert

B. Desertification

C. Dessert

D. Dessertification

13. All the following are causes of desertification except

A. Bush Burning

B. Poor irrigation methods

C. Wrong application of agro-chemicals

D. Soil conservation

14. Which of the following is not a way of controlling deforestaion?

A. Legislation

B. Alternate supply of fuel

C. Reduction of lead in petrol

D. Public Education

15. Mining is associated with all the following environmental problems except

A. Land Degradation

B. Slash and Burn

C. Water pollution

D. Deforestation

16. Which of the following describes the sequential order of soil erosion by water?

A. Splash – Sheet – rill – gully erosion

B. Sheet – splash – gully – rill erosion

C. Rill – sheet – splash – gully

D. Gully – rill – sheet – splash erosion

17. Which of the following is not a cause of Bush fires?

A. Slash and Burn Farming method

B. Palm-wine Tapping

C. Natural occurrences

D. Hunting

18. Bush fires cause all the following except

A. Loss of habitat

B. Desertification

C. Habitation of reptiles

D. Pollution

THE ATMOSPHERE AND AIR POLLUTION

19. Which of the following part of the atmosphere is the closest to the earth?

A. Stratosphere

B. Troposphere

C. Thermosphere

D. Mesosphere

20. In which of the following parts of the atmosphere can the ozone layer be located?

A. Troposphere

B. Thermosphere

C. Stratosphere

D. Mesosphere

21. CFC contains all the following elements except

A. Carbon

B. Calcium

C. Fluorine

D. Chlorine

22. Global warming is caused by

A. the sun increasing its ray on the earth

B. the depletion of the ozone layer

C. death of water bodies

D. absorption of radiation by gases such as carbon dioxide.

23. Which of the following is not a LIKELY effect of Global warming?

A. Flooding

B. Tsunami

C. Health problems

D. Desertification

24. Which of the following is not an atmospheric pollutant?

A. Noise

B. Nitrogen Oxide

C. Cyanide

D. Chorofluorocarbons (CFCs)

25. The most common form of atmospheric pollution caused by the engines of factories (industries) is

A. Suphur Dioxide

B. Particulate from Diesel Engines

C. Lead-in Petrol

D. Nitrogen Oxide

26. The commonest source of Chorofluorocarbons (CFCs) is

A. Exhaust from Cars

B. Air conditioners and Refrigerators

C. Liquefied Petroleum gas

D. Industrial Wastes

27. Which of the following pollutants is a known cause of ozone layer depletion?

A. Carbon Monoxide

B. Nitrogen oxide

C. Chorofluorocarbons (CFCs)

D. Sulphur Dioxide

WATER AND SANITATION

28. The chief source of water pollution in Ghana is

A. Acids

B. Agro-chemicals

C. Solid wastes

D. Oil –spillage

29. Water pollution can cause the following health problems except

A. Hepatitis

B. Syphilis

C. Typhoid

D. Cholera

30. One of the harmful ecological problems created by the formation of artificial lakes is

A. River blindness

B. Sleeping sickness

C. Bilharzia

D. Tuberclosis

31. Improper disposal of rubbish can cause

A. Sedimentation

B. Dehydration

C. Pollination

D. Epidemic

32. Polythene is considered an environmental threat because

A. It does not decompose easily

B. It is not derived from the environment

C. Many products are made out of it

D. It does not allow water get into the soil

33. Attempt to ensure sanitation in our communities have been hampered by

A. inadequate sanitation officers

B. lack of commitment on the part of the populace

C. small fines imposed on offenders of sanitation rules

D. bribery and corruption

34. Our refuse dump sites are heaping up because of

A. the population has increased rapidly over the years

B. they are located on hilly grounds

C. management of waste has not been promoted

D. it is a good source of manure.

35. The development of urban communities is associated with all the following environmental problems except

A. solid waste management

B. chocking of gutters

C. bushy surroundings

D. sand mining

APPENDIX 'B'

QUESTIONNAIRE FOR TEACHERS

UNIVERSITY OF CAPE COAST

CENTRE FOR DEVELOPMENT STUDIES

Dear Teacher,

You are being asked to participate in a research project entitled, " Environmental Education in Secondary Schools in the Sunyani Municipality." The purpose of this research is to look at the extent to which Environmental Education (EE) is carried out in Secondary Schools and whether the ineffectiveness of it is the cause of lack of concern for the environment by Senior Secondary students. Your participation is voluntary. Your candid response to each of the questions would go a long way to provide data that gives a true reflection of the situation on the ground. Your anonymity would be much secured.

MODULE 1: Background of Respondents

You may respond to any of the questions by ticking the options that best fits your situation.

