UNIVERSITY OF CAPE COAST

# VIEWS OF GEOGRAPHY STUDENTS ON THE ROLE OF THE GEOGRAPHY CURRICULUM IN PROMOTING ENVIRONMENTAL EDUCATION IN SENIOR HIGH SCHOOLS IN THE CAPE COAST METROPOLIS

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2024

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BY

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Thesis submitted to the Department of Business and Social Sciences Education of the Faculty of Humanities and Social Sciences Education, College of Education Studies University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy Degree in Curriculum and Teaching

JANUARY 2024

# DECLARATION

## Candidate's Declaration

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

Candidate's Signature: …….. Date: ……

Name: Anthony Nsiah

## Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised under the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature: ……. Date: …….....

Name: Prof. Bethel Tawiah Ababio

Co-supervisor's Signature: …….. Date…….....

Name: Dr. Anthony Akwesi Owusu

## ABSTRACT

This study explored the views of geography students on the role of the geography curriculum in promoting environmental education in SHS in the Cape Coast Metropolis. The descriptive survey design was used for the study. Three hundred and fifty final year geography students were provided a questionnaire on environmental awareness and attitude and a teacher-made test which captured some environmental themes. The results revealed that students demonstrated average knowledge on environmental issues. The results also showed that students were highly aware of the environmental issues. Regarding the attitudes of students toward the environment, results showed that students' emotions toward the environment were high but their behaviour and actions toward the environment were low. The relationship among environmental knowledge, awareness and attitude were all positive. In addition, it was revealed that environmental knowledge makes a statistically insignificant contribution to environmental attitude. The conclusion drawn from these findings is that environmental knowledge from the geography curriculum seems to be average yet it is not enough to affect students' attitudes toward the environment. This points to a need for an experiential learning component that emphasizes more practical and connected activities based on the natural environment.

## KEY WORDS

Environmental attitude

Environmental awareness

Environmental education

Environmental knowledge

Final-year geography students

Geography curriculum

## ACKNOWLEDGEMENTS

I wish to offer my sincere thanks to my supervisors, Prof. Bethel Tawiah Ababio and Dr. Anthony Akwesi Owusu, at the Faculty of Humanities and Social Sciences Education, University of Cape Coast, for their invaluable suggestions and comments. Despite having busy schedules, they found time to review my work and offer the necessary advice. I want to remind them that I have a record of their efforts in my memory.

I am also grateful to my senior brother and his lovely wife; Mr and Mrs. Adu-Boahen whose support and encouragement in countless ways have been amazing in my learning period. I am grateful to my family especially my father, Anthony Nsiah (Snr), my mother, Cecilia Appiah and my other siblings, Juliet and Veronica who supported me. I say God bless you all.

My sincere gratitude goes to Mr. Joseph Narh and Mr. Sender Kyeremeh who helped me in diverse ways as far as this work is concerned. To my friends, Ms. Paulina Afful, Mr. Collins Anobil, Mr. Richard Ohene Quarshie I say God bless you for your love and words of encouragement.

## DEDICATION

To these lovely souls – Mr. and Mrs. Adu-Boahen

# TABLE OF CONTENTS


| | Page |
|---|---|
| DECLARATION | ii |
| ABSTRACT | iii |
| KEY WORDS | iv |
| ACKNOWLEDGEMENTS | v |
| DEDICATION | vi |
| LIST OF TABLES | xi |
| LIST OF FIGURES | xii |
| CHAPTER ONE: INTRODUCTION | |
| Background to the Study | 1 |
| Statement of the Problem | 6 |
| Purpose of the Study | 10 |
| Research Objectives | 10 |
| Significance of the Study | 11 |
| Delimitation | 12 |
| Limitations | 13 |
| Operational Definition of Terms | 13 |
| Organisation of the Study | 14 |
| CHAPTER TWO: LITERATURE REVIEW | |
| Overview | 16 |
| Conceptual Review | 16 |
| Development of Environmental Education | 16 |
| Mechanisms of Environmental Education | 16 |
| Environmental Education and the Geography Curriculum | 23 |

Environmental Education and Education for Sustainable Education (ESE) 29

Environmental Education in Ghana 30

Evolution of Geography in Secondary Schools in Ghana 32

Student and Environmental Education 38

Teacher and Environmental Education 39

Teaching and Learning Methods and Their Roles in Environmental Education 41

Theoretical Review 44

Theory of Environmentally Responsible Behaviour (ERB) 44

Behavioural Change Model 46

Theory of Planned Behaviour 47

Empirical Review 49

Conceptual Framework 63

Chapter Summary 65

CHAPTER THREE: RESEARCH METHODS

Introduction 67

Research Design 67

Study Area 68

Population 70

Sample and Sampling Procedure 71

Data Collection Instrument 73

Test for Validity and Reliability of Instrument 74

Data Collection Procedures 76

Ethical Considerations 76

Data Processing and Analysis 78

Chapter Summary 79

CHAPTER FOUR: RESULTS AND DISCUSSION

Introduction 80

Demographic Characteristics of the Respondents 80

Presentation and Discussion 82

Research Question One 83

Research Question Two 85

Research Question Three 89

Research Hypothesis 1 97

Research Hypothesis 2 98

Research Hypothesis 3 99

Chapter Summary 100

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction 102

Summary of the Study 102

Key Findings 104

Conclusions 105

Recommendations 108

Suggestions for Further Research 109

REFERENCES 111

APPENDICES 132

A List Of Tables On Descriptives 132

B Questionnaire for Students 135

C Teacher -Made Test For Students 139

D Introductory Letter From DoBSSE 144

E Introductory Letter From IRB 145

# LIST OF TABLES


| Table | | Page |
|---|---|---|
| 1 | Population Distribution for final year Geography Students | 71 |
| 2 | Sample Distribution for Final Year Students' Population | 72 |
| 3 | Reliability Results of Instrument | 76 |
| 4 | Schools of Respondents | 80 |
| 5 | Gender and Age of Students | 81 |
| 6 | Students' Performance on Environmental Knowledge Test (EKT) | 84 |
| 7 | Environmental Awareness of Final Year Geography Students | 86 |
| 8 | Environmental Attitude of Final Year Geography Students | 89 |
| 9 | Tests of Normality | 96 |
| 10 | Correlation between Environmental Knowledge and Environmental Awareness | 97 |
| 11 | Correlation between Environmental Awareness and Environment Attitude | 98 |
| 12 | Correlation between Environmental Knowledge and Environment Attitude | 99 |

## LIST OF FIGURES


| Figure | | Page |
|---|---|---|
| 1 | Behavioural change model | 47 |
| 2 | Conceptual framework | 63 |
| 3 | Map of the study area | 69 |

# CHAPTER ONE

## INTRODUCTION

The ability to raise some level of consciousness and sensitivity in individuals towards the environment can be seen as an important process in dealing with problems related to the environment. The equipping of students in order to raise their level of consciousness is essential (Uzun, & Saglam, 2006; Aydin, 2010). Secondary education is unquestionable when raising students to confront environmental challenges as all students may not end up in the university. Environmental education is studied from diverse points of view by many branches of science. Nevertheless, the boundaries of these studies persist within the fields of science (Uzun, & Saglam, 2006; Aydin, 2010).

Geography has a unique place in environmental education. As a matter of fact, geography has a close relationship with both the natural sciences, social sciences and environmental problems; it has the advantage of a more comprehensive and objective look. Geography deals with people and places with regards to the present and future. With this aspect geography is a science investigating about everything where people work and live (Aslan, 2009).

The role of geography education is crucial in inciting consciousness about the need to be environmentally responsible beginning from our localities to the global level. Hence, the role of geography education in building awareness for the environment in the geography curriculum should be investigated. This chapter focuses on the background to the study, statement of the problem, purpose of the study, research questions, significance of the study, delimitation and limitations of the study, operational definition of terms, and organization of the study.

**Background to the Study**

Environmental education has evolved into a scientific discipline which stems from the relationship between man and his environment. It involves educating through step by step and scientific ways about the need to safeguard the environment (Külköylüoğlu, 2000; Kabaş, 2004). Doğan (2000) explains environmental education to be the various knowledge, values, abilities, and experiences developed to obtain the capacity to deal with current and future environmental issues and this corresponds to individuals and societies' desire towards the goodwill of the environment. It can also be described as the education that helps individuals to develop the required skill set and relevant dispositions needed to appreciate and safeguard the interrelationship between their social and biotic environments (Kabaş, 2004).

The importance of environmental education as a strand today remains resolute as it helps to address the negative changes in the environment. Everything in existence relates one way or another to the environment; ranging from humans to all other organisms. Just as humans depend on the environment for sustenance; their activities have an adverse implication on the environment which will further affect the now and future generation. Over the past years, an awareness of the environment has been generated with the advancement of science and environmental problems that have cropped up (Decamps, 2000; Thapa, 2001).

Environmental education remains a focus to the world at large and as a result a lot of parameters have been taken to increase its education among the populace. The intention of environmental education is to communicate to the community how human actions influence the environment. One focus of

environmental education as discussed by Moyo and Masuku (2018) is making people conscious about the environment and the encouragement of one's action towards the love of safeguarding the forest. Zsoka, et al (2013) further state that environmental education is related to sustainable environment and emphasizes on environmental knowledge, environmental attitudes, and environment skills; where environmental knowledge refers to the information and responsiveness about environmental problems and solution. The various perspectives of environmental education have been developed by various stakeholders including the school.

Curriculum in schools remains an important place where environmental education can be expressed. As a result, Clayton and Myers (2009) surmise that, the general disposition of the world towards environmental education is affected by the opportunities created by the school curriculum. Goals of environmental education are implemented in major school subjects. Özden (2008) therefore notes that the overall scope of formal environmental education should start from early grade to the tertiary level whereas instructions concerning environmental science and environmental concerns should be taught from basic school up to tertiary level. Robinson (2013) utters that the goals of environmental education is achieved through the school curriculum in established subjects in the primary, secondary and university schools in countries. However, the curriculum of secondary schools contains a faint mention of environmental education in the social science subjects with geography playing an important function.

It is important to compare the many ways that geography education or curriculum contributes to environmental education to other academic areas. Firstly, geography education has focused on various themes in order to aid its

development. Various reports have been written to measure the historical and current trends of development in geography education. Haubrich (1996), the then chairman of the International Geographical Union (IGU) Commission on Geographic Education, published the initial study on the state of geography education in various nations based on social and economic development index. The study developed a benchmark for continued revisions on the international comparison on geography education. Grounded on an account, Gerber (2001) conducted a study on the condition of geography in the curriculum of various levels of education in 31 countries of the world.

The study was expected to throw light on the strength and weaknesses of international geography education. The study looked at the position of geography in the curriculum, the methods to studying geography in these curricula; the importance of knowledge, skills and values in these teaching resources; specific aspects in developing geography teachers; and common research methods used in geography education. It has led to a compilation of works that aimed at contributing to geography education.

Notwithstanding the contributing works on geography education listed above that have contributed immensely to geography education in many school curricula, there seems to be a growing concern of the role of geography towards environmental education. Geography has been strategically positioned in school curriculum over the years (Baerwald, 2010; Bowlick & Kolden, 2013; Butt & Lambert, 2014). Not only does geography influence education and job opportunities (Baerwald, 2010; Mukesh & Sarita, 2015). It also plays a dynamic role in determining people's understanding of the world they inhabit (Incekara

& Khalil, 2014; Alam, 2016; Balasubramanian, 2016; Burnett & Crowe, 2016; Scoffham, 2019).

In Africa, environmental education which enhances knowledge and attitude toward the environment has through the years been channelled through the curriculum of most African education systems. An instance is a study by Norris (2016), in representing the aims of environmental education in Nigeria which indicated how the curriculum of the Nigerian education system incorporates environmental education. He stipulated that in accordance with the focus and ultimate goal of the Environmental Education (EE) curriculum in Nigeria, four themes made up the anchor of this curriculum in the country and the components include: biological foundation, human environment and development, environmental change and impact and sustainable development.

Furthermore, these components can be seen in the school system. The key subjects containing EE content and components are stated below based on the various levels of education in the country

1. Primary school: Mathematics, social studies, science, English language, Islamic religious studies and Christian religious studies.
2. Junior Secondary: Social studies, agriculture, introductory technology, integrated science, home economics, business studies, mathematics and English language.
3. Senior secondary: Mathematics, English language, home economics, clothing and textile, food and nutrition, Christian religious studies, history, geography, economics, home management, biology, physics, and chemistry.

Thus, we can see the role of geography education serving as a conduit to communicate environmental knowledge, awareness and attitude to students (Norris, 2016).

Compared to the global settings, the subject of geography has a special standing in Ghana's education, starting from the basic through to the tertiary levels (Opoku, et al. 2020). Amazingly, geography as a discipline of study in Ghana can be traced from the days of education reforms (Anlimachie, 2019). Geography is a subject that is offered as an elective in the General Programmes (General Arts and General Science) at the senior high school (SHS) level. Unusual for core topics, the curricula for Integrated Science and Social Studies both include geographic content. The SHS geography curriculum is grouped into Physical Geography (including geomorphology, climatology, and biogeography); Human and Regional Geography; and Elements of Practical Geography (Ministry of Education [MoE], 2010).

In addition to other goals, Geography education in Ghanaian SHSs is aimed at enhancing skills, and knowledge about the environment and also increase appreciation and value of the environment (MoE, 2010). It also aims to provide students with geographical skills and information so that they can contribute to environmental sustainability. It also aims to empower learners with knowledge of geography and skills that will enable them to contribute to environmental sustainability (ibid.).

Unlike some international contexts (Harvey & Forster, 2004; Smith, 2009; Thomas-Brown, 2011; Kubiatko, et al. 2012) where student enrolment in geography is decreasing in the United States, the situation in Ghana is quite distinct. The total number of students reading geography in SHS has been

enormous in the past years with majority of boys reading geography as an elective (Opoku et al., 2020). Notwithstanding this success, the Ghanaian setting seems to provide limited research on assessing the role geography plays in promoting environmental education. This study will seek to explore the role of geography curriculum towards environmental education among students and teachers.

**Statement of the Problem**

The environment conditions have been devastating and its consequence has been widespread in the world. The UNEP (2013) claims that, about the size of 300 football fields is being cleared per hour from forest areas in the world. By the year 2030, the planet might have only 10% of its forests; if deforestation is not stopped, the forest could disappear in less than 100 years. Despite efforts to protect forest land, legal deforestation is still rampant. Additionally, one of the biggest environmental problems today is outdoor air pollution. Data from the World Health Organization (WHO) shows that an estimated 4.2 to 7 million people die from air pollution worldwide every year and that nine out of 10 people breathe air that contains high levels of pollutants.

Ghana has experienced issues with deforestation as a result of logging, increased agricultural production, and infrastructure development. Forests play a crucial role in maintaining biodiversity and ecological balance. According to a report by the Food and Agriculture Organization (FAO), Ghana lost an estimated 60,000 hectares of forest annually between 2010 and 2020 (FAO, 2020). Illegal small-scale mining, commonly known as "galamsey," has been a significant environmental issue in Ghana. This practice involves the use of harmful chemicals which leading to water pollution and habitat destruction. A

study by Hilson and Yakovleva (2007) highlighted the environmental impact of galamsey activities, including water pollution and deforestation. Improper waste disposal and management have contributed to environmental pollution in Ghana. The World Bank noted that only about 20% of waste generated in Ghana is properly managed, contributing to environmental pollution and public health concerns (World Bank, 2018).

A failure to address these concerns has devastating consequences. The neglect of environmental concerns often leads to habitat destruction, pollution, and climate change, contributing to the loss of biodiversity, increased air and water pollution, contributing to respiratory diseases and waterborne illnesses, resource scarcity, affecting communities that rely on natural resources for their livelihoods (World Bank, 2020)

Amidst these challenges, there is a growing recognition of the pivotal role that education can play in cultivating environmentally conscious citizens. However, the effectiveness of current educational initiatives, specifically the geography curriculum, in promoting environmental education remains a subject of scrutiny.

With reference to this problem, in recent years, scholarly reviews have played a pivotal role in addressing pressing environmental concerns. Smith (2019) highlighted the urgency of adopting sustainable practices to mitigate the impact of climate change on vulnerable ecosystems. A comprehensive analysis conducted by Green et al. (2021) highlighted the need for interdisciplinary collaboration in addressing pollution and its negative effects on biodiversity. Furthermore, the work of Johnson (2020) provided a critical examination of policy interventions, emphasizing the importance of aligning governmental

strategies with scientific recommendations to achieve meaningful environmental outcomes. The role of the geography curriculum in promoting environmental education in Ghana is a critical aspect that demands attention due to the escalating environmental challenges facing the country (Agyeman, 2017).

Despite the acknowledged significance of environmental education in fostering sustainable development (UNESCO, 2014), there is a discernible gap in understanding how the geography curriculum aligns with and effectively contributes to this goal in the Ghanaian educational system. This gap raises concerns about the adequacy of current educational strategies to address environmental issues and instil a sense of environmental responsibility among students in Ghana.

While the geography curriculum is intended to provide students with a comprehensive understanding of the physical and human aspects of the environment, there is a need to assess whether it effectively incorporates contemporary environmental issues and fosters a holistic approach to environmental education (Opoku et al., 2020). The evolving nature of environmental challenges, such as climate change, deforestation, and pollution, requires an adaptable curriculum that equips students with the knowledge and attitude necessary to navigate and address these issues (MoE, 2010).

This study aimed to go beyond exploring students' knowledge about the environment but also strengthen their corresponding awareness and attitude toward the environment to contribute to environmental education in the Cape Coast Metropolis. Thus, this study sought to assess the views of geography students on the role of geography curriculum in promoting environmental education in the Cape Coast Metropolis.

**Purpose of the Study**

The purpose of this descriptive study is to explore the views of geography students on the role of geography curriculum in equipping students with the requisite knowledge, awareness and attitude on environmental education in senior high schools in the Cape Coast Metropolis.

**Research Objectives**

Specifically, the study aims to:

1. explore the level geography curriculum promotes environmental knowledge of students in the SHS
2. ascertain the level geography curriculum has engendered environmental awareness among students in the SHS
3. determine the level geography curriculum has affected attitude of students towards environmental issues.
4. explore the relationship between environmental knowledge and environmental awareness of students
5. explore the relationship between environmental awareness and environmental attitude of students.
6. explore the relationship between environmental knowledge and environmental attitude of students

**Research Questions**

The following are the research questions that guided the study.

1. To what level does geography curriculum promote environmental knowledge amongst students in the SHS?
2. To what level has the geography curriculum engendered environmental awareness among students in the SHS?

3. To what level has the geography curriculum affect attitude of students towards environmental issues?

**Research Hypotheses**

The following hypotheses were also tested:

1. $H_0$: There is no statistically significant relationship between environmental knowledge and environmental awareness of geography students.

   $H_1$: There is statistically significant relationship between environmental knowledge and environmental awareness of geography students.
2. Ho: There is no statistically significant relationship between environmental awareness and environmental attitude of geography students.

   $H_1$: There is statistically significant relationship between environmental awareness and environmental attitude of geography students.
3. Ho: There is no statistically significant relationship between environmental knowledge and environmental attitude of geography students.

   $H_1$: There is statistically significant relationship between environmental knowledge and environmental attitude of geography students.

**Significance of the Study**

The study would be useful to government institutions, educational institutions, teachers, curriculum researchers, and the students in the field of geography education in SHS. The conclusions may trigger awareness amongst various government agencies, especially the Environmental Protection Authority to recruit the students of the geography curriculum, students in our

senior high schools as change agents who would be a voice in their respective communities. This would serve as an addition to educating the communities about the environment and their role in sustaining it. As participants of the earth's habitation, the concept of sustainability ought to guide our actions towards the environment. Thus, we must demonstrate a sense of responsibility in ensuring that the state of our environments is protected and preserved. Moreover, as instructors, it is our core mandate and honour to harness adequate knowledge, awareness, and attitude amongst learners and citizens alike toward the environment. The fruitful assessment of the curriculum would distinguish instructors as change activists and representatives and would cause learners to go beyond the cognitive accumulation of concepts, facts, and themes about the environment, but also have the ability to substantially assess problems and concerns of the environment.

Moreover, the findings may also be beneficial to the National Council for Curriculum and Assessment (NACCA) of the Ministry of Education; The results of this work would specify the awareness, knowledge, and attitude levels of geography students and teachers towards the environment. This evidence may be used by NaCCA to evaluate the prevailing requirements, advance curriculum purposes, and actions, and appraise variations in the contributors as an outcome of the environmental education concerns in the geography curriculum.

**Delimitation**

The study is delimited to explore the role of SHS geography curriculum in promoting environmental education in Ghana. This is because several studies have concentrated on exploring environmental education among schools with

respect to general subjects. The study is delimited to aspects of the physical environment such as climate, water, land and vegetation. Data will be collected from only geography teachers and students in public SHS in Cape Coast Metropolis. Also, it will be suitable to perform such a study in all the senior high schools across the country but the study focuses on Cape Coast Metropolis.

**Limitations**

The limitations of the study are mainly based on the extent to which the study's results may be applied and the tool employed to gather information from participants. Regarding the study's findings' generalizability, it is still possible that the very small sample size prevented the results from being applied across Senior High Schools in other regions in Ghana or to further African states. As a result, the study's conclusions are limited to the study population. Research using a questionnaire as the tool does not yield comprehensive data. (Johnson & Christensen, 2012). Moreover, the majority of the items in the instrument were restricted in nature. This indicates that participants were forced to make judgments on the things devoid of having any input in the subject at hand. Additionally, certain essential details that the study might not have addressed may have been lost as a result of this. To compensate for this shortcoming, the survey was sufficiently extensive to guarantee that the majority of important topics were addressed.

**Operational Definition of Terms**

Definitions were provided to induce better understanding of the study. They include:

**Environmental knowledge**: To develop knowledge, abilities, and a fundamental comprehension of the environment and the issues it faces.

**Environmental awareness:** Sensitivity with regard to environmental issues and problems.

**Environmental attitude**: To develop values, sentiments of care, and motives for helping to improve and safeguard the environment.

**Environmental education**: A procedure of creating a global population that is conscious of the environment as a whole and the issues that arise from it, and that has the awareness, capabilities, behaviours, possible motives, and devotion required to contribute both together and individually toward solving existing issues and preventing the emergence of new ones.

**Geography curriculum**: A curriculum that focuses on equipping learners to understand man, environment and the relationship that exists between them.

**Organisation of the Study**

The study is organised in five chapters. Chapter One covers the introduction of the study which centres on the background to the study, statement of the problem, purpose of the study, research questions, significance of the study, delimitation of the study, limitations of the study, and operational definition of terms. Chapter Two presents the review of related literature, with emphasis on theories, conceptual framework as well as related empirical studies on the research questions that guided the study. Details of the method that was used in the investigation is presented in Chapter Three. This includes the research design, population, sample and sampling procedure, instrumentation, data collection procedures and method of data analysis. The fourth chapter presents the results of the data analysed. The chapter further discusses the results and the findings of the study. The final chapter, Chapter Five, summarizes the

study to draw conclusions. Based on the conclusions, recommendations were made.

# CHAPTER TWO

# LITERATURE REVIEW

## Overview

A review of the literature relevant to this investigation is the focus of this chapter. The purpose pertaining the review of related literature is to establish a foundation for endorsing or debunking earlier deductions by evaluating the ideas and conclusions of this study and sections of investigations. The review covers the conceptual, theoretical and empirical aspects of the review. The conceptual review comes first. Following that is a theoretical framework. Relevant empirical studies are deliberated while retaining the core problems and sub-problems in mind. For precision and easiness, this review has been considered under the subsequent sections:

1. Conceptual Review
2. Theoretical Review
3. Empirical Review

## Conceptual Review

This section comprises a review of history and concepts about environmental education. It also indicates the relationship among student, teachers and environmental education. Furthermore, there was an emphasis on the geography curriculum in Ghana.

## Development of Environmental Education

In addressing initial discussion of environmental education, the concept had undergone a certain period of evolution over the years. Palmer (1998) asserts that the coming to terms of environment and education has evolved over the years and even though both education and environment may not have been

used in conjunction with each other, the concerns about the environment can be attributed to past initiatives organized through conferences. Nevertheless, Gough and Noel (2010) communicate that the concept of education about the environment had presented itself to be the educational aspect of the environment around the 1960s'. Hence, the purpose of education about the environment was to form a sensitivity and knowledge among people concerning the earth and its associated issues. The roots and early knowledge of environmental education are quite open to contentions.

Relating to the roots of environmental education, Palmer (1998) alludes to Sterling (1990), providing a hint on the early period of environmental education to a man called Geddes, who was a Scottish scholar. From Geddes, the basis for contemporary environmental education was the relationship that existed between the environment and the requirement for fundamental education.

Notwithstanding the disagreements about the place and time the phrase "environmental education" was initially used on a worldwide scale, environmental education transitioned following several successful United Nations forums such as the 1972 Stockholm United Nations Conference on the Human Environment, when environmental education became a sensitive topic under discussion. The decision to introduce environmental education curricula globally, both inside and outside of schools, was the result of the deliberation. It demonstrated how cross-disciplinary environmental education is and how it can be regenerated through curriculum integration and the structuring of environmental education procedures inside educational institutions (Athman & Monroe, 2001).

The goals of environmental education were outlined in the Tbilisi Declaration (1977) and the Belgrade Charter (1975), which were developed under the direction of UNESCO and the UNEP. Subsequently, the various global conventions on environmental education converted into the prevailing ideologies to deliver the outline for environmental education at all levels. Throughout 1977 and 1989, environmental education formed an essential aspect of UNESCO's intermediate strategies and goals.

As a first contribution, the conference organized in 1977 in Georgia by UNESCO, was an initial intergovernmental conference on environmental education. A total number of 66 states convened and the suggestions that emerged opted for a more extensive execution of environmental education in all forms of education. A short-term set of aims for environmental education in the school system founded on eleven principles was issued in an announcement subsequently (Bornmann, 1997). The aims that originated from the Tbilisi Conference Declaration in 1977 are the following:

1. Awareness: to assist the world of society in developing consciousness of the overall environment and its related programs;
2. Knowledge: to assist the world of society advance diversity of understandings to gain a fundamental insight into the earth and its related issues;
3. Attitudes: to support the world of society develop a wide range of morals and sensitivities regarding the environment and the inspiration to contribute to environmental education;
4. Skills: to assist the world of society gain requisite expertise for recognizing and contributing to environmental issues;

5. Participation: to afford the world of society with a prospect of engaging all people in all dimensions toward contributing to issues relating to the environment (Hungerford 1990).

This publication founded on this conference formed the outline for environmental education in many countries and also offered an outline to govern the environmental strategies of school curricula systems aimed at contributing to environmental concerns (Bornmann, 1997). The initial conference provided an initial framework for the continuing expansion of environmental education. As the years evolve, the emphasis on education about the environment rather deepened to add other driving concepts in its operations.

Again, in 1980, the scope of environmental education broadened to include a conservation component by the World Conservation Strategy (WCS). According to Tilbury (1995) and Bornmann (1997), the new development placed adequate attention on relevance relating to the utilization of reserves towards sustainability. Hence, the inclusion of the conservation component was to establish a link with the environmental strategies of school curricula systems aimed at contributing to environmental concerns.

Subsequently, Bornmann (1997) reviews on it that attitudes, behaviour, culture, and environmental ethic were to be emphasized. These variables remain essential features of what is done in the classroom and outside the classroom, most importantly when a program is designed to educate society about the environment. This new development vividly reviewed the evolution of environmental education and further indicated how environmental education has been endorsed about the shifting issues that were present in issues of the environment. In the I990s' the pressures of the emerging environmental issues

and associated problems led to the inclusion of sustainability. It encouraged the decision to assume a precise standpoint about the issues of the modern environment. It considered sustainability as a long-term goal where the emphasis was shifted from just environmental improvement.

Consequently, further developments continued to be organized to cushion the agenda of environmental education. At the international level, an intergovernmental forum about the environment was organized.

Following the International Union for Conservation of Nature's (IUCN) 1992 Earth Summit in Rio de Janeiro, curriculum development for environmental education centered on integrating sustainable development to meet local environmental challenges. The IUCN preferred to use the term sustainable education (Fien, 1995; Firth, 1996). Agenda 21 during the summit concluded that "Education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues… It is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making" (UNCED 1992).

Here, education for environmental sustainability (EEFS) was to be heralded. Hence, deliberation of the varying philosophical spots and their understanding of diverse ways through which the environment could be developed via education. The aim of the education for environmental sustainability (EEFS), students may review their moral and partisan positions about environmental development. Additionally, education for environmental sustainability would promote a serious case for the need to deliver practical

solutions to the rising needs of the environment aimed at sustaining the environment.

In retrospection, environmental education documentarily began with an emphasis on key concepts such as knowledge, awareness, attitude, skill, and participation during the first intergovernmental conference. It further included the need to refocus the message of environmental education to add sustainability. In all, there has been a certain level of evolution in understanding environmental education to meet current modern demands. The progress made over the period sufficed for a period. The curriculum of schools in the African continent documents the advancement of environmental education. Ghana has not been exempt from the global dissemination of the historical foundations of environmental education through its educational curriculum.

A look at the total environmental landscape would be appropriate to better understand the blueprint of the land and the extent to which its environment had been tempered with. Not only that, but the various interventions that have been developed to spearhead environmental education. The school curriculum notably remains a major tool in integrating environmental education. Aside from knowledge about the environment, which is more theoretical, the need to develop a positive attitude towards the environment is worth noting.

**Mechanisms of Environmental Education**

Education about the environment takes the shape of varying variables or concepts that further embody what it aims to achieve. The Tbilisi conference declaration in 1977 provides the basis with regards to the mechanisms or components that make up environmental education.

***Environmental knowledge***

According to UNESCO (1987), environmental education was defined in the Tbilisi Declaration as a process of learning that broadens people's understanding of the environment and the problems it faces, equips them with the know-how to deal with these problems, and cultivates behaviors, commitments, and drives them to make responsible decisions. From the description, knowledge represents any efforts to augment various groups so that they can acquire various levels of consciousness and sensitivity towards the environment and its associated concerns. Engaging students through environmental knowledge is an essential goal of environmental education which can promote positive attitude and behaviour towards the environment (Duerden & Witt, 2010).

Additionally, Notoatmodjo (2002) asserts that several associated behaviors are demonstrated by the cognitive component of knowledge, including knowing, comprehension, implementation, evaluation, summary, and appraisal. Thus, understanding the environment at large comes from a mechanism of evidence and collaboration process involving ideas, techniques, realities, beliefs, morals and behaviours, and the variety of nature's features about the environment that surrounds the biosphere.

Considering the context of Ghana, the environment comprises contamination and degradation of the atmosphere, water, and land resources (Van Roostbroek & Amlalo 2006). The right consciousness regarding these concerns of the environment by students would ultimately cause sensitization of problems related to the environment and hence, corresponding attitudes and behaviour to incite pro-environmental responsible behaviour. The connection

that exists between environmental knowledge and unspoken environmental attitudes remains unclear. As a result, the link from knowledge to pro-environmental responsible behaviour takes on different spheres in many studies done on them. The geography curriculum encapsulates the domains of learning. Namely, the cognitive, affective and psychomotor. The content of the geography curriculum reveals environmental related issues that students and teachers are exposed to.

***Environmental awareness***

Environmental awareness is a concept that is encapsulated in many disciplines. At this present time, there has not been a concrete definition of environmental awareness. Some scholars align environmental awareness as a function of environmental literacy, which may be defined as the function of knowledge, skills, and motivation (Jannah, et al. 2013). Other scholars define environmental awareness as an attitudinal disposition towards the effects of degradation of the environment due to human negligence (Ham, et al. 2016). It can also be defined as one's ability to comprehend the link between activities of humans, the environment, and the capacity to partake in activities that are connected to the environment (Liu, Vedlitz, Shi, 2014; Umuhire & Fang, 2016).

This study focuses on how knowledge about environment-related issues can build a form of awareness in students and teachers. The knowledge, skills, and value gained in the geography curriculum serve as a standpoint upon which people become sensitized about environmental issues. Regardless, one's environmental knowledge determines the level of awareness of the environment.

***Environmental attitude***

An attitude refers to a feeling about something. It tends to provide a pattern of behaviour. It serves as a powerful attribute that can generate consciousness in people to concentrate their efforts towards protecting the environment and thereby reducing pollution in the environment (Hooda, 2016).

The term 'attitudes' by default goes beyond the accumulation of information; but rather a general application of knowledge and prevalent issues of the environment that leads to a decision to perform (Cherry, 2018). Environmental attitude depicts that there is a common awareness regarding the environment in order to contribute to its concerns and development. As people become conscientized about the environment, it leads to the generation of perceptions, views, and sentiments towards the environment. According to Kaur (2011), when people become aware of the needs and conditions of the environment they develop perceptions, views, and sentiments towards the environment which may be called environmental attitude. He further purported that attitude can be acquired from parents, teachers, and peer group members.

The source of attitude may generate from the influence of the stakeholders in the society. This could be seen in the development of certain attributes as we interact with the members of society. The observations garnered from interactions with stakeholders of the society develop a certain perception, sentiments, values, and know-how in us which affects our way of perceiving issues. Hence, our viewpoint to contribute to environmental protection is affected. School curricula with emphasis on education about the environment that incorporate effective learning experiences generate pro-environmental

behaviours which in its sense provides another step from just knowledge and awareness of the environment.

Regarding the relationship between awareness and attitude among the students, its importance is essential in addressing the uncertainties of the degradation of the environment. So, there is the need to engage students' minds beyond the scope of knowledge into a realm of appropriate alertness regarding the environmental issues that surround our society. Hence, people's involvement in safeguarding the environment is encouraged. This leads to active participation in the protection of the environment (Aydın & Kaya 2011).

The geography curriculum has been designed not to only impart knowledge about the environment but to affect students' and teachers' attitude toward the environment. This study not only considers the role of geography curriculum in promoting environmental knowledge but also a corresponding positive attitude may be realized toward the environment.

**Environmental Education and the Geography Curriculum**

The mechanism via which geography and environmental education are dispensed can be attributed to the curriculum. The curriculum encompasses the entire educational activity that includes content or subject matter in the teaching and learning process.

Bednarz et al. (2006) and Cecioni (2005) assert that geographical education is widely considered an appropriate medium for environmental education due to its interdisciplinary character and comprehensive approach. This stance has been reaffirmed by Tilbury (1997) who claims that certain concepts such as sustainability, dependency, urbanization and industrialization are all important in environmental education. Moreover, she reiterates that

geography in schools afford a better understanding to exist between natural and human environments, it helps students understand environmental processes and sparks their curiosity in safeguarding the environment.

Geography education in schools has covered an extensive ground in its bid to address the various modern environmental issues and concern, in line with developments in environmental education. The evolving times have brought a substantial drift in emphasis of geography. This can be seen in the massive upgrade in the school geography curriculum as can be observed in different national settings signifying the evolution that has taken place in the past 20 years, as a result of the major upgrade of environmental education, principally in Europe, Asia, North America (Bednarz, et al. 2006; Cotton, 2006; McKeown, 2006; Yeung, 2009).

Despite the fact that the connection between geography and environmental education has been extensively covered in literature. However, some components of research on sustainable environments have been emphasised in modern studies and are covered in the majority of geography curriculum documents (Dalelo, 2011). In general, a sustainable environment is one that promotes socioeconomic, environmental, and industrial development while preserving natural resource benefits for coming generations. On the other hand, agricultural shifting and the clearing of forested areas are currently at an all-time high in terms of sustainability (Ozguc & Tumertekin, 2012). There seems to be important topics that endanger a sustainable environment which is addressed through geography education. They are:

1. Whatever the goal of nuclear activity is;

2. Overexploitation of subsurface resources, particularly oil and natural gas extraction, has resulted in lasting environmental damage;
3. Destruction of mountains to expose ore deposits and resulting damage to the ecosystem (Ozguc & Tumertekin, 2012);
4. Overexploitation of mines frequently results in metals like iron and manganese being discharged into drinking water supplies (Gunes-Durak, et al., 2013);
5. Industrial facilities emit gases that contribute to global warming;
6. Destruction of natural flora far from settlements, which should be protected, as a result of human and economic activities, and the resulting drought due to rising evaporation (Erinc, 1996); both international and regional disputes
7. Destruction of natural resources as a result of global and local wars;
8. Attempts to exert influence in key the iceberg regions and the arctic continental shelf in the name of study;
9. Building innovative civilizations in arid regions; and
10. The inability of the atmosphere to function properly as a result of greenhouse gases and global warming (Donmez, 1984).

Like other Sub-Saharan African countries, Ghana's urban people deal with environmental difficulties on a daily basis. In other countries, these challenges mostly impact the impoverished in rural regions. Only 21 percent of city-dwelling Ghanaians utilize pump loos, and 7% still utilize the beach, a grassy area, or the forest as their restrooms, based on the findings of the Ghana 2003 Population and Medical Survey. In addition, 30% of urban Ghanaians lack access to potable water, 57.6% have no waste disposal facilities, and cute

housing-related matters affect 41% of Ghanaian urban inhabitants (Ghana Statistical Service, 2004). Retrospectively, environmental education that is both effective and rational can help to prevent the aforementioned environmental issues. Governments should conduct young and adult learning initiatives to increase the public's understanding of environmental challenges. Thus, geography education develops methods for environmental education, and observing fundamental components of active teaching processes, such as incentive, personal fulfillment, and the relationship between what is learned and actual-life circumstances, is important. This may be achieved by structuring instruction in environmental practices around a methodical strategy for learning and including relevant studies and hands-on methods of instruction, as well as promoting "innovative" learning settings to engage students (Ozdemir, 2007).

From this perspective, geography should be given more weight in environmental education. Increased geographic studies in environmental education are intended to assist these places in becoming more sustainable economic areas, passing down cultural values to future generations, raising environmental awareness, and finally avoiding many difficulties, particularly environmental ones (Kahraman, 2011). Exposing the physical and social factors that lead to problems with the environment is geography's most significant advancement in learning about the environment.

Geography helps make the behavioural changes meant by education regarding the environment a reality by demonstrating the reciprocal link. When developing an environmental educational initiative, this geographic component should be taken into account, and outdoor should be included as a practical component of the curriculum. In general, the role played by geography

education in environmental education cannot be overemphasized. Beginning from the various thematic areas of our environment that are studied to the need to adopt effective methods for teaching environmental education, geography education has been a notable presence in promoting education about the environment. The objectives of environmental education also engage sustainability in its practice. In that, knowledge of our environment will also lead to the need to ensure that sustainable development is promoted.

**Environmental Education and Education for Sustainable Education (ESE)**

The concept of realizing that "economic growth and social progress must be balanced with environmental concerns" led to the creation of sustainable development (SD), which is related to EE. (Banerjee, 2003; Thomas, 2009). Due to the efforts of the Bruntland Commission, it gained attention. As a result, Chambers (2011) defined SD as a type of development that satisfies current needs without endangering the ability of those who follow to satisfy their own.

Conflicts between social progress, economic expansion, and environmental preservation prompted the establishment of sustainable development. Economic expansion has often been attained through unfair arrangements, that is, without regard for environmental implications or the communities whose life is dependent on the environment and its resources. Thus, sustainable development is defined as a path of action or development that prioritizes environmental conservation while utilizing existing resources to meet present human needs without depleting or exhausting resources that will be required to sustain future generations' lifestyles (intergenerational considerations).

The aforementioned term is used in this study because it explains the transition from environmental education to sustainable development education. One may argue that tearing down the boundaries that separate the natural world, society, and the economy is fundamental to achieving sustainable development. While environmental education is necessary, it was also anticipated that some type of education would be required to address the issue of long-term sustainable development. Thus, in the early 1990s, the concept of education for long-term growth developed (Barraza, et al. 2003; UNESCO, 2004). With the benefit of hindsight, it is possible to see how learning about the environment evolved into education for equitable growth, which helped bring environmental issues into the political, social, and economic spheres, where environmental protection and preservation efforts will be realized. In that, a combined organized effort of resources will be ascertained to plan in the long term on how to better preserve the environment for future generations. From the Ghanaian perspective, environmental education emerged through the various menace associated with the environment and the varied efforts that have been made to ascertain these problems

**Environmental Education in Ghana**

The environmental profile of Ghana as reported by Van Roostbroek and Amlalo (2006) depicts the reliance of Ghanaians on natural resources. These biological treasures have been overused due to non-sustainable practices, according to Van Roostbroek and Amlalo. According to him, agriculture, logging, habitat loss, and the development of deserts pose a danger to forests, wetland habitats, soil quality, and water supplies. Ghana's Parliament enacted the Environmental Protection Agency Act, 1994 (Act 490), an innovative

environmental regulation, because of the country's sensitivity about environmental issues.

This Act mandated the establishment of the Environmental Protection Agency (EPA). Among the Agency's duties were advising the Minister of Science and the Environment on environmental policy formulation and launching formal and informal education campaigns to increase public understanding of the environment's significance to the nation's economic and social stability. Apart from official education, the EPA will provide workshops and training courses, in addition to collecting data and reporting on environmental issues. Ghana also recognizes that maintaining a good standard of living is essential to its economic development.

Therefore, a fresh plan and trust are desperately required to guarantee that deliberate efforts are made to achieve an excellent way of life through the primary goal of improved practices that raise the calibre of governance of the environment. Given this, Ghana's National Policy on Environment has made an effort to reconcile the protection of earth's resources with economic growth. Ghana's government has outlined strategies in this regard, which include ongoing and extensive instructional activities. Therefore, it is recognized that education is essential to the accomplishment of any environmental project. As a result, the National Environmental Policy requires that environmental education be taught in schools. As part of the educational reform initiative, the Ministry of Education, in partnership with the Ghana Environmental Council, included environmental topics in key disciplines including fundamental science, agricultural science, cultural studies, practical skills, and technical abilities (JICA, 1999).

In the end, the most compelling and successful method for environmental management will be the collective wisdom of our society gathered via education. Geography education in this regard must be seen to be a great tool among many others to aid environmental management and education. In Ghana, geography has transitioned throughout the years and continues to evolve to meet current modern demands.

**Evolution of Geography in Secondary Schools in Ghana**

According to historians, In the sixteenth century, Christian churches and traders from the Netherlands, France, and England brought formal education to the Gold Coast, which is now Ghana. Their goal was to teach the "mullato" children basic reading and writing so they could become artisans, secretaries, or soldiers (Foster, 2006; Adu Boahen, 1975). As a result, to encourage commerce, the early colonial educational course contained some basic geographic information on setting, directions, and computations of distance in addition to zoning regions based on the endowment of natural resources. There is little geographic information because the evangelists also intended to create an independent native church with literate local helpers.

Moving on, by the time of July 24, 1874, Ghana became a British colony when the British announced the establishment of the Gold Coast Colony. The British Crown took over the educational system between 1821 and 1840 by providing money for a small number of public schools. The goal was to educate people to read and write English so that trade could be facilitated and colonial rule and culture could become ingrained (Pimpong, 2008). The curriculum material enhanced the merchants' education system's content, albeit to a reduced degree. It was not, nevertheless, adequately thorough.

However, in 1924, the colonial government, under the leadership of Gordon Guggisberg, the then-leader of the Gold Coast (now Ghana), established the Achimota College to offer higher and professional teacher education to the Gold Coast. The goal of this initiative was to create a top-notch high school establishment in Ghana. As a result, the study of geography became a subject in our high school curriculum (Pimpong, 2008). The Accelerated Development Plan for Education (ADPE) was developed in 1951, shortly before and after Ghana gained independence in 1957. Kwame Nkrumah was the first president of independent Ghana in 1957 as well as the first prime minister of Ghana when under colonial rule.

The program has significantly improved access to colleges, technical schools, programs for educating teachers, and high school (Adu Boahen, 1975). As a result, geography started to take center stage in high school and college in Ghana. Since then, Ghana has implemented several educational changes aimed at enhancing understanding of geography to support national growth. To better align education with community needs, the Kwapong Educational Review Committee of 1966, for instance, aimed to modernize career and technical schooling and enhance students' learning of hands-on abilities in the classroom (Poku, et al. 2013). This was subsequently followed by the education of 1987, which sought to raise the standard of instruction through longer school days, more competent teachers, and an emphasis on education's flexibility or relevance. In order to increase relevance and provide students with a variety of skills and competences that can serve significant roles in every industry, geospatial awareness was judged to be crucial.

Additionally, the Ghana White Paper on Education Reform was the result of a thorough reform carried out by the Anamuah Mensah Educational Review Committee, which was officially formed in 2004. By partnering with the commercial sector, the reform sought to establish a link between education and the labour market (Ministry of Education, Science and Sports, 2005). This was also consistent with the MDGs and EFA objectives, which highlight the significance of sustainable development education for the continuation of life on a local, national, and international scale.

Thus, the Education Strategic Plan (ESP), Ghana's strongest curricular approach, was created as a result of the 2004 changes. ESP's overarching goal was to deliver high-quality education for skill development, self-actualization, and peaceful cohabitation in the interests of national progress. As a result, the geography curriculum in high school is viewed as one of the most essential pathways for achieving these objectives. (GoG, 2012).

This initiative however served as the pedestal in ensuring that the overall goal of geography about environmental education began to take shape. Hence, in 2010, the Minister of Education through the Curriculum Research and Development Division (CRDD) reformed the curriculum to incorporate environmental dimensions in the senior high school curriculum.

**Geography curriculum in senior high schools in Ghana**

Regarding the various domains of learning, geography encapsulates all these domains in its implementation at the classroom level. The communicative, cognitive (mental development regarding environmental resources), emotional (caring and protection of the environment), and psychomotor (hands-on-skills for environment management) domains all benefit from Geography education

in Ghana's Senior High Schools (MoE, Ghana, 2010). Thus, the geography curriculum in SHS makes a significant contribution to the overall goal of education.

To address societal issues and provide vital basic knowledge for Ghana's growth. In Ghana, geography education aims to prepare learners to comprehend and adapt to daily life in a changing environment (MoE, Ghana, 2010). Learners who pursue geography should be able to comprehend geographic information and have a deep awareness of environmental issues and how it affects human development. The SHS geography curriculum in Ghana states that the study of geography is to be one of the means by which the following national curricular goals are carried out at the senior high school level:

1. enhancing pupils' ability to communicate, especially when discussing and assessing environmental issues;
2. imparting information and comprehension of their surroundings, country, and the globe to students;
3. establishing ethical principles and beliefs about the riches of environment;
4. equipping pupils with significant abilities to enable them to participate in environmental development and sustainability initiatives, such as planting trees and aversion to erosion or management;
5. raising an age of individuals capable of reflecting on others, honoring their worth, and upholding the ideals that Ghanaians and the rest of the international society hold dear;

6. giving learners the tools, they need to earn a decent life later on This speaks to the occupations in geography that graduates with this degree can pursue;
7. promoting collaboration throughout nation's numerous cultural communities for national advancement and growth, as well as awareness of diverse geographic contexts, both domestically and globally;
8. gaining knowledge of the concepts and regulations that underpin sustainable land use strategies by learning how to organize and manage space effectively in a variety of geographic contexts. (MoE, 2010).

**Content of the geography syllabus**

The geography syllabus has been divided into three interconnected branches for teaching and examining at the senior high school level:

1. Landforms, climate, weather, plant and animal life are all studied in physical geography (Geomorphology, Climatology, and Biogeography). Physical geography should be taught and studied with a focus on interpreting the subject's physical and human elements.
2. Human and Regional Geography is concerned with the study of human economic activities and their classification into districts, regions, and zones. Themes should be used to teach human and regional geography.
3. Practical Geography entails the use of map reading, map interpretation (including statistical maps and diagrams), data collection, and analysis skills. It should be taught using physical, human, and regional geography examples (Amoako-Mensah, 2010).

Students and teachers will be able to actively and effectively use the interrelated knowledge in Geography to contribute to creating perspectives on

tackling the nation's interconnected socioeconomic difficulties as a result of the topics chosen and divisions established. The curriculum has been designed to cover the three years of a three-year senior high school, i.e., grades 10 through 12 (MoE, 2010).

The content of the geography syllabus contains a section dubbed "environmental concerns" where the emphasis is on the pollution of land, water and air. This helps to relate to the study of environmental concerns, awareness of them and the necessary attitude that must be demonstrated by learners and teachers alike. Hence, this study how environmental concerns are represented by the geography syllabus.

**Profile dimensions**

The senior high school geography curriculum is broken down into three interrelated branches for instruction and assessment:

1. Landforms, climate, weather, plant and animal life are all studied in physical geography (Geomorphology, Climatology, and Biogeography). It is important to emphasize the interpretation of the physical and human components of physical geography in both teaching and learning.
2. The classification and analysis of economic operations involving humans are the focus of human and geography of the region. into districts, regions, and zones. Themes should be used to teach human and regional geography.
3. Practical Geography entails the use of abilities in data gathering and analysis, map reading, and geographic analysis (including maps with statistics and diagrams). Examples from human, physical, and regional geography should be used while teaching it (Amoako-Mensah, 2010).

The themes selected and the divisions made will enable educators and students to actively and successfully apply the associated expertise in geography to contribute to the development of perspectives on addressing the interconnected socioeconomic challenges facing the country. The course work is intended to span all three years of a senior high school, i.e., grades 10 through 12 (MoE, 2010).

The content of the geography syllabus contains a section dubbed "environmental concerns" where the emphasis is on the pollution of land, water and air. This helps to relate to the study of environmental concerns, awareness of them and the necessary attitude that must be demonstrated by learners and teachers alike. Hence, this study how environmental concerns are represented by the geography syllabus.

**Student and Environmental Education**

Learners must actively interact with intricate societal and environmentally friendly ideas, concerns, and hazards in both domestic and international settings when it comes to environmental curriculum. To gain knowledge of the processes underlying societal and environmentally friendly ideas, learners must proactively conceive, get ready for action, or participate in proactive instructional activities (Tal, 2005; Fundisa for Change, 2013). Therefore, geography may take the lead in supplying the information, abilities, mindsets, and beliefs required to address the preservation of the environment through a subject-based curriculum (Catling, et al. 2013). However, because of the holistic character of EE, it is critical to examine all areas of learning and not to focus on mastery of the content of Environmental Education (EE) (Gayford, 1998; Tal, 2005; Marques, et al. 2008).

Much has been stated about learners' exposure to EE, but the main objective of EE is to instill a feeling of responsibility in students. Students' knowledge about the environment must reflect in their actions. As result, teacher involvement in EE is key if this can be realized. The purpose of this study is to investigate students' understanding of environmental issues, their recognition of those issues, and their attitudes toward those issues.

**Teacher and environmental education**

Around the world, it is understood that environmental problems and obstacles to a sustainable future are significant and pertinent to the field of education (Anderson & Strecker, 2012). There have been assertions on the role that geography education plays in environmental literacy (EE). The International Geographical Union Commission on Geographical Education (IGU-CGE) supports this claim, citing geography as an important vehicle for teaching EE (Haubrich, 1992).

Raselimo (2017) concurs, asserting that the subject's broad multidisciplinary nature—which necessitates a combination of the physical and social sciences—makes it perfect for Education for Sustainable Development (ESD). Geography, according to Gritzner (2002), is the study of "what is there, why it is there, and why people should care." The implication of Gritzner's definition of geography, according to Al Mamun, et al. (2015), is that it is "a methodology, a unique way of organizing and analysing information about the location, distribution, pattern, and interactions of the varied physical and human features of Earth's surface.

To summarize, geography is a science that studies how humans interact with their surroundings. Anyanwu and Le Grange (2017) were motivated to

look into the effects of teacher factors on the climate change literacy of geography instructors in the instance of climate change literacy. Their research showed that the knowledge of geography instructors about climate change is significantly influenced by factors such as gender, age, experience as a teacher, and grade level. Since climate change education might enable learners to make a difference to equitable development targets, the authors recommended extending training opportunities to enhance literacy. In a study of the opinions of prospective teachers of the environment and its importance to their teaching, Yavetz et al. (2014) also found that aspiring teachers did not fully grasp the term "environment."

They did not regard humans as a component of the environment, nor did they understand the natural world as an intricate network of relationships among people, artificial systems, and natural environments, even though they all understood the relevance of EE and ESD in their future responsibilities as instructors. Teachers may encounter difficulties when they lack confidence or expertise in teaching environmental themes since they might not comprehend how to go about teaching them. Moreover, our understanding of the environment is ever-evolving due to its continual change. This suggests that familiarity with the area is necessary. As noted by Blyth and Meiring (2018), even established global warming experts cannot claim to fully understand the complex systems at play.

Due to a lack of pedagogical subject understanding, teachers may not be effectively-prepared to interpret and implement the curriculum, reinforcing the significance of professional development programs. Although there was evidence of a good attitude toward environmental issues, Ogunyemi and

Ifegbesan (2011) discovered that there was evidence of a knowledge gap that could impede environmental stewardship. Teachers who are not ecologically educated will be unable to successfully educate children about environmental issues. Tuncer et al. (2009) state that when teachers possess sufficient understanding of the issue, students will achieve adequate knowledge about the environment.

In review, the role of teachers is as important as the teaching of EE in a geography classroom. Teachers' qualification is as important to make them competent in teaching EE. In that, teachers' exposition in knowing and understanding EE as incorporated in the geography syllabus is worthwhile. Furthermore, it is crucial for instructors to have the pedagogical approaches and attitudes that enable EE to be taught and learned in the learning environment. This amounts to the notion that effective teaching and learning strategies go a long way in creating a lasting positive attitude among students notwithstanding the impact, it has on the instructors themselves. Geography teachers' relation to this study hinges on the fact that they are the ones who implement the curriculum in the classrooms and so their views are regarded as important as that of the students. Therefore, it is vital to investigate their level of environmental awareness, knowledge, and, lastly, attitude toward environmental issues or concerns.

**Teaching and Learning Methods and their Roles in Environmental Education**

Teaching and learning methods provide a degree of various ways through which the aims, goals, and objectives of environmental education could be realized. This includes the educational opportunities presented by learning

and instruction procedures. In the words of Cotton and Winter (2010), role plays and models about group discussions allow students to have a deeper understanding and develop empathy for others while also allowing a variety of viewpoints to be discussed. However, they can be hostile and challenging to manage, particularly when an emotionally charged subject is covered. Here, the teacher promotes listening and introspection, and planned questions could help the pupils grasp metacognition.

Other teaching-learning activity includes stimulus activities. According to Oulton, et al. (2004); Cotton and Winter (2010), stimulation exercises are widely employed in theater classrooms, but they may be used in other contexts as well. Observing an image, video, or story from the newspaper, for example, might stimulate thought or conversation. The use of debate can prove relevant. Students must acquire knowledge about the subject and build an argument since debates need a number of groups of students to express competing points of view (Cotton & Winter 2010). However, when it comes to sustainability concerns, this might lead to a "us versus them" mentality, making students more devoted to their beliefs rather than encouraging empathy or a knowledge of other people's viewpoints (Oulton, et al. 2004; Cotton & Winter, 2010).

Pertaining personal and moral perspectives, students are allowed to investigate by being provided a scenario to determine what they would and should do in a critical situation (Nott & Wellington 1995; Cotton & Winter 2010). Case studies enable research and comprehensive viewpoints. a technique for adding environmental and sustainability themes to a curricular that wouldn't otherwise do so. This often makes learning about contextual concerns locally easier. Cotton and Winter (2010) resonate with the role of writing. They

remark that a prime instance of analytical writing and reading includes dissecting news stories or other writing to uncover the author's intentions and prejudices, then developing a counterargument based on opposing ideas (Cotton & Winter 2010). It is impossible to exclude educational programs based on which includes fieldwork and associated activities.

According to Smith and Sobel (2010), neighbourhood-based, education encourages interdisciplinary inquiry and instruction where learners help localities solve problems and the community has a part in the execution of education. Students are encouraged to learn by experience through fieldwork, which can have an impact on their emotions and foster the development of critical thinking abilities (Scott & Gough 2003; Cotton & Winter 2010). Through fieldwork, students may gain a deeper knowledge of stakeholder perspectives and learn about local problems. Lastly, demonstrating best practices or "the hidden curriculum" (Jackson, 1968; Cotton & Winter, 2010) may either support or contradict what is taught in the classroom. Examples of this include the teacher putting the paper in the garbage can during class or the kids seeing recycling containers all over campus.

Recapitulating the role of various teaching and learning method that exists to aid the delivery of EE in the classroom, it is of great importance to note that majority of these teaching styles are designed to make teaching and learning practical and also to generate a sense of critical thinking which allows students to fully replicate and contribute to teaching and learning. Hence, the generation of ideas is encouraged; which further influence how they behave towards the environment. EE stands on the pedestal of influencing the attitude of its learners to better preserve the environment.

## Theoretical Review

This section considers the theory of environmentally responsible behaviour, the behavioural change model and the theory of planned behaviour as the underpinnings for review. The relevance of these theories is further discussed to enable better understanding as applied to the study.

### Theory of Environmentally Responsible Behaviour (ERB)

The Environmentally Responsible Behaviour theory became the theory in focus as Hines, Hungerford, and Tomera contributed to its promotion (Hines, et al. 1987). According to this theory, a person's purpose to take action, centre of control—a natural ability to exert influence over the events in their life—knowledge, beliefs, and feeling of personal accountability are all important factors to consider when deciding whether or not to embrace a certain behaviour.

This theory is relevant because the geography curriculum ought to be designed not to contain environmental facts and concepts only but also various skills and expertise that leads to practical solutions to environmental issues faced by students and teachers. It further reveals that knowledge is subject to the situations prevalent at a particular time. Hence, varying forms of knowledge ranging from theoretical to practical is needed to induce pro environmental behaviours. This new model was projected due to certain relationships within the various variables that had been recognized to cause responsible environmental behaviour. With this in the background, Hines, et al. (1987) therefore describe the various ways diverse knowledge could link up to control intelligence to perform, which leads to pro-environmental behaviour. This theory demonstrates how for instance; it is for environmental education to be

much more than just mere environmental familiarity but must incorporate information on practical approaches, and the needed measures to enhance self-efficiency and pro-environmental behaviour.

In contrast to the behavioural model, knowledge is a core segment of the model proposed by Hines et al. (1987), but they concluded that simple factual knowledge about the environment is not enough as a cause of responsible environmental behaviour. They suggested that people must also come to terms with the knowledge of the necessary courses of action available to be used in a given situation (Hines et al., 1987). This is necessary because situations or conditions are changeable and as a result, knowledge is limited to specific conditions or situations people may not be able to adapt to when there are situational changes. In Hsu and Roth's (1998) study of pro-environmental responsible behaviour among secondary school teachers, they concluded that the requisite abilities and expertise were the prevailing indicators of pro-environmental responsible behaviour. They, therefore, proposed these two indicators namely; abilities and expertise would obtain an important status in secondary and tertiary education.

On account of this theory by Hines et al (1987), it can be said that the theory provides other notable factors that can influence environmental behaviour. Namely, the aspect of self-control, and the intention to act responsibly. However, the complexity that exists in human behaviour appears to be rather confusing; in that human behaviour may seem predictable but also poses an unpredictability in its expression in another time. It is suggested that research be made to study other underlying processes to enhance the understanding and appreciation of pro-environmental responsible behaviour.

**Behavioural Change Model**

The perception of behavioural change was associated with Hungerford and Volk in 1990. It is related to the assumption when exposed to adequate knowledge in certain circumstances, people would become sensitive about environmental issues and as a result be inspired to act in a custom that shows responsibility towards the environment. The construct of moving from acquiring knowledge to exhibiting good attitudes and finally to good behaviour can be seen in other models as observed in the behavioural model. Consequently, it is claimed that when responsible environmental actions are developed, knowledge and environmental attitudes increase (Hungerford & Volk, 1990).

Nevertheless, other studies rebuffed the assumptions raised in the behavioural change model since it only considered only human principles in its assumptions. Hence, there was a major discontentment from just a simple direct illustration of the model for a considerable amount of time (Hungerford & Volk, 1990). Scholars at that moment turned their focus to a proposition that could be verified and accepted over the years. The behavioural model may appear straightforward, but it offers a foundation for comprehending the potential connections between consciousness of the environment, information, and behaviour—as well as the ways in which these might be attained or not. Being environmentally literate may not always translate into environmentally friendly behaviour. Nevertheless, an inadequacy of awareness might not induce poor management of the environment. So, other aspects such as skill, the purpose to take action, and individual obligation ought to be given some level of inclusion

and consideration. Figure 1 shows the behavioural change model as modelled by Hungerford and Volk (1990).

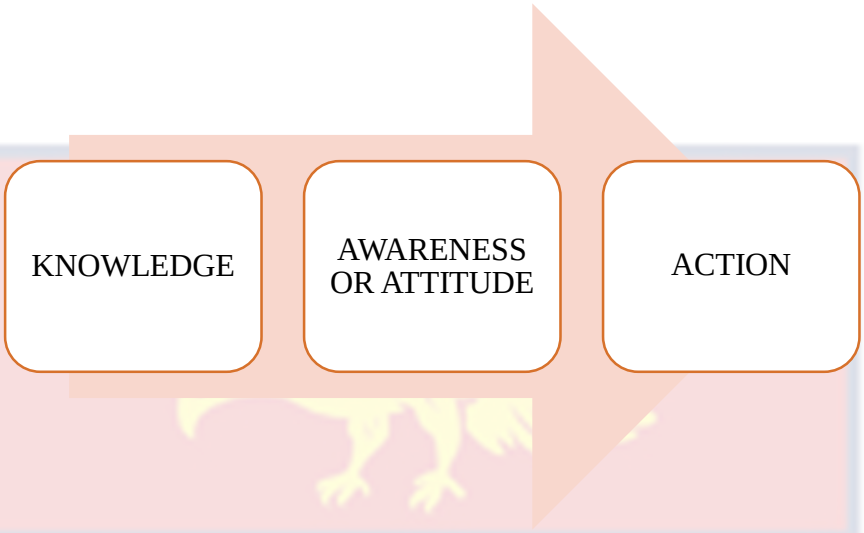


*Figure 1*: Behavioural change model

Source: Hungerford and Volk (1990).

This theory is relevant because it provides a guiding principle in demonstrating the processes involved in environmental education. Though not detailed, it provides a linear approach involved in environmental education. The knowledge dimension reveals the content of the geography curriculum, the awareness indicates the sensitivity towards environmental issues generated from environmental knowledge whereas the action relates to environmental attitude that must be possessed by student and teachers.

**Theory of Planned Behaviour**

The theory of planned behaviour has been one of the commonly used models to predict the correlation dimensions of behaviour. It was proposed by Ajzen (1988). Based on Ajzen and Fishbein's (1980) Theory of Reasoned Action, which holds that attitudes and subjective standards have an impact on intent to behave, which may be utilized to forecast action. In this case, subjective norms refer to an individual's thoughts of whether others in their

society—family, friends, and colleagues that the person should or should not take part in a particular behaviour. Environmental attitudes and actions have been proven to be regulated by the social world. Again, knowledge in this setting according to Azjen and Fishbein (1980) is no reflected. Rather, beliefs refer to knowledge about a specific practice. In this regard, the representation of cognitive components through affective elements through their influence on beliefs is allowed in Azjen's paradigm. As a result, attitudes, subjective norms, and intention before behaviour all have a mediated connection to knowledge or beliefs.

All behavioural effects, including attitude, subjective standards, and the feeling of behavioural control, have a planned component, according to the Theory of Planned Behaviour. The behavioural intention component has no bearing on the link between the behaviour and the perceived behavioural control component. The inclusion of the perceived behavioural control factor sets the Theory of Planned behaviour apart from the notion of reasoned action.

According to Azjen (1988), the sense of behavioural control pertains to the stated comfort level or discomfort level when executing an activity, and it is assumed to be influenced by both past encounters and potential challenges in the future. For instance, someone is less likely to recycle their cans if they don't perceive the cans, they placed in the recycling bin are genuinely recycled. Therefore, independent of attitude, perceived behavioural control is a mediating factor in whether or not a person would engage in responsible environmental activities.

The theory of planned behaviour can be related to this study in the sense that certain responsible environmental activities engaged by people is normally

subject to a prior knowledge about how things should be done. The saying that goes like "experience is the best teacher" is revealed here. In that, when individuals engage in any environmental responsible activities, they are more likely to contribute to their environment positively.

**Empirical Review**

The research that has been done on the subject are the main subject of this portion of the chapter. This is especially crucial to the study since it would serve as the foundation for comparisons. The research concerns that have been developed to direct the study provide the basis for organising the empirical review.

**Exploring studies about environmental knowledge amongst students and teachers**

Research on the knowledge, attitudes, and actions of secondary school pupils about environmental concerns was conducted by Varoglu et al. (2017). The purpose of the study was to look at students' gender-related knowledge, attitudes, and actions. A descriptive survey research comprising 145 students in eighth grade was carried out on the study sample.

Concerning environmental knowledge, an EKT was taken by the students; where only 5% of students got high scores and about 49% had an average score from the EKT. There was no discernible variation in the scores of male and female pupils based on gender. The students looked at a number of environmental problems, such as water contamination, acidic precipitation depletion of the global warming, and the effect of greenhouses. The purpose of the questions was to assess students' understanding in relation to their STEM curricula. Additional findings about the link between behaviour, attitude, and

awareness revealed a limited relationship between behaviour and awareness of the environment.

Conversely, there was a modest correlation between behaviours related to the environment and awareness as well as mindset. It appears that knowledge about environmental issues does not necessarily implicate that students' behaviour towards the environment would be better. It further implies that having a majority of the students with an average score speaks volumes; signifying that the environmental contents in the science and technology curriculum may be low and needs to be updated to meet the demands of the times.

In addition, Nunez and Clores (2017) investigated students' level of environmental knowledge. This study explored the environmental literacy of K–10 graduates using a quantitative research design. The non-experimental descriptive-correlational design was used specifically. 614 senior high school students in the Philippines were used as a convenient sample for the study. Their findings revealed that students although have a low level of environmental knowledge, they tend to have high environmental behaviour and attitude. In terms of gender, it was discovered that male students possess more knowledge about the environment as compared to female students.

However, female students possess affection towards the environment and more intention to change the environment. The results made it very evident that being aware of the environment does not automatically translate into pro-environment behaviour. It was evident that those with greater environmental knowledge have significant environmental sensitivity and attitudes but may not always exhibit strongly pro-environmental behaviour. According to the

correlation between the environmental literacy aspects, it was determined from the results that there is a positive but modest correlation between environmental awareness and environmental conduct.

Kumar and Rani (2019) steered a study, aimed at comparing the environmental knowledge of B.Ed. and D.Ed. teacher trainees. Out of the 300 B.Ed. and 300 D.Ed. teacher trainees, the study used the normative survey approach with a sample of 600 teacher candidates. The main conclusions showed that both B.Ed. and D.Ed. teacher candidates had a good level of environmental knowledge. Compared to the D.Ed. male trainee teachers that were examined, the male B.Ed. teacher candidates scored higher on the knowledge of the environment scale.

Therefore, there was a notable disparity in the understanding of the environment of male teacher candidates pursuing a B.Ed. and a D.Ed. Generally, the study indicated that teacher trainees have a high level of environmental knowledge. The study found out that through nature-based education students' environmental knowledge was higher and this correlated to positive behaviour. However, without exposure to nature, environmental knowledge remains low according to the study of Otto and Pensini (2017) in which they sought to explore the influence of nature-based education on environmental knowledge. The limitation of this study was that, the type of nature-based education is not clear.

Ganaa (2011) explored environmental education in senior high schools in the northern region of Ghana. The research methodology used for the study was descriptive, and it included both qualitative and quantitative data. A total of 400 respondents, including 384 pupils, 30 instructors, 6 head teachers, and 4

education and environmental officials, were included in the study's sample. The purpose of the article was to investigate the connection between information about the environment, environmental awareness, and teaching about the environment. The primary conclusions showed that pupils' environmental understanding was lacking. It further explained this by pointing out that the social studies curriculum's environmental education instruction lacked any hands-on exercises. Teachers who took part in the study were asked to provide their thoughts on how pupils felt about environmental education.

The findings showed that students are highly interested in environmental concerns, do not think environmental education is an improper use of time, and are in favour of adding additional environmental themes to the curriculum. This demonstrated the good attitude that pupils had toward learning. Students who read social studies as an aspect of study from other subject areas participated in the survey.

The quantity of studies examined in this part reflects instructors' and students' information about the environment. The student or instructor population employed in this research comes from a variety of academic fields. This makes it possible to determine students' and instructors' understanding of the environment levels regardless of their academic area of study. This research is related to others since it examines environmental information that both instructors and students of geography possess. Since geography is concerned with the world, the current study examined how much each group of students and geography teachers knew about the environment. Once more, geography students who took an EKT test made up the population participants in this study.

**Environmental awareness amongst students and teachers**

The environmental consciousness of teacher candidates was investigated by Ergin (2019). Descriptive research methodology was used in the study. A total of 532 students, drawn at random from the Pedagogical Formation program and all departments within Trakya University Faculty of Education, participated in the research. The following results demonstrated that there was a substantial level of awareness regarding the environment and that there is no distinction among genders in the three sub-scales or total awareness.

The level of consciousness about the environment among candidate teachers varies depending on many factors, including age, class they are studying, where they live, whether they are aware of the potential consequences of damaging nature and animals, and whether they have a their choice for blossoms, trees, and greenery. These differences may have an impact on their environmental consciousness in one way or another. Overall, it was shown that the individual instructors had a very high level of environmental knowledge. Regarding the location, background information on its ecology, culture, natural resources, and economy have to have been looked into to offer more details about the different environmental problems that are common there. Additionally, the study was done on aspiring instructors who had little to no prior teaching experience.

In another study, Gümrükçüoğlu et al. (2017), investigated students' levels of environmental awareness and knowledge at the Karadeniz Technical University Health Services Vocational School. The descriptive method was used in the study whiles a sample size of 184 was used. According to this study, students often scored highly on environmental behaviour and consciousness

scales. The environmental awareness scale used was divided into consciousness and behaviour scales respectively. It was found that the student's opinions were "totally agree" on the environmental awareness scale and "mostly" on the environmental behaviour scale. A further investigation into the behaviour scale revealed the importance of environmental practices for students in terms of both consciousness and behaviour. In this regard, the students stated that they did not follow environmental publications, did not devote time to the topic, saved energy, and shared some of their old products with others rather than throwing them away.

However, they stated that the majority of the recycled products they use are not delivered to the appropriate units and that they use environmentally hazardous products. This revealed mixed results concerning how environmental education affects students' behaviour or attitude. Again, a statistically significant difference in mean environmental awareness scale scores was discovered in favour of female students. The study also demonstrates that students' environmental awareness is not at a desirable level in their behaviours. A deficiency in practice training might be the cause of this. Since education creates a bridge between knowledge and action, both current and future students should get more environmental education.

Azila et al. (2021) conducted a study to investigate the environmental awareness of consumers who lived in Malaysia. It also aimed at exploring how gender differences influence environmental awareness. This study selected a quantitative research approach and employed a questionnaire to gather data from respondents. Using the convenience sample approach, one hundred and eighteen replies were obtained. According to the findings, knowledge and

awareness are significantly correlated, with the very basis of expertise serving as a foundation for the development of environmental consciousness. The study also showed a connection between environmental awareness and social media platforms.

Here, it was seen that using social media platforms raised customers' understanding of environmental issues. The findings showed that there is no discernible difference in the attitudes of male and female customers toward green goods and environmental consciousness based on gender. However, the study was quantitatively analysed and it would have suggested that a qualitative dimension could be established to further explore to induce adequate understanding. Again, the study looked at environmental awareness in the light of gender. Environmental awareness can be investigated from other socio-demographic perspectives such as; age, education status, income, etc. Again, other people outside the scope of consumers could also serve as respondents of the study.

Majumder (2017) steered a study on the assessment of environmental awareness amongst university students in Bangladesh. Data was gathered from students at two public and two private institutions using the descriptive research methodology. These four institutions provided a sample of 400 students, 60% of whom were male and 40% of whom were female. The study also investigated the awareness of students towards problems related to the environment and the kind of behaviour reflected towards the environment. The study's conclusions showed that noise, the contamination of the environment, water, and soil, as well as climate-related problems, are the main factors destroying the ecosystem.

The TV, literature, and newspaper are just a few of the mediums via which students may cultivate an awareness of their surroundings, with the elderly making less efforts. It was revealed that students with a background in the environment tend to have more awareness of the environment whilst the students with no environmental knowledge were less aware of the environment.

From the study, it was further revealed that education remains the main channel in inducing awareness about the environment. Furthermore, with regards to attitudes developed from this awareness of the environment, it was revealed that students' attitudes remain negative.

In 2018, Karaismailoglu and Erten carried out research on teachers' environmental consciousness. The purpose of the study was to look into people's knowledge, attitudes, and behaviors regarding the environment and how things like gender and teaching experience affect environmental awareness. The descriptive method was applied. Thirty-two pre-service instructors volunteered to participate in the study.

Teachers' attitudes and knowledge were found to be higher on the environmental awareness scale, suggesting that a rise in environmental knowledge is accompanied by an increase in attitudes. It was also revealed that participants who were females had higher environmental knowledge and attitude. One major way teachers know about the environment was through the media and also how often they spoke about environmental issues in their homes and classes influenced their knowledge and attitude.

Nevertheless, with regards to the behaviour towards the environment, it was realized that the behaviour of participants was very low. It could be deduced that teachers who were part of environmental organizations had a low behaviour

towards the environment. It appears that their knowledge of the environment reflected no effective behaviour. According to this study, variables considered were knowledge, attitude, and environmental behaviours. It could be deduced that environmental attitude was considered different from environmental behaviour. In a real sense, attitude appears to entail emotions, and behaviour (actions, commitments). Teachers' attitudes and knowledge were found to be higher on the environmental awareness scale, suggesting that a rise in environmental knowledge is accompanied by an increase in attitudes. Again, the role of parents in this study appears not to be included, as no effort is done to transcend the knowledge from teachers to parents with regards to environmental awareness.

The quantity of studies examined in this section reflects students' and teachers' environmental awareness. The population of students or teachers used in these studies emerges from different subject disciplines. This makes it possible to determine the degree of environmental consciousness among instructors and students regardless of the subjects they are studying.

This current study relates to others in the sense that the environmental awareness of geography students and teachers is explored and an understanding is gained from the association between environmental knowledge and awareness. Since geography deals with the environmental education, the current study looked at exploring the level of environmental awareness of both students and teachers of geography. Also, for this current study, the population subjects were geography students and their teachers in which students answered a questionnaire while the teachers were interviewed.

**Environmental attitude amongst students and teachers**

Research led by Zachariou et al. (2020) looked at secondary school students' opinions toward environmental issues and environmental education. The primary aim of the study was to investigate how students' opinions and views toward the environmental curriculum relate to their opinions and understandings of environmental issues in their home or school. A survey was utilized to gather information using the descriptive approach, with a sample size of 1059 pupils.

According to the survey, the secondary school pupils in the Greek prefecture of Viotia predicated their opinions on environmental issues about soil, water, and atmospheric pollution. In terms of attitudes and views about the environment, the survey found that people needed more environmental education campaigns to be implemented and increased in understanding of environmental concerns the more aware they were of them.

Additionally, people are more inclined to participate successfully in environmental initial training courses the more aware they are of environmental concerns. According to Zachariou et al.'s study, there were variations in students' views and perspectives on environmental education based on their gender and educational backgrounds. Specifically, females showed a more favourable attitude toward environmental education than boys did.

Once more, the study showed a relationship between respondents' gender and their level of EE factor application and understanding. To be more precise, males had a negative perspective and women a favourable one. According to Zachariou et al.'s (2020) research, there was no consideration of the relationship between the three main components of education—students,

parents, and instructors. Investigating the interactions between these three groups and how they react to different environmental education-related initiatives would have been fascinating. An exploration into this educational process would have further brought an insight into the interplay of these educational processes in environmental education.

About the teacher aspect, research conducted in Greece by Zachariou et al. (2017) investigated teachers' views toward environmental education (EE). The technique used a descriptive research approach, and the sample size consisted of 262 instructors from 53 different schools. The study looked at how these sentiments related to other demographic factors such as neighbourhood and local environmental circumstances. The research reveals a significant correlation between the attitudes of educators toward environmental education (EE) and the state of the environment and problems with the environment in their communities. Additionally, good attitudes toward EE are positively associated with environmental knowledge and information.

Again, the study revealed that knowledge and information may lead to increased teacher sensitivity, as well as student and future citizen participation in actions that will provide them with the means to improve their attitude toward the environment. Nevertheless, from the study, teachers also tend to consider themselves less responsible for the environmental quality of their place of residence. In that, a tendency to deny personal responsibility for the current situation and shift blame to others, as well as a cautious attitude toward the state.

Another study by Barghi et al (2017) sought to evaluate environmental awareness, attitude, and performance in students at the post-graduate level about certain challenges of the environment. The study's objective was to assess post-

graduate students' understanding of the environment, behaviour, and performance. This study employed the descriptive-survey method. the required information was gathered from a sample of 70 students. The results of the findings showed that there was an average score on the environment. The media was the main source of information on the environment. An investigation into the correlation between environmental attitude and awareness showed that there was a positive relationship—that is, that a greater level of awareness was associated with a more positive attitude toward the environment.

However, the same was not seen about the relationship between environmental attitude and environmental performance. Hence, the higher the attitude of students towards the environment increased the better their performance and behaviour towards the environment. The analysis revealed that the higher the attitude of students towards the environment increased the lower their performance and behaviour towards the environment. It appears that; attitude is distinguished from performance and behaviour. It was possible to conclude that environmental attitude was considered distinct from environmental behaviour. In reality, attitude appears to include emotions and behaviour (actions, commitments).

Arshad et al. (2021) conducted a research on the beliefs, consciousness, concerns, and behaviours of university students about the environment across academic fields. The study's goal was to evaluate attitude of learners, consciousness, issues, and actions related to the environment in three academic areas: social sciences, the natural and life sciences, and arts and humanities. 824 students from two government and two privately owned schools provided data for the descriptive study project. Findings about the student’s awareness,

behaviour, and concern level revealed higher responses; signifying a higher level of awareness about the environment. Environmental issues such as food contamination, polar melt, air pollution, quality drinking water, and overpopulation.

Although the awareness, behaviour, and concern level differed across disciplines generally there was a high level. The results generally revealed that students across these academic disciplines had positive and high awareness, concern, and behaviour about the environment. However, it was revealed that their attitudes were quite low. On the subject of environmental attitude, a mean of 2.95 was reported which was not encouraging and hence it demonstrated a negative effect on environmental behaviour. Although this may rather represent a higher attitude towards the environment.

From the study, it appears that emphasis appears to be on students at the expense of teachers. It also failed to explore the factors that determine higher attitudes toward the environment. It can also be said that the scope of the academic disciplines involved in the study could have included other disciplines such as the vocational and technical. Knowing emphatically well that environmental awareness, attitude, and concern remain the fight of all. Hence, the need to incorporate other disciplines and stakeholders. Lastly, an analysis of data could have been done on the gender differences to ascertain the extent of the variations in the environmental attitude of students.

Redondo and Puelles (2017) sought to investigate the gap that exists between environmental attitude and behaviour. A survey was conducted online where sample used consisted of 10,001 subjects. The results were enlightening; self-control of individuals could fill the gap so that a good attitude toward the

environment could lead to corresponding behaviour. These findings could be traced to the theory of environmentally responsible behaviour by Hines, et al. (1987). The findings reveal that the missing link that has resulted in the consistent gap that exists in the environmental attitude and behaviour construct could be associated with the lack of self-control. Hence, possession of knowledge is not enough to convert environmental attitudes into pro-environmental behaviours.

Reflecting on these studies it can be deduced that the linkage that exists between environmental knowledge, awareness, and attitude is not a definite one. Studies do reveal that a high knowledge and awareness of environmental issues lead to corresponding positive attitudes and behaviour. However, the extent of the relationship appears blurred. In that, students' and teachers' advancements in environmental knowledge are sometimes not enough to necessitate positive behaviour towards the environment. As for positive emotions, there may seem to be an upgrade that exists amongst students and teachers. Nevertheless, such an upgrade in their behaviour tends to diminish. This further suggests that other factors may be investigated to ascertain the means and ways by which the total environmental attitude may increase or upgrade significantly.

The present study has distinctive features and contributes by filling a knowledge gap in many ways. Research has mostly concentrated on students as well as prospective and the in-service instructors overall. For instance, studies by Zachariou, et al (2017) and Arshad, et al. (2021) to mention but a few looked at exploring of environmental attitude of students and teachers regardless of their discipline. Yet due to its multidisciplinary nature, geography teachers and students are best placed to address EE. The closest to this was a study by Ganaa

(2011) which looked at environmental education through the social studies curriculum. This current study considers geography due to its nature to effectively spearhead EE. Again, EE is considered to be contextual and the Ghanaian context is unique, but little is known in investigating its role through the geography curriculum. Studies such as Majumder (2017), Azila, et al. (2021) to mention a few were conducted in Bangladesh and Malaysia respectively. This current study provides a different geographical context for investigating EE among students and teachers.

In effect, the major rationale of the school geography aims at developing environmental consciousness and attitudes amongst its learners. This current study aims to affirm or disaffirm whether environmental knowledge through geography education leads to a pro-environmental attitude and behaviours.

**Conceptual Framework**

The relationship between the variables is shown in the conceptual framework. They are geography curriculum environmental awareness, environmental knowledge, environmental attitude.

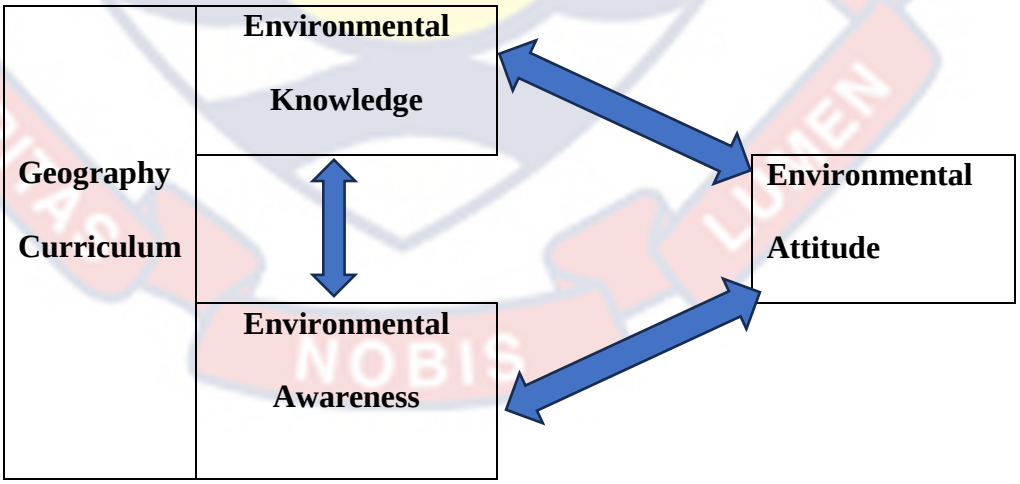


*Figure 2:* Conceptual framework on the role of geography curriculum in promoting environmental knowledge, awareness, and attitude.

Source: Author's construct (2022)

Adapted from the model of behavioural change and the theory of Environmentally Responsible Behaviour (2022).

Engaging students through environmental knowledge is an essential goal of environmental education which can promote positive attitude and behaviour toward the environment (Duerden & Witt, 2010). Additionally, Notoatmodjo (2002) posits that the cognitive dimension of knowledge demonstrates some related actions: knowing, understanding, application, analysis, synthesis, and evaluation. Hence, knowledge about the environment comes from a merchandise of evidence and collaboration process involving ideas, techniques, realities, beliefs, morals and behaviours, and the variety of nature's features about the environment that surrounds the biosphere.

Environmental awareness is a concept that is encapsulated in many disciplines. At this present time, there has not been a concrete definition of environmental awareness. Some scholars align environmental awareness as a function of environmental literacy, which may be defined as the function of knowledge, skills, and motivation (Jannah, et al. 2013). In this study, environmental awareness may be defined as the consciousness of the various concerns of the environment as a function of knowledge.

An attitude refers to a feeling about something. It tends to provide a pattern of behaviour. it serves as a powerful attribute that can generate consciousness in people to concentrate their efforts towards protecting the environment and thereby reducing pollution in the environment (Hooda, 2016). Environmental attitude denotes a general awareness of the environment in order to contribute to its concerns and development.

Generally, geography education at the SHS in Ghana can be seen in the cognitive (intellectual dimension about the environment), affective (safeguarding of the environment) and psychomotor (first-hand expertise for managing the environment) domains of learning (MoE Ghana, 2010). According to Catling, et al. (2013), environmental education that leads to sustainability of the environment can find expression in geography through the school curriculum by delivering the needed skill, information, morals, awareness, and behaviour.

Considering some teaching methods that can help the surge of environmental education through geography curriculum include role plays, group discussions, debates, fieldwork, case studies, problem-based learning, etc. The deployment of role plays and simulations affords students the privilege of detailed appreciation and commiserating with students (Cotton & Winter 2010). Furthermore, place-based education gives students the chance to integrate their knowhow, perceptions, opinions and thoughts from other academic subjects and again, the communities serve as reference point where students could apply their knowledge in protecting the environment (Smith & Sobel 2014).

**Chapter Summary**

In this chapter, there has been a review of literature related to the study. The adaption of the Behavioural Model and the theory of Environmentally Responsible Behaviour provided the theoretical framework for the study. These theories basically contain several variables such as knowledge, awareness, and attitude. This framework outlines the various processes that exist to make environmental education possible. Concerning this, the overall aim of the

geography curriculum is to instil a sense of knowledge, awareness, and attitude towards the environment.

Some empirical studies have that the environmental knowledge of students and teachers alike remains high; whilst others communicate a moderate or low knowledge about the environment with a corresponding increase in awareness. The empirical review further showed that high or moderate environmental knowledge does not translate into effective attitudes towards the environment, others found otherwise. Thus, it is very difficult to conclude whether or not environmental knowledge translates into pro-environmental attitudes and behaviours. Thus, it is essential to carry out this study in order to investigate the perspectives of geography students about the function of the geography curriculum in advancing environmental education in SHS within the Cape Coast Metropolis.

# CHAPTER THREE

# RESEARCH METHODS

## Introduction

This chapter discusses the methodology that was adopted for the study. It entails the research design, population, sample and sampling procedure, data collection instrument, data collection procedure, data processing and analysis.

## Research Design

The study used a quantitative methodology and a descriptive survey design, which Best and Kahn (1995) state incorporates a variety of relationships, including the way that current situations, beliefs, and recommended behaviors are expressed. It also grants the prospect of selecting a sample for the population being studied to generate generalizations that will be made from the sample. Fink (2001) coordinates that rather than elucidating the condition, the descriptive survey helps the investigator identify, observe, and classify its constituent parts. Consequently, the application of this design helps the investigator to establish important findings of a condition by unfolding, recording, investigating, and rendering situations that occur. Hence, the descriptive survey is considered a suitable design for the perspectives of geography students about the function of the geography curriculum in advancing environmental education in SHS within the Cape Coast Metropolis.

Furthermore, this study does not dissociate itself from the fact that many survey designs are based on subgroups of a certain target demographic. Investigations in descriptive surveys are considered to portray a picture of the way issues are at a definite moment. Regarding this study, no effort was deployed to control settings or steer variables, thus, the descriptive survey

design is regarded most suitable. The study aimed to assemble essential information on settings and variables that cannot be controlled. Finally, because it can quickly gather a large amount of data from teachers and students, it was seen to be the best option for research.

There are restrictions on the descriptive survey itself. These consist of the possibility of the importance of the data being disregarded when the investigator gives much attention to the variety of exposure to the neglect of adequate explanation regarding the effects of those data for essential concerns, theories, and problems (Kelley, et al. 2003). Kelley, et al. (2003) additionally intimated that the personal matters of respondents may be interfered with and hence, the probability of producing undependable replies and struggle in evaluating the simplicity of interrogations that prompt anticipated responses.

**Study Area**

The senior high schools in the Cape Coast Metropolis comprised the research area. There were five schools with mixed enrollments and five schools with only one gender total. The number of public SHS in Cape Coast Metropolis was the cause of the sex ratio, which is the exact scenario in the metropolis. Figure 3 shows the study Area.

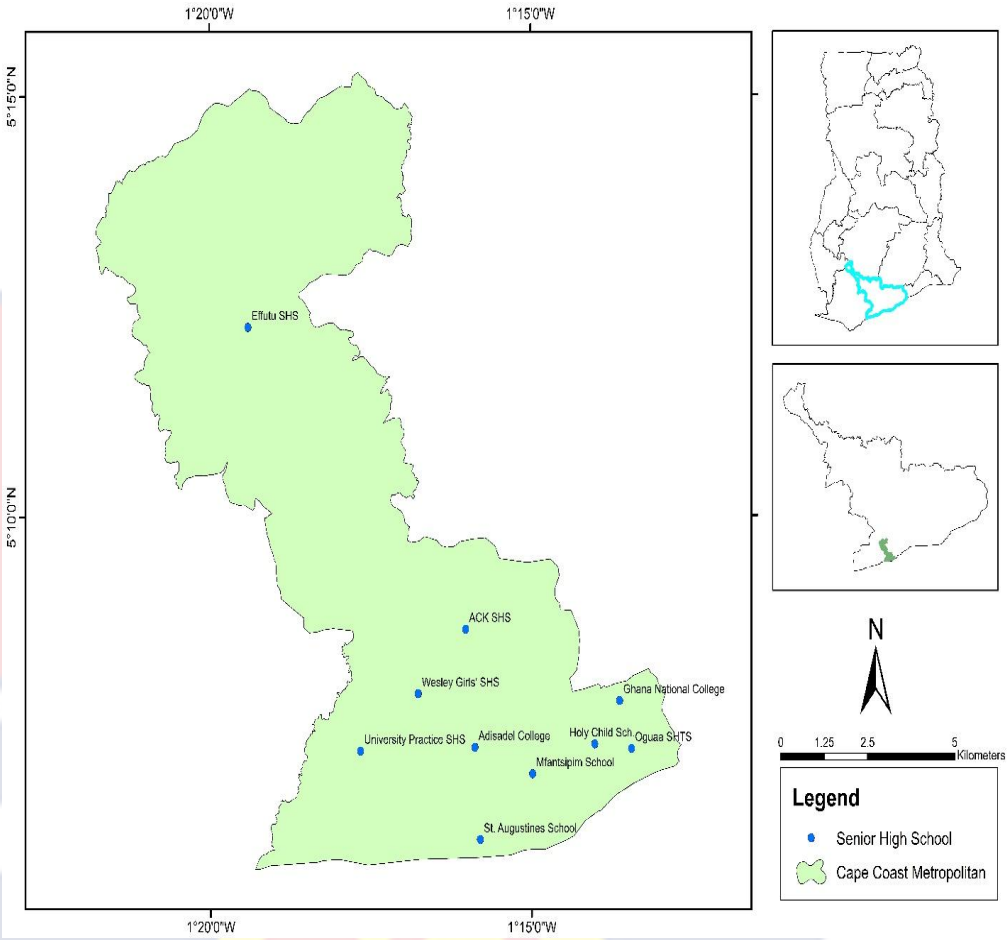


*Figure 3:* Map of public senior high schools in the Cape Coast metropolis**.** Source: ArcGis (2022).

In the Ghanaian Central Region's Cape Coast Metropolis, government-run senior high schools served as the study's sites. Cape Coast happens to lie on the coordinates 5.1315° N, 1.2795° W. The metropolis has in its treasure the Cape Coast Castle and it is noted for fishing activities and its educational foundations and heritage in the country.

The Cape Coast Metropolis is home to 10 government senior high schools. They are Adisadel College, Mfantsipim School, Holy Child School, Wesley Girls Senior High School, St. Augustine's College, Oguaa Senior High Technical School, Effutu Senior High/Tech School, Academy of Christ the King, Ghana National College, and University Practice Senior High School.

With regards to secondary education, the early missionary activities in the area resulted in the establishment of the schools that have existed till this day, namely, Mfantsipim School, Adisadel College, Holy Child School, Wesley Girls Senior High School, and St. Augustine's College. The senior high schools are made up of single-sex schools and mixed schools. For ethical reason, the name of the schools was represented in alphabets. On matters of the subject taught in these schools, geography is an elective offered to General Arts and General Science students.

The researcher considered it relevant to use the seat of education in Ghana, which is Cape Coast. I chose to use the public schools because they dominate the Metropolis – about twice the number of private senior high schools. (GES, Statistical Divisional report, 2014). Additionally, the choice of Cape Coast was because the problem is reported as a nationwide phenomenon and could be studied from any part of the country (Ghana Audit Service, 2023).

**Population**

The survey encompassed all senior high school geography students in the Cape Coast Metropolis who were enrolled in public schools. The Cape Coast Metropolis is home to ten state high schools. A total of 1446 final-year students were enrolled in the 10 schools (Student Records and Management Information System in the schools (SRMIS) Unit, Central Regional Education Service, 2022). The research only included final-year students since they had completed most of the themes and subjects covered in the subject of geography and were therefore more suited to provide relevant answers. For ethical reason, the name of the schools was represented in alphabets. Table 1 shows the population distribution of the final-year students.

**Table 1: Population Distribution for final year Geography Students**

| School | Number | Male | % | Female | % |
|---|---|---|---|---|---|
| School A | 201 | 201 | 100 | - | - |
| School B | 278 | 278 | 100 | - | - |
| School C | 154 | - | - | 154 | 100 |
| School D | 9 - | - | - | 90 | 100 |
| School E | 187 | 187 | 100 | - | - |
| School F | 60 | 23 | 38 | 37 | 62 |
| School G | 45 | 23 | 51 | 22 | 49 |
| School H | 76 | 39 | 51 | 37 | 49 |
| School I | 105 | 26 | 25 | 79 | 75 |
| School J | 250 | 72 | 29 | 178 | 71 |
| Total | 1446 | 849 | | 597 | |

Source: Student Records and Management Information System in the schools (SRMIS) Unit, Central Regional Education Service (2022)

**Sample and Sampling Procedure**

A sample is described by Osuala (2005) as the subdivision of the population which signifies the total group of the study. He further explains that a sample is necessary because the researcher may not gain access to the entire population. Consequently, a person may be able to conclude the characteristics of the general population from which a sample is drawn by seeing the characteristics of the sample. Through the process of sampling, the researcher can observe a relatively smaller number of constituents rather than the entire population and obtain a representation of the entire target population. As a matter of fact, "samples are expected to be representative. For that reason, samples are expected to be chosen by means of sound methodological principles" (Sarantakos, 1998, p. 140). An overall number of 350 final-year students reading geography were sampled. The research only included final-year students since they had completed most of the themes and subjects covered

in the course material for geography and were therefore more suited to provide relevant answers. The investigator's decision to take 350 students out of 1446 students was based on the sample size calculation approach proposed by Krejcie and Morgan (1970), who state that 306 is the lowest number that may be taken from a population of around 1500. However, 350 students were included in the study by the researcher to boost external validity. Furthermore, the reason for the rise was the researcher's expectation that answer returns may not be 100%.

By dividing the population of each school by the total population of all schools, the sample size for each school was calculated. The resulting number was then multiplied by the sample size as a whole. For ethical reason, the name of the schools was represented in alphabets.

Table 2 shows the sample distribution for final year students' population.

**Table 2: Sample Distribution for Final Year Students' Population**

| School | Number | Male | % | Female | % |
|---|---|---|---|---|---|
| School A | 49 | 49 | 100 | - | - |
| School B | 67 | 67 | 100 | - | - |
| School C | 37 | - | - | 37 | 100 |
| School D | 22 | - | - | 22 | 100 |
| School E | 45 | 45 | 100 | - | - |
| School F | 15 | 6 | 40 | 9 | 60 |
| School G | 11 | 6 | 55 | 5 | 45 |
| School H | 18 | 9 | 50 | 9 | 50 |
| School I | 25 | 6 | 24 | 19 | 76 |
| School J | 61 | 17 | 29 | 44 | 71 |
| Total | 350 | 205 | | 145 | |

Source: Field Data (2022)

Once more, the responders were selected using the basic random procedure and a table of random numbers. The procedures described by Cohen et al. (2007) were used to figure out the appropriate sample size for every one

of the 10 schools. The researcher listed and labelled all members of the population in each school (001-350) and then use the table of random point to select cases whose numbers came up with three (3) digits, since the population of the study had three digits, which is 350 respondents. He then scanned the table in a systematic way (that is by reading horizontally). Those figures with four digits and above 350 were not considered. Cases selected were used in forming the sample. Until each school had the necessary sample size, the procedure was repeated. This technique was chosen since sampling is not impacted by the investigator's potential for obvious biases.

**Data Collection Instrument**

A questionnaire and teacher-made test were the instruments employed to explore the views of geography students on the role of the geography curriculum in promoting environmental education in SHS in the Cape Coast Metropolis. The questionnaire was adapted from de la Vega (2004), Ganaa (2011) and Naim, et al. (2019). The choice to use questionnaire and teacher-made test is because of its reliability and validity. Punch (as referenced in Owusu, 2014) recommended that it is appropriate to employ a previous instrument if one exists for a complicated and multidimensional variable, which is why the survey and teacher-made exam were modified.

Nonetheless, some were utilized exactly as they were in the authors' original writings, while others were changed to better suit the research's objective. The instruments utilized were modified by changing the word choices in a few of the sentences.

Items on the questionnaire were close-ended because according to Cohen et al. (2007), they are easy to collect and upfront in coding, and do not

favour overly depending on the expressions of the respondents. It employed a five-point Likert-type scale that ranged from "Strongly agree (SA) =5, "Agree" (A) =4, "Uncertain" (U) =3, "Disagree" (D) =2 to "Strongly Disagree" (SD) =1. The use of the five-point Likert scale was informed by the suggestion by McKelvie (as cited in Owusu, 2014) that the five-category scale is more dependable in relation to the other scales.

In addition, most environmental surveys, especially those that served as a model for this study, use a five-point Likert scale. The questionnaire was divided into three sections based on the research questions that guided the study. Section "A" focused on the demographic characteristics of the respondents. Section "B" was made up of 7 items and considered the environmental awareness of the students. Section "C" which dealt with the environmental attitude of students was made up of 13 items.

The teacher-made test made up of 26 items dealt with the environmental knowledge of the students and was adapted from Ganaa (2011). The environmental knowledge section was divided into three themes; land resources, atmosphere, and air pollution, water resource, and sanitation. The Land resources were made up of 9 items, the atmosphere and air pollution were made up of 9 items while water resources and sanitation comprised 8 items.

**Test for Validity and Reliability of Instrument**

Different validity tests were run on the instruments by the authors De la Vega (2004), Ganaa (2011), and Naim, et al. (2019), whose survey questions were modified for this work. However, the researcher found it appropriate to ensure that the instrument for the study was valid and reliable because the adapted instruments were used in USA, Finland, Turkey, and Ghana. The

questionnaire and teacher-made test were therefore, given to the researcher's supervisors to help determine the content validity of the instruments. The suggestions that were provided by the supervisors were incorporated into the final instruments. The suggestions by these supervisors led to modifications of some items on the questionnaire. Four items that were not clear in meaning were modified. In all 26 items were used for the purpose of the study. Having experts who reviewed the instrument as urged by Naim, et al. (2019) ensured that items were complete, relevant and arranged in appropriate format which yielded a high level of content validity.

The instruments were subsequently pilot-tested in three selected schools in the Effutu Municipality amongst 35 students. This zone was selected for the pilot testing because the geography curriculum as implemented had similar content features as related to the schools in the Cape Coast Metropolis. Again, the instructors from both areas shared similar characteristics in terms of qualifications. The 35 students were selected because they formed 10% of the sample projected for the main study. According to Connelly (2008), existing works advise that a preliminary investigation sample should be 10% of the sample projected for the main study. The core drive of the pre-testing is to authenticate the correctness of the items. The answers from these students were used to determine the reliability of the instrument. The Cronbach's alpha reliability of the components of the instrument yielded the following values:

**Table 3: Reliability Results of Instrument**

| Variables | No. of items | Cronbach's Alpha |
|---|---|---|
| Environmental Knowledge | 25 | .770 |
| Environmental Awareness | 7 | .707 |
| Environmental Attitude | 13 | .849 |

Source: Field data (2022)

Fraenkel and Wallen (2000) assert that "for research purposes, a useful rule of thumb is that reliability should be at .70 and preferably higher" (p. 179). The instrument that was used for the pilot study was not modified since none of the items were found to be misleading. The pilot test took place in May 2022 whilst the data collection took place in June, 2022.

**Data Collection Procedures**

A total of 350 questionnaires and teacher-made test were administered to students in June. Approximately two weeks were used to administer the questionnaire. Ample time was used to clarify the items in the research instruments to the respondents to enable the researcher get precise information from the respondents. Since no one was coerced to partake in the study, provision was made for anyone who wished to withdraw from the research at any point in time. Hence, an adequate explanation was given to respondents about the objective of the research work. Again, no one was coerced to provide responses for the study. As a result, respondents were not obligated to reveal their identity, either by name, or contact number. This was to ensure privacy and secrecy.

**Ethical Considerations**

The University of Cape Coast Institutional Review Board before beginning the data collection activities (see Appendix E) was consulted

regarding ethical concerns. To obtain their informed consent, all study participants were informed about the goals, purpose, and possible applications of the research findings. Since the majority of the study participants are students enrolled in different schools, prior to contacting respondents, the schools were contacted to obtain their consent.

The respondents' confidentiality was upheld as needed. Through the use of an administration system that required participants to provide only their age and gender—not their names—respondents were guaranteed anonymity and confidentiality. Additionally, the respondents were made aware of their ability to withdraw from the study at any time. Anonymity and confidentiality were highly valued in order to uphold standards and ethical issues, as well as the right to privacy, voluntary participation, and no harm to participants. Because they are entitled to privacy, students' rights to privacy must always be upheld. In this sense, the study's participants' right to privacy was upheld, and no information was ever obtained from them without their knowledge or consent. Lastly, for confidentiality purposes, the name of the schools was represented in alphabets (A, B, C, D, E, F, G, H, I, J).

Again, respondents' voluntary participation is a crucial factor when it comes to ethical concerns in research. The importance of the study was explained to the respondents because it takes some time for questionnaire responses to be received. Respondents were free to exercise their voluntary right to participate in the study after receiving this notice. As a result, nobody was forced to take part in the research.

Furthermore, it is commonly known that unethical behaviour, such as plagiarism, is not tolerated. This typically starts when a researcher manipulates,

fabricates, or plagiarizes other people's work, whether or not citations are included. To prevent plagiarism, this study adhered strictly to the guidelines for acceptable scientific behaviour. Notably, ideas, works, and writings were properly acknowledged by giving the proper citations in the main refereeing style adopted by the University of Cape Coast and the in-text referencing. All entry institutional protocols were observed before data was collected. All participants in this research were duly informed of the significance to the metropolis after this exercise is successfully carried out.

**Data Processing and Analysis**

The data was sieved to remove any irrelevant responses before being coded in order to answer the research questions that guided the study. The Statistical Package for Service Solution (SPSS 23.0) and Microsoft Excel were then used to manage the data. The data were analysed using both descriptive and inferential statistics. Research questions one (1) through three (3) were analysed using descriptive statistics, which include frequencies and percentages, mean of means, and standard deviations. For research question four (4) and the related research hypothesis, correlation was used as part of the inferential statistics.

**Data Management**

The hard and soft copies of data collected (survey) would be kept by the researcher for at least 5 years after the study before it would later be burned. Information derived from the participants has been confidentially kept by the researcher and would not be released to any third party except required by law.

## Chapter Summary

The research methods that were used for the study were discussed in this chapter. For the study, a descriptive survey design combined with a quantitative methodology was used. A total of 350 respondents were sampled for the study using both the proportionate and simple random sampling techniques. A teacher-made test and questionnaire were taken from de la Vega (2004), Ganaa (2011), Naim, et al. (2019) in order to gather data. Utilizing both descriptive and inferential statistics, the data collected from the questionnaire was examined. The answers to Research Questions 1-3 were found using descriptive statistics, which included frequencies and percentages, means of means, and standard deviations. Correlation analysis was used in the inferential statistics to analyse the related research hypothesis.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

## Introduction

The chapter highlights the findings from the field research conducted to investigate geography students' opinions regarding the contribution of the geography curriculum to environmental education in SHS in the Cape Coast Metropolis. There are two sections in which this chapter appears. The respondent's demographic details are covered in the first part. The primary data to address the research questions developed to direct the study are the subject of the second section.

## Demographic Characteristics of the Respondents

The demographic characteristics of the student included: school, gender, and age. These demographic characteristics were considered important because they could aid the analysis of the formulated research questions. Again, they would provide and enrich the understanding of the category of respondents who were involved in the study. For ethical reason, the name of the schools was represented in alphabets (A, B, C, D, E, F, G, H, I, J).

The results are presented in Tables 4-5.

**Table 4: Schools of Respondents**

| School | No. | % |
|---|---|---|
| School A | 49 | 14.0 |
| School B | 67 | 19.14 |
| School C | 37 | 10.57 |
| School D | 22 | 6.28 |
| School E | 45 | 12.85 |
| School F | 15 | 4.28 |
| School G | 11 | 3.14 |
| School H | 18 | 5.14 |
| School I | 25 | 7.14 |
| School J | 61 | 17.42 |
| Total | 350 | 100.00 |

Source: Field data (2022)

Table 4 shows the schools of the respondents. It is seen from the table that, the majority (19%) of the respondents were students of School B, and only a few (3.1%) of the respondents were students of School G. It appears that School B has more students reading geography relative to the other schools. This is apparent because the sample, as drawn from the various programmes, was proportionate to the population.

**Table 5: Gender and Age of Students**

| Variables | No. | % |
|---|---|---|
| Gender | | |
| Male | 205 | 58.6 |
| Female | 145 | 41.4 |
| Age | | |
| 15 to 20 years | 280 | 80.0 |
| 21 to 25 years | 70 | 20.0 |
| 26 to 30 years | - | - |
| Total | 350 | 100.0 |

Source: Field Data (2022)

Table 5 reveals that 145 respondents (41.4%) were female and 205 respondents (58.6%) were male. This unmistakably demonstrates that there was a gender gap among the study's respondents. According to Atuahene and Owusu-Ansah (2013), there is a general assumption that more males than females are admitted to the Ghanaian educational system, which is supported by the relatively large number of male students. This, however, would not have an adverse effect on the study's conclusions because the sample was chosen based on how representative the respondents' gender was in relation to the population.

**Presentation and Discussion**

This section deals with the discussion of the data from the field to address the research questions and hypotheses that were formulated to guide the study. Three research questions were posed to elicit students' responses about their views on the role of geography curriculum in promoting environmental education in SHS in the Cape Coast Metropolis. They were:

1. To what level does geography curriculum promote environmental knowledge amongst students in the SHS?
2. To what level has the geography curriculum engendered environmental awareness among students in the SHS?
3. To what level has the geography curriculum affected attitude of students towards environmental issues?

The following hypotheses were also tested:

1. $H_0$: There is no statistically significant relationship between environmental knowledge, and environmental awareness of geography students.

   $H_1$: There is statistically significant relationship between environmental knowledge and environmental awareness of geography students.

2. Ho: There is no statistically significant relationship between environmental awareness and environmental attitude of geography students.

   $H_1$: There is statistically significant relationship between environmental awareness and environmental attitude of geography students.

3. Ho: There is no statistically significant relationship between environmental knowledge and environmental attitude of geography students.

   $H_1$: There is statistically significant relationship between environmental knowledge and environmental attitude of geography students.

Firstly, the questionnaire consisted of objective test representing the first research question and a five-point Likert scale questionnaire representing the other research questions. These were administered and analysed using frequencies, percentages, mean of means and standard deviations. From the analysis, Research Question One used frequencies and percentages to ascertain and evaluate the performance of the students out of the objective test. With regards to the research questions 2 and 3, the scale had a mean of 3. This was because response 3 corresponded with the choice *Uncertain*. As such, any response with a mean greater than 3 was deemed as an agreement and a response of less than 3 was also seen as a disagreement with the statement. A standard deviation below 1.0 showed that the responses from the respondents were homogeneous and heterogeneous when it was above 1.0.

**Research Question One: To what level has the geography curriculum promoted environmental knowledge amongst students in the SHS**

The first research question sought to explore the level geography curriculum has promoted environmental knowledge among students in the SHS At this point, the responses of students with regard to their knowledge of certain environmental issues are analysed. Gronlund's (1995) criterion of mastery was applied. In line with Gronlund theory, students who scored less than 65% are interpreted to have mastered only a few of the subject's objectives. The scores

were interpreted as follows: Scores of 0-12 were interpreted as students being fairly knowledgeable of the environment (low environmental knowledge). Scores of 13-19 suggest that students are knowledgeable of the environment (average environmental knowledge). Scores of 20-26 show that students are highly knowledgeable of the environment (high environmental knowledge). The results are presented in Table 6.

**Table 6: Students' Performance on Environmental Knowledge Test (EKT)**

| Rank | Frequency | Percent |
|---|---|---|
| Above average | 101 | 28.9 |
| Average | 209 | 59.7 |
| Below average | 40 | 11.4 |
| Total | 350 | 100.0 |

Source: Field Data (2022)

The analysis of the environmental knowledge test (EKT) demonstrates that majority of students performed averagely on the test. Students 101 (28.9%) had an above average score in the EKT test. This signify that only 28.9% of the student have high environmental knowledge which further reveal the percentage of students that are highly knowledgeable of the environment. Students 209 (59.7%) had an average score in the EKT test. This represent an average in environmental knowledge; further signifying majority of the students are knowledgeable about the environment. Lastly, students 40 (11.4%) had a below average score in the EKT test. This shows students are fairly knowledgeable of the environment.

The analysis of students' performance in the EKT reveals the views of geography students on the impact of the geography curriculum in promoting environmental knowledge. The test indicates that total knowledge about the environment is average with majority of students demonstrating average mastery of the environmental themes in the geography curriculum. The average

knowledge of students in environmental education is consistent with findings of earlier studies conducted in other countries. Summarily, the study corroborated the findings of Nunez and Clores (2017) their results indicated that students have a moderate level of environmental knowledge (M = 17.5).

However, the findings contradicted the findings of earlier studies. For instance, the study contradicts that of Ganaa (2011) that in the senior high schools in Northern Ghana, students possessed a low level of environmental knowledge. The respondents were students who study general study, business, home economics, and agriculture. The nature of the subjects studied by the students may have accounted to the variation in knowledge.

**Research Question Two: To what level has the geography curriculum engendered environmental awareness among students in the SHS?**

Research Question Two sought to ascertain the level geography curriculum has engendered environmental awareness among students in the SHS. In view of this, there was an effort to determine the overall stance of students and teachers regarding their level of environmental awareness. The results are presented in Table 7.

**Table 7: Environmental Awareness of Final Year Geography Students**

| Statement | Mean | SD |
|---|---|---|
| Geography curriculum teaches me to like nature | 3.96 | .90 |
| Geography curriculum teaches me to appreciate sea, land, ponds, and other natural features. | 3.95 | .91 |
| Geography curriculum teaches me to be aware that it is wrong to sell areas that have lost their natural characteristics to bring money to our country. | 3.51 | 1.12 |
| Geography curriculum teaches me to be aware that the construction of hotels for tourism in national parks and forests should not be allowed | 2.85 | 1.38 |
| Geography curriculum teaches me to be aware that for housing, wetlands should not be drained so houses can be built there | 3.57 | 1.22 |
| Geography curriculum teaches me to be aware that the environment cannot clean itself so human waste disposal is a problem | 4.34 | 1.00 |
| Geography curriculum teaches me to be aware that the ozone layer has been thinned so there is a danger to our country | 4.25 | .97 |
| Mean of Means/ Average Standard Deviation | 3.78 | 1.10 |

Source: Field Data (2022)

Table 7 presents the result of the data collected on environmental awareness of SHS students in the Cape Coast Metropolis. The direction ($M$ = 3.96, $SD$ = 0.90; $M$ =3.95, $SD$ = 0.91) of the respondents agreed that through their studies in geography they like nature, and consequently they also appreciate the sea, land, ponds, and other natural features respectively. In simple terms, this signifies the fact that the study of geography inculcates a liking for nature, and additionally, they value the land, water, ponds, and other natural characteristics.

Respondents also agree with the statement that geography has brought an awareness that it is wrong thing to sell areas that have lost their natural characteristics to bring money to our country ($M$ = 3.51, $SD$ = 1.21). This signifies respondents' opinion and belief about how irrespective of the economic gains that may be accrued from selling areas that have lost their

natural characteristics, the restoration of such areas should be prioritized and deemed important in the maintenance of natural resources. A sense of natural resource management is ignited among students.

Again, the direction ($M$ = 3.57, $SD$ = 1.22) of the respondents also affirmed that the geography curriculum has made them aware of the need not to displace wetlands for housing purposes. This may stem from their knowledge about the crucial benefits of the wetland's ecosystem.

A direction ($M$ = 3.57, $SD$ = 0.22; $M$ = 4.25, $SD$ = 0.97) affirmed the statement geography has helped to create the awareness that the environment cannot clean itself so human waste disposal is a problem and how the depletion of the ozone layer poses a danger to the country respectively. This perceived indication is based on the prevalent sanitation crisis in the country and the need for people to be responsible for the waste generated. On depletion of the ozone layer and its related danger to the country, a perceived awareness may be attributed to students' knowledge of the atmospheric pollution that predominantly stems from mankind

Respondents were in contrast to the statement that the geography curriculum has made them aware that the construction of hotels for tourism in national parks and forests should not be allowed ($M$ = 2.85, $SD$ = 1.38).

Generally, the mean of means (mean = 3.78) suggests that students' level of awareness about the environment is noticeably high; signifying the direction of responses of students. This particular direction of the response submits that the knowledge of geography curriculum leads to high environmental awareness.

The findings of this research question are in line with the findings Gümrükçüoğlu et al. (2017) who reported that students in Karadeniz Technical University Health in Turkey totally agree on the environmental awareness scale. The students indicated their belief that media should be used to educate and inform them. The students further indicated their belief that media should be used to educate and inform them to make them aware of the environment. In support, the study of Majumder (2017) testified that students with a background in the environment tend to have more awareness of the environment whilst the students with no environmental knowledge were less aware of the environment. Some environmental issues students become aware of include air pollution, water pollution, soil pollution, noise, and climate-related issues.

With regards to the various ways through which students develop an awareness of the environment includes; the TV, books, and newspaper with little attempt by the elderly. It was further revealed that education remains the main channel in inducing awareness about the environment. Karaismailoglu and Erten (2018) revealed in their study that one major way teachers become aware of the environment was through the media and also how often they spoke about environmental issues in their homes and classes influenced their knowledge and attitude.

In summary, the students' environmental education sensitization was closely related hence, it can be deduced that the environmental awareness of students hinges on their exposure to environmental issues. It could be traced that issues about the environment are scattered through the mass media and through schools. Therefore, one's opinion, beliefs, and thoughts are shaped by exposure to environmental issues. The school remains a massive pivot where

the various dynamics of the environmental system are communicated; adequate skills are delivered and opinions and beliefs are fashioned in the proper frameworks necessary to effect change in human attitude and behaviour.

**Research Question Three: To what level has the geography curriculum affected attitude of teachers towards environmental issues?**

Research Question Three sought to determine the level the geography curriculum has affected attitude of students towards environmental issues. In view of this, there was an attempt to determine the overall position of students regarding their level of environmental attitude. The results are presented in Table 8.

**Table 8: Environmental Attitude of Final Year Geography Students**

| Statement | Mean | SD |
|---|---|---|
| Through the study of geography, I am satisfied with learning more environmental lessons in the geography curriculum | 3.60 | 1.05 |
| Through the study of geography, I am willing to take responsibility in protecting the environment. | 3.80 | .89 |
| Through the study of geography, I get irritated with people who cause environmental pollution. | 3.53 | 1.12 |
| Through the study of geography, I worry about global environmental issues. | 3.46 | 1.11 |
| Through the study of geography, I feel guilty when I do harm to the environment. | 3.35 | 1.13 |
| Through the study of geography, I am proud of myself because of my sensitivity to the environment. | 3.33 | 1.07 |
| Through the study of geography, I warn a person who pollutes the environment without hesitation. | 2.93 | 1.15 |
| Through the study of geography, I voluntarily participate in any activity organized related to the natural environment at school. | 2.88 | 1.17 |
| Through the study of geography, I share my knowledge about the environment with my friends. | 2.96 | 1.17 |
| Through the study of geography, I am exposed to read books about environmental issues apart from geography textbooks. | 3.09 | 1.21 |
| Through the study of geography, I take part in clean-up campaigns. | 2.77 | 1.20 |
| Through the study of geography, I am a member of an environmental group. | 2.27 | 1.07 |
| Through the study of geography, I take part in any environmental NGO activities. | 2.32 | 1.11 |
| Mean of Means/ Average Standard Deviation | 3.10 | 1.11 |

Source: Field Data (2022)

Table 8 presents the result of the data collected on environmental attitude of SHS students in the Cape Coast Metropolis. The direction of responses of students ($M$ = 3.60, $SD$ = 1.05) affirmed to the statement that "through the study of geography, I am satisfied with learning more environmental lessons in the geography curriculum". This perceived claim indicates the need for more environmental issues to be covered in the curriculum textbooks. Floods, global climate change, wildfires, soil, water, and air pollution; desertification; the ozone hole; a decline in biodiversity; an increase in extreme weather events; a shift in plant and animal species; and improper waste management remain part of the environmental issues covered in the geography curriculum.

The direction of responses of students ($M$ =3.80, $SD$ = 0.89) agree with the statement that "through the study of geography, I am willing to take responsibility in protecting the environment". The perceived claim of this statement hinges on an apparent adequate knowledge and awareness of the environment.

The findings indicate students demonstrate the need to take care of the environment. In contrast to this claim, Zachariou, et al. (2017) from their study that explored teachers' attitudes toward environmental education (EE) in Greece, teachers rather tend to consider themselves less responsible for the environmental quality of their place of residence. In that, a tendency to deny personal responsibility for the current situation and shift blame to others, as well as a cautious attitude toward the state.

The statement "Through the study of geography, I get irritated with people who cause environmental pollution" had had a direction of response ($M$

= 3.53, *SD* = 1.12) which signifies students' agreement with the statement. This perceived aspect of attitude is attributed to an emotional tendency concerning the environment. In other words, the kind of emotion that is expressed as a result of the geography curriculum. This perceived emotional tendency to get annoyed by instigators of environmental pollution signifies an important function of what the geography curriculum generates in its learners.

Furthermore, the direction of responses of students (*M* = 3.46, *SD* = 1.11) affirm the statement that "Through the study of geography, I worry about global environmental issues". On the matter of emotional tendencies found in environmental attitude, students' response indicates that a high level of anxiety is generated when they are exposed to environmental concerns.

In the sense that students have a perceived worry regarding the global environmental issues associated with our world.

Additionally, the statement "Through the study of geography, I feel guilty when I do harm to the environment" had a direction of response (*M* = 3.35, *SD* = 1.13). This implies a high or positive attitude towards the environment. In as much as this corresponds to an emotional tendency in humans in general. It can be seen to be evidence in ensuring that we regard the environment as it should and try various means to make compensation for the degrading environment by choosing to act positively towards the environment. It affirms the feeling that you should be saving the world and helping the environment more.

This finding is consistent with the study of Rees et al. (2015) in exploring the direct impact of moral emotions on environmental attitudes and behaviour. The study revealed that people may change their evaluation of past

environmentally burdening behaviours and future environmentally friendly behaviours to restore balance in their relationship with the environment in the same way that intellectual dishonesty may cause people to change their attitudes to reduce inconsistencies between attitudes and behaviour.

The direction of students' responses ($M$ = 3.33, $SD$ = 1.07) affirmed, "Through the study of geography, I am proud of myself because of my sensitivity to the environment". It can be deduced from this trend that students' background in geography makes them confident in themselves.

The direction of students' responses ($M$ = 2.93, $SD$ = 1.15) disagreed with the statement "I warn a person who pollutes the environment without hesitation". This represented a drop in attitude with regard to the environment. It could be deduced that in as much as students' emotions were positive regarding environmental issues, their behaviour towards environmental issues was rather reduced. This claim is consistent with the findings of Barghi et al. (2017) who evaluated a study on environmental awareness, attitude, and performance in students at the post-graduate level about certain challenges of the environment. The study revealed that a difference is observed in the relationship between environmental attitude and environmental performance (behaviour). Hence, the higher the attitude of students towards the environment increased, the lesser their performance and behaviour towards the environment.

The statement "Through the study of geography, I voluntarily participate in any activity organized related to the natural environment at school had a direction of response ($M$ = 2.88, $SD$ = 1.17). This indicated that the direction of the students' responses disagreed with the statement. This reveals that students perceived behaviour or action to participate in activities organized

related to the natural environment was low. Perhaps, they only did that at the compulsion of the student leaders and school authorities. This finding agrees with the study of Arshad et al. (2020) which investigated the environmental attitude, awareness, concern, and behaviour of university students across academic disciplines in Pakistan. The study revealed on the subject of environmental attitude, a mean of 2.95 was reported which was not encouraging and hence it demonstrated a negative effect on environmental behaviour. Teachers were asked how much voluntarily participated in any activity related to the natural environment.

The statement "Through the study of geography, I share my knowledge about the environment with my friends" had a direction of response ($M$ =2.96, $SD$ = 1.17). This indicated that the direction of the students' responses disagrees with the statement that; students' commitment to spreading the mandate of environmental education is low.

Furthermore, the statement "Through the study of geography, I am exposed to read books about environmental issues apart from geography textbooks" had a direction of response ($M$ = 3.09, $SD$ = 1.21). This finding shows that a high number of students are exposed to environmental issues apart from the geography textbooks.

Again, the statement "Through the study of geography, I take part in clean-up campaigns" had a direction of response ($M$ = 2.77, $SD$ = 1.20). This represented a low turnout of students taking part in clean-up campaigns. This further indicates the concentration on the accumulation of knowledge for examination purposes instead an added need to participate in clean-up campaigns.

Lastly, the statements "Through the study of geography, I am a member of an environmental group" and "Through the study of geography, I take part in any environmental NGO activities" had a direction of response ($M$ = 2.27, $SD$ =1.07; $M$ = 2.32, $SD$ = 1.11) respectively. This indicates that small number of students happened to be part of any environmental groups in their schools and hence participated in environmental group activities.

Generally, the mean of means (mean = 3.10) suggests that students' level of attitude about the environment through the geography curriculum is closer to neutral as it exceeded the 3.0 mark by just a point; signifying the direction of responses of students. This direction of response signifies that students' level of attitude about the environment through the geography curriculum is positive yet not strong enough. This particular trend of the response submits that the knowledge of geography curriculum leads to high environmental awareness leading to a high attitude concerning the environment.

This finding is consistent with the study of Barghi et al. (2017) where higher awareness about the environment led to a higher attitude to the environment. Zachariou, et al. (2017) also affirm to this finding. Their study revealed that knowledge and information may lead to increased teacher sensitivity, as well as student and future citizen participation in actions that will provide them with the means to improve their attitude toward the environment. However, the study of Arshad et al. (2020) revealed otherwise. Their findings revealed that their attitudes were quite low. On the subject of environmental attitude, a mean of 2.95 was reported which was not encouraging and hence it demonstrated a negative effect on environmental behaviour.

Nevertheless, it is worth noticing that in the context of this study, the variable; attitude comprised emotions and behaviour (actions, commitments, participation) tendencies. Hence, some statements yielded to emotional tendencies regarding the environment whilst others yielded to behaviour (actions, commitments, participation) regarding environmental issues or concerns.

For instance, the mean environmental attitude for six statements/behaviours was found very discouraging because it was less than 3. These statements were "Through the study of geography, I warn a person who pollutes the environment without hesitation" with a mean behaviour of 2.93, "Through the study of geography, I voluntarily participate in any activity organized related to the natural environment at school" with a mean behaviour of 2.88, "Through the study of geography, I share my knowledge about the environment with my friends" with a mean behaviour of 2.96, "Through the study of geography, I take part in clean-up campaigns" with a mean behaviour of 2.77, "Through the study of geography, I am a member of an environmental group" with a mean behaviour of 2.27, and "Through the study of geography, I take part in any environmental NGO activities" with a mean behaviour of 2.32.

The other statement under environmental attitudes had a mean within the range of 3.09 and 3.8. These findings reveal that within the environmental attitude variable lies the behavioural dimension which indicates low behaviour and participation on the part of students

These findings are consistent with Barghi et al. (2017) in their study that sought to evaluate environmental awareness, attitude, and performance in students at the post-graduate level about certain challenges of the environment.

The analysis revealed that, the higher the attitude of students towards the environment increased, the lower their performance and behaviour towards the environment. It appears that; attitude is distinguished from performance and behaviour. It was possible to conclude that environmental behaviour is a subset of environmental attitude. In connection to this, the findings of Karaismailoglu and Erten (2018) indicated that from the environmental awareness scale, teachers' attitudes and knowledge were higher; such that as the level of environmental knowledge increases, attitudes also increase.

***Statistical Test Assumptions***

**Table 9: Tests of Normality**

| Kolmogorov-Smirnov[a] | Statistic | df | Sig. |
|---|---|---|---|
| Knowledge | .063 | 350 | .002 |
| Awareness | .095 | 350 | .000 |
| Attitude | .053 | 350 | .018 |

a. Lilliefors Significance Correction

A test of normality was conducted to test normality of the data. Table 9 reveals a Kolmogorov-Smirnov test indicating that all variables namely knowledge, awareness and attitude do not follow a normal distribution, ($p < 0.05$). Again, the groups that are being compared do not have similar variance. The data are not independent. In that, the variables consisted of a predictor and outcome variable. Non parametric tests are used when data do not follow a normal distribution. Hence, the use of the spearman rank correlation for the analysis.

**Research Hypothesis 1:$H_1$: There is statistically significant relationship between environmental knowledge and environmental awareness of geography students.**

The first research hypothesis sought to establish whether there was a statistically significant relationship between environmental knowledge and environmental awareness of geography students. The table below shows the relationship between environmental knowledge and environmental awareness.

**Table 10: Correlation between Environmental Knowledge and Environmental Awareness**

| Variable | | Knowledge | Awareness |
|---|---|---|---|
| Knowledge | Spearman correlation | 1 | .248** |
| | Sig. | . | .000 |
| Awareness | Spearman correlation | .248** | 1 |
| | Sig. | .000 | . |

Source: Fieldwork (2022) **$p$ < .01(2-tailed).

The results of the Spearman correlation indicates that there is a statistically significant relationship between environmental knowledge and environmental awareness of geography students (r [348] = .248, p < .001). The environmental knowledge and environmental awareness of the students were moderate and positively associated. This indicates that as knowledge increases, it leads to significant increase in awareness. Therefore, we reject the null hypothesis.

**Research Hypothesis 2: $H_1$: There is statistically significant relationship between environmental awareness and environmental attitude of geography students.**

The second research hypothesis sought to establish whether there was a statistically significant relationship between environmental awareness and environmental attitude of geography students. The table below shows the relationship between environmental awareness and environmental attitude.

**Table 11: Correlation between Environmental Awareness and Environment Attitude**

| Variables | | Knowledge | Awareness |
|---|---|---|---|
| Awareness | Spearman correlation | .248** | 1 |
| | Sig. | .000 | . |
| Attitude | Spearman correlation | .058 | .248** |
| | Sig. | .278 | .000 |

Source: Fieldwork (2022) **$p$ < .01(2-tailed).

The results of the Spearman correlation indicates that there is a statistically significant relationship between environmental awareness and environmental attitude of geography students ($r$ [348] = .248, $p$ < .001). Environmental awareness and environmental attitude were moderate and positively associated. This reveals attitude towards the environment depends on the increase in environmental awareness which is subjected to knowledge about the environment. Therefore, we reject the null hypothesis.

**Research Hypothesis 3: $H_0$: There is no statistically significant relationship between environmental knowledge and environmental attitude of geography students.**

The research hypothesis sought to establish whether there was a statistically significant relationship between environmental knowledge and environmental attitude of geography students.

**Table 12: Correlation between Environmental Knowledge and Environment Attitude**

| Variables | | Knowledge | Awareness |
|---|---|---|---|
| Knowledge | Spearman Correlation | 1 | .248** |
| | Sig. | . | .000 |
| Attitude | Spearman Correlation | .058 | .248** |
| | Sig. | .278 | .000 |

Source: Fieldwork (2022) **$p$ < .01(2-tailed).

The results of the Spearman correlation indicates that there is no statistically significant relationship between environmental knowledge and environmental attitude of geography students ($r$ [348] =.058, $p$ >.001). Meanwhile, the relationship environment knowledge and environmental attitude of students were weak but positively associated. Therefore, we fail to reject the null hypothesis.

This result is consistent with the findings of earlier studies conducted in other countries. Varoglu et al. (2017) conducted a study on secondary school students' knowledge, attitudes, and behaviours towards environmental issues. The results indicated that with regards to the relationship that exists among knowledge, attitude, and behaviour showed that the relation between environmental knowledge and behaviour is weak (r=0.21). Whilst,

environmental attitude had a moderate relationship with environmental knowledge and behaviour. According to the correlation between the environmental literacy aspects, it was determined from the results that there is a positive but modest correlation between environmental knowledge and environmental attitude.

The findings of Kumar and Rani (2019) showed that through nature-based education students' environmental knowledge was higher and this correlated to positive behaviour. Barghi et al. (2017) also support this finding in their study that environmental awareness and environmental attitude revealed a positive relationship; where a higher awareness led to a higher attitude about the environment.

However, the same was not seen about the relationship between environmental attitude and environmental performance. The analysis revealed that the higher the attitude of students towards the environment increased the lower their performance and behaviour towards the environment. Lastly, the study of Nunez and Clores (2017) revealed the correlation between the environmental literacy aspects, namely; environmental knowledge, attitude, behaviours, and sensitivity, it was determined from the results that there is a positive but modest correlation between environmental knowledge and environmental attitude.

**Chapter Summary**

The chapter has indicated that the final year geography students in the Cape Coast Metropolis moderate have environmental knowledge. The student's performance in the environmental knowledge test (EKT) was average signifying a high environmental knowledge. The study further found that

students' environmental awareness was also high leading to a positive attitude towards the environment. The component of environmental behaviour and performance under the environmental attitude of both students and teachers was found to be low. Moreover, there is a moderate and positive association between environmental knowledge, and environmental awareness but the strength of association between environmental knowledge and environmental attitude was weak yet positive. The following section is the last which focuses on the summary of the study, conclusions and recommendations.

# CHAPTER FIVE

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## Introduction

This is the final chapter of the study. The report summary is presented first. Conclusions are drawn from the study's key findings to aid in the generation of appropriate recommendations for policy formulation. Lastly, suggested areas for future research are also provided.

## Summary of the Study

The research was conducted to find out the role of geography curriculum in promoting environmental education in senior high schools in the Cape Coast Metropolis. The study adopted a descriptive survey design. The sample size for the research was 350 final-year geography students which were obtained through proportionate stratified sampling technique and a simple random picking. The instrument used in the study were a questionnaire and teacher-made test protocol. The questionnaire was adapted from De la Vega (2004), Naim, et al. (2019) while the teacher-made was adapted from Ganaa (2011) for data collection. The Cronbach's alpha reliability of the components of the instrument yielded the following values; (teacher-made test) environmental knowledge (0.770), environmental awareness (0.707) and environmental attitude (0.849) (See Appendix A).

Descriptive and inferential statistics were used to analyse the data that was obtained from the questionnaire. The descriptive statistics including frequencies and percentages, mean of means, and standard deviations were used to determine the responses of the research questions 1-3. The inferential

statistics comprised the use of correlation to analyse the relationship among the variables in the research hypothesis.

In order to address the specific objectives of the study, the following research questions were formulated:

1. To what level does geography curriculum promote environmental knowledge amongst students and teachers in the SHS?
2. To what level has the geography curriculum engendered environmental awareness among students and teachers in the SHS?
3. To what level has the geography curriculum affected attitude of students and teachers towards environmental issues?

The following hypotheses were also tested:

4. $H_0$: There is no statistically significant relationship between environmental knowledge, and environmental awareness of geography students.

   $H_1$: There is statistically significant relationship between environmental knowledge and environmental awareness of geography students.
5. Ho: There is no statistically significant relationship between environmental awareness and environmental attitude of geography students.

   $H_1$: There is statistically significant relationship between environmental awareness and environmental attitude of geography students.
6. Ho: There is no statistically significant relationship between environmental knowledge and environmental attitude of geography students.

$H_1$: There is statistically significant relationship between environmental knowledge and environmental attitude of geography students.

**Key Findings**

The following are summary of key findings that emanated from the study;

1. The first objective was to explore the level geography curriculum has promoted environmental knowledge among students in the SHS. The analysis of students' performance in the EKT reveals the views of geography students on the impact of the geography curriculum in promoting environmental knowledge. The test indicates that total knowledge about the environment is average with majority of students demonstrating average mastery of the environmental themes in the geography curriculum.
2. The second objective was to ascertain the level geography curriculum has engendered environmental awareness among students in the SHS. In that, they were adequately knowledgeable on environmental issues such as land resources, atmosphere and water.
3. The third objective was to determine the level the geography curriculum has affected attitude of students towards environmental issues. It is important to note, however, that in the context of this study, the variable, attitude, was made up of emotions and behavioural (actions, commitments, and involvement) patterns.
4. The fourth objective sought to investigate the relationship between environmental knowledge and environmental awareness of geography students. The study revealed that environmental knowledge and

environmental awareness of the students were moderately and positively associated. Meanwhile, the relationship between environmental knowledge and environmental attitude of students were weak but positively associated.

5. The fifth objective sought to investigate the relationship between environmental awareness and environmental attitude of geography students. It was revealed that environmental awareness and environmental attitude were moderate and positively associated.
6. The final objective sought to investigate the relationship between environmental knowledge and environmental attitude of geography students. It was revealed that the relationship between environmental knowledge and environmental attitude of students was weak but positively associated.

**Conclusions**

The following conclusions were drawn from the study's key findings.

From the study, one major issue that was explored was the level geography curriculum has promoted environmental knowledge among students in the SHS. The EKT performance analysis of students reveals the impact of the geography curriculum in promoting environmental education among students was average. The literature review showed that the environmental knowledge of both B.Ed. and D.Ed. teacher trainees are high. According to literature when students were assessed on environmental issues such as; land pollution, global warming and the greenhouse effect, acid rain, ozone layer, and water pollution, the results revealed that the majority of students performed averagely on the test.

Comparing the findings of the study and the literature it can be concluded that, geography students' knowledge of environmental issues raised in the geography curriculum is high in the sense that, they are familiar with the core issues that affect the environment. It can further be determined that the geography curriculum educates students about the dangers of human activities against the environment as issues on land, water, and air are covered.

In addition, with regards to the level geography curriculum has engendered environmental awareness among students in the SHS, the study revealed that student's awareness of environmental issues is significantly high. The literature testified to this study that students with a background in the environment tend to have more awareness of the environment whilst the students with no environmental knowledge were less aware of the environment with most students becoming aware of include air pollution, water pollution, soil pollution, noise, and climate-related issues. Again, the literature also confirmed that university students' positive agreement on the environmental awareness scale conducted revealed that students' awareness of environmental issues increased when they were exposed to the media apart from what they are taught in the classrooms.

From the findings and the literature review, it can be concluded that knowledge of the geography curriculum leads to heightened environmental awareness and further proves that geography education in SHS continues to serve as a crucial fulcrum where many environmental system dynamics are conveyed, appropriate skills are imparted, and attitudes and beliefs are shaped in the appropriate frameworks required to bring about change in human attitude and behaviour.

With reference to the level the geography curriculum has affected attitude of students towards environmental issues, the study revealed that students have a positive attitude toward the environment in general. Probing further the attitude of students toward environmental issues, the study revealed that students' behaviour towards the environment was low. This confirms what was found out in the literature where higher awareness about the environment led to a higher attitude to the environment. The literature also revealed that the higher the attitude of students towards the environment increased the lower their performance and behaviour towards the environment.

Based on the evidence from the study findings as well as the literature, it can be concluded that students may have a positive attitude towards the environment but their actions, and commitments may be negative. In that, they may show positive emotions toward the preservation of the environment as revealed in this study, but their efforts and actions towards it may be low.

Lastly, in determining the relationship/association between environmental awareness, environmental knowledge, and environmental attitude, the study revealed that environmental knowledge and environmental awareness of the students were moderate and positively associated, and also that of environmental awareness and environmental attitude were moderate and positively associated.

However, the relationship between environmental knowledge and environmental attitude of students were weak but positively associated. This conclusion is supported by the literature that a positive association between environmental attitude and awareness, with greater awareness resulting in a more positive attitude toward the environment. The literature further

demonstrated that there is a weak correlation between environmental knowledge and behaviour in terms of the relationship that exists between knowledge, attitude, and behaviour.

Grounded on the indication from the study findings as well as the literature, it can be concluded that environmental knowledge through geography curriculum plays a less significant role in affecting the attitudes (performance, behaviour, and actions) towards the environment. It can also be said that knowledge about the environment is not enough to result in pro-environmental behaviour.

**Recommendations**

In view of the above research findings and conclusions, the following recommendations were made:

1. In increasing students' attitudes toward the environment, students must be encouraged to form environmental safety NGOs. Here, through the Environmental Protection Agency (EPA) provision of funds to support them would serve as a springboard to practise their knowledge of environmental protection. The continuity of such actions of students through their environmental safety NGOs would contribute to the Environmental Protection Agency's effort in protecting the environment through education. Through this platform, they would use their knowledge to think about environmental challenges and develop rational, effective solutions.
2. The Minister of Education through the National Council for Curriculum and Assessment (NaCCA) may enrich the course contents of geography in SHS to deal with global issues such as climate change and global

warming. Enough curriculum updates about these current global environmental crises would galvanize and contribute to awareness of students with the tools to help educate other people against activities that pollute the environment.

3. More crucially, for studies to fully involve the whole person, there should be an experiential learning component. The study therefore recommends that through the services of the Ghana Education Service (GES) and the National Council for Curriculum and Assessment (NaCCA), geography teachers should be well equipped to place less emphasis on theoretical information and more on practical and connected activities based on the natural environment (such as field excursions), projects, cooperative learning, forums, case studies, audio and visual simulations, brainstorming, etc. Where involvement is required, the constructivist approach which emphasizes experiential learning has been found to be helpful because it enables students to absorb challenges of their own creating and generating answers based on their own experiences. Geography teachers ought to employ a range of cutting-edge teaching techniques, and students must be inspired to make good decisions every day.

**Suggestions for Further Research**

The following can be considered for further research.

1. Future research is required to investigate teaching methods and aids in the improvement of environmental education in the geography curriculum.

2. Research is needed to reach conclusions on how students, parents, and teachers react to various environmental education actions.
3. On a national level, studies may be conducted to increase students' environmental knowledge and awareness and to encourage more responsible environmental attitudes and behaviours.

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# APPENDICES

## APPENDIX A

### List Of Tables On Descriptives

**Scale: Environmental Knowledge**

| Reliability Statistics | | |
|---|---|---|
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| .770 | .768 | 25 |

Source: Field data (2022)

**Scale: Environmental Awareness**

| Reliability Statistics | | |
|---|---|---|
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| .707 | .717 | 7 |

Source: Field data (2022)

**Scale: Environmental Attitude**

| Reliability Statistics | | |
|---|---|---|
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| .849 | .850 | 13 |

Source: Field data (2022)

**Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| KNOW | .063 | 350 | .002 | .985 | 350 | .001 |
| AWW | .095 | 350 | .000 | .975 | 350 | .000 |
| ATT | .053 | 350 | .018 | .991 | 350 | .027 |

a. Lilliefors Significance Correction

Source: Field data (2022)

**Frequency (LAND RESOURCES KNOWLEDGE)**

| | Wrong response | | Correct response | | Total |
|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | |
| The science of managing forest resources which include | 185 | 52.85714 | 165 | 47.14286 | 350 |
| The process by which the plant life of an area is destroyed resulting in the infertility of a land is called | 147 | 42 | 203 | 58 | 350 |
| Which of the following is not a way of controlling | 111 | 31.71429 | 239 | 68.28571 | 350 |
| Bush fires causes all the following except | 20 | 5.714286 | 330 | 94.28571 | 350 |
| Mining is associated with all the following except | 22 | 6.285714 | 328 | 93.71429 | 350 |
| All the following are causes of desertification except | 18 | 5.142857 | 332 | 94.85714 | 350 |
| Which of the following describes the sequential order of | 91 | 26 | 259 | 74 | 350 |

Source: Field data (2022)

**Frequency (ATMOSPHERE KNOWLEDGE)**

| | Wrong response | | Correct response | | Total |
|---|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage | |
| Which of the following part of the atmosphere is the closest to the earth | 153 | 43.83954 | 196 | 56.16046 | 349 |
| In which of the following part of the atmosphere can the | 171 | 48.99713 | 178 | 51.00287 | 349 |
| Which of the following is not an atmospheric pollutant? | 148 | 42.52874 | 200 | 57.47126 | 348 |
| CFC contains all the following elements except | 40 | 11.42857 | 310 | 88.57143 | 350 |
| The commonest source of chlorofluorocarbons (CFCs) is | 178 | 50.85714 | 172 | 49.14286 | 350 |
| The most common form of atmospheric pollution caused by the machines of factories is | 194 | 55.42857 | 156 | 44.57143 | 350 |

| | | | | | |
|---|---|---|---|---|---|
| Global warming is caused by | 242 | 69.34097 | 107 | 30.65903 | 349 |
| Which of the following is not a likely effect of global warming | 186 | 53.14286 | 164 | 46.85714 | 350 |
| Which of the following is a known cause of ozone layer | 166 | 47.42857 | 184 | 52.57143 | 350 |

Source: Field data (2022)

**Frequency (WATER AND SANITATION KNOWLEDGE)**

| | Wrong response | | Correct response | | Total |
|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | |
| The chief source of water pollution in Ghana is | 88 | 25.14286 | 262 | 74.85714 | 350 |
| One of the harmful problems created by the formation of artificial lakes is | 54 | 15.42857 | 296 | 84.57143 | 350 |
| The development of urban communities is associated with all the following environmental problems except | 164 | 46.85714 | 186 | 53.14286 | 350 |
| Water pollution can cause the following health problems except | 64 | 18.28571 | 286 | 81.71429 | 350 |
| Our refuse dump sites are heaping up because of | 44 | 12.57143 | 306 | 87.42857 | 350 |
| Attempts to ensure sanitation in our communities have been hampered by | 87 | 24.85714 | 263 | 75.14286 | 350 |
| Polythene is considered an environmental threat because | 38 | 10.85714 | 312 | 89.14286 | 350 |
| Improper disposal of rubbish can cause | 92 | 26.43678 | 256 | 73.56322 | 348 |

Source: Field data (2022)

## APPENDIX B

### Questionnaire for Students

**UNIVERSITY OF CAPE COAST**
**COLLEGE OF EDUCATIONAL STUDIES**
**FACULTY OF HUMANITIES AND SOCIAL SCIENCES**
**DEPARTMENT OF BUSINESS AND SOCIAL SCIENCES**
**EDUCATION**
**QUESTIONNAIRE FOR GEOGRAPHY STUDENTS**

This survey assesses the adequacy of geography curriculum in promoting environmental education amongst students in the Cape Coast Metropolis. The questionnaire seeks to gather primary data for a research work in partial fulfillment for a Master of Philosophy Degree in Curriculum and Teaching at the University of Cape Coast, Cape Coast. I would appreciate your responses to the questions that follow. Please note there are no right or wrong answers; I am only interested in your personal opinions. It will take you roughly 15 to 20 minutes to complete this questionnaire. The study is purely for academic purposes and responses will be treated with highest level of confidentiality. Thank you for taking the time to assist me in this endeavor.

**Instructions**

Kindly answer the questions that are in this questionnaire. Using the scales assigned to each statement, indicate by ticking (√) the appropriate bracket that answers the questions. Please tick [√] the correct response from the options given.

**SECTION A: PERSONAL DATA**

1. Name of school ……
2. Sex: Male ( ) Female ( )
3. Age of respondents: 15-20 ( ) 21-25 ( ) 26-30 ( )

**SECTION B: THE LEVEL THE GEOGRAPHY CURRICULUM HAS ENGENDERED ENVIRONMENTAL AWARENESS OF STUDENTS IN THE SHS**

Please indicate the extent of your agreement or disagreement with the statement by ticking **[√] Strongly Disagree (SD), Disagree (D), Uncertain (U), Agree, (A) and Strongly Agree (SA)** (please select only one) to reflect your opinion.

| | Statement<br>Geography curriculum teaches me to: | SD | D | U | A | SA |
|---|---|---|---|---|---|---|
| **4.** | like nature. | | | | | |
| **5.** | appreciate sea, land, ponds, and other natural features | | | | | |
| **6.** | be aware that there is wrong to sell areas that have lost their natural characteristics to bring money to our country. | | | | | |
| **7.** | be aware that the construction of hotels for tourism in national parks and forest reserves should not be allowed. | | | | | |
| **8.** | be aware that for housing, wetlands should not be drained so houses can be built there. | | | | | |
| **35.** | be aware that the environment cannot clean itself, so human waste disposals are a problem. | | | | | |
| **9.** | be aware that the ozone layer has been thinned so there is a danger to our country | | | | | |

**SECTION C: THE LEVEL THE GEOGRAPHY CURRICULUM HAS AFFECTED ENVIRONMENTAL AWARENESS OF STUDENTS IN THE SHS**

Please indicate the extent of your agreement or disagreement with the statement by ticking **[√] Strongly Disagree (SD), Disagree (D), Uncertain (U), Agree (A), and Strongly Agree (SA)** (please select only one) to reflect your opinion.

| | Statement<br>Through the study of geography: | SD | D | U | A | SA |
|---|---|---|---|---|---|---|
| **10.** | I would be satisfied if we had more environmental lessons in geography curriculum. | | | | | |
| **11.** | I am willing to take responsibility in protecting the environment. | | | | | |
| **12.** | I get irritated with people who cause environmental pollution. | | | | | |
| **13.** | I worry about worsening global environmental issues. | | | | | |
| **14.** | I feel guilty when I do harm to the environment | | | | | |
| **15.** | I am proud of myself because of my sensitivity to the environment | | | | | |
| **16.** | I warn a person who pollutes the environment without hesitation. | | | | | |
| **17.** | I voluntarily participate in any school activity organized related to the natural environment. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **18.** | I share my knowledge about the environment with my friends | | | | | |
| **19.** | I am exposed to read books about environmental issues apart from geography textbooks | | | | | |
| **20.** | I take part in clean up campaigns | | | | | |
| **21.** | I am a member of an environmental group | | | | | |
| **22.** | I take part in environmental NGO activities | | | | | |

## APPENDIX C

### Teacher -Made Test For Students

**UNIVERSITY OF CAPE COAST**

**COLLEGE OF EDUCATIONAL STUDIES**

**FACULTY OF HUMANITIES AND SOCIAL SCIENCES**

**DEPARTMENT OF BUSINESS AND SOCIAL SCIENCES**

**EDUCATION**

**STRUCTURED INTERVIEW GUIDE FOR GEOGRAPHY TEACHERS**

This survey assesses the adequacy of geography curriculum in promoting environmental education amongst students in the Cape Coast Metropolis. The questionnaire seeks to gather primary data for a research work in partial fulfilment for a Master of Philosophy Degree in Curriculum and Teaching at the University of Cape Coast, Cape Coast. I would appreciate your responses to the questions that follow. Please note there are no right or wrong answers; I am only interested in your personal opinions. It will take you roughly 15 to 20 minutes to complete this questionnaire. The study is purely for academic purposes and responses will be treated with highest level of confidentiality. Thank you for taking the time to assist me in this endeavour.

**THE LEVEL THE GEOGRAPHY CURRICULUM PROMOTES ENVIRONMENTAL KNOWLEDGE OF STUDENTS IN THE SHS**

Please, respond to all the following questions by ticking the correct letter.

**Test of knowledge on selected environmental themes**

**Land resources**

**1.** The process through which plants prepare their food is known as……..

a. Dehydration
b. Hydration
c. Glucose
d. Photosynthesis

2. The science of managing forest resources which include planting trees, caring for trees, the maintenance of forest product is known as ……

a. Afforestation
b. Agriculture
c. Agro forest
d. Forestry

**3.** The process by which the plant life of an area is destroyed resulting in the infertility of
a land is called…….
a. afforestation
b. Deforestation
c. Depopulation
d. Desertification

**4.** Which of the following is **not** a way of controlling deforestation?
a. Alternate supply of fuel
b. Legislation
c. Public education
d. Reduction of lead in petrol

**5.** Which of the following is **not** a cause of bush fires?
a. Hunting
b. Natural occurrence
c. Palm–wine tapping
d. Slash-and-Burn farming method

**6.** Bush fire causes all the following **except**
a. Desertification
b. Habitation of reptiles
c. Loss of habitat
d. Air Pollution

**7.** Mining is associated with all the following **except**
a. Deforestation
b. Land degradation
c. Slash and burn
d. Water pollution

**8.** All the following are causes of desertification **except**
a. Bush burning
b. Poor irrigation methods
c. Soil conservation
d. Wrong application of agro-chemicals

**9.** Which of the following describes the sequential order of soil erosion by water?
a. Gully-rill-sheet-splash erosion.
b. Rill-sheet-splash-gully erosion
c. Splash-sheet--rill-gully erosion.
d. Sheet-splash-gully-rill erosion.

**The Atmosphere and Air Pollution**

**10.** Which of the following part of the atmosphere is the closest to the earth?
a. Mesosphere
b. Stratosphere
c. Thermosphere
d. Troposphere

**11.** In which of the following parts of the atmosphere can the ozone layer be located?
a. Mesosphere
b. Stratosphere
c. Thermosphere
d. Troposphere

**12.** Which of the following is **not** an atmospheric pollutant?
a. Chlorofluorocarbons (CFCs).
b. Cyanide
c. Nitrogen Oxide
d. Noise

**13.** CFC contains all the following elements **except** …….
a. Calcium
b. Carbon
c. Chlorine
d. Fluorine

**14.** The commonest source of chlorofluorocarbons (CFCs) is…….
a. Air conditioners and Refrigerators.
b. Exhaust from cars
c. Industrial waste
d. Liquefied petroleum gas.

**15.** The most common form of atmospheric pollution caused by the machines of factories is.....
a. Lead in petrol.
b. Nitrogen Oxide.
c. Particulate from diesel engines.
d. Sulphur Dioxide.

**16.** Global warming is caused by…….
a. absorption of radiation by gases such as carbon dioxide.
b. the sun increasing its rays on the earth.
c. scarcity of water bodies.
d. the depletion of the ozone layer.

**17.** Which of the following is **not** a likely effect of global warming?
a. Desertification.
b. Flooding.
c. Health problems.
d. Tsunami.

**18.** Which of the following is a known cause of ozone layer depletion?
a. Carbon Monoxide.
b. Chlorofluorocarbons.
c. Nitrogen Oxide
d. Sulphur Dioxide

**Water and Sanitation**
**19.** The chief source of water pollution in Ghana is……..
a. Acid
b. Agro – Chemical
c. Oil Spillage
d. Solid Waste

**20.** One of the harmful problems created by the formation of artificial lakes is…….
a. Bilharzia
b. River blindness
c. Sleeping sickness
d. Tuberculosis

**21.** The development of urban communities is associated with all the following environmental problems **except**
a. Bushy surroundings.
b. Choking of gutters.
c. Sand winning.
d. Solid waste.

**22.** Water pollution causes the following health problems **except**
a. Cholera
b. Hepatitis
c. Syphilis
d. Typhoid

**23.** Our refuse dump sites are heaping up because ……
a. management of waste has not been promoted properly
b. the population has increased rapidly.
c. they are good source of manure
d. they are located on hilly grounds

**24.** Attempts to ensure sanitation in our communities have been hampered by
a. bribery and corruption.
b. inadequate sanitation officers.
c. lack of commitment on the part of the populace
d. small fines imposed on offenders of sanitation rules.

**25**. Polythene is considered an environmental threat because
a. it does not allow water get into the soil
b. it is not derived from the environment.
c. it does not decompose.
d. many products are made of it.

**26.** Improper disposal of rubbish can cause
a. Dehydration.
b. Epidemic
c. Pollination.
d. Sedimentation.

# APPENDIX D

## Introductory Letter From DoBSSE

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
FACULTY OF HUMANITIES & SOCIAL SCIENCES EDUCATION
DEPARTMENT OF BUSINESS & SOCIAL SCIENCES EDUCATION
Telephone: +233 209408788
EXT. (268), Direct: 35411.
Telegrams & Cables: University, Cape Coast.
Email: dbase@ucc.edu.gh
Our Ref: DoBSSE/37/V.2/68
Your Ref:
UNIVERSITY POST OFFICE
CAPE COAST, GHANA

DATE: 29th July, 2022

The Chairperson
Institutional Review Board
University of Cape Coast
Cape Coast

Dear Sir,

**ACCEPTANCE OF PROPOSAL**

We formally bring to your notice that the Department is satisfied with the research proposal of Mr. Anthony Nsiah, and has accordingly given the said candidate the permission to apply for ethical clearance from IRB in order to enable him to undertake data collection.

He is working on the Research Topic: "**Role of Geography Curriculum in Promoting Environmental Education in Senior High Schools in the Cape Coast Metropolis.**"

We count on your usual cooperation.

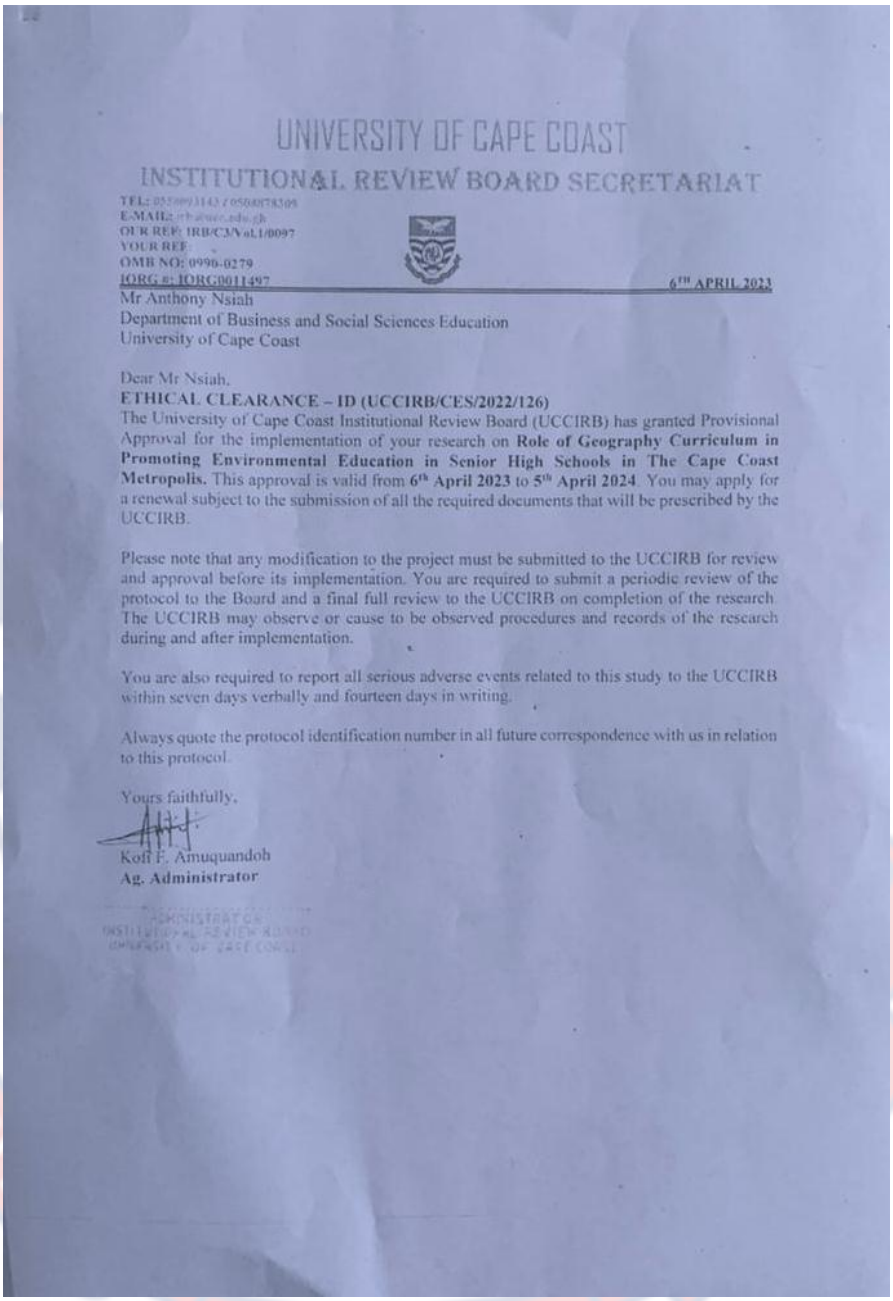
Thank you.

Yours faithfully,

**DR. BERNARD Y. S. ACQUAH**
**HEAD**

# APPENDIX E

## Introductory Letter From IRB



UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 0559091143 / 0504078309
E-MAIL: irb@ucc.edu.gh
OUR REF: IRB/C3/Vol.I/0097
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0011497

6TH APRIL 2023

Mr Anthony Nsiah
Department of Business and Social Sciences Education
University of Cape Coast

Dear Mr Nsiah,

**ETHICAL CLEARANCE – ID (UCCIRB/CES/2022/126)**

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research on **Role of Geography Curriculum in Promoting Environmental Education in Senior High Schools in The Cape Coast Metropolis.** This approval is valid from **6th April 2023** to **5th April 2024**. You may apply for a renewal subject to the submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit a periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Koff F. Amuquandoh
**Ag. Administrator**