

**EFFECT OF SERVICE AND COLLABORATIVE LEARNING STRATEGIES ON
STUDENTS' ENVIRONMENTAL KNOWLEDGE IN SELECTED JUNIOR
SECONDARY SCHOOLS IN OYO STATE, NIGERIA**

BY

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(201711140)

**A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE
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FACULTY OF EDUCATION



AT THE
University of Fort Hare
Together in Excellence

UNIVERSITY OF FORT HARE

2019

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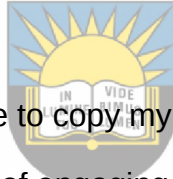
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ABSTRACT

Though many strategies have helped in increasing students' knowledge and awareness about environmental issues, yet, environmental challenges and problems are still on the increase in Nigeria. This may be due to the fact that environmental issues are controversial and require collaborative efforts of all citizens, especially school students. This study determined the effects of service learning and collaborative learning in social studies on Junior Secondary School students' environmental literacy. It also explored the moderating effects of school location and gender. The study adopted a pretest-posttest, control group, quasi-experimental design. Multi-stage sampling technique was employed. Six (6) secondary schools that are co-educational from Ibadan were purposively selected based on presence of environmental challenges in their immediate environment. There were three (3) schools from Ibadan city (urban area of Ibadan) and three (3) from Ibadan less city (rural area of Ibadan). Seven hypotheses were tested at 0.05 level of significance. Five research instruments were used for the study, these were; Environmental Knowledge Test (EKT, $r = 0.76$), Environmental Attitude Questionnaire (EAQ, $r = 0.85$), Service Learning Guide (SLG, $r = 0.71$), Collaborative Learning Guide (CLG, $r = 0.66$) and Conventional Learning Guide (CLG, $r = 0.73$). Analysis of Covariance (ANCOVA) was used in testing the seven formulated hypotheses. Scheffé Post-hoc analysis was carried out to determine the source of significant effect of treatment. Significant interaction effect was described using graphical representation. All hypotheses were tested at $P < .05$ level of significance. The results revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental knowledge ($F_{(2,582)} = 824.98$; $p < 0.05$, partial $\eta^2 = 0.739$), with an effect of 73.9%. There was also a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental attitude ($F_{(2,582)} = 1317.79$; $p < 0.05$, partial $\eta^2 = 0.819$). The findings showed that there was a significant main effect of gender (male/female) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 3.99$; $p < 0.05$,

partial $\eta^2 = 0.007$) but there was no significant main effect of school location (urban/rural) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 0.08$; $p > .05$, partial $\eta^2 = 0.00$). Based on these findings, it was recommended that teachers should adopt service learning and collaborative learning strategies in the teaching of environmental concepts and problems in Social Studies in order to improve students' performance in Social Studies. Teachers should facilitate the use of service learning and collaborative learning strategies in schools to improve students' environmental problem-solving skills and their achievement in the subject. Teaching institutions should not only include service learning and collaborative learning strategies in their curriculum but should endeavour to provide practical experience for pre-service teachers to be well grounded and equipped on the use of these strategies.

Keywords: environmental knowledge, environmental attitude, service learning strategy, collaborative learning strategy



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DEDICATION

This research work is dedicated to the glory of Almighty God, to the memory of my late father, Elder F.A. Alalade and all environmentalists who take upon themselves the burden of making the world a cleaner place.



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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This is the first chapter of this research work, and it serves as an outline and introduction of the study. The focus here is to contextualize the problem under investigation from international, regional and national perspectives. The chapter also outlines the statement of the problem, research questions and hypotheses, purpose of the study, research objectives, and significance of the study. It also make a presentation of definitions of the key terms, and highlights the scope of the study.



1.2 Background to the study

Environment is a broad concept. It refers to all or part of an object's or a living being's surrounding. It becomes everything that surrounds man hence, everything that is used by man including man himself. It includes the physical, chemical, biological, psychological and socio-cultural dimensions and in fact everything that makes up the context in which the individual lives. Environment is not a residual, but an entity which incorporates attitudes, values, institution economic, science and technology and ideology. In general, the environment provides all life support systems in the air, on water and on land as well as the materials for fulfilling all developmental aspirations.

A wave of serious concern about the environment has swept across the world; at local, national and international levels, about the situation of environmental deterioration. Environmental issues have become recurring phenomena at international forums. The environment has become a central issue in discussion at

the United Nations General Assembly that various step are been taken towards creating awareness amongst people of various countries. Taylor, Little Dyke, Eames and Coll (2009) succinctly put it by saying that the people of the world are living at a period when environmental issues are receiving attention that had never been seen before. In order to justify the attention given to the environment, Skamp, Boyes and Stanisstreet (2007) were of the opinion that tackling challenges connected with the environment is a government, corporate and community responsibility, and this does not exclude individuals.

Adu, Olatundun and Oshati (2014) averred that research evidence have shown that a part of the prominent features of the environment today is the speed at which it is becoming worse. This view is in tandem with Ogunbiyi and Ajiboye (2009) assertion that in recent years, environmental crises have metamorphosed into both national and international interest. The deterioration in the environment is seen everywhere today, whether in the developed countries or developing countries.

Adu, Olatundun and Oshati (2014) asserted that environmental challenges are not new but increasing in magnitude and scarily becoming issues out of control. In the past few years, reports about the environment have shown that there is a close linkage between the environment and human survival (UNEP, 2016; Gbadamosi, 2012). This is to state the obvious, that human existence depends solely on his environment, especially the physical environment. According to Nkire (2011), the component of the physical environment such as water, land, air, plants and animals as well as microbes add together to make human life worthwhile and meaningful with the physical environment acting as human life support. Jenkins and Jenkins (2009) also claimed that natural processes and ecosystem protect and nourish human beings, as nature supplies the basic needs for survival and maintenance of life support. However, the environmental situation in the world today presents a gory detail; tales of loss (both human lives and resources), disaster and hardship.

Crises in the environment are everybody's burden, at local, national and international levels. Most environmental problems such as flood, pollutions (air, water, noise and

land), desertification, deforestation global warming and climate change are all due to human error of omission or commission. Jenkins and Jenkins (2009) corroborated this view by saying human decision – making and subsequent actions about interactions with the environment can maintain and protect the environment, or modify or destroy it. This clearly shows that humans have major role to play in shaping their environment, as well as getting ready for the consequences of such influence. Human being, either individual or collectively through their deliberate or non-deliberate actions have caused damage to the human environment, and this in turn brought about myriads of social problems.

There are persistent problems of uncontrolled waste generation and poor waste disposal, uncontrolled discharge of harmful industrial waste, as well as inefficient waste management and legislation by government (Gbadamosi, Ajagbe & Awolola, 2010; Handerson, Fisher & Frazer, 2008; Osibanjo, 2008). Aside these man-induced environmental problems, natural disasters, particularly floods, landslides, tornadoes, coastal and land erosion take their toll. In the words of Nkire (2011), drought, floods, deforestation and poor agricultural practice have driven about 25million environmental refugees off the land.

The much talked about greenhouse effect is made stronger by continued yearly emission of carbon dioxide into the atmosphere. The depletion of the ozone layer continues through extreme release of chlorofluoro-carbons. This in turns destroys the ozone layer and threatens biodiversity.

The consequence of worsening environmental situation is burdensome on the earth ecology (Gbadamosi 2012). Industrialized economies like “China, Japan, Germany and others are grappling with air pollution. UNEP (2008) affirmed that industrial pollution is contributing to the growth of greenhouse gases which happens to be a major cause of global warming. In developing nations on the other hand rapid growing population and economic development are as well leading to a number of environmental issues, the issues include natural resources depletion, deforestation, indiscriminate waste disposal, pollution, erosion, flooding etc (UNEP, 2008; Yadaf

2013; Adu & Olatundun, 2014). Human activities have considerable effect on the timing, magnitude and how often extreme climate events occur.

If there is an issue that deserves constant and regular attention it is environmental issues that confront the world today. The importance of giving value to ecological systems and making efforts to protect the integrity of these systems cannot be underestimated (Innes 2012).

In response to these environmental challenges several attempts have been made individually and collectively by successive governments and international organizations; policies we formulated and conferences were held to mitigate the menace of environmental hazards locally, nationally and internationally. It is of importance to note that these attempts are still ongoing as the environmental problems are daily staring us in the face. Notable among such international conferences and workshops were those of Tbilisi, Georgia in 1977 it was the world's first intergovernmental conference on environmental education; the Rio de Janeiro Conference of 1992 in Brazil, Earth Summit in Johannesburg, South Africa, 2002, Environmental Congress in Durban, South Africa (UN, 2017) and One Planet Summit in Paris, France, 2017. Nonetheless, the event that shows the importance of the environment is the setting aside of June 5 of every year as World Environment Day. The Nigerian environment is diverse and dynamic.

Nigeria has a total land area of 983,213 square kilometres of which 773,783sq. kilometres are in the savanna zones 75,707sq kilometers are in the derived savanna zones and 133,717 square kilometers are in the forest zone. The country lies between 4°N and 14°N, and between 3°E and 15°E. Nigeria is located within the tropics and therefore experiences high temperatures throughout the year. The mean for the country is 27°C. Average maximum temperatures vary from 32°C along the coast to 41°C in the far north, while mean minimum figures range from 21°C in the coast to under 13°C in the north.

Nigeria has a population of about 150 million impacting on the physical environment through their various activities within an area of about 923,000 square kilometres. This, coupled with variability in elements of climate such as rainfall and temperature among others, exposes several physical and socio-economic sectors in the country to the impacts of climate change. Nigeria is already experiencing high population density. The interaction of these millions of Nigerians with their respective environment has left indelible mark on the landscape. The manifestation of these impacts includes; urbanization, deforestation, desertification, overpopulation and all kinds of pollution. These impacts have both negative and positive effects on the natural environment. It is the negative impacts of man's interaction with the environment that is emphasized in this study.

Critical environmental problems in Nigeria include but not limited to sheet erosion, gully erosion, coastal and marine erosion and land subsidence occur particularly in the coastal areas of Nigeria Delta. Flooding occurs throughout Nigeria in three main forms; coastal flooding, river flooding and urban flooding. Drought and desertification, oil pollution from spills, oil well blow-outs, oil ballast discharges and improper disposal of drilling mud from petroleum prospecting have resulted in problems such as: the loss of the aesthetic values of natural beaches due to unsightly oil slicks; damage to marine wildlife, modification of the ecosystem through species elimination and the delay in biota (fauna and flora) succession; and decrease in fishery resources.

Others are urban decay and squatter settlements, industrial pollution and waste, municipal solid waste, the various non-biodegradable household petrochemical products such as polythene bags, plastic containers, Styrofoam packages and tyres which litter Nigerian cities; a million litres of crankcase oil disposed from mechanic workshops; industries, power stations and commercial houses discharged carelessly into drains and ground surfaces in the cities. Other problems are concrete Jungles/cities, loss of fauna and flora, climatic change, ozone layer depletion Nigeria also has had to contend with global environmental issues such as

climatic change or global warming is due to the increasing concentrations of atmospheric warming or greenhouse gases (GHG), especially carbon dioxide (CO₂) whose concentrations have increased from 280 parts per million (PPM) in the 1800s to about 380 parts per million (PPM) now.

To Bosah (2013), the pressure on the environment due to climate change - higher temperature, shifting seasons, more frequent and extreme weather events such as floods and droughts, the challenge for food production becomes even more daunting. Furthermore, Babanyara, Usman and Saleh (2010) opined that mankind's activities on the environment in his quest for development have resulted in a continuous and serious degradation of the ecosystem, thus posing a threat to both his present and future living. Ndahlahwa (2005) also emphasized that human beings use the environment in three basic ways: as a *resource bank*- the environment supplies them with raw materials needed to maintain their existence, and their social and technological structures; as a *habitat* – people require more space per individual than any other species and as *sink* for wastes- human beings produce more waste than other species.

Moreover, rapid population growth and urbanization is of great concern to the sustainability of cities, the more people are there on the earth, the greater the impact on the environment and pressures on resources. As such, the unwise use of the natural environment due to ignorance, poverty, overpopulation and greed amongst others has led to the degradation of the environment. Additionally, there has been explosive growth in global urban populations in recent decades (Babanyara, Usman & Saleh, 2010). Africa is currently experiencing the highest rate of urbanization, with a four-fold increase in urban dwellers anticipated between 1990 and 2020, to reach 500 million people. These and too numerous to mention environmental problems are not limited to Nigeria only, but each country in Africa and world over battles with myriad of these environmental degradation.

Environmental challenges vary in intensity and form in various countries of the world. Henry and Douhounnikoff (2008) highlighted the environmental problems in

Russia to include water and air pollution, and informal waste dump among other issues. The government of Russia Federation had taken different step towards tackling this challenge, and one of those steps was the 1993 constitution of the Russian Federation which endows each citizens with the right to a favourable environment, reliable information about its condition and to compensation for the damage caused to his or her health or property by ecological violations (Henry & Douhouvnikoff, 2008). Poland, a country in East Europe is confronted with air pollution coming from her heavy industries and automobiles, as well as issues of waste management that are related to increased consumption which invariability exert pressure on her natural resources. Platje and Slodczyk (2009) claimed that the issue of air pollution is well tackled by closing many polluting heavy industries and introduction of less polluting production techniques.

Furthermore, Calick (2009) identified the main reason for environmental problems in Turkey to be abuse of natural resources, which include the removal of 2.5million hectares of fields. Turkey, according to Calick (2009) also suffers from soil erosion and considerable quantities of waste. Rapid development and changes to the Malaysian economy along with swift population growth brought different environmental problems which include pollution, deforestation, management of solid waste (Salih & Yahya, 2009). Papua New Guinea has identified the challenges of deforestation, domestic waste disposal, and water pollution as part of the environmental issues it faces, consequently, the country has integrated environmental literacy into it school curriculum (Lauer & Rifi, 2008).

Yadar (2013) listed environmental issues confronting India to include water, air and land pollutions, though the country has regularly made legislation to tackle these critical issues. China air pollution is scary enough, according to Rohde and Muller (2015) air pollution is said to contribute to 1.6 million deaths annually in China, roughly 17% of all deaths in China.

Botswana happens to be one of the countries enjoying rapid economic development in Africa, but this development has also brought with it several environmental challenges. These environmental challenges have caught the government attentions as they adversely impact on the people and land resources. These include pollution of air, water, soil, vegetation resources, littering, indiscriminate dumping and stock piling of waste, among others (Matsoga, 2009; GoB, 2007; Ajiboye & Silo, 2008). Ethiopia, a country located in the northeastern part of Africa, is a predominantly agrarian country. Engida and Areaya (2009) listed a number of environmental challenges confronting this northeastern country to include land degradation the major environmental problem that has led to increased soil erosion and flooding. The list also includes environmental pollution emanating from misguided application of chemicals in agriculture.

In Tanzania, Mtaita and Eames (2009) observe the environmental problems to be deforestation, land degradation, drought, environmental pollution, etc. Mtaita and Eames (2009) claimed that these environmental problems have been linked to diseases such as cholera, malaria, sleeping sickness, dysentery and schistosoma. South Africa, the most developed economy in Africa, is not spared threats to its environment with diverse natural phenomena. South Africa is facing the challenges of littering, deforestation, pollution (air, water and land), desertification, deforestation and other hazards (Loubser, 2009). Darkoh (2009) asserted that in South Africa more than 200,000 tons of litter is discarded on the land each years and picking up this litter cost millions of taxpayers' money annually.

In Nigeria, environmental disaster news is read almost on daily basis in the print and electronic media in almost all continents of the world. Such news includes "heavy rainfall causing devastating floods and landslides across the globe", In August 2008, the residents of Makurdi were thrown out of their residences and their farmlands left impoverished after two days of heavy down pour of rainfall. It was described as very disastrous, (Taiwo, 2001; Emeribeole, 2015). In 2011, Usman Danfodio University, Sokoto, Lagos, Delta, Ibadan and other parts of the country

have been affected by flooding chasing the inhabitants away from their residence. It has shattered both the built environment and undeveloped plan. It has claimed many lives, and millions of properties got lost due to its occurrences (Adejuwon & Aina, 2014).

According to Onifade, Adio-Moses, Adigun, Oguntunji and Ogungboye (2014) and a report by BBC (2012) in late July 2012, at least 39 people were killed due to flood in the central part of Nigeria, Plateau State. Heavy rainfall caused the Lamingo dam to overflow near Jos, sweeping across a number of neighborhoods in Jos and approximately 200 homes were submerged or destroyed. In addition, at least 35 people were missing, while Manasie Phampe, the head of the Red Cross in the state, announced that relief efforts were ongoing. The head of the Red Cross in Plateau state, Manasie Phampe, said rescue efforts were continuing. The floods left 3,000 people homeless, many of whom are taking refuge in government buildings in Jos (BBC, 2012; Onifade et. al, 2014). Ola (2014) reported that the city of Ibadan recorded another flood disaster in which over 100 lives were lost, while over 100 billion Naira worth of properties damaged.

Among the crucial environmental problems facing Nigeria today are enormous population pressure, poor automobile and traffic infrastructure, build-up of 'green gasses' (global warming), ozone layer depletion, oceanic despoliation (loss of species), and over-use of pesticides (and species loss).

Other environmental problems include deforestation, desertification, soil erosion, wind erosion, flooding, lowering of water tables, unsafe water, inadequate sanitation, soil depletion, loss of wetlands, loss of land species, genetic stock materials depletion and the intractable ethnic and religious crises resulting mainly from resource depletion and environmental degradation (Olujide & Ajitoni, 2011). Other researchers have also identified some major environmental threats such as environmental pollution, flooding, municipal solid waste, desertification, deforestation and poor environmental sanitation (Isiquizo, Ndikanwu & Adebajo, 2011; Akpan, 2009; Adelegan, 2008; Osibanjo, 2008). These are more immediately

life-threatening than those associated with the affluence of rich countries, such as carbon (iv) oxide emissions, depletion of stratospheric ozone, photochemical smog, acid rain and hazardous wastes (World Bank, 2008).

Meanwhile, Robinson (2013) observed that the manifestation and persistence of these environmental problems have prompted the federal government to bring about environmental policy and environmental education with a view to prevent and ameliorate environmental damage. Jackson Onome Robinson Research indicates that most developing countries including Nigeria have long established laws and formal institutional structures to address their serious environmental problem (Bell, 2002). In Nigeria, the laws and institutions are notably; Water Ways Act (1915); Public Health Act (Amended 1958); Forest Ordinance (1937); Petroleum Drilling and production Regulation Act (1969); Navigable water Act (1968); Minerals Act (1969); Associated Gas reinjection Decree (1979); Federal Environmental protection Agency Act (1989); Natural Resource Conservation Council (1989); Land Use Decree (now Act 1978); Environmental Impact Assessment Act (EIA 1992); Federal Ministry of Environment Act (1999); Oil Spill Detection and Response Agency (NOSDR 2006).

Research also clearly shows that Nigeria is a signatory to international agreement and conventions as follows: Vienna Convention (1994); The Bonn Convention (1979); Convention on Biological Diversity (1992); Basel Convention on the Control of Trans-boundary movement of Hazardous Waste and their Disposal (1987); World Heritage Convention (1978); United Nations Framework Convention on Climatic Change (1992); International Union for the Conservation of Nature and Natural Resources (IUCN Guideline, 1996); Convention on the Conservation of Migratory Species of World Animals (1979) and World Convention on International Trade in Endangered Species of Fauna and Flora (1973). Despite the proliferation of these legal and regulatory arrangements environmental degradation has exacerbated (Dikko, 2004). Though institutional and legal framework may be well intended, enforcement is largely ineffective and this ineffective enforcement is in

part a direct product of the nature and character of the Nigerian state (Okaba, 2004).

More importantly, ineffective enforcement and strategy failure stem from the poor public and civic consciousness of the cross cutting implications of the environment on socio-economic development which environmental education is poised to redress.

However, scholars have attributed environmental challenges in most communities in Nigeria to people's lack of environmental awareness, poor knowledge, and lack of adequate skills to identify, prevent and solve environmental problems or challenges (Ajiboye & Ajitoni, 2008; WWF, 2008; Ajitoni, 2005; Okebukola, 2001). In a similar vein, Abiona (2008) and Olatundun (2008) identified peoples' poor environmental attitude towards environmental issues as one of the factors contributing to environmental problems in Nigeria. Effective legislation on the part of government is also said to be lacking (Gbadamosi, Ajagbe & Awolola, 2010; Handerson, Fisher & Frazer, 2008; Osinbajo, 2008).

It can be inferred that education can therefore bring the needed change or act as the catalyst the world needs. A knowledge system including education forms the essential framework for the interaction of society and their changes overtime. Education has always been considered to have behaviour modification effect, especially with regards to the young generation (Bray & Cridge, 2013). Iyamu and Iyamah (2007) opined that the potency of education as a veritable instrument and vehicle of social transformation could not be over looked. Towing the path of above statement is Ekanem (2007) who stated that education is a major tool for the quick transformation of any nation.

Speaking further, Ekanem (2007) said education provides the direction as well as addresses the needs of the society at each point in time. Ajala (2007) was of the view that change is most likely to start with a small group of people doing something in a new way, which may gradually spread to other group and then

whole society. An example of such includes environmental movement among others. Education is seen as a factor in combating environmental degradation, flooding and indiscriminate dumping of refuse, as well as poor knowledge of refuse disposal unhygienic living and unkempt environment (Adubi, Agbanigo & Omojogberu, 2006).

The significance of education rests on its being responsive to the yearnings and aspirations of the people or society. Correspondingly, curriculum must necessarily and logically be responsive to the needs and yearnings of society, since it remains the core of education. To do this, it must have adequate knowledge of the happenings, needs, yearnings and aspirations of its particular society, on the one hand, and the world at large, on the other. This gives curriculum its true but unique nature and identity as a PRAXIS (Pratt, 1994). In this regard, it proffers solutions accordingly. This, according to Pinnar (1995), is the era of post-structuralism in curriculum, a sharp shift from two other past paradigms of curriculum. It is an era when curriculum concerns itself with the holistic view of the society with regard to the blending and integration of “in and out” of school to form a unit or entity. It is a period that transcends the Tylerian or traditional myopic view on curriculum as a discipline that concerns itself with the happenings in the school alone.

Explaining the above, Taubman quoted in Pinnar (1995) pointed out that education as a social institution provides human resources and other essentials to other social institutions. Equally, education is seen as a means of inducting people into the society where they live and preparing them for life (Igwe & Osayame, 2007). This requires that education, through curriculum, should know the modus operandi of these institutions not only in the present, but even beyond and far ahead of time, so as to groom the essential human resources. This assertion is clearly supported by Pratt (1994) and Igwe and Osayame (2007) who emphasized that the curriculum be functional by addressing human needs. The role of curriculum in education cannot be overemphasized. Though a subset of education, it remains the core and

nucleus of education regardless of the type (formal, informal or non-formal). Thus, curriculum is all encompassing in the educational process.

The above assertions show clearly, in the words of Pinnar (1995) and Pratt (1994), the existence of two worlds, namely, the world of the classroom and the real-world of the society. A good and commendable curriculum should ensure that little or no dichotomy exists between these two worlds. In the same vein, Igwe & Osayame, (2007) sees a realistic curriculum as a good and workable curriculum, the type designed to help the citizenry transform, reconstruct, change, where necessary, and improve the culture of the people through the process of education. Since curriculum and education cannot be studied, analyzed and applied in isolation from the society, they must work in and for the society. The potency of education as a veritable instrument and vehicle of social transformation is duly acknowledged.

Education is aimed at producing citizenry that is knowledgeable concerning the biophysical environment and its associated problems. Akomolafe (2011) saw education as a process in which individual gain awareness of their environment and solve present and future environmental problems. Wesley-Suitz (2006) summed it up by saying that environmental concerns are formed only when people see themselves as an integral part of nature. The curriculum expects schools to become catalysts in changing and shaping student attitude and actions towards the environment. Formal education in school is regarded as one of the best tools to transmit adequate knowledge and inculcate the appropriate environmental values in young generation specifically learners (Harun, Hock & Othman, 2011).

In response to the opportunities offer by education to ameliorate the burden of environmental problems is the emergence of environment education. Environmental education has been prompted by the reality that man's environment is neither permanent nor immutable. Velepini (2016) traced the origin of environmental education to the promotion of nature and outdoor study in elementary schools and subsequently to the conservation movement.

The field of environmental education is said to be looking at ways through which it can contribute to environmental integrity and human wellbeing (Kudryavtsev, 2013). Speaking on environmental education and its underlying rationale, Cunningham and Cunningham (2002) justifiably said that, it is only an environmentally educated person that can understand scientific concepts and facts that underlie environmental issues, the inter-relationship that shapes nature as well as understand how human society is influencing the environment

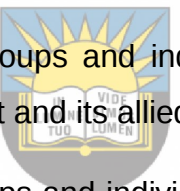
Learning about environmental issues and their interrelationship could be termed environmental education (EE). While according to UNEP (2012) EE involves the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his bio physical surrounding. Moreover UNESCO (1978) in the Tbilisi Declaration described EE as "a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations and commitments to make informed decisions and take responsible action". The infusion of Environmental Education into Social studies curriculum is as a result of the subject's major role of developing the key values and attitudes, knowledge and skills including processes that are necessary for students to become responsive and concerned citizens.

Social studies is an important subject on the school curricular of some countries around the world (USA, Nigeria, Botswana, Canada, etc.). It is a problem solving skill subject with the capacity to empower an individual with the right knowledge, desirable attitude and skills much required in any society as well as tackling the challenges of survival. The justification for Social studies is founded on the capacity of this curricular area to proffer solution to social problems within the human society, as well as fostering appropriate citizenship values (Gbadamosi, 2012). This view is corroborated by Ajiboye (2010) and Olubela (2014) that Social studies

contribute to an individual's ability to act wisely or make informed and reasonable decision for the common good of the society.

Oladiti (2014), in his own contribution said social studies integrates most emerging issues around the world, and these include Environmental Education. Environmental Education is one of the study areas in social studies contained in the 9 year Basic Social Studies Curriculum developed by Nigeria Education Research and Development Council (NERDC). Therefore the onus lies on the Social studies educator to seek solutions to the menace of environmental problems as it affects the society (Gbadamosi, 2012).

The fundamental role of environmental education (E.E.) is to give concrete awareness about the environment and how to use it for sustainable development. Abubakar (2010) outline the objectives of environmental education as follows:

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- a. Awareness: To help social groups and individuals acquire an awareness and sensibility to the total environment and its allied problems and/or issues;
- b. Sensitivity: To help social groups and individuals gain a variety of experience in, and acquire a basic understanding of the environment and its associated problems and/or issues;
- c. Attitude: to help social groups and individuals to acquire a set of values and feeling of concern for the environment and motivation for actively participating in environmental improvement and protection;
- d. Skills: to help social groups and individuals acquire skills for identifying and solving environmental problems and/or issues; and
- e. Participation: to provide social groups and individual with an opportunity to be actively involved at all levels in working toward, resolution of environmental problems/or issues.

To Ofodun and Okere (2016), knowledge as related to environmental problems and the right action to solve them become one of the requirements for responsible behaviour. Environmental knowledge is human's understanding towards the unity of space, things, power, condition, and organism, including human with its behavior which influence other's survival and welfare. It could be acquired in dual way- from experience or via scientific information. Formal EE may involve the latter, which follows a definitive and systematic procedure. According to Notoatmodjo (2002) knowledge in the cognitive domain has six actions: knowing, understanding, application, analysis, synthesis, and evaluation. Environmental knowledge is a product obtained from information and interaction process involving concept, method, facts, principle, social norm, law norm, religious norm, value system and human's attitude, and natural phenomenon about environment covering the unity of space with living and non-living creatures and the conditions in it.

Hines, Hungerford and Tomera (1986) state that: Behaviour is not shaped by itself. It is shaped by learning process. Therefore in learning, human must exhibit conscientious environmental alliance. Alliance that considers planet earth as belonging to all its occupants; natural resources exploration and utilization in harmony with nature and galvanizing for ethical and responsible environmental behaviour for future generation.

Apart from the need for environmental knowledge, research into the environmental attitude is not only essential but also requisite. According to Azwar (2003), attitude is a general evaluation created by human toward themselves, other people, object or issue. Notoatmodjo (2002) defines attitude as reaction or response towards stimulus or object. Purwanto (1999:62) states that attitude portends ideas or feelings with the tendency to act as that object's attitude. A general attitude can be defined as something which must be perceived by the individual as connected in some meaningful way to a specific situation to serve as a basis for an evaluative reaction in that situation (Prislin & Ouellette, 1996). Ajzen (2012) reviewed the ability of attitudes to predict intentions and overt behaviour; according to the theory

of planned behaviour, people act in accordance with their intentions, while intentions in turn are influenced by attitudes toward the behaviour.

There are several other studies on environmental attitude especially in primary and secondary (Shofoluwe, 2012; Robinson, 2013; Omofonmusan & Osa-Edoh, 2008; Leeming et al., 1993; McMillan et al., 2004). Focus has been to sway younger age pupils to pro-environment behaviour. Schmidt (2007) study was to find how environmental issues knowledge influenced the attitude and behaviour of students and result showed a positive environment attitude afterwards, Environmental attitude is dynamic as it could either be positive or negative as regards support of an environmental object. Purwanto (1999) states: —attitude can be positive or negative. Ofodun and Okere (2016) asserted that positive attitude is an act of approaching, loving, and hoping for specific object. Negative attitude tend to avoid, hate, and dislike specific object. However EE advocacy is paramount as studies show those not participated in the environmental issues course (Schmidt (2007) had poor awareness with implied poor pro-environment behaviour.

Most concepts in Social Studies are value based and cannot be taught effectively using conventional strategy. Scholars in Social Studies education have worked on strategies for the teaching of environmental education concepts in schools. Among such strategies were group learning strategy (Akinrinola, 2004), local community project (Emekauwa, 2004), outdoor service learning (Bartosh, Tudor and Ferguson, 2005), full and quasi participatory strategies (Ajitoni, 2005), hands-on learning (Danforth, 2005), concept mapping and problem-solving (Adekunle, 2005), value education and problem-solving skills (Ogunbiyi, 2006), collaborative learning (Duffin, Phillips & Tremblay, 2006), outdoor learning (Olatundun, 2008), school yard habitat programme (Lieberman, Hoody & Lieberman, 2005), service learning and educational trips (Gbadamosi, 2012) among others.

Nevertheless, despite the effect of these instructional strategies in bringing positive change to the teaching and learning process as established by the studies mentioned above, the rate at which environmental problem increased in Nigeria is

alarming. Thus, the gap between what is taught in the school and what the student actually learn has clearly shown that there is need for instructional strategies that will link what is learnt with reality. It is on this basis that this study is designed to employ instructional strategies that promote active learning and participation of learners. Instructional strategies that have the capability of promoting achievement in and positive attitude to environmental education should be encouraged. There is the need for all and sundry in education sector to take advantages of these strategies to promote meaningful learning in school.

Of all numerous strategies that have the potentials of improving learner's performance and problem solving skill, service learning and collaborative learning strategies take pride of place. These strategies can develop children's curiosity toward helping them in scientific inquiry, a focused and systematic approach to observation, documentation and investigation. Service learning is an idea whose time is here, and its use has increased in educational institutions all over the world. Service learning involves learners in community activities that are organized by the school. Bates (2009) explained service learning to be an instructional approach that engages student in services related activities while connecting the experience to course curricula so student have the opportunity to learn academic content while applying that knowledge in services to their community. Service learning actually dwells on the idea that education is meant to develop social responsibility and prepare learners to be active citizens.

National Service Learning Clearing House (NSLC) (2011) conceptualized service learning as a teaching and learning instructional strategy which engages young people (learners) in proffering solution to problem or challenges within their school and communities as part of their academic studies or other planned learning activity. Service learning helps to bridge the gap between curriculum content learnt by the students and its application in the world around them. Wade (2008) supplied a very comprehensive definition of service learning in this way, it is a method by which young people learn and develop through active participation in thoughtfully-

organized service experience that meet actual community needs, that are integrated into each young person's academic curriculum, that provide structured time for a young person to think, talk, and write about what he/she did and saw during the actual service activity, that provide young people with opportunities to use newly acquired academic skills and knowledge in real life situations in their own communities, that enhance what is taught in the school by extending student learning beyond the classroom, and that help to foster the development of a sense of caring for others. This is further broken down by Reynolds and Ahern-Dodson (2010) who affirmed that service learning projects are inserted into a school curriculum in a specific subject with the aim of helping student link community based concerns to formal school topics to boost students' learning and interest.

Service learning has been employed in many studies and it has proved to be of great benefit to learners in those studies (Wilson, Bradbury & McGlasson, 2015; Bates 2009; Pryor & Pryor, 2007; Olabode, 2010; Astin, Vogelgesang, Ikeda & Yee, 2000; Gbadamosi, 2012). Service learning provides an ideal environment for developing positive attitudes among learners and involving them in socially responsible behaviours (Adediran & Ajirobo, 2016). This is in line with Belisle and Sullivan (2007) who claimed that service learning strategy gives learners the opportunity to apply the academic skills and knowledge they acquire in the classroom to real-world circumstances.

Furthermore, collaborative learning strategy is of interest to the researcher. Lai (2011) defined collaboration as the mutual engagement of participants in a coordinated effort to solve a problem together. The learners are the participant while the teacher coordinates the effort. Laal and Laal (2011) saw collaborative learning as an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task or create a product. This strategy is not just about teacher-learner interaction but the role of peer relationship and this makes it learner-centred pedagogical strategy. Collaborative learning which is also known as cooperative learning (Jacobs, 2013;

Gillies & Boyle, 2013) has been referred to by Sonthara and Vanna (2009) as teaching practice that provide opportunities to learners to learn together in small groups.

Scholars have listed the benefits of collaborative learning to be academic gains, positive working relations, higher levels of self-esteem, improved communication skills, enhanced ability to be successful in the world of work and in the society, knowledge of team work, learning to help one another, etc. (Gillies & Boyle, 2013; Sonthara & Vanna, 2009; Lai, 2011; Saha & Singh, 2016). In view of the pervasive disconnection existing between what is taught by the teacher and what is learnt by the students Fakeye (2012) opined that there is need for more innovative strategies which can change students' thought patterns. Service and collaborative learning strategies may therefore fill this divide between what is taught and what is learnt

To Dattilo and McKenney (2011), a number of variables may affect the effectiveness of these strategies on students' knowledge in and attitude to environmental issues and problems. These variables include students' academic ability, personality traits, home influences, school influences, religious beliefs, school type, location and cultural practices, among others. For this study, the moderating effects of gender and school location would be examined in this study.

Almost everything is gendered; humans always differentiate between males and females, though it has been referred to as human invention. Its influence is very pervasive whichever way we took at it. Over the last 20 years, academic discourse changed the vocabulary it used to talk about male and female as subjects for study (Crocco, 2008). Gender replaced sex as the way to describe differences and similarities between men and women, reflecting new notions concerning the social and cultural construction of physical and psychological attributes. Kendall (2007) referred to gender as the culturally and socially built distinction between male and female seen in the meanings, beliefs and practices connected with masculinity and femininity. This distinction does not always result to discrimination or disadvantage. Yang (2010) defines gender as social traits and opportunities related with being

male or female and the relationship between men and women, boys and girls as well as those between men and women that are socially built and are learned through the course of socialization. Gender is a social construction that has important repercussion in our daily lives. Gender imbalance in the African society has continued to influence every aspect of our lives. The sex stereotype is responsible for variation in the education interest, ability and even aspiration of male and female children.

Gender, according to Nkire (2011) constitutes a serious issue in environmental degradation in recent times. In traditional African setting, the female folk are responsible for house cleaning as well as maintenance of the environments sanitation; therefore the female may be expected to have better knowledge, and more so positive attitude to the environment. However, studies have not unanimously agreed on the gender that has the better knowledge or greater positive attitude to the environment. While Adu, Olalundan and Oshati (2014) Macdonald and Hara (2010) and Olatundun (2008) reported that female pupils had higher environmental knowledge and positive attitudes mean scores than their male colleagues Gbadamosi (2012), Wang and Cheng (2010) and Abiona (2008) found no significant difference in the male and female knowledge and attitude mean scores.

The above findings by scholars shows that the effect of gender on environmental knowledge and attitude have not reached any consensus. Studies might need to consider cultural background of research subject in order to address gender roles within cultures so as to understand the effect of such on research outcome. Weldeana (2014) and Nieminen, Savinainem and Viri (2013) in their separate studies unanimously agreed that prior knowledge, attitude and beliefs of students are major contributing factors in gender difference.

One other variable that is capable of influencing learning outcomes is school location of learners. School location plays a crucial role in the determination of learners' academic performance. Some scholars believed that location may make it

easier for students to learn content (Chawla & Cushing, 2007; Collado, Staats and Corraliza, 2013). The immediate environment of learners can impact the level of environmental awareness as well as attitude to issues relating to the environment.

Previous studies have delved into the effect that school location might have on learner's achievement, knowledge, attitude etc. whether in the sciences, arts or humanities. Adu, Olatundun and Oshati (2014) observed that learners from indigenous areas obtained higher environmental knowledge than learners from planned areas. But learners from planned areas had higher environmental attitude score than those from indigenous areas. Falade (2012) in a study submitted that school location in favour of urban centers has significant effect on learners' attitude towards school subjects. It may be as a result of the fact that schools in the urban centres have better infrastructure and more so greater opportunities around them when compared to their counterparts in rural areas. Adediran and Ajiboye (2016) highlighted some of the factors that may make learners in urban areas to be more competent than those schooling in the rural areas, especially in civic education concepts, these are social and infrastructural amenities: good roads ICT, social media and conducive environment. Kiumi, Kibe and Nganga (2013) observed that schools located in rural areas are denied of resources such as libraries, electricity supply and technology, while those in the urban centres have these resources in place that will contribute to effective teaching and learning.

In the same vein, Oloyede and Asaju (2016) observed that the place where a school is located tells a lot about the availability of resources, facilities, category and qualification of the teachers in the school, the social environment existing there and so on. They concluded that those factors may determine the level of knowledge acquisition and skill acquisition by learners. While Oloyede and Asaju (2016) found significance effect of school location on learner's environmental knowledge; they observe that learner's in the urban area had greater environmental knowledge than people in the rural areas. On the contrary, Gbadmosi (2012)

affirmed there is no significant effect of school location on learners' environmental knowledge.

As a result of conflicting research outcomes, there is the need to further study the effect of school location on learning outcomes in environmental education concept in social studies. It is important that an investigation be conducted to ascertain how school location and gender affect Junior Secondary School students' environmental knowledge and attitude. Therefore, the study investigates the effect of service and collaborative learning strategies on Junior Secondary School Students' environmental Knowledge in Oyo State, Nigeria.

1.3 Statement of the Problem

Some human activities as a result of search for 'quality standard of living' through science and technology have brought other problems on the environment. These problems, such issues include over population, greater pollution, the death and destruction caused by toxic spills and dumps, the massive deforestation of the world's rain forests for commercial purposes, the harm caused by numerous oil spills, the destruction of wildlife habitats for human development, the release of dangerous gases (greenhouse effect) in the atmosphere such as sulfur dioxide (SO₂), nitrogen oxide (NO₂), methane (CH₄), chlorofluorocarbons (CFCs), the hydroxyl radical (OH) and carbon dioxide (CO₂).

Though many strategies have helped in increasing students' knowledge and awareness about environmental issues, yet, environmental challenges and problems mentioned earlier are still on the increase in Nigeria. This may be due to fact that environmental issues are controversial and require collaborative efforts of all citizens, especially the school students. The challenge for the teachers and educators is to adopt service and participatory strategies for dealing with these controversial environmental issues in an ethical and efficient way. Service learning and

collaborative learning strategies are two of such strategies with learners as the main focus of instruction, and also participatory in nature. Research evidence (Bates, Drits, Allen & McCandless, 2009; Hakkinen, Jarvela, Makitalo-Siegl, Ahonen, Näykki & Valtonen, 2017; Johnson, 2008) have also shown that the use of service learning and collaborative learning strategies could enhance students' propensity to civility, re-orientation and learners' competence and participatory skills.

These strategies also have the potentials of increasing students' capacities to analyze public issues and to cooperate with others in group activities. Also, many people do not understand why the environment should be preserved and to these people resources in the environment are finite, discrete entity and should be exploited. These environmental problems are visible at home, in the school and communities at large. More efforts are urgently required to beat the speed of environmental degradation and resources depletion in Nigeria. This thus necessitated new research into strategies that would focus on all the three domains of education; students' environmental knowledge, attitude and environmental practices. Such teaching strategies should be equally effective in promoting environmentally-friendly values. Such strategies should also enhance positive interactions and friendships among students. Hence this study determined the effects of service learning and collaborative learning in social studies on Junior Secondary School students' environmental literacy. It also explored the moderating effects of school location and gender on environmental knowledge and attitudes of the students in Social Studies.

1.4 Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance;

Ho1: There is no significant main effect of treatment (service and collaborative learning strategies) on Junior Secondary School students'

- a. Environmental knowledge

b. Environmental attitude

Ho2: There is no significant main effect of gender (Male/Female) on Junior Secondary School students'

a. Environmental knowledge

b. Environmental attitude

Ho3: There is no significant main effect of school location (urban/rural) on Junior Secondary School students'

a. environmental knowledge

b. environmental attitude

Ho4: There is no significant main interaction effect of treatment and gender on Junior Secondary School Students'

a. environmental knowledge

b. environmental attitude



Ho5: There is no significant interaction effect of treatment and school location on Junior Secondary School Students'

a. environmental knowledge

b. environmental attitude

Ho6: There is no significant interaction effect of school location and gender on Junior Secondary School students'

a. environmental knowledge

b. environmental attitude

Ho7: There is no significant interaction effect of treatment, school location and gender on Junior Secondary School students'

a. environmental knowledge

b. environmental attitude

1.5 Objectives of the study

In view of the stated research hypotheses, this study sought to:

1. Examine the main effect of service learning and collaborative learning strategies on Junior Secondary School students' environmental knowledge and attitude;
2. Evaluate the main effect of gender on Junior Secondary School students' environmental knowledge and attitude;
3. Assess the main effect of school location on Junior Secondary School students' environmental knowledge and attitude;
4. Investigate the interaction effect of treatment and gender on Junior Secondary School students' environmental knowledge and attitude;
5. Determine the interaction effect of treatment and school location on Junior Secondary School students' environmental knowledge and attitude;
6. Assess the interaction effect of school location and gender on Junior Secondary School students' environmental knowledge and attitude;
7. Ascertain the interaction effect of treatment, school location and gender on Junior Secondary School student's environmental knowledge and attitude.

1.6 Purpose of the study

The purpose of this study was to establish the effects of service learning and collaborative learning strategies on Junior Secondary School students' environmental knowledge in Oyo State, Nigeria.

1.7 Significance of the study

It is hope that the findings from this study would expose the students to the knowledge of the environmental challenges that daily confront them thereby creating the awareness in them that they are problem solvers and not just helpless victims of the environment. The study would make the students move from passive citizens to active citizens with positive attitude towards the physical environment. It would also awake their consciousness to the fact that they can make changes in their environment, society and the world at large. Furthermore, the students would understand the nexus between human action and consequences of such action on the physical environment.

This study would also inspire the teachers to see the need to provide students with real life experiences that can help bridge the gap between what is learnt in the classroom and the real world. This would bridge the gap between theory and practice. Furthermore, the findings of this study would help the society at large, as it would enable the school to place more emphasis on participatory learning that would improve the knowledge of the coming generation about their environment and as well inculcate the right attitude into them for the greater benefit of their society thus raising a generation of humans that are committed to sustainable development.

1.8 Delimitation of the study

This study would ascertain the effect of service learning and collaborative learning strategies on Junior Secondary School students' environmental knowledge in Oyo State, Nigeria. The study would involve six Junior Secondary School II students in four local government areas (Ibadan South-East, Ibadan North, Ona Ara, and Egbeda) of Oyo state. The choice of JSS II class was borne out of the observation that JSS I students are relatively new in the school, while JSS III students may be

preparing for External examination. Four environmental concepts were covered in this study and they are content/topics approved by the Nigerian Education Research and Development Council (NERDC) in the revised environmental education concepts in the New Junior Secondary School Social Studies II Curriculum (NERDC, 2007). These content/topics are: the meaning of environment, types of resources in the environment, environmental issues and problems and environmental education. This study will determine the effects of service learning and collaborative learning in social studies on Junior Secondary School students' environmental literacy. It also explored the moderating effects of school location and gender on environmental knowledge and attitudes of the students in Social Studies.

1.9 Operational and conceptual definition of key terms

The following terms are operationally defined and as well explained as used in this study. Only those concepts that are central to the study are considered.

1.9.1 Service-Learning: It is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility and strengthen communities (Cathryn Berger Kaye, 2010). While in this study, it is defined as a strategy for teaching and learning that provides students with real life learning experiences (in and outside the classroom) within the curricular context.

1.9.2 Collaborative learning strategy: Laal and Laal (2011) defined collaborative learning as an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. And for the purpose of this study it has been construed to be an instructional strategy whereby students work together in small groups as a team in the classroom in order to maximize gain from each other.

1.9.3 Environmental knowledge: The acquisition of ideas and experience gained from exposure to activities in environmental concepts which would assist the pupils

individually and collectively in solving issues and problems associated with the environment, its use and conservation now and in the future (Gbadamosi, 2012). In this study it is explained to be the acquisition of ideas and experiences in the understanding and awareness that come through experience or interaction with the bio-physical environment.

1.9.4 Environmental attitude: Adu, Olatundun and Oshati (2014) stated that environmental attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect: to the environment. Moreover, this study sees it as the state of mind or feeling towards a given environmental issues, problems or objects.

1.9.5 Conventional Instructional Strategy: Olubela (2014) claimed that it is a method of teaching where teacher has full control of the lesson with little or no learners' participation. For the purpose of this study, it is referred to as the traditional teacher centred approach to teaching where teacher has full control of the lesson with little or no learners' input.

1.9.6 School Location: Oloyede and Asaju (2016) identified school location to be the place where a school is located which may be either a rural area or an urban area. Meanwhile, this study has taken it to also be the location of the students' school, either in urban or rural areas.

1.9.7 Gender: Kendall (2007) referred to gender as the culturally and socially built distinction between male and female seen in the meanings, beliefs and practices connected with masculinity and femininity. This study hereby used the term gender as the classification of boys and girls into male and female.

1.9.8 Environmental Education: Environmental Education has been described by United State Environmental Protection Agency (EPA) (2017) as a process that allows individuals to explore environmental issues, engage in problems solving, and take action to improve the environment. This study defined it as the process of

transmitting and communicating environmental information and awareness to the Social Studies students for a change of attitude and values for the sustainability of their living environment.

1.10 Organization of this study

The study comprises five chapters.

1.10.1 Chapter 1 of this study gave a comprehensive background introduction from an international, regional and national perspective and context as it relates to the problem been investigated. It as well discussed the statement of the problem, research hypotheses and research objectives, purpose and significance of the study, among other issues that are take the first stage of a research work.

1.10.2 Chapter 2 concerns the review of relevant literatures that are related to the problem under investigation. This was done under various subheadings that were derivable from the research hypotheses. The theoretical framework is well stated, and the researcher also carried out a discussion of other variables in relation to the research title.

1.10.3 Chapter 3 is about the methodology employed for data collection. The researcher gave justifications for the choice and relevance of the research paradigm, approach, design, instrumentation, and data collection procedures in this study.

1.10.4 Chapter 4 consists of data analyses, interpretation, and discussion.

1.10.5 Chapter 5 which is the last chapter is about the summary of the study, conclusions and recommendations.

1.11 Summary

The essence of this chapter was to give a comprehensive overview of the background to the study, the statement of the problem, research hypotheses, the scope of the study, as well as the significance of this study. This chapter also took

care of the definition of terms; the terms were operationally and conceptually defined, in line with how they have been made use of in this study in order for them to be easily contextualized by would be readers. Effort was also made to give an explanation of the interconnectivity of the study throughout to preserve the quality of being one research report or thesis. In summary, this first chapter and its contents were explicitly assessed with a view to supplying the research guideline or blueprint for this particular study. From here we move to Chapter Two for both the theoretical framework and literature review which are dealt with comprehensively.



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CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

In the preceding chapter, the attention was on the introduction and conceptualization of this research. It took an in-depth look at the background to the study from the perspectives of international, regional and national dimensions. Furthermore, the work progressed to the statement of the problem under investigation, research hypotheses; objectives of the study, purpose of the study as well as its significance, and delimitation of the study. Both operational and conceptual definitions of key terms were also done.

In this chapter two, the following areas of the research are focused on; theoretical framework and review of related literatures. The theoretical framework acts as the guideline for this study in the sense that it provides a sense of direction. A review of related literatures that were very relevant to the research work was undertaken. This said review was attempted in tandem with the hypotheses formulated in chapter one of this study. An articulation of the theoretical framework is presented, highlighting its main attributes and how it informs the current study. A detailed discussion on the review of related literature is also made in this chapter under the sub-headings derived from the research hypotheses. The issues, ideas, and concerns in relation to the effects of service learning and collaborative learning strategies on junior secondary school students' environmental knowledge and attitude were critically analyzed.

2.2. THEORETICAL FRAMEWORK

This section analyses the theoretical framework which guided the organization and direction of the research work. Imenda (2014) was of the opinion that a theoretical framework is the soul of every research work. It informs how a researcher conceptualise the research problem, how one proceeds in investigating the problem, and what meaning(s) the researcher join to data emanating from such a study or investigation. Looking at it another point of view, the theoretical framework can be viewed as a “guideline” for the entire dissertation exercise, working as a guide on which the researchers can build and support their study (Grant & Osanloo, 2014). The authors asserted further, that it as well makes available the structure to explain how the investigator will philosophically, epistemologically, methodologically, and analytically approach the whole research. From the foregoing, theoretical framework affirms that formal theory may influence and guide research in the provision of explanations to certain contextual issues and relationships. Simply put, theoretical framework is about selected theory (or theories) that act as basis for the researcher’s opinion in relation to the researcher’s understanding. It as well sheds light on the ideas and definitions that are of relevance to the research title. Therefore, it can be described as the foundation from which all knowledge is constructed (metaphorically and literally) for a research study (Grant & Osanloo, 2014).

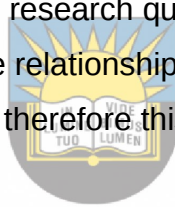
2.2.1 THEORY AND FUNCTIONS OF THEORY

Cohen, Manion and Morrison (2012) opined that theory is a set of interrelated concepts, definitions and schemes that present a systematic view of phenomena by specifying relations among variables, with the purpose of explaining and foreseeing the phenomena. In reality what theory does is to gather all of the fragmented observed data into a logical conceptual framework with wider acceptability. Theories can be empirical, critical or grand theory.

Functions of theories

- It is a prospective source of further information and discoveries;
- It leads to discovery of new hypotheses and unravelling questions that were initially left;
- It discloses gaps in knowledge;
- It identifies critical areas where further investigation is required; and
- It enables a researcher to hypothesize the existence of previously unknown phenomena (Cohen, Manion & Morrison 2007).

The use of theory in a quantitative research by the researcher is to provide an explanation or prediction about the relationship that exists between variables in the study. It is imperative to have deep knowledge about the nature and use of variables as they form a basis for research questions and hypotheses. A theory describes the how and why of the relationship of a variable serving as a link between or among the variables, therefore this research work is hinged on the rational choice theory.



2.2.2 Constructivism Theory

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The theory of constructivism is very applicable to this research. Constructivism as a theory can be traced to the works of Piaget (1973) and Bruner (1986). This theory of learning suggests that knowledge is constructed through building on previous and current experiences to generate new knowledge. In other words, constructivism is a theory of knowledge which argues that humans generate knowledge and meaning from their active experiences, i.e. the things they do. The theory further explains that construction of knowledge by individuals is done in interaction with the environment and in the process there is a noticeable change in the individual and the environment. Constructivism promotes an educational process that fosters the independence of the learner in exploring, synthesizing and constructing experiences to influence his/her own learning (Ogunyemi, 2011). Learning, from the angle of a

constructivist, is an active process whereby learners learn to discover principles, concepts and facts on their own.

Constructivism is a theory of learning based on the idea that knowledge is constructed by the knower based on mental activity. Learners are considered to be active organisms seeking meaning. Construction of meaning may initially bear little relationship to reality, but will become increasingly more complex, differentiated and realistic as time goes on. The term refers to the idea that learners construct knowledge for themselves; each learner individually and socially construct meaning as he or she learns. Knowledge can be completely characterized using the techniques of semantic analysis or task analysis. A key to efficiency and effectiveness of acquiring knowledge is simplification and regularization; thought can be completely broken down into simple block, which form the basis of instruction.

Constructivists share the view that conditioning is an adequate tenet on which to base contemporary learning theory (Duit & Treagust, 1998). However, the need for conditioning along a cognitive continuum has been established in works such as Bloom's Taxonomy (Atherton, 2007). The essence of foundation knowledge, in part based on conditioning, is evident in the most constructivist mathematics or science lessons. Constructivism merely supports minimizing the dependence of conditioning in preference for higher order cognitive abilities as students' progress through their education. Constructivism offers a significant but by no means exclusive pedagogy to educators seeking a more engaging learning environment. Fundamental contributions of constructivism to learning theory:

- Learning must be regarded as an active and collaborative process of knowledge construction;
- Learning is to be seen as an autonomous process, to be regulated by the learners' expectations, goals, existing schemata and intentions;
- Learning is a process of experimentation based on previous knowledge and experience;

- Learning is a process of socially negotiated construction of meaning;
- Learning is a process which must be supported by a rich learning environment rooted in real life and authentic situations.

Piaget's theory of constructivist learning has had wide ranging impact on learning theories and teaching methods in education, and it is an underlying theme of many education reform movements. Constructivism is an approach that has emerged within the cognitive school of thinking and it underlies much of the work currently undertaken in the field of education and social psychology. Constructivism, according to Kelly (1955), adds the notion of 'context' and process to understanding behaviour change. The essence of constructivism is that people are active sense-makers who are continually assessing their environment and acting according to the ways in which they interpret the situation (Ross & Nisbett, 1991; Allen, Bosch, Kilvington & Oliver, 2001). This perspective highlights the fact that people may react to the same information in very different ways. Importantly, constructivism sees learning as an internal process of interpretation, rather than a process of knowledge transmission.

Teaching, therefore, is the process that supports this construction and reconstruction of new knowledge, rather than being the communication of knowledge. What this study suggests is that approaches to facilitate behaviour change are most effective when used to enhance constructivist or learner-centred instructional strategies because they emphasize interactivity and learner control and engagement (Klausmeier & Goodwin, 2006). Studies into behaviour change have shown aspects which include the following. First, behaviour change is different for every person, and does not occur in one step. People move through stages of change in their own ways and in their own time. Second, the enabling environment influences these stages of change. Third, people adapt and improve the enabling environment through individual and collective capacity development. Finally, the crucial goal for any programme, particularly in environmental education,

then, is to enhance people's capacity to modify their environment so that environment enables movement through stages of change.

The underlying premise for cooperative learning is founded in the constructivist epistemology. This theory has its philosophical basis in the development of reflective thinking which says that knowledge is socially constructed (Stumbo & Wardlaw, 2011). It is an attempt to bring together a series of influences. These are the Deweyan principles of constructivism; Stentorian critical action research; and Friesian educational philosophy (Ajitoni, 2005). These are supported by the writings of such great philosophers and psychologists as John Dewey, Herbert Thelen, Jean Piaget, L.S. Vygotsky, Paulo Freire, and others like them (Jofili & Watts, 1995).

Constructivism presupposes that knowledge is actively constructed by the knower. Human's experience and the social and educational world are a constructed organic interaction of people, organized and shaped by their cultured, status and gender (Kim, 2005). Thus, thoughts (knowledge), feelings (attitudes), and action (practice) cannot be separated each from the other Johnson et.al. (2003) has summarized these principles in their definition of a new paradigm of teaching. First, they believe that knowledge is constructed, discovered, and transformed by students. The school and the teacher create the conditions within which students can construct meaning from the material studied by processing it through existing cognitive structures. This they retain in long-term memory where such knowledge remains open to further processing and possible reconstruction.

Second, students actively construct their own knowledge. Learning is conceived of as something a learner does, not something that is done to the learner (Panitz, 2006; Ajitoni, 2005). Students do not passively accept knowledge from the teacher or curriculum. Learning is not a spectator sport. Students do not learn much just spitting in classes listening to teachers, memorizing prepackaged assignments, and spitting out answers (Chickening & Gamson, 1987). Students activate their existing cognitive structures or construct new ones to subsume the new input.

Third, the objective of the school is to develop students' competencies and talents. Hence, education, according to Freire (1976), means liberation. McClaren and Lankshear (1994) observe that Freire's pedagogy for liberation aims to push people to become active participants in shaping the economic, social and cultural environment in which they live. In schools, students must develop skills, competencies, and talents and be active in controlling their own learning.

Fourth, education is a personal transaction among students and between the school and students as they work together. As such, teachers need to be democratic and make efforts towards the liberation of students, rather than their 'domestication.' That means inviting students to think critically about both the content of lessons as well as the learning process. This attitude, according to Ajitoni (2005), entails a shift of 'authority' from the teacher to the students.

Fifth, all the foregoing can only take place within a cooperative context. There are at least three general theoretical perspective that have guided research on cooperation. They are cognitive-developmental, behavioural, and social interdependence. The cognitive developmental perspective is largely based on the theories of Piaget and Vygotsky. The work of Piaget and related theorists is based on the premise that when individuals cooperate on the environment, socio-cognitive conflict occurs. This crates cognitive disequilibrium, which in turn stimulates perspective taking ability and cognitive development (Panitz, 2006). Ige (2013) stated that there are four epistemological assumptions at the heart of constructivist learning. These are:

- I. Knowledge is physically constructed by learners who are involved in active learning;
- II. Knowledge is symbolically constructed by learners who are making their own representations of action;
- III. Knowledge is socially constructed by learners who convey their meaning and making to others;

IV. Knowledge is theoretically constructed by learners who try to explain things they do not completely understand.

The work of Vygotsky and related theorists is based on the premise that knowledge is social, constructed from cooperative efforts to learn, understand, and solve problems. The behavioural theory perspective focuses on the impact of group reinforces and rewards on learning. The most important theory dealing with cooperation is social interdependence theory (Panitz, 2006). Sixth, teaching is assumed to be a complex application of theory and research that requires considerable teacher training and continuous refinement of skills and procedures (Johnson et. al, 2003).

It is from the foregoing that the proposed service learning and collaborative learning guide will make use of constructivism theory as a base. Ajiboye (2008), is of the opinion that through constructivism knowledge is constructed when individuals engage socially in talk and activity which concerns challenges or tasks. The theory would no doubt support this study in the attempt to create unwavering interest to learn as the students would be guided in examining and discovering solutions to some environmental challenges through their efforts. It will also help the learners to connect what is learnt to real life situations.

2.3 CONCEPTUAL REVIEW

2.3.1 Service Learning Strategy

Service learning is an instructional approach that engages students in service related activities while connecting the experience to course curricula so students have the opportunity to learn academic content while applying that knowledge in service to their community (Bates, 2009). Service learning as a teaching-learning strategy mixes classroom teaching and service in the community. It affords the students the opportunity to apply learnt curricular concepts to projects in the community. It affords learners the opportunity of honing their skills of problem solving, critical thinking, cooperation as well as planning and management, and civic responsibility. Service

learning stands for a strong type of pedagogy with potentials in the sense that it provides a way of connecting the academic with what is practical.

There is always the problem of taking service learning for community service (Cox, 2017). While community service is just offering a service to meet the specific need of a community, for example, filling pot hole on roads with debris, service learning does this community service and also go some steps further; identifying the causal factor, figuring out lasting solutions, and fixing the community service within the curricular context.

Tell me and I forget, show me and I remember. Involve me and I understand (Chinese proverb), service learning affords the learners the opportunity to be involved in societal issues. When students are engaged in practical activities in the real world, abstract and theoretical materials that are hitherto linked to the traditional classroom put on new meanings. Senator John Glen of (National Commission on Service Learning) in LAUSD (2007) rightly gave the whole essence of service learning by saying:



Service-learning is unique because it enables teachers to improve students' academic performance, sense of civic responsibility, self-confidence and workplace skills with a single teaching method. It links classroom lessons with real-life learning. Pp. 14.

Service-learning is new to many teachers, but it is recently evolving in teaching and learning processes. As an emerging trend in social studies programme, it is superseding mere community services, where students or teachers (or both) renders free, unsolicited services for the community. Rather, service-learning according to National Service-Learning Clearinghouse (2013) is an organized, collaborative, reflective process that requires active participation, and must impact on a community in a positive way with the goal of enhancing academic and citizenship. When

educators emphasize cooperation and moral commitment courtesy service learning the learners become prepared to in meeting the most pressing needs of their society.

Furthermore, service-learning uses community services to enhance educational learning outcomes. In social studies, service-learning is considered as a teaching strategy for promoting social justice in democratic societies. To Wade (2000) and Harkavy (2004), service-learning enhances students' and teachers' values, skills and knowledge needed to function as effective citizens of a country. Renner (2011) further emphasized that service-learning instills a critical consciousness in students. The strategy enables learners to engage in collaborative, practical and problem-solving activities that will enhance effective teaching and learning. In order to distinguish high quality service learning experience from low quality service learning experience Yizhao (2009) identified seven elements:

- Integrated learning;
- Collaboration;
- Civic responsibility;
- Evaluation;
- High quality service;
- Student voice; and
- Reflection.



While more researches are being carried out globally on service-learning strategy, classroom teachers inevitably controls the fate of service-learning. Teachers decide if they should incorporate service-learning into their classroom activity, although school heads and government educational agencies may pose curriculum restrictions to such hands-on academic activities (Hart, 2011).

Other benefits of service-learning instructional strategy are that, both teacher and learners will appreciate and value their individual and joint contributions in helping to create an appealing and safe environment for working and learning. The strategy also provides a nexus and meeting point for many stakeholders – the teachers, students, parent and community to for academic connections and community partnership.

Theoretically, civic action approach provides greater opportunities to promote critical service-learning approaches. Furthermore, critical service-learning according to Mitchell (2007) is credited to Paulo Freire. Freire (1979) considered a critical pedagogy as one liberating and humanizing, and suggested a problem posing education model where students investigate societal problems. This is referred to as critical theory. Service learning is critical in orientation because it promotes a critical consciousness that transforms learning as students work with a community towards eliminating social injustice through civic engagement. Another theory that supports service-learning is critical inquiry, which according to Crotty (2003) questions power relationships in order to reveal hegemony and ultimately take action for emancipation.

From the findings of the study, teachers showed very limited knowledge of the concept of service-learning, and majority had no prior knowledge. Some teachers confused service-learning with community service or social service. This therefore calls for more research into the strategy and more participation of students and teachers in service-learning programmes. However, Bilig (2001) emphasized that service-learning is unique because the action is tied to curriculum and the action is continually reflected on throughout the six phases of service-learning which are investigation, planning, action, reflection, demonstration and celebration.

Moreover, many teachers are yet to understand the benefits of service-learning, which according to Gains-Hanks and Grayman-Simpson (2011) is reciprocity of endeavour that benefits both the school and community. The findings also revealed that teachers are overwhelmingly desire to implement service-learning in their

countries in specific ways that will typically complement their teaching expertise. Metz and Youniss (2005) assert that mandating service-learning did not negatively impact those predisposed to volunteer. The study further shows how required service-learning increases civic engagement and knowledge for students not inclined to volunteer. Meanwhile, Wade (2000) opined that service-learning requires extraordinary levels of preparation from teachers, and teachers must be ready to implement service-learning activities in spite of restrictions from their colleagues and or school administrators. Many critics of service-learning warned of the danger of a traditional service-learning approach because of the implications to further inequities and the status quo with a critical perspective (Penner, 2011). Others also warned against “us-them” dichotomy where the server has superiority over those being served (Mitchell, 2008).

2.3.2 Collaborative learning strategy

Teachers in a variety of educational settings have long used collaborative strategy to teach students at different levels of education. Collaborative learning is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product (Laal and Laal, 2011). Collaborative learning activities allow students to provide explanations of their understanding; this can help students elaborate and reorganize their knowledge. Collaborative learning by nature creates opportunities to develop students ‘cognition by actively communicating with more proficient peers and thereby expanding conceptual potential (Springer, 2015). Moreover, collaboration involves participants working together on the same task, rather than in parallel on separate portions of the task (Lai, 2011), and this learning style builds team spirit, cooperation, togetherness and unity. Working in groups promotes collaborative learning and offers several advantages over individual learning. Collaborative learning strategy has the dual outcome of improving both self-efficacy and academic achievement

Students learn best when they are actively involved in the process. Researchers report that, regardless of the subject matter, students working in small groups tend

to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats. Students who work in collaborative groups also appear more satisfied with their classes. (Beckman, 1990; Chickering & Gamson, 1991; Collier, 1980; Cooper & Associates, 1990; Goodsell, Maher, Tinto, and Associates, 1992; Johnson & Johnson, 1989; Johnson et.al., 1991; Kohn, 1986; McKeachie, Pintrich, Lin & Smith, 1986; Slavin, 1980, 1983; Whitman, 1988). Haugwitz and Sandmann (2010) asserted that advantages of collaborative learning strategies can be realized when students through discussion of newly introduced concepts integrate individual knowledge with collective knowledge. Studies have shown that students understand concepts better if they communicate them while learning. This approach fosters improved communication and problem solving skills, as well as achievement.

Various names have been given to this form of teaching, and there are some distinctions among these: cooperative learning, collaborative learning, collective learning, learning communities, peer teaching, peer learning, reciprocal learning, team learning, study circles, study groups, and work groups. All in all, there are three general types of group work: informal learning groups, formal learning groups, and study teams (adapted from Johnson, Johnson & Smith, 1991).

Informal learning groups are ad hoc temporary clustering of students within a single class session. Informal learning groups can be initiated, for example, by asking students to turn to a neighbor and spend two minutes discussing a question you have posed. You can also form groups of three to five to solve a problem or pose a question. You can organize informal groups at any time in a class of any size to check on students' understanding of the material, to give students an opportunity to apply what they are learning, or to provide a change of pace. *Formal learning groups* are teams established to complete a specific task, such as perform a lab experiment, write a report, carry out a project, or prepare a position paper. These groups may complete their work in a single class session or over several weeks.

Typically, students work together until the task is finished, and their project is graded. *Study teams* are long-term groups (usually existing over the course of a semester) with stable membership whose primary responsibility is to provide members with support, encouragement, and assistance in completing course requirements and assignments. Study teams also inform their members about lectures and assignments when someone has missed a session. The larger the class and the more complex the subject matter, the more valuable study teams can be. The suggestions below are designed to help you set up formal learning groups and study teams. If you have never done group work in your classes, you might want to experiment first with informal learning groups. Two other tools, "Leading a Discussion" and "Supplements and Alternatives to Lecturing: Encouraging Student Participation," describe a variety of easy ways to incorporate informal learning groups into your courses. "Helping Students Write Better in All Courses" discusses informal collaborative writing activities.

2.3.2.1 General procedures for collaborative learning strategy

Plan for each stage of group work: When you are writing your syllabus for the course, decide which topics, themes, or projects might lend themselves to formal group work. Think about how you will organize students into groups, help groups negotiate among themselves, provide feedback to the groups, and evaluate the products of group work.

Carefully explain to your class how the groups will operate and how students will be graded: As you would when making any assignment, explain the objectives of the group task and define any relevant concepts. In addition to a well-defined task, every group needs a way of getting started, a way of knowing when its task is done, and some guidance about the participation of members. Also explain how students will be graded. Keep in mind that group work is more successful when students are graded against a set standard than when they are graded against each other (on a curve). See Grading Practices (Source: Smith, 1986).

Give students the skills they need to succeed in groups: Many students have never worked in collaborative learning groups and may need practice in such skills as active and tolerant listening, helping one another in mastering content, giving and receiving constructive criticism, and managing disagreements. Discuss these skills with your students and model and reinforce them during class. Some faculty use various exercises that help students gain skills in working in groups (Fiechtner & Davis, 1992). See "Leading a Discussion" for examples of guidelines for participating in small groups. (Sources: Cooper, 1990; Johnson et.al, 1991).

Consider written contracts: Some faculty give students written contracts that list members' obligations to their group and deadlines for tasks (Connery, 1988).

Create group tasks that require interdependence: The students in a group must perceive that they "sink or swim" together, that each member is responsible to and dependent on all the others, and that one cannot succeed unless all in the group succeed. Knowing that peers are relying on you is a powerful motivator for group work (Kohn, 1986). Strategies for promoting interdependence include specifying common rewards for the group, encouraging students to divide up the labor, and formulating tasks that compel students to reach a consensus (Johnson et.al. 1991).

Make the group work relevant: Students must perceive the group tasks as integral to the course objectives, not just busywork. Some faculty believe that groups succeed best with tasks involving judgment. As reported by Johnson et.al. (1991), for example, in an engineering class, a faculty member gives groups a problem to solve: Determine whether the city should purchase twenty-five or fifty buses. Each group prepares a report, and a representative from each group is randomly selected to present the group's solution.

The approaches used by the various groups are compared and discussed by the entire class. Goodsell, Maher, Tinto and Associates (1992, pp. 75-79) have compiled a detailed bibliography of discipline-specific efforts in collaborative learning that can be useful for developing tasks and activities.

Create assignments that fit the students' skills and abilities: Early in the term, assign relatively easy tasks. As students become more knowledgeable, increase the difficulty level. For example, a faculty member teaching research methods begins by having students simply recognize various research designs and sampling procedures. Later, team members generate their own research designs. At the end of the term, each team prepares a proposal for a research project and submits it to another team for evaluation. (Cooper and Associates, 1990).

Assign group tasks that allow for a fair division of labour: Try to structure the tasks so that each group member can make an equal contribution. For example, one faculty member asks groups to write a report on alternative energy sources. Each member of the group is responsible for research on one source, and then all the members work together to incorporate the individual contributions into the final report. Another faculty member asks groups to prepare a "medieval newspaper." Students' research aspects of life in the Middle Ages, and each student contribute one major article for the newspaper, which includes news stories, feature stories, and editorials. Students conduct their research independently and use group meetings to share information, edit articles, proofread, and design the pages. (Smith, 1986; Tiberius, 1990).

Set up "competitions" among groups: A faculty member in engineering turns laboratory exercises into competitions. Students, working in groups, design and build a small-scale model of a structure such as a bridge or column. They predict how their model will behave when loaded, and then each model is loaded to failure. Prizes are awarded to the groups in various categories: best predictions of behaviour, most efficient structure, and best aesthetics (Sansalone, 1989).

Consider offering group test taking: On a group test, either an in-class or take-home exam, each student receives the score of the group. Faculty who have used group exams report that groups consistently achieve higher scores than individuals and that students enjoy collaborative test taking (Hendrickson, 1990; Toppins,

1989). Faculties who use this technique recommend the following steps for in-class exams:

- Assign group work at the beginning of the term so that students develop skills for working in groups;
- Use multiple-choice tests that include higher-level questions. To allow time for discussion, present about twenty-five items for a fifty-minute in-class exam;
- Divide students into groups of five;
- Have students take the test individually and turn in their responses before they meet with their group. Then ask the groups to arrange themselves in the room and arrive at a group consensus answer for each question. Score the individual and group responses and prepare a chart showing the average individual score of each group's members, the highest individual score in each group, and the group's consensus score. Ninety-five percent of the time, the group consensus scores will be higher than the average individual scores (Toppins, 1989).

2.3.3 Procedures for organizing learning groups

Decide how the groups will be formed: Some faculty prefer randomly assigning students to groups to maximize their heterogeneity: a mix of males and females, verbal and quiet students, the cynical and the optimistic (Fiechtner & Davis, 1992; Smith, 1986). Some faculties allow students choose with whom they want to work, although this runs the risk that groups will socialize too much and that students will self-segregate (Cooper, 1990). Self-selected groups seem to work best in small classes, for classes of majors who already know one another, or in small residential colleges (Walvoord, 1986). Still other instructors prefer to form the groups themselves, taking into account students' prior achievement, levels of preparation, work habits, ethnicity, and gender (Connery, 1988). They argue for making sure that members of each group are exclusively graded students or exclusively pass/ not pass students and that well-prepared students be placed in groups with other well-prepared students. Other faculty, however, try to sprinkle the more able students evenly among the groups (Walvoord, 1986). A middle ground, proposed by Walvoord

(1986), is to ask students to express a preference, if they wish, then make the assignments yourself. You could, for example, ask students to write down the names of three students with whom they would most like to work.

Be conscious of group size: In general, groups of four or five members work best. Larger groups decrease each member's opportunity to participate actively. The less skillful the group members, the smaller the groups should be. The shorter amount of time available, the smaller the groups should be. (Cooper, 1990; Johnson, Johnson & Smith, 1991; Smith, 1986).

Keep groups together: When a group is not working well, avoid breaking it up, even if the group requests it. The addition of the floundering group's members to ongoing groups may throw off their group process, and the bailed-out troubled group does not learn to cope with its unproductive interactions. (Wolvoord, 1986).

Help groups plan how to proceed: Ask each group to devise a plan of action: who will be doing what and when. Review the groups' written plans or meet with each group to discuss its plan.

Regularly check in with the groups: If the task spans several weeks, you will want to establish checkpoints with the groups. Ask groups to turn in outlines or drafts or to meet with you.

Provide mechanisms for groups to deal with uncooperative members: Walvoord (1986) recommends telling the class that after the group task is completed, each student will submit to the instructor an anonymous assessment of the participation of the other group members: who did extra work and who shirked work. If several people indicate that an individual did less than a fair share, that person could receive a lower grade than the rest of the group. This system works, says Walvoord, if groups have a chance in the middle of the project to discuss whether any members are not doing their share. Members who are perceived as shirkers then have an opportunity to make amends. Here are some other options for dealing with shirkers:

- Keep the groups at three students: it is hard to be a shirker in a small group;
- Make it clear that each group must find its own way to handle unproductive group behaviour; and
- Allow the groups, by majority vote, to dismiss a member who is not carrying a fair share. Students who are dropped from a group must persuade the group to reconsider, find acceptance in another group, or take a failing grade for the project.

Perhaps the best way to assure comparable effort among all group members is to design activities in which there is a clear division of labour and each student must contribute if the group is to reach its goal. (Connery, 1988; Walvoord, 1986).

2.3.3.2 Evaluating Group Work

Ensure that individual student performance is assessed and that the groups know how their members are doing: Groups need to know who needs more assistance in completing the assignment, and members need to know they cannot let others do all the work while they sit back. Ways to ensure that students are held accountable include giving spot quizzes to be completed individually and calling on individual students to present their group's progress. (Johnson et.al. 1991).

Give students an opportunity to evaluate the effectiveness of their group: Once or twice during the group work task, ask group members to discuss two questions: What action has each member taken that was helpful for the group? What action could each member take to make the group even better? At the end of the project, ask students to complete a brief evaluation form on the effectiveness of the group and its members. The form could include items about the group's overall accomplishments, the student's own role, and suggestions for changes in future group work. Rau and Heyl (1990) have developed a form that can be used for an interim or final evaluation (Johnson et.al. 1991; Walvoord, 1986).

Decide how to grade members of the group: Some faculty assign all students in the group the same grade on the group task. Grading students individually, they

argue, inevitably leads to competition within the group and thus subverts the benefits of group work. Other faculty grade the contribution of each student on the basis of individual test scores or the group's evaluation of each member's work. If you assign the same grade to the entire group, the grade should not account for more than a small part of a student's grade in the class (perhaps a few bonus points that would raise a test score from a B - to a B) (Cooper, 1990; Johnson, Johnson & Smith, 1991).

2.3.3.3 Dealing with Student and Faculty Concerns About Group Work

"I paid my tuition to learn from a professor, not to have to work with my classmates, who don't know as much." Let students know at the beginning of the term that you will be using some group techniques. Students who are strongly antagonistic can drop your class and select another. Inform students about the research studies on the effectiveness of collaborative learning and describe the role it will play in your course. Invite students to try it before deciding whether to drop the class (Cooper and Associates, 1990).

"Our group just isn't working out." Encourage students to stick with it. Changing group membership should really be a last resort. Help your students learn how to be effective group members by summarizing for them some of the information in "Leading a Discussion" and "Encouraging Student Participation in Discussion."

"Students won't want to work in groups." Some students may object, in part because most of their education has been based on individual effort, and they may feel uncomfortable helping others or seeking help. The best advice is to explain your rationale, design well-structured meaningful tasks, give students clear directions, set expectations for how team members are to contribute and interact, and invite students to try it (Cooper and Associates, 1990)

"Students won't work well in groups." Most students can work well in groups if you set strong expectations at the beginning of the term, informally check in with

groups to see how things are going, offer assistance as needed, and provide time for groups to assess their own effectiveness. Some groups may indeed have problems, but usually these can be resolved. See "Encouraging Student Participation in Discussion" for suggestions on how to minimize monopolizers, draw out quiet students, and generally engage all students in active participation.

"If I do group work, I won't be able to cover as much material during the semester as I do when I lecture." Yes, adding group work may mean covering fewer topics. But research shows that students who work in groups develop an increased ability to solve problems and evidence greater understanding of the material. Some instructors assign additional homework or readings or distribute lecture notes to compensate for less material "covered" in class (Cooper and Associates, 1990).

2.3.3.4 Setting Up Study Teams



Tell Students about the benefits of study teams: Study teams meet regularly outside of class to study together, read and review course material, complete course assignments, comment on each other's written work, prepare for tests and exams, and help each other with difficulties that are encountered in class. Study teams are guided by the notions that students can often do as a group what they cannot do by themselves and that students can benefit from peer teaching-explanations, comments, and instruction from their course mates.

Explain how study teams work: Study teams can work in a number of ways. In one model, all students read the assignments but each member agrees to provide to the group in-depth coverage of a particular segment of the material and to answer as fully as possible whatever questions other members of the study team might raise. In this model, then, each member agrees to study all the material yet each also tries to become an "expert" in a certain area of the material.

In another model, the teams' activities vary from meeting to meeting. For example, at one meeting, teams might review class notes to see whether there is agreement on the most important points of the lecture or discussion. In another session, teams might go over a class quiz or test to ensure that all team members clearly understand each of the questions, especially those that were answered incorrectly by one or more members. Another session might be devoted to reviewing problem sets or exchanging drafts of written papers for peer editing.

In a third model, the main agenda for each study team session is a set of study questions. Early in the term, the study questions are provided by the professor or graduate student instructors. After three or four weeks, each team member must bring a study question related to the week's lecture material to the team meeting. The questions structure the discussion and are modified, discarded, or replaced by the group as the session proceeds. At the session's end, the study questions that the group chooses as the most valuable are turned in for review by the instructor. You can let students decide for themselves how to structure their study teams, or you can offer advice and suggestions (Gushy, 1988; Johnson, Johnson & Smith, 1991; Light, 1992; Study Groups Pay Off, 1991).

If Study teams are optional, offer students extra credit for participation: For example, students who are members of an official study team might get bonus points for each assignment, based on the average grade received by the individual group members (Study Groups Pay Off, 1991).

Let students know what their responsibilities are as a study team member.

Students who participate in study teams agree to do the following:

- Prepare before the study team meeting (for example, do all the required reading or problem sets);
- Complete any tasks that the group assigns to its members;
- Attend all meetings and arrive on time;

- Actively participate during the sessions in ways that further the work of the group;
- Help promote one another's learning and success;
- Provide assistance, support, and encouragement to group members; and
- Be involved in periodic self-assessments to determine whether the study team is working successfully (Is too much work being required? Is the time in study team meetings well spent?).

In addition, let students know that they can improve the effectiveness of their study teams by making sure each session has a clearly articulated agenda and purpose. They can also work more efficiently if all logistical arrangements are set for the semester: meeting time, length, location.

Help students locate meeting rooms: Arrange with your department or campus room scheduler to make available small meeting rooms for study teams. If appropriate, consider using group rooms in the residence halls.

Limit groups to no more than six students: Groups larger than six have several drawbacks: it is too easy for students to become passive observers rather than active participants; students may not get the opportunity to speak frequently since there are so many people; students' sense of community and responsibility may be less intense in larger groups.

Let students select their own study teams unless you have a large class: Since the groups are designed to last the term and will meet outside of class, give students the opportunity to form groups of three to six members. Arrange one or two open groups for students who do not know others in the class. If students will be selecting their own groups, offer several small group activities during the first three weeks of class and rotate the membership of these ad hoc groups so that students can get to know one another's interests and capabilities before forming study teams. See "Personalizing the Large Lecture," "Supplements and Alternatives to Lecturing," "Encouraging Student Participation in Discussion," and

"The First Day of Class" for ideas on small group activities and how to help students get to know one another.

If your class is very large and letting students select their own groups seems too difficult, have students sign up for teams scheduled to meet at particular times. This means that students will form groups based solely on when they can regularly attend a study team meeting. Try to form the groups by sections rather than for the large lecture class overall. Students in the same section are more likely to know each other and feel a sense of responsibility for their study team (Walvoord, 1986)

Use a portion of class time for arranging study groups: Announce that study groups will be set up during the third or fourth week of the course. At that time, hand out a description of study teams and students' responsibilities, and let students talk among themselves to form groups or to sign up for scheduled time slots. Suggest that all members of the study team exchange phone numbers. Encourage the study teams to select one person as the convener who will let all members know where the group is to meet.

Devote a class session to study teams: Ask students to meet in their study teams to review course material or prepare for an upcoming exam or assignment. Use the time to check in with the groups to see how well they are operating. Some faculty regularly substitute study team meetings for lectures. To the extent possible, meet with a study team during an office hour or review the work of a study team sometime during the semester.

2.3.4 Environmental Education Concept

Environment can be considered to be all surroundings that have the capacity to affect the behaviour, growth and development of the living things that mingle within the

system (Adu, et.al. 2014). Education, on the other hand is either an act or a process of transmitting or acquiring knowledge, skills and attitude in preparation for a profession or a specific goal. Environmental Education means the knowledge acquired about the environment. It has been defined in several but similar ways by educationists and environmentalists. USA Environmental Protection Agency (2017) defines Environmental Education as a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

Grant makers Association describe Environmental Education (EE) as an aim to create an environmentally literate citizenry, poised and motivated to take action on pressing environmental issues. Environmental Education, thus, embraces ecological issues, development practices and social concerns (Velempini, 2016).



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In ecological terms, 'environment' has a more limited meaning which is essentially physical and biological. Environment in this sense encompasses an array of ecosystem. An ecosystem consists of both living (including man) and non-living components and their physical surrounding: land, water, air etc. Thus this narrower meaning restricts the concept "environment" to the physical or natural environment, comprising God given natural resources, natural elements and natural environment whether or not modified by man. Such an approach is adopted by two principal environmental laws in Nigeria. Section 38 of the Federal Environmental Protection Agency Act defines 'environment' to "include water, air, land and all plants and human beings or animals living therein and the inter-relationships which exist among these or any of them." Similarly, the Environmental Impact Assessment Decree of Nigeria defines the term 'environment' as including:

- a) land, water and air, including all layers of the atmosphere;
- b) all organic and inorganic matter and living organisms; and,
- c) the interacting natural systems that include components referred to in paragraphs (a) and (b).

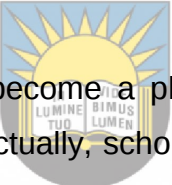
An indication of what the environment encompasses at an international level is given by the broad range of issues now addressed by international law; including conservation and sustainable use of natural resources and biodiversity; conservation of endangered and migratory species; prevention of deforestation and desertification; preservation of Antarctica and areas of outstanding natural heritage; protection of oceans, international water courses, the atmosphere, climate, and ozone layer from the effects of pollution; safeguarding human health and the quality of life. Inevitably, however, any definition of the environment will have the quality of meaning we want it to mean. Hence understandably, many international conventions avoid the problem of definition, however, no doubt, as Caldwell remarks it is a term that everyone understands and no one is able to define.

In the broad sense, Black's Law Dictionary (1979, 5th ed.) defines environment as ranging from the totality of physical, economic, cultural, aesthetic, and social circumstances and factors which surround and affect the desirability and value of property or which also affects the quality of people's lives. Further still, Oxford English Dictionary describes environment as the conditions under which any person or thing lives or is developed; the subtotal of influences which modify and determine the development of life or character. The broad meaning will subsume historical, cultural, technological, natural, economic, political factors, influences and milieus within the concept of environment. In ecological terms, environment has a more limited meaning which is essentially physical and biological. Environment in this sense encompasses an array of ecosystem. An ecosystem consists of both living (including man) and non-living components and their physical surrounding - land, water, air, etc. Thus this narrower meaning restricts the concept environment to the

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2.4 Environmental Problems and Issues in Nigeria



Environmental degeneration has become a phenomenon of global concern which deserves an urgent intervention. Actually, scholars around the globe agreed that the earth's climate is no longer what it used to be due to human activities that release greenhouse gases into the atmosphere (UN Foundation, 2008). In most developing countries, including Nigeria, there have been accelerated incidences of deforestation, soil erosion, flood, desertification, pollution, poor waste disposal and management. On the other hand, the exhaustion of certain natural resources and various types of pollution from the crisis of modern production system in the highly industrialized countries constitute major threats to the quality of the environment.

The air we breathe every day is being overloaded with Carbon IV oxide and other poisonous effluents from different categories of vehicles, industries and power plants. The water we need for domestic uses have been rendered unsafe by a variety of chemical substances. The land is stripped bare of its vegetation or polluted with oil spills and human wastes. The rising sea levels resulting from global warming cause serious threat to people living in island countries and coastal areas. The ozone-depleting substances such as products with chloroflorocarbons, and methyl bromides

from which plastics and foams are made, allow excessive levels of harmful ultraviolet rays to reach the earth. This has resulted in increased rates of skin cancer, eye damage and weak immune systems in people, etc. There is also a high rate of waste generation apparently due to the accelerated rate of population explosion.

If sustainable development is to be achieved, natural resources must be carefully managed and protected. Indeed, we have come to realize in Nigeria that environmental problems exist and they have negative effects on the survival of man, animals, and plants. Nigeria comprises of diverse geographic and climatic zones, and constitutes a single environmental system which is particularly vulnerable to all forms of trans-boundary pollution. It is believed that the environment holds the widest potential to serve as a meeting-ground among nations as they forge new paths towards sustainable development. In an interdependent world, phenomena such as acid rain, ozone depletion, desertification or marine pollution do not respect national borders.



2.4.1 Urbanization

Urbanization is caused by high population growth rate and rural- urban migration. Urbanization in Nigeria is characterized by city slums with serious environmental consequences. The problem has been described as acute and exemplifies the inability of development measures to keep pace with the rate of population growth. The problem of the deposal of sewage and refuse is quite serious because of the rapid rate of generation of non-biodegradable materials such as plastics.

Environmental conditions in cities have gradually deteriorated due to the rapid growth of the cities and the attendance inability of social services and infrastructures to keep pace with the rate of growth. Inadequate storm drains, dumping of refuse in drainage lines and construction of houses close to and even on the natural water channels have been shown to be responsible in that order for the increasing cases of flood in the urban centers. Environment problems associated with the increasing growth of urban slums including overcrowding in squalid housing conditions, poor quality or

unavailability of basic infrastructures and social services, such as water and sewage facilities and even lack of access routes (NEST, 1992)

2.4.2. Overpopulation

Population is a major factor in all environmental- related issues. Overpopulation causes stress on the environment. Environmental problems such as overpopulation, degradation, erosion, desertification, etc. are caused by man's misuse of resources in the environment. Until very recently, Nigerians regard their "large population size" as a symbol of greatness, power and prestige and tend to resist attempts to reduce it drastically. It is only just becoming clear, that over population is forcing traditional societies to abandon age old production systems and resources management techniques that allowed them to produce enough food for themselves at minimal impacts on the environment. There is evidences everywhere of rapid decline in environmental quality and human living conditions occasioned by rapid increase in human numbers In 1985, Mabogunje, reasoned that because of the economic emergency that was declared in the country, the next few years where going to witness tremendous efforts at increased production and enhanced productivity in the country. Under such stressful situation, "it will be easy for people to become so exigent, worrying only about what to get out of the environment for their own immediate needs and uses, without caring very much for the consequence, especially for succeeding generations (Mabogunje, 1985).

The Federal Government of Nigeria (1988) National Policy on population for development also made the observation that "the present high rate of our population growth is already contributing substantially to the degradation of the ecology of the country. It observes that land fragmentation, over-farming and over-grazing have led to soil erosion and desertification and that overcrowding has led to the spread of shanty towns and urban blight, all of which would worsen if the present population growth continues (NEST, 1992).

2.4.3 Water issue

Shortage of water may be the most crucial environmental problem facing Nigeria today, and touching upon its existence. Water scarcity is exacerbated by the deteriorating quality of water resources due to demographic, industrial and agricultural pressures. Since the mid-1980s, demand has at times outstripped supply. Nigeria's water resources are limited by the country's climate, geography and hydrology.

Seventy-five (75) percent of the annual rainfall is concentrated in seven months, with at least five irregular rainy months. Global climatic change may further magnify the pressure on Nigeria's water system by increasing temperature and evaporation rates and changing precipitation regimes, for better or worse. Furthermore, while water demand is greatest in the heavily populated regions and in the southern part of the country, rainfall water storage reservoirs and water resources are largely concentrated in the south.

The water environment, usually the first to be seriously affected by pollution is a vital resource satisfying at least six different categories of uses of water, (i) public water supply; (ii) fresh-water fisheries; (iii) marine fisheries and wildlife; (iv) industrial water supply; (v) agricultural water supply; and (f) recreation and aesthetic enjoyment.

Water pollution reduces the amount of pure, fresh water that is available for satisfying these necessities. The pollutants that affect water come mainly from industries, farms, and sewerage system treated and untreated sewage. Industries dump huge amounts of waste products into bodies of water each year. These wastes include chemical, wastes from animals and plant matter, and hundreds of other substances. Wastes from farms include animal wastes, fertilizers, and pesticides. Most of these materials drain off farm fields and into nearby bodies of water.

Industrial, agricultural and domestic consumption of water is ever increasing in Nigeria. The major sources of Nigeria's annual fresh water are derived from rivers, reservoirs, the coastal aquifer, and the inland, mountain aquifer and springs. The total river flow accounts for somewhat over 50 percent of the total. Since surface and

ground water resources can no longer meet the demands of a growing population and economy, Nigeria should increase its development and use of treated and waste water, blackish/grey water and water harvesting (collection, storage and use of storm runoff). The emphasis should be laid on recycling waste water while waste water is treated and reused for agricultural purposes, mainly for the irrigation of food and cash crops as well as animal fodder.

2.4.4 Deforestation

Forest are large area of land with trees and are noticeable in area with subequatorial and monsoon types of climates. The importance of the forest to man cannot be over emphasize. They act as sanctuary for rare and/or endangered animals. Forests act as storm breaks, thereby protecting the towns and villages from destruction. They provide useful products such as wood and char-coal for fuel, fibre for paper and textiles, medicine from the bark and leaves of some plant, breeding ground for animals, check erosion, and supply of food and materials for building houses. In 1975, the total area of forest of all types in the country was estimated at about 360,000sq kilometers or about one third of the country total land area. It was also estimated that the annual harvest of sawn timber from high forest was 1.5 million cubic meter which would take between 25 to 30 years to denude the forest of matured timbers. With rapid rise in domestic consumption of timber due to increased rate of building construction resulting from the rise in population and income, it would take less than 15 years to exhaust the forest of timber resources (NEST, 1992).

Deforestation is a process whereby trees are felled for several purposes, but without replanting to replace the ones felled. Deforestation is dangerous to man, animals and properties. It leads to erosion of the soil and storm, which can cause destruction of properties, crops and Animals. When forest are cleared, the soil are exposed to erosion devastation, floods occur, and rivers and lakes, are filled up with silt. The water becomes dirty and impure for mankind. The remover of tree canopy (particularly the leaves) has effect on the rainfall of that area, as there is less leaf surface area for the transpiration of water, which in turn affects the relative humidity

of the atmosphere. The repeated cultivation of crops on cleared area of plant tends to exhaust the soil of its mineral content (Omiegbe, 1998).

Deforestation in general – for agricultural development, urban growth, industrial expansion and pressure from an increasing population-has reduced the extent, diversity and stability of the Nigerian forest. The food and Agricultural Organization (FAO) estimated that Nigerians destroy about 600,000 hectares of her forest every year through careless exploitation and husbandry (Okafor, 1988). Such careless exploitation of the forest has been implicated in a number of worsening environmental problems in the country including soil erosion and infertility, desertification and flooding.

2.4.5 Desertification

Desert is barren lands, waterless and treeless and often sand covered such as Sahara desert which spread across Africa continent. Desertification is therefore the encroachment of the desert on land that was once fertile. Desertification can be inducing either by natural process or by the action of man. Natural hazards such as drought and sand deposit by winds are prime factors in the desertification process. Desertification is more pronounced in the northern part of the country where the Sahara desert has eaten deep into the once fertile land. The Lake Chad basin which is situated in the area is not left out of desertification. The lake basin has diminished from a water surface area of about 24,000sq. Kilometers in 1963 to about 3,000sq. kilometres in 1984 (Daily Times, may 21, 1985).

This is due to natural hazards (Drought and sand particles transported by winds to the area) and man's unwise use of the lake environment. Desertification is dangerous to man. It leads to famine, diseases, destruction of crops, livestock and man. Desertification can be controlled through irrigation, terrace ploughing and planting of trees and grasses.

2.4.6 Pollution

Environmental pollution can be categorized into three groups. These are air or atmospheric pollution, aquatic or water pollution and land or surface area pollution. Ajitoni (2010) saw pollution as the introduction of materials into the environment that reduces the purity of the environment.

Air pollution: Most of the earth's resources are not distributed equally. Air is everywhere but its quality varies from place to place. Air quality depends on freedom from pollution. The World Health Organization (WHO) (1990) defined air pollution as "limited to situation in which the outer ambient atmosphere contains materials in concentrations which are harmful to man and his environment". Man's activity on the earth surface has largely degraded the quality of the lower atmosphere. The growth and development of industries and Urbanization has contributed greatly to the excess carbon monoxide produced by combustion and other human activities.

The more industries a country has, the harder it is to keep air free from dust and chemical pollution. Industries pollute the air with sulfur dioxide and other gasses. Carbon monoxide reacts with the blood vessel and prevents it from taking up oxygen and the people are suffocated. In Nigeria, several rural towns that had in the past enjoy fresh and dry air are currently experiencing air pollution problems (Obajimi, 1998). This is due to industrialization process and expansion in human activities.

Air pollution turns clear, odourless air into hazy, smelly air that harms health, kills plants, and damages property. Man is the cause of air pollution as he pours hundreds of millions of gases and particulates into the atmosphere each year. One of the most common forms of air pollution is smog (smoke and fog).

Effects of air pollution include respiratory diseases which may be as a result of particulates that settle in the lungs and result to asthma and bronchitis. It is also believed that particulates may even help to cause such diseases as cancer, emphysema, and pneumonia. Air pollution also harm plants as poisonous gasses in the air may restrict the growth of, and eventually kill all kinds of plants. Hydrocarbons

injure plants also. Air pollutants may also affect the weather. Both gases and particulates can cause changes in the average temperatures of an area.

Water pollution: Aquatic or water pollution is the discharge of unwanted biological, chemical and physical materials into water bodies from man's environment. The pollutants are usually chemical, physical and biological substances that affect the natural condition of water. This incidence is responsible for the wide spread water contamination in most Nigeria cities. Also solid wastes have equally flooded the water ways in these urban centers. Land surface pollution is the occurrence of unwanted materials or waste on land. The commonest pollutant on land is the waste products that are often scattered on land area in the cities.

According to Onwioduokit (1998), most environmental problems are due to the production or consumption of goods whose waste products translate easily into pollutant. Ayeni (1978) and Sada (1981) believed that the emergence of urbanization is responsible for the rapid accumulation of solid waste. Generally, it would appear that the growth of urbanization and industrial development coupled with improper wastes management control have added a great dimension to land area pollution in Nigeria. Generally, there are other environmental problems resulting, from the humanization of the natural environment, only some of the important impacts are discussed.

Land pollution: Land pollution through solid wastes generation and dumping on the land constitutes the main environmental management problem in Nigeria. Nigeria Environmental Study Action/Team, NEST (2006) and Ologhobo (2008) posited that environmental problems in Nigeria are essentially those of solid wastes which emanate from discarded materials, generated from domestic and community activities or from industrial, commercial and agricultural operations. These problems are compounded by the advent of industrialization and urbanization in different states and local government areas of Nigeria, high population density, intense land use, and improper handling and disposal of accumulated wastes. NEST (2008) and Egunjobi (2008) reported that wastes generation by the Nigerian city inhabitants grows in the

same proportion as the cities grow. Indeed, there is a strong positive correlation between population growth and volume of solid wastes generation in any country's urban areas and cities.

Land may become polluted not only through the addition of specific contaminants, but also through alteration to such a degree and in such a manner as to render it unsuitable for its best zones use as demanded by the local authorities. Some of the common contaminants contributing to land pollution around urban centres are household refuse especially food remnants; packing materials such as papers, cartons, boxes and plastics, tyre residuals, tin cans, and ashes resulting from burning ; organic industrial residuals such as those from cannery operations like pulps, pits, and culls, partially concentrated organic sludge such as textile mills, and discarded unusable materials in form of junked vehicles and parts, oil drums and similar items. Most often times, the children, adults and even animals defecate openly on the land.

The pollution from such dumping could result in the production of not only unsightliness but also bad odour. More seriously, such improper disposal method of wastes can become a serious health hazard through creating a suitable environment from which diseases can be transmitted. The modes of transmission can be either through biological vectors, physical and mechanical means, direct contact or other means related to the socio-economic status of a given household.

Land pollution through waste dumping could result in waste of available financial resources because of constant refuse collection, disposal and treatment. The money used for waste management by the government could have been for development purposes.

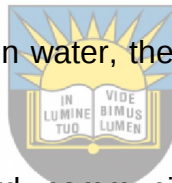
In addition, land pollution through wastes dumping constitutes a great percentage of mortality rates due to communicable diseases orchestrated by this unwholesome attitude of the Nigerian households and industrial organizations.

Solid wastes: Solid wastes are probably the most visible forms of pollution. Man throws away billions of tons of solid material each year. Much of the wastes end up

littering roadsides, floating in lakes and streams, and collecting in ugly dumps. Examples of solid wastes include junked automobiles, tyres, refrigerators, cans and other packaging materials, and scraps of metal and paper.

Solid wastes present a serious problem because most of the methods used to dispose of them result in some type of damage to the environment:

- i. When the wastes are out into open dumps, they ruin the aesthetics of the surrounding areas.
- ii. Dumps also provide homes for disease-carrying animals, such as cockroaches and rats.
- iii. Some solid wastes can be destroyed by burning them, but burning produces smoke that causes air pollution
- iv. When wastes are dumped in water, they contribute to various forms of water pollution.



Johnson (2010) listed fire hazard, communicable diseases, contamination of the underground water, and pollution of the landscape, urban flooding, unsightliness and odour nuisance as part of the major environmental consequences of ineffective solid wastes management practices in Nigeria.

Suggested solutions to problems of solid waste management in Nigeria are that:

- i. There must be an established effective management information system to aid planning, decision-making and control;
- ii. In ensuring household storage of solid wastes, suitably adapted plastic and galvanized metal bins may be used. The cost of these may be subsidized to enable them to be within the reach of every householder;
- iii. Disposable household paper or plastic bags may be introduced and the local production of these, at cheaper prices to households, can be encouraged;

- iv. Emphasis must be laid on house-to-house solid wastes collection services;
- v. Despite the fact that the use of communal collection service for solid wastes management is evidenced in Nigerian most cities, yet it is recommended that no user, where communal facilities exist, must have to carry solid wastes for more than 150 metres to the depot;
- vi. For adoption of other more sophisticated storage appliances there is need to consider implications of these in respect of costs, available skill and general practicality of maintenance;
- vii. To make solid wastes transportation easier, it is necessary to relate the type and size of vehicular units required to operating factors, namely, the nature of the solid wastes, haulage distance, and the traffic situation;
- viii. Any decision on the types of vehicles to be purchased for solid wastes transportation must be accompanied either with a strong and legally binding after-sales service agreement, or with a decisive programme of training local staff to do the servicing;
- ix. The three systems of waste disposal in practice are landfill, incineration and composting. At present, the most commonly acceptable is sanitary landfill;
- x. The selection, operation and design of the landfill should be based on a systematic integrated study and an evaluation of all physical conditions, economic and socio-political constraints as well as required equipment for the various operations;
- xi. For small urban communities, non-mechanical composting techniques appear beneficial, while mechanical technique is considered suitable for large urban centres. The former technique is labour-intensive while the latter is capital-intensive;

xii. There should be original and adaptive research development in designing correct equipment for dealing with all areas of environmental activities, including solid wastes;

xiii. In the annual operational budget for solid wastes management, special attention must be paid to maintenance costs of vehicles, plant and equipment to ensure for these a high and efficient availability ratio; and

xiv. The enacted environmental protection law should be enforced with sincerity.

Other types of pollution: There are some things in the environment that pollute the environment but they cannot be classified as air, water, soil pollutants, or as solid wastes. They travel through and affect various parts of the environment. These pollutants include noise, radiation, pesticides, and such metals as mercury and lead.



Noise: it is one of the most common and widespread form of pollution. It is especially troublesome in urban areas. People in and near cities are exposed to loud noise much of the time. The noise comes from such things as aircrafts, motor vehicles, construction projects, and industries. The noise causes discomfort in people. In extreme cases, loud noise can damage hearing or even cause deafness. A few city dwellers have nervous breakdowns because of noise. Some people who live near an airport are eight times more likely to be admitted to a mental hospital than if they live in a quiet area.

Radiation: This is an invisible pollutant that can be highly dangerous. Some radiation reaches the earth from the sun and other space. Larger amounts come from radioactive materials such as fall out from nuclear weapons and waste materials, from nuclear power plants and from various electronic devices. Exposure to large amounts of radiation is believed to result in cancer and in harmful changes in reproductive cells. A number of electronic devices produce small amounts of radiation. These devices include X-ray machines, colour television sets, and microwave ovens. After an atomic weapon has been tested, radioactive substances

may reach the ground in rain, get taken up by plants, and then may pass along the food chains, becoming concentrated at each stage. The radio-isotope, strontium-90, for example, can be taken up by cattle and passed on to man in milk and cheese, and up in his bones. Here the substance may affect the bone marrow where blood cells are made, causing leukemia or blood cancer. This recognized danger from nuclear fallout led to the Test-ban Treaty of 1963 which prevented above-ground testing of nuclear weapons by Russia and America.

Pesticides: Pesticides affect more than the natural cycles in soil and water. Much pesticides material does not reach the insects, or other pests it is intended to kill. Instead, tiny particles of the pesticide travel through the air and water, sometimes for great distances. Humans and animals that come in direct contact with the pesticides take it into their bodies, and the materials collect in tissues and organs. Humans and animals also take in pesticides indirectly when they eat organisms that contain the material. For example, a large fish can take in heavy amounts of pesticide by eating smaller fish that have the material in their bodies. A human may then eat the large fish and acquire the highly concentrated material the fish contains. In this way, materials are passed from one organism to another in a food chain.

2.5 SANITATION IN NIGERIA

Sanitation means the promotion of hygiene and prevention of diseases by maintenance or improvement of sanitary conditions. It refers principally to the safe handling, and treatment, disposal or recycling of waste water and management of solid and industrial wastes are related and equally important components of sanitation. Hygiene practices such as safe provision, storage and handling of drinking water and food, as well as personal hygiene habits are also component parts of sanitation. Of a great concern in sanitation and health is the issue of waste disposal. Wastes may be solid, liquid, and gas and classified as follows:

- i. Liquid wastes (faeces, urine, spillage from in-house or community taps and hand pumps, bathroom wastes, laundry washings and kitchen washings);
- ii. Solid wastes (refuse, garbage, street sweepings, rubbish, metals, plastics, ashes, etc.);
- iii. Clinical wastes (arising from hospitals, health centers, dental and veterinary-surgeries, homes of people with diseases such as diabetes, etc. or renal failure who treats themselves);
- iv. Agricultural wastes; and
- v. Industrial wastes. (Adelaja, 2008).

The sanitation problem is made more acute by the explosion of urban growth coupled with attendant problems of poor general sanitation, inadequate housing planning, absence of adequate supply of safe drinking water, unsanitary disposal of waste, food contamination, lack of pest control activities and high prevalence of communicable diseases (Odumosu, 2008).

Oyeshola (2009) asserted that children's health is at most risk from lack of clean drinking water and adult women are more exposed to health hazards of contaminated water. This is because they are the primary water fetchers, they wash clothes and utensils and when children are sick, women nurse them. Thus, making them run the risk of the same infection. Similarly, the absence of good drainage leading to messy and unhealthy surroundings, stagnant water (which is breeding environment for vectors transmitting diseases like bilharzias, guinea worm, malaria, diarrhea, dysenteries, typhoid, intestinal parasites, etc.) in urban areas of developing countries. In semi-arid or other environmentally vulnerable areas in pastoral communities, people and animals commonly may use the same water point, construction of latrine or soak ways and the possibility of a contamination of ground water sources is often not taken into consideration. Influx of people into towns and cities is in many cases not proportion to the volumes of water and sanitary facilities available. In poor neighbourhoods, where people lack

the means to arrange acceptable solutions themselves, this can lead to unhealthy conditions.

However, the flooding on Nigeria's major roads is due largely to refuse blocking the drains and other outlets provided, thereby encouraging mosquito breeding. The World Health Organization (WHO) estimates that about 50 percent of the world hospitals beds are occupied by patients suffering from those illness caused by unwholesome water supply and inadequate sanitation. Dr. Halfan Mahler, former WHO Director General once stated that the number of water taps and improved sanitation per 1000 persons is a better indicator of health than the number of hospital beds. The sanitation related diseases plaguing our country include, diarrhoea, dysentery, cholera, typhoid, fever, malaria, yellow fever, tetanus, tuberculosis, etc. the morbidity and mortality caused by these diseases are unacceptably high.



2.5.1 Sanitation constraints

The following are the constraints to good sanitation in Nigeria:

- i. Inadequate funding of sanitation programme;
- ii. Absence of basic sanitation facilities for domestic use;
- iii. Lack of political will on the part of government in implementing effective sanitation programmes;
- iv. Lack of proper institutional structure;
- v. Inadequate public information and education on sanitation and hygiene practices;
- vi. Inability of the government to update and enforce enabling laws and edicts on sanitation;
- vii. Inadequate manpower and ineffective supervision; and

viii. Role conflict in terms of responsibility among government agencies and professional bodies.

Therefore, poor sanitation is a particular problem in crowded urban environments where lack of space makes unsafe disposal of faeces especially dangerous. As developing nations become more urbanized, improving sanitation for millions of low-income city dwellers must be a priority. In communities without resources to build latrines, safer sanitation may involve setting aside restricted areas for defecation and burying practices associated with sanitation such as constant sweeping of the house and its surroundings, clearing of the bushes around the house and handwashing even if latrines are not available. Improved sanitation, water and hygiene decrease exposure to pathogens, such that the number of cases of disease and death is reduced.

2.6 Environmental information



International and regional organizations as well as governments of various countries in the world have begun to realize that information is a critical resource/asset necessary and essential for effective management of their environment. The major concern of the environmental information managers is to grant the citizenry access to environmental information and data for use, thereby promoting the quality of environment and compliance monitoring.

Environmental information can be defined as news, messages, ideas, facts, and processed data obtained from published and unpublished sources that are capable of increasing or improving the knowledge state of the users or recipients on matters relating to environmental problems and how best to manage their environment for good living.

Taiwo (2007) stated that without adequate, current and accessible environmental information, the objective of any purposeful and meaningful efforts at managing our environment might not be realized. Nevertheless, environmental information, to be

information, has to have value, capable of being used for rational decision-making and has to be designed to lead to action, that is, good management of the environment by man for better living.

Environmental information management therefore is the application of management principles to the acquisition, organization, control, dissemination and use of information relevant to having human affairs and activities and the physical environment of man on the same equilibrium level. It may also be viewed as the art of mobilizing and efficient allocation of resources (men, money, materials, and machines) in capturing, processing/analyzing, organizing, storing, retrieving and disseminating information for environmental planning, decision-making and controlling activities.

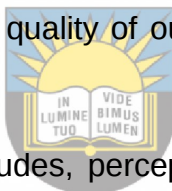
Environmental information management in any nation must cover the following components of the environmental management:-

- 
- The logo of the University of Fort Hare is a shield-shaped emblem. It features a yellow sun with rays at the top, a blue sky, and a yellow sun at the bottom. Inside the shield, there is a book with the Latin motto 'IN LUMINE TUO' on the left and 'VITAE BIVUS LUMEN' on the right. Below the shield, the text 'University of Fort Hare' is written in a large, serif font, and 'Together in Excellence' is written in a smaller, italicized font below it.
- i. Solid waste management
 - ii. Toxic and hazardous waste management
 - iii. Water pollution
 - iv. Air pollution
 - v. Industrial pollution
 - vi. Bio-diversity management
 - vii. Natural resources management and conservation

2.6.1 Goals of environmental information management

The goals of environmental information are as follows:

- i. Increasing users or people's knowledge and understanding of the environment, the forces that contribute to its deterioration and how environmental quality could be greatly improved;
- ii. Sensitizing the citizens or the public to the need to handle the environment with great care and tact so that its capacity for sustaining the population can be maintained or increased;
- iii. Inculcating skills in citizenry for solving environmental problems and improving the quality of the environment for better living;
- iv. Inculcating aesthetic values that will encourage a culture a culture of environmental beautification and maintenance;
- v. Mobilizing citizens to actively cooperate and involve themselves in the protection and restoration of the quality of our environmental by planning suitable action programmes and projects;
- vi. Inculcating appropriate attitudes, perception and sense of responsibility that will enable man live harmoniously with his environment; and
- vii. Identifying specific chemical, biological, physical, psychological and socio-cultural characteristics of the environment of man that constitute potential hazards to life and health. (Oduro-Mensah, 2012; Igbozurike 2007).



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2.6.2 Role of environmental information

The role of environmental information in sound management of environment include:

- i. Environmental information x-rays environmental problems that need urgent attention;
- ii. It assists in the design of target intervention for monitoring environmental protection policy;

- iii. It helps in identifying incidence and prevalence of any specific environmental problem(s);
- iv. It assists in the conduct of environmental surveillance;
- v. It assists in the formulation of environmental policies and strategies;
- vi. It aids environmental assessment impact;
- vii. It assists in defining epidemiological and ecological concepts;
- viii. It provides the basis for efficient allocation of resources for environmental management; and
- ix. It helps in providing the mechanisms for the control of any ecological catastrophic episodes.



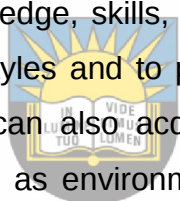
2.7 Environmental Education and its objectives

Environmental Education (EE) is a lifelong multidisciplinary approach to learning that helps people to understand and appreciate the environment and people's connection to and impact on it (Razzino, 2003). Environmental education is a process which develops awareness, knowledge, and understanding of the environment, positive and balanced attitudes towards it, and skills which will enable students to participate in assessing the state of the environment (Wiser Earth, 2007).

Environmental education prepares people for an ecological sustainable future. It empowers individuals to maintain and restore the earth's natural systems and fosters support for the well-being of future generations by promoting sustainable lifestyles (Razzino, 2003). This requires understanding of the need to achieve a balance between the environmental, social and economic aspects of development. Moreover, environmental education involves respecting and valuing the achievements of the past and supporting the preservation of those aspects of the

built environment which remind people of those achievements. The subject also has a spiritual focus, inspiring an emotional and sensitized response from people, not only in their appreciation of the wonders of the natural world, but making them feels at one with the environment (Macionis, 2007).

When environmental education is incorporated into the school curriculum, or infused into various subjects, students learn *about* the environment; develop skills to investigate and solve issues *in* the environment; acquire attitudes of care and concern *for* the environment; adopt behaviours and practices, which *protect* the environment; and understand the principles of ecologically sustainable development. By so doing, environmental education will help and seek to achieve the level of competence and citizenship in all students that will enable them to contribute to the achievement of sustainable societies (Wikipedia, 2010). Through environmental education, students acquire knowledge, skills, and attitudes to enable them to form judgments about sustainable lifestyles and to participate in environmental decision-making (Elstgeust, 1997). They can also acquire technical skills associated with environmental management, such as environmental cost accounting and life cycle analysis.



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From the foregoing, environmental education can be defined as a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi, Declaration, 1978).

The goal of environmental education is to create a world population that is aware of, and concerned about, the environment and human impacts on the environment (Wiser Earth, 2007). An environmentally educated population will have the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solving current problems and preventing new ones. The objective of environmental education, as observed by Wiser Earth (2007), is to generate knowledge to enable the sustainable management of global natural and physical

resources. Environmental education, therefore, focuses on (1) awareness and sensitivity about the environment and environmental challenges; (2) knowledge and understandings about the environment and environmental challenges; (3) attitude concern for the environment and help to maintain environmental quality; (4) skills to mitigate the environmental problems; and (5) participation for exercising existing knowledge and environmental related programmes (Wiser Earth, 2007).

If this focus of environmental education aims to foster students' understanding of the environment as an integrated system, and to develop attitudes and skills which are conducive to the achievement of ecologically sustainable development, then the focus is bound to have implications on the social studies curriculum objectives; on the students; on the school; and on the wider society.

The implications on the Social Studies curriculum objectives will include, among others, the need to develop students' knowledge and understandings about the nature and function of the ecosystems and how they are interrelated, the impact of people on environments, the principles of ecologically sustainable development, and the role of community, politics and market forces in environmental decision-making (Environment Education Policy, 2002).

The curriculum must also make provision for developing students' skills in applying technical expertise within an environmental context, identifying and assessing environmental problems, communicating environmental problems to others, resolving environmental problems, adopting behaviours and practices that protect the environment and evaluating the success of their actions. Moreover, the curriculum objectives must develop on students' values and attitudes relating to a respect for life on Earth, an appreciation of their cultural heritage, and a commitment to act for the environment by supporting long-term solutions to environmental problems (Environment Education Policy, 2002).

The implication of the focus of environmental education on the school pertains to two main areas: the management of resources by the school and the management of

school grounds. In the management of resources, schools will have to take a whole-school approach to waste disposal in particular; employ best practice in management of resources, and identify learning opportunities for students that will be the outcome of practices in the management of resources. Similarly, for the management of school grounds, schools will have to manage school grounds in accordance with the principles of ecologically sustainable development; develop school grounds as part of the overall school plan; and identify learning opportunities for students resulting from the management of school grounds. For schools to manage resources according to the principles of ecologically sustainable development, it has been suggested that schools should avoid and reduce, reuse and recycle, and minimize waste generation as much as possible (Balagot, 1990).

The efficient management of resources within the school will, no doubt, provide a range of benefits. These will include improvements to the school environment such as reduction in litter and waste, improvements in health and safety; a sense of community and pride in the school; participatory democracy in the management of the school with respect to decisions that directly affect the students; and increased student confidence and skills in making decisions on environmental issues (Environment Education Policy, 2002).

Today, most social problems experienced by humans somehow have their root in the distribution and use of natural resources. Definitely, human survival depends on the continued existence of natural resources and the quality of human's life is intricately linked to the quality (and perhaps also, the quantity) of resources in the environment such as water, air, soil and so forth (Smyth, 2006). Evidence abound that in spite of the efforts of many environmental organizations, human's environmental problems continue to worsen (Oladapo, 2010). Resources are being depleted and habitats are still being destroyed to make way for human progress. Other life forms that depend on these resources and surroundings also become threatened. This chain effect of resource depletion or environmental degradation ultimately affects all human beings.

Environmental Education can help to build the necessary support and capability of environmental management. Indeed, it constitutes both a precondition for and a tool to be used in effective implementation. The failure to incorporate environmental concerns into formal and informal education can therefore be an obstacle to effective environmental management. In countries where official development model is not sustainable, the first role of environmental education may be to work towards a change of that model; otherwise the model becomes a major obstacle to effective environmental management (Aka, et al, 2005).

Environmental education takes into account the diversity of problems faced by different people in different locations and/or occupations. It reaches different target groups and has different degrees of credibility or power of persuasion. Therefore, it is now widely recognized that environmental education should be part of a country's environmental strategies and of National Environmental Action Plans (Okebukola, 2001), Environmental education will be needed not only to increase awareness, knowledge and skills, but also to build up the constituency supporting environmental concerns, which is necessary to keep an environmental management process flourishing (Erocal, 2004).

Conceptually, the link between environmental management and environmental education is quite straightforward. At the level of education system, it can be seen to consist of the incorporation of the principles of sustainable development into teaching. At the level of national political and economic decision-making, leaders and entrepreneurs have to be made aware of the environmental issues and how they can be addressed before appropriate policies can be designed and institutions be set up. At a more technical level, people have to be trained to manage and monitor systems to protect the environment. Environmental education should constitute an integral part of concrete measures to establish effective environmental policies in developing countries (Erocal, 2004).

It is widely accepted that, education is an effective means that society possesses for confronting the challenges of the future. Over time, education also powerfully affects

cultures and societies, increasing their concern over unsustainable practices and their capacities to confront and master change (UNESCO, 2008). Education not only can inform people, but can change them. Education makes people wiser, more knowledgeable, better informed, ethical, responsible, critical and capable of continuing to learn (UNESCO, 2008).

We are living in the planet where everybody recognizes that current economic development trends are not sustainable and that we are facing tremendous environmental challenges. Education is the key to sustainability and an essential foundation for sustainable development (ESD Toolkit). Sustainability requires a population that is aware of the goals of a sustainable society and has the knowledge and skills to contribute to these goals. Education is considered as a means for disseminating the knowledge and developing skills, for bringing about desired changes in behaviours, values and lifestyles necessary to achieve sustainable development, and for promoting public support for the continuing and fundamental changes that will be required. Education is humanity's hope and an effective means in the quest to achieve sustainable development (UNESCO, 2008).

2.8 Nigerian Environmental Laws and Regulations

The role of legislation in inducing responsible attitudes and behaviours towards the environment cannot be overlooked. Legislation serves as an effective instrument for environmental protection, planning, pollution, prevention and control. These include the Constitution of the Federal Republic of Nigeria (1999), the National Environmental Standards and Regulations Enforcement Agency (NESREA) Act, Environmental Impact Assessment Act, The Land Use Act, Harmful Waste (Special Criminal Provisions) Act, and the Hydrocarbon Oil Refineries Act. Others are the Associated Gas re-injection Act, the Endangered Species Act, Sea Fisheries Act, the Exclusive Economic Zone Act, Oil Pipelines Act and the Petroleum Act. It also includes the Petroleum Products and Distribution (Management Board) Act, the Territorial Waters Act, Nuclear Safety and Radiation Protection Act, Nigerian Mining

Corporation Act, Quarantine Act, River Basins Development Authority Act, Pest Control of Production (special powers) Act, Agricultural (Control of Importation) Act, Animal Diseases (control) Act, the Bees (Impact Control and Management) Act, the Civil Aviation Act and Factories Act. Others are Water Resources Act, Hides and Skins Act, Federal National Park Act and the Niger-Delta Development Commission (NDDC) Act.

The constitution, as the national legal order, recognizes the importance of improving and protecting the environment and makes provision for it. Relevant sections are:

- **Section 20** makes it an objective of the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria.
- **Section 12** establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria.
- **Section 33 and 34** which guarantee fundamental human rights to life and human dignity respectively, have also being argued to be linked to the need for a healthy and safe environment to give these rights effect.

The earliest efforts of the Nigerian government in environmental protection legislation were geared either towards public health and safety, or to the protection and conservation of economically important natural resources. This is demonstrated by the following national environmental laws:

- a. Deaths and Burial Act of 1958, Laws of the Federation, Section 41, provides that nobody shall attempt to bury a corpse in any building, yard, garden or compound within 100yards of any dwelling house. Any breach will be liable to imprisonment for 6 months;
- b. The Criminal Code of 1958 contains provisions, which create the offence of common nuisance. It provides that where a person does anything that obstructs or causes inconvenience or damage to the public in the exercise of rights common to

all members of the public, it is an offence. This offence correlates with the common law offence of public nuisance and may be used to punish unlawful discharges or release of harmful substances on public land and water because of inconvenience and damage to public in the enjoyment these rights are likely to cause. A person who commits an offence under this section is liable to 2 years imprisonment;

- c. The Criminal Code of 1958, section 245 provides that any person who corrupts or fouls the water of any spring, stream, well, tank or place so as to render it less fit for the purpose for which it is ordinarily used is guilty of a misdemeanor and is liable for imprisonment for 6 months. Furthermore, anybody who commits noxious acts which affect public health is liable under section 247 (a) of the Criminal Code and if guilty of misdemeanor, will be liable to 6 months imprisonment. This covers cases of factories emitting black toxic smoke and gas flaring during drilling activities.

Until recently, emphasis was not laid on the impact of environmental pollution in Nigeria, as such, existing laws both criminal and civil, which regulate the environment are scattered in various statute books. Recent Nigerian legislations are based on the World Health Organization (WHO). American Public Health Association (APHA), and United States Environmental Protection Agency (USEPA) standards. Some of the statutes and laws on the protection of the Nigerian environment include:

- a. Waterworks Act, 1915;
- b. Public Health Act, 1917;
- c. National Effluent Limitation Regulations of 1991;
- d. Pollution Abatement in industries and Facilities Generating Waste Regulations of 1991;
- e. Solid and Hazardous Waste Management Regulation of 1991;
- f. Environmental Impact Assessment (ETA) Decree No. 86 of 1992;
- g. The Nigerian Urban and Regional Planning Law Decree No. 89 of 1992; and
- h. Section 20 (i) FEPA Decree No. 88 of 1998. Under this decree the discharge of hazardous waste substances into the air, water and land in Nigeria is prohibited.

Persons who violate this provision and are convicted of the offence shall be liable to a fine of N1,000,000:00 or imprisonment for for 10 years or both. Where the offender is a corporate body, the fine imposed is a maximum of N500,000:00 and an additional fine of N1,000:00 for every day that the offence subsists.

Table 2.1: An overview of Pollution in Nigeria and the impact of legislated standards on its abatement

S/ No	Year	Name/Type of Legislation	Implementing Agency	Area of Jurisdiction	Primary Purpose
1	1863	Township Improvement Ordinance	Lagos Colonial government	Lagos Colony	Sanitation
2	1917	Township Ordinance	National Colonial Government	Entire Protectorate	Sanitation
3	1928	Lagos Town Planning Ordinance	Government	Lagos colony and later the entire protectorate	Land Use
4	1946	Town and Country Planning Ordinance Nos. 4 and 29	Government	Lagos and the Three Regions	Land Use
5	1958	1946 Town and Country Planning Ordinance amended	Lagos and Regional Governments and Later State Governments through Planning Authorities, State	Lagos City Regions (then) and States	Development Control

		and published as Laws of Nigeria	Town Planning Division, Urban Development Boards		
6	1974	Food and Drugs Decree	Foods and Drugs Agency	National	Sanitation and Health
7	1979	Part of Constitution of Fed. Rep. of Nigeria	Local Government Councils Nationwide	Local Government Areas	Sewage and refuse disposal
8	1985	Environmental Sanitation Edict	Lagos State Waste Disposal Board	Lagos State	Sanitation and Pollution Control
9	1986	Lagos State Town and Country Planning Edict	Lagos State Town Planning Authority	Lagos State	Physical Planning/Health
10	1987	Factories Decree	Federal Factory Inspectorate	Industries Nationwide	Safety and Health
11	1988	Harmful Wastes Decree No. 42	Federal Environmental Protection Agency (FEPA)	National	Sanitation, Health and Ecosystem Protection
12	1991	Pollution Abatement in Industries Cap. 131	FEPA	Industries Nationwide	Sanitation, Health and Ecosystem Protection
13	1992	Environmental Impact Assessment Decree 86	FEPA	National	Health and Ecosystem Protection, Sanitation

					and Physical Planning
14	1992	Urban and Regional Planning Decree 88	All tiers of Government	National	Proper Physical Developmen t

Source:

Olokesusi (1988) "An overview of Pollution in Nigeria and the impact of legislated standards on its abatement" The Environmentalist vol. (8) 1:31-38

2.8.1 National Environmental Standards and Regulation Enforcement Agency (NESREA) ACT 2007 Administered by the Ministry of Environment, the National Environment Standards and Regulation Enforcement Agency (NESREA) Act of 2007 replaced the Federal Environmental Protection Agency (FEPA) Act. It is the embodiment of laws and regulations focused on the protection and sustainable development of the environment and its natural resources. The following sections are worth noting:

- **Section 7** provides authority to ensure compliance with environmental laws, local and international, on environmental sanitation and pollution prevention and control through monitory and regulatory measures.
- **Section 8 (1)(K)** empowers the Agency to make and review regulations on air and water quality, effluent limitations, control of harmful substances and other forms of environmental pollution and sanitation.
- **Section 27** prohibits, without lawful authority, the discharge of hazardous substances into the environment. This offence is punishable under this section, with a fine not exceeding, N1,000,000 (One Million Naira) and an imprisonment term of 5 years. In the case of a company, there is an additional fine of N50,000, for every day the offence persists.

2.8.2 National Effluent Limitation Regulations

- **Section 1 (1)** requires industry facilities to have anti-pollution equipment for the treatment of effluent.
- **Section 3 (2)** requires a submission to the agency of a composition of the industry's treated effluents.
- **National Environment Protection (Pollution Abatement in Industries and Facilities producing Waste) Regulations (1991)**
- **Section 1** Prohibits the release of hazardous substances into the air, land or water of Nigeria beyond approved limits set by the Agency.
- **Section 4 and 5** requires industries to report a discharge if it occurs and to submit a comprehensive list of chemicals used for production to the Agency.

2.8.3 Federal Solid and Hazardous Waste Management Regulations (1991)

- **Section 1** makes it an obligation for industries to identify solid hazardous wastes which are dangerous to public health and the environment and to research into the possibility of their recycling.
- **Section 20** makes notification of any discharge to the Agency mandatory.
- **Section 108** stipulates penalties for contravening any regulation.

2.8.4 National Environmental (Sanitation and Wastes Control) Regulations, 2009

This regulation that was promulgated in 2009 among other things makes adequate provisions for waste control and environmental sanitation including punishments in cases of malfeasances.

The Management of Solid and Hazardous Wastes Regulations

These regulate the collection, treatment and disposal of solid and hazardous waste for municipal and industrial sources and give the comprehensive list of chemicals and chemical waste by toxicity categories.

The National Oil Spill Detection and Response Agency Act 2005 (NOSDRA ACT)

This statutory regulation makes adequate regulations on waste emanating from oil production and exploration and its potential consequences to the environment.

The National Effluents Limitations Regulation

This instrument makes it mandatory that industrial facilities install anti-pollution equipment, make provision for further effluent treatment, prescribe maximum limit of effluent parameters allowed for discharge, and spell out penalties for contravention.



The National Guidelines and Standards for Environmental Pollution Control In Nigeria

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This was launched on March 12th 1991 and represents the basic instrument for monitoring and controlling industrial and urban pollution.

National Policy on Environment

Launched by Government on 27th November 1989, this document prescribe guideline and strategies for achieving the Policy Goal of Sustainable Development

Environmental Impact Assessment (EIA) Act. CAP E12, LFN 2004

An Environmental Impact Assessment (EIA) is an assessment of the potential impacts whether positive or negative, of a proposed project on the natural environment:

The E.I.A Act, as it is informally called, deals with the considerations of

environmental impact in respect of public and private projects. Sections relevant to environmental emergency prevention under the EIA include:

- **Section 2 (1)** requires an assessment of public or private projects likely to have a significant (negative) impact on the environment;
- **Section 2 (4)** requires an application in writing to the Agency before embarking on projects for their environmental assessment to determine approval;
- **Section 13** establishes cases where an EIA is required; and
- **Section 60** creates a legal liability for contravention of any provision.

The Nigerian Urban And Regional Planning Act CAP N138, LFN 2004

The Urban and Regional Planning Act is aimed at overseeing a realistic, purposeful planning of the country to avoid overcrowding and poor environmental conditions. In this regard, the following sections become instructive:

- **Section 30 (3)** requires a building plan to be drawn by a registered architect or town planner;
- **Section 39 (7)** establishes that an application for land development would be rejected if such development would harm the environment or constitute a nuisance to the community;
- **Section 59** makes it an offence to disobey a stop-work order. The punishment under this section, is a fine not exceeding N10, 000 (Ten thousand naira) and in the case of a company, a fine not exceeding N50, 000; and
- **Section 72** provides for the preservation and planting of trees for environmental conservation.

Land Use Act (CAP 202, LFN 2004)

The Land Use Act places the ownership, management and control of land in each state of the federation in the Governor. Land is therefore allocated with his authority for commercial, agricultural and other purposes.

Harmful Waste (Special Criminal Provisions) Act Cap H1, LFN 2004. The Harmful Waste Act prohibits, without lawful authority, the carrying, dumping or depositing of harmful waste in the air, land or waters of Nigeria. The following sections are notable:

- **Section 6** provides for a punishment of life imprisonment for offenders as well as the forfeiture of land or anything used to commit the offence;
- **Section 7** makes provision for the punishment accordingly, of any conniving, consenting or negligent officer where the offence is committed by a company; and
- **Section 12** defines the civil liability of any offender. He would be liable to persons who have suffered injury as a result of his offending act.

Hydrocarbon Oil Refineries Act, Cap H5, LFN 2004. The Hydrocarbon Oil Refineries Act is concerned with the licensing and control of refining activities. Relevant sections include the following:

- **Section 1** prohibits any unlicensed refining of hydrocarbon oils in places other than a refinery; and
- **Section 9** requires refineries to maintain pollution prevention facilities.

Oil In Navigable Waters Act, CAP 06, LFN 2004. The Oil in Navigable Waters Act is concerned with the discharge of oil from ships. The following sections are significant:

- **Section 1 (1)** prohibits the discharge of oil from a Nigerian ship into territorial waters or shorelines;
- **Section 3** makes it an offence for a ship master, occupier of land, or operator of apparatus for transferring oil to discharge oil into Nigerian Waters. It also requires the installation of anti-pollution equipment in ships;

- **Section 6** makes punishable such discharge with a fine of N2,000 (Two thousand naira) ; and
- **Section 7** requires the records of occasions of oil discharge.

Associated Gas Re-Injection Act, Cap 20, LFN 2004. The Associated Gas Re-Injection Act deals with the gas flaring activities of oil and gas companies in Nigeria. The following sections are relevant to pollution prevention: -

- **Section 3 (1)** prohibits, without lawful permission, any oil and gas company from flaring gas in Nigeria;
- **Section 4** stipulates the penalty for breach of permit conditions.

The Endangered Species Act, Cap E9, LFN 2004. This Act focuses on the protection and management of Nigeria's wildlife and some of their species in danger of extinction as a result of overexploitation. These sections are noteworthy:

- **Section 1** prohibits, except under a valid license, the hunting, capture or trade in animal species, either presently or likely to be in danger of extinction;
- **Section 5** defines the liability of any offender under this Act;
- **Section 7** provides for regulations to be made necessary for environmental prevention and control as regards the purposes of this Act.

Sea Fisheries Act, Cap S4, LFN 2004. The Sea Fisheries Act makes it illegal to take or harm fishes within Nigerian waters by use of explosives, poisonous or noxious substances.

Relevant sections include the following:

- **Section 1** prohibits any unlicensed operation of motor fishing boats within Nigerian waters;
- **Section 10** makes destruction of fishes punishable with a fine of N50,000 or an imprisonment term of 2 years; and

- **Section 14 (2)** provides authority to make for the protection and conservation of sea fishes.

Inland Fisheries Act, Cap I10, LFN 2004. Focused on the protection of the water habitat and its species, the following sections are instructive:

- **Section 1** prohibits unlicensed operations of motor fishing boats within the inland waters of Nigeria; and
- **Section 6** prohibits the taking or destruction of fish by harmful means. This offence is punishable with a fine of N3, 000 or an imprisonment term of 2 years or both.

Exclusive Economic Zone Act, Cap E11, LFN 2004. The Exclusive Economic Zone Act makes it illegal to explore or exploit natural resources within the Exclusive zone without lawful authority. The Federal Government regulates the activities of the Exclusive Zone.



Oil Pipelines Act, Cap 07, LFN 2004. The Oil Pipelines Act and its Regulations guide oil activities. The following sections are pertinent;

- **Section 11 (5)** creates a civil liability on the person who owns or is in charge of an oil pipeline. He would be liable to pay compensation to anyone who suffers physical or economic injury as a result of a break or leak in his pipelines.
- **Section 17 (4)** establishes that grant of licenses are subject to regulations concerning public safety and prevention of land and water pollution.

Oil Pipelines Regulations (Under Oil Pipelines Act)

- **Section 9 (1) (b)** establishes the requirement of environmental emergency plans.
- **Section 26** makes punishable any contravention with a fine of N500,000 and/or an imprisonment term of six months.

Petroleum Act, CAP P10, LFN 2004. The Petroleum Act and its Regulations remain the primary legislation on oil and gas activities in Nigeria. It promotes public safety and environmental protection. The following sections are relevant:

- **Section 9 (1) (b)** provides authority to make regulations on operations for the prevention of air and water pollution.

Petroleum drilling and production regulations:

- **Section 17 (1) (b)** places restrictions on licensees from using land within fifty yards of any building, dam, reservoir, public road, etc.
- **Section 23 and 27** prohibits, without lawful permission, the cut down of trees in forest reserves.
- **Section 25** establishes that reasonable measures be taken to prevent water pollution and to end it, if it occurs.

Petroleum Refining Regulation

- **Section 43 (3)** requires the Manager of a refinery to take measures to prevent and control pollution of the environment.
- **Section 45** makes any contravention punishable with a fine of N100 or an imprisonment term of six months.

Mineral oil safety regulations and crude oil transportation and shipment regulations. These Regulations prescribe precautions to be taken in the

production, loading, transfer and storage of petroleum products to prevent environmental pollution.

Petroleum Products And Distribution Act, Cap P12, LFN 2004. Under this Act, the offence of sabotage which could result in environmental pollution is punishable with a death sentence or an imprisonment term not exceeding 21 years.

Territorial Waters Act, Cap T5, Lfn 2004. The Territorial Waters Act makes punishable any act or omission committed within Nigerian waters which would be an offence under any other existing law.

Nuclear Safety And Radiation Protection Act, Cap N142, LFN 2004. The Act is concerned with the regulation of the use of radioactive substances and equipment emitting and generating ionizing radiation. In particular:

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- **Section 4** provides authority to make regulations for the protection of the environment from the harmful effects of ionizing radiation.
 - **Section 15 and 16** makes registration of premises and the restriction of ionizing radiation sources to those premises mandatory.
 - **Section 37 (1) (b)** allows an inspector verify records of activities that pertain to the environment.
 - **Section 40** clarifies that the same regulations guiding the transportation of dangerous goods by air, land or water should also apply to the transportation of radioactive substances.

Nigerian mining corporation act. Cap N120, LFN 2004. This Act establishes the Nigerian Mining Corporation. It has authority to engage in mining refining activities and to construct and maintain roads, dams, reservoirs, etc. In particular:

- **Section 16** creates a civil liability on the corporation for the physical or economic damage suffered by any person as a result of its activities.

Quarantine act, cap q2, lfn 2004. The Quarantine Act provides authority to make regulations for preventing the introduction, spread and transmission of infectious diseases such as cholera, yellow fever, typhus, etc. Under this Act, violation of any regulation is punishable with a fine of N200 or an imprisonment term of 2 years or both.

River Basins Development Authority Act, Cap R9, LFN 2004. The River Basins Development Authority is concerned with the development of water resources for domestic, industrial and other uses, and the control of floods and erosion.

Pest Control Production (Special Powers) Act, Cap P9, LFN 2004. The Pest Control of Production Act is concerned with export produce conditions and pest control. In particular:

- **Section 1** provides an inspector authority to take emergency measures to control pest infestation of produce.

Agriculture (Control Of Importation) Act, Cap A93, LFN 2004: The Agriculture Act and its Plant (Control of Importation) Regulations are concerned with the control of the spread of plant diseases and pests. Worth noting is: **Section 6** which allows authorized officers to take emergency control measures, and provides for the recovery of costs and expenses incurred by the officers in controlling the situation.

Animal Diseases (Control) Act, Cap A17, LFN 2004: The Animal Disease (Control) Act makes it an offence to import any animal, hatching egg or poultry into Nigerian except under a permit. The following sections are relevant:

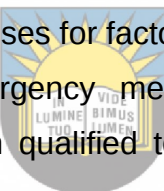
Section 5 provides an inspector with the authority to take emergency measures where necessary. **Section 10** stipulates penalties for contravening any regulation. **Section 13** requires owners of trade animals to possess a movement permit and ensure the fitness of their animals.

Section 20 provides authority to make regulations that prevent and control the spread of animal diseases.

Bees (Import Control And Management) Act, Cap B6, LFN 2004: It is an offence, under this Act, to import bees or apicultural materials into Nigeria without a valid permit. A person could also be held liable for exceeding the terms of his permit.

Civil Aviation Act. Cap C13, LFN 2004: The Civil Aviation Act promotes public safety by providing regulations to secure the safety of persons and property in the aircraft and others who may be endangered by it.

Factories Act, Cap F1, LFN 2004: The Factories Act promotes the safety of workers and professionals exposed to occupational hazards. Under this Act, it is an offence to use unregistered premises for factory purposes. In particular: **Section 13** allows an inspector take emergency measures or request that emergency measures be taken by a person qualified to do so in cases of pollution or any nuisance.


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Water Resources Act, Cap W2, LFN 2004: The Water Resources Act is targeted at developing and improving the quantity and quality of water resources. The following sections are pertinent:

Section 5 and 6 provides authority to make pollution prevention plans and regulations for the protection of fisheries, flora and fauna; and

Section 18 makes offenders liable, under this Act, to be punished with a fine not exceeding N2000 or an imprisonment term of six months. He would also pay an additional fine of N100 for everyday the offence continues.

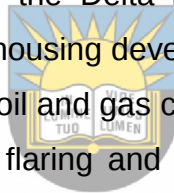
Hides and Skins Act, Cap H3, LFN 2004: The Hides and Skins Act and its Regulations are concerned with the preparation, quality and trade of hides and

skins. It prohibits the use of unlicensed premises or enclosure as a place for the preparation or buying of hides and skins for export.

The Federal National Parks Act, Cap N65, LFN 2004: The National Parks Act is concerned with the establishment of protected areas used for resource conservation, water catchments protection, wildlife conservation and maintenance of the national eco-system balance.

Niger-Delta Development Commission (NDDC) Act, Cap N68, LFN 2004: The Niger-Delta Development Commission Act is concerned with using allocated funds to tackle ecological problems arising from the exploration of oil minerals in the Delta.

Section 7 (1) (b) empowers the Commission to plan and to implement projects for the sustainable development of the Delta in the field of transportation, health, agriculture, fisheries, urban and housing development, etc. The Commission, under this Act, has a duty to liaise with oil and gas companies and advice stakeholders on the control of oil spillages, gas flaring and other related forms of environmental pollution.



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Environmental Sanitation Law: This is a law of Lagos State focused on environmental sanitation and protection. It punishes in varying degrees acts like street obstruction, failure to clean sidewalks, cover refuse bins or dispose wastes properly.

Environmental Pollution Control Law Section 12 of this law under the **Laws of Lagos State** makes it an offence to cause or permit a discharge of raw untreated human waste into any public drain, water course or onto any land or water. This offence is punishable with a fine not exceeding N100,000 (One hundred thousand naira) and in the case of a company, a fine not exceeding N500,000.

Criminal Code: The Criminal Code contains provisions for the prevention of public health hazards and for environmental protection. Hence, **Sections 245-248** deal with offences ranging from water fouling, to the use of noxious substances.

State Environmental Protection Agencies: Apart from these environmental regulations, each state of the federation has one or more environmental protection agencies, which are involved in environmental sanitation, environmental awareness and education and enforcement of environmental laws and regulations.

2.9 EMPIRICAL STUDIES

2.9.1 Studies on Knowledge and Attitude to Environmental Education

Knowledge is a concept that is abstract in nature. Knowledge as a concept, though powerful, has no clear definition so far. Right from the age of Greek philosophy up to contemporary experts in field of knowledge management, various people have tried to define knowledge but such definitions are not really clear.

A popular definition says knowledge is justified true beliefs shown to have the limitations given by the justification condition and the truth nature (Bolisani & Bratianu, 2018). Davenport and Prusak (2000) defined knowledge as a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers.

Bolisani and Bratianu (2018) asserted that Knowing is one of the most specific human processes and knowledge is its result. This is to say that knowing and knowledge remain subjects of human inquiry from the time of old. Philosophers, among whom we had Plato, Aristotle and others Epistemology as a theory of knowledge, in an attempt to answer to the fundamental question: What is knowledge?

Many arguments, theories and many answers were put up to support them, but no single theory has been taken as being completely satisfactory. Bolisani and Bratianu (2018) in their opinion concluded that knowledge is not created a priori and is not

innate in a deterministic form. However, it is created through our sensory interface with the real world, and processed finally by our mind. John Locke emphasized that objects exist in the outer world and added that our sensory perception is the most essential spring of our knowledge. A lot of contemporary philosophers attempted to make a connection between rationalism and empiricism by producing conceptual frameworks with basis on several syntheses between them.

Some scholars, (Dombrowski, Rotenberg & Bick, 2013) claimed that there are three kinds of knowledge:

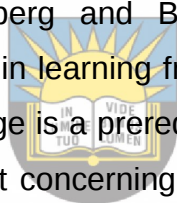
a) experiential knowledge; b) skills; and c) knowledge claims. According to them, the three are interconnected, but with some distinct features of their own.

Experiential knowledge can be regarded as the knowledge that we acquired from direct connection with the human environment, through our sensory system, and subsequently processed by the human brain. For example, if we desire to know what an ocean is then one must endeavor to go where there is ocean and touch it, smell it, taste it and play with it. Such knowledge cannot be got only from books or seeing some videos with people surfing the ocean or at a beach in beautiful areas. Persons inhabiting geographical areas where there is no ocean may have real difficulties understanding what an ocean is. They do not have experiential knowledge about ocean. This type of knowledge, that is, experiential knowledge, is personal because it can only be got through direct interconnection of our sensory set up and then processed by our brain. It is majorly set on keen and careful consideration. Several people going through similar experience are likely to acquire separate experiential knowledge

Skills simply refer to the knowledge that has to do with how to do something. This is structured on experiential knowledge but a well-structured and action focused knowledge acquired by doing over and over a particular job and learning as a result of doing it. This can be said to be the way we learn playing soccer, cooking, swimming, driving, playing guitar or doing many other related activities. It is like learning

unconsciously to perform a certain procedure or to follow a given algorithm. You don't learn driving by studying a book on motor vehicles and their workings. It has to be learnt through constant practice engaging the whole body and dwelling upon it for better coordination which involves positioning the car on the road and applying the appropriate gears as and when due. Skill is know-how knowledge, it is most time called procedural knowledge because it has to do with carrying out a task in consonance with a given method. Thinking skill is very essential for those who are regarded as decision makers. Experience helps in using intuition effectively, especially meaningful experience that assist in building mental models. Fortifying your experience base can help improve intuitive skills.

Knowledge claims are those things we know, or assume we know. Knowledge claim is framed by humans in a way that is explicit through the use of a natural or symbolic language. Dombrowski, Rotenberg and Bick (2013) were of the opinion that knowledge claims empowers us in learning from one another and as well as building our shared knowledge. Knowledge is a prerequisite for awareness that ignites actions of individuals. It determines a lot concerning the behaviour of individuals and in this situation, students.

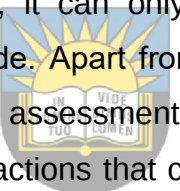


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Adu et. al. (2014) comprehensively defined environmental knowledge to be the acquisition of idea and experience on environmental problems, conservation of resources, and how to solve the social ills and problems created by human in the course of satisfying his needs through the exploration and exploitation of the environment. Harun, Hock and Othman (2011), summed environmental knowledge to be ability to understand and evaluate the impact of a society on the ecosystem. Environmental knowledge is one of the objective components of effecting environmental education; it creates awareness, positive attitude, skills and practices that promote environmental sustainability. Harun et.al (2011) concluded that knowledge improves awareness which motivates environmentally responsible actions.

Attitude on the other hand can be described as the state of mind or feeling towards given issues, problems or objects. Harun et.al. (2011) perceive attitude to be a

complex mental construct (perception) which emerges out of an integration of an individual's belief and values system. An attitude is someone's disposition to behave with a particular amount of favourableness or otherwise to an object, person, behaviour, event, institution, or to other distinguished aspect of the individual's environment. In as much as definitions of attitude are not the same, many modern theorists consented that the distinctive attribute of attitude is its evaluative (pro-con, positive-negative) dimension (Fishbein & Ajzen, 1975; Hill, 1981). This perspective is reinforced by the fact that almost every standard attitude scaling techniques terminate in a score that locates a person on an evaluative continuum in relation to the attitude object (Fishbein & Ajzen, 1975). An attitude comprises of cognitive, affective, and behavioral elements.

It is also widely admitted that attitude is a conjectural concept. Attitude is not accessible to direct observation; it can only be deduced from reactions that are measurable to the object's attitude. Apart from the necessity that the said reactions mirror favourable or unfavourable assessment of the object, there are almost no limits when it comes to the types of reactions that can be thought of. Attitude is about 1. A mental state (conscious or unconscious) 2. Value, beliefs, or feeling, and 3. Predisposition to behaviour.  *Together in Excellence*

Many modern social psychologists apply a cognitive or information-processing approach to formation of attitude. Fishbein and Ajzen's (1975) expectancy-value model of attitudes illustrate this approach. According to this model, attitudes result reasonably from the beliefs people hold about the object of the attitude. Speaking on a general term, beliefs are formed as a result of associating an object with certain attributes, i.e., with other objects, characteristics, or events. There is the possibility that when we watch a television drama, we may come to believe that the characters displayed by the actors are their real life characters.

Reaction, whether verbal or nonverbal reaction that shows either a positive or negative nature regarding an object can be used to deduce the latent attitude, but

only reasoning that come to mind automatically (i.e., salient beliefs) give a vision of an attitude's educative basis.

Just because the features that get to be associated to the object are already determined positively or otherwise, humans spontaneously and simultaneously gain an attitude aimed at the object. In this way, humans learn to develop interest in objects they believe possess majorly desirable features, and they develop attitudes that are not favourable toward objects they link to mostly undesirable features. Expressly, the opinionated value of each feature adds to the attitude in direct proportion to the potency of the belief.

Environmental attitude therefore can then be defined as a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to the environment (Adu et.al. 2014). People's attitude to environmental issues varies in direction and intensity; some are enthusiastic while others are languid, in all environmental attitudes determines the survival of our planet. Another important factor that affects the environment is people's environmental attitude. Attitude is noted to be usually influenced by what one values. As such one's attitude affects how he/she relates to other people and to the environment in general and so constitutes a major influence on our prospect for achieving a sustainable future.

Environmental attitudes apply to general feelings toward ecology and the environment, feelings and concern for specific environmental issues, and feelings toward acting to remedy environmental problems. Personal responsibility represents the individual's sense of obligation toward the environment, either in general or to a specific aspect (e.g., reducing air pollution or recycling). Locus of control represents individuals' perceptions of their ability to bring about environmental change through personal behaviour. Someone who attributes change to external factors, not to personal behaviour (external locus of control), will be less inclined to influence a situation. Peoples' attitude towards dirty environment in Nigeria is not due to absence of environmental law, it was observed that there was ignorance on people's part as a

result of high level illiteracy and this is a prominent factor militating against keeping a clean environment in the interior and slum areas (indigenous areas).

Environmental knowledge seems to be the major tool to combat environmental degradation, climatic challenges, flooding, and indiscriminate dumping of refuse, poor knowledge of refuse disposal, unhygienic living, and unkempt environment. Environmental education is the acquisition of knowledge of how man can manage environment to bring out comfort, healthy and worthwhile living. It is also about the study of environmental challenges. It is to prevent human factors that constitute environmental challenges, and to have awareness of the challenges to be surmounted, and however to make environment habitable for people' survival, and comfort (Peer, Goldman & Yavetz, 2007)

Environmental Education is a process in which individuals gain awareness of their environment, acquire knowledge, skills, values, experiences, and also the determination and enablement to act individually and collectively, to solve present and future environmental problems (Bartosh, Tudor & Ferguson, 2005). Emekauwa (2004) was of the view that environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, awareness of how to help solve these problems and motivation to work toward their solution.

Akomolafe (2011) researched into students' awareness knowledge and attitude, revealed a high level of students' environmental awareness knowledge in the area of environmental hazard, flooding, global warming, and environmental change, destruction to forest, oil spillage, and indiscriminate bush and refuse burning. She concluded from her findings that, the high level of environmental awareness knowledge and favourable environmental attitude revealed in her study, were an indication of the level of preparedness, for parents of tomorrow who could have a better understanding of the environment, develop culture of environmental maintenance, and transfer same to younger generation.

A series of studies have been carried out on environmental education awareness and attitude, for instance Kola-Olusanya (2006) revealed that teachers' attitudes and practices concerning environmental issues were not significantly influenced by gender and year of study, but area of specialization has a significant influence on both attitudes and behaviour. Danforth (2005) found that education, income and age, were important influences on students' and people's perception of environmental issues. A study carried out by Lieberman, Hoody and Lieberman (2005) suggested that gender is an influential factor in gaining environmental knowledge. According to them, the number of science classes taken by students factored into the differences in knowledge between genders, but did not account for the entire difference.

Bartosh, Tudor, Ferguson and Taylor (2005) in their study revealed that out of a group of high school students questioned about energy and pollution issues, 29.2% of female had satisfactory knowledge as compared with almost 44% male students. Some studies, however, insisted that there were no significant differences between the gender in terms of science and environmental education. They further said that, one study about influential factors of learning environment, showed that gender was not one of the top three factors related to attitudinal outcomes (Duffin, Phillips and Tremblay (2006). Series of studies in environmental education have revealed paying attention to pre-service teachers and environmental attitude. Peer, Goldman and Yavetz (2007) reported limited environmental knowledge among pre-service teachers from three higher education institutions; however their overall environmental attitudes were positive. Furthermore, they observed a correlation between environmental knowledge and environmental attitudes.

Ramana (2009) views that increased knowledge about the environment is assumed to change environmental attitudes. Lee (2006) pointed out that historically human environment impact is connected to a variety of human necessities and desires; he cited for instance the desire for physical comfort, mobility relief from labour, enjoyment, power, status, personal security, maintenance of tradition and family, and so forth. Akintunde (2004) referred to possible failures one could encounter when

fostering environmentally responsive behaviours. He pointed out that instead of telling students what to do in regard to pro-environmental attitudes, a more responsive approach should emphasize culturally responsive ecological actions. In his view, this approach would take into account local variants such as culture, needs and motivation of local residents as members of the team in charge of addressing the problem.

Literature has been dedicated to the exploration of pro-environmental attitudes. Babalola, Babalola and Okhale (2010) investigated this issue from person's value system framework. In their view the development of environmental-oriented behaviour depends on the value system people assign to themselves, to others and to fauna and flora resources. Similarly, Oladapo (2012) suggested that environmental concerns are formed only when people see themselves as an integral part of nature. Macionis (2007) stated that lack of favourable attitude was the result of individualistic postures adopted as people put themselves first over communal and environmental goals. Welch found out that education had a significant influence on environmental attitude. The study carried out by United Nations Environment Programme (UNEP, 2014) investigated the cognitive and affective bases of environmental attitudes to indicate that, it is what people feel and believe about the environment that determines their attitudes toward it. The findings suggested that for environmental educators interested in changing environmental attitudes, emotions and beliefs rather than knowledge need to be targeted as sources of information on which to base their environmental programmes.

Observations have shown that, the keeping of environment clean and neat is deteriorating. Based on the experience of our old parents' who lived in remote villages, clans and compounds, they have a culture of keeping their environment clean, even with little or no knowledge of western education. In African setting, women have been saddled with house hold cleaning and environmental sanitation, therefore women are supposed to be more knowledgeable and have positive attitude to environmental attitude. It is believed that with the level of education there should be improvement in the knowledge and attitude to environmental issues. It appears that with increase in

population and urbanization, the level of keeping environment in hygienic condition is becoming deteriorating.

2.9.2 School location and students' knowledge, attitude and practices

The school system, regardless of which level of operation, is generally accepted as a major agent of education. It provides avenues for interaction between students and teachers on subject matters. Education starts from the cradle, and catching children young with quality education remains a veritable tool to lifelong development. The future of a nation's socio-economic and political wellbeing lies with the quality of children's education because they are the future leaders. The binding relationship between education, economy and society is interactive and teachers play a pivotal role in the educational development of any nation and society. Schools are complex, vibrant systems that have an influence on students' academic, affective, social and