1. Sex: Male [ ] Female [ ]

2. Age: 20-30 [ ] 41-50 [ ] 51+ [ ]

3. No. of years taught 0- 5 years [ ] 6 – 10 years [ ] 11 – 15 [ ]
16 + [ ]

4. Subject taught: Social Studies [ ] Others [ ]

MODULE 2: EE and the school Curriculum

5. Have you ever taught a topic on the environment?Yes [ ] No [ ]

If No, why? .....

6. How often are issues about the environment raised during tuition?

Regularly [ ] Not so often [ ] Not at all [ ]

MODULE 3: EE in Schools

For each item, please circle the number in the right columns to indicate the degree to which item describes your situation. The corresponding scale is:

1. Not at all 2. To a very little extent 3. To a little extent

4. To a large extent 5. To a very little extent

As a teacher, I						
1	allow my students to ask questions relating to the environment	1	2	3	4	5
2.	answer most questions posed by my students on the environment to the best of my ability	1	2	3	4	5
3.	refer my students to places they can have information when I am asked a question relating to the environment and for which I have little or no idea	1	2	3	4	5
4.	encourage my students on field trips to ascertain at first hand, the level of	1	2	3	4	5

	environmental degradation in the community					
5.	take my students on field trips to ascertain at first hand, the level of environmental degradation in the community	1	2	3	4	5
6.	discuss with my students better ways of dealing with environmental problems	1	2	3	4	5
7.	monitor my students' attitude towards the environment after classes	1	2	3	4	5
8.	have contributed to the activities of a club that is concerned about the environment	1	2	3	4	5
9.	make students aware of environmental problems through music	1	2	3	4	5

MODULE 4: Students and EE

For each item, please circle the number in the right column to indicate the degree to which the item describes your situation. The corresponding scale is:

1. Strongly agree 2. Disagree 3. Agree 4. Strongly agree

My students					
1	show much interest in the study of environmental issues	1	2	3	4

2.	think lessons about the environment is a waste of time	1	2	3	4
3.	think studies about environmental problems is all about restricting them in a way	1	2	3	4
4	feel more topics about the environment should be added to the syllabi	1	2	3	4
5.	Think study of the environment should be an issue for filthy communities	1	2	3	4
6.	would have opted out of the lessons about the environment if they had the chance	1	2	3	4

MODULE 5: Effectiveness of EE

The corresponding scale in this section is:

1. Not certain 2. Disagree 3. Agree

With the current provisions of EE in schools, I anticipate that by the time my students finish school they would be able to:				
1	examine how man is being controlled by the environment in Ghana and the circumstances under with this occurs	1	2	3
2.	examine the activities of man that upset the ecological balance in Ghana	1	2	3
3.	state possible steps that should be taken at the local and	1	2	3

	national levels to conserve the physical environment for future generation			
4.	explain how humans can adapt the environment to their needs	1	2	3
5.	differentiate between "preservation" and "conservation"	1	2	3
6.	describe how Ghanaians degrade the environment	1	2	3
7.	state how the damage caused to the environment affect the lives of humans.	1	2	3
8.	defend the claim that when the last tree dies, the last man also dies.	1	2	3
9.	suggest what an individual can do to conserve their environment	1	2	3

MODULE 6: General Comments

1. Do you agree that the duration and topics treated about the environment are enough to help students appreciate the need to adopt positive attitudes towards the environment? Yes [ ] No [ ]

Give reason(s): .....

.....

2. What do you suggest to be possible ways of helping our students have a better attitude towards the environment?

.....

APPENDIX 'C'

GUIDELINES FOR INTERVIEWS

Name: .....

School: .....

Date of Interview: .....

1. What programmes do you offer in your school? .....

.....

.....

2. How do you select students into the various programmes? Are the academic abilities of students in the various even? .....

.....

.....

3. Is there a club in your school that seeks to promote the environment?

.....

.....

.....

4. Do you think the environment is being given the needed attention in your school?

.....

.....

5. What attempt(s) have you made to incorporate environmental studies in the curriculum?

.....

.....

6. How would you generally assess the attitude of your students towards the environment – Excellent, Very Good, Good, or Bad? Why

.....

.....

7. In what other ways do you help your students to develop positive attitude towards the environment?

.....

APPENDIX 'D'

GUIDELINES FOR STRUCTURED DIRECT OBSERVATION

Name of School: .....

Date of Observation: .....

Grading Scale:

Bad 1

Good 2

Very Good 3

Excellent 4

NO	POINT OF OBSERVATION	GRADING			
1	Littering on Campus	1	2	3	4
2.	Reaction of students upon finding a litter	1	2	3	4
3	Cleanliness of classrooms	1	2	3	4
4.	Waste disposal system	1	2	3	4
5.	Waste disposal system	1	2	3	4
6.	Drainage system	1	2	3	4
7.	Availability of trees	1	2	3	4
8.	Noise level	1	2	3	4
9.	Water management	1	2	3	4
10	Availability of school garden	1	2	3	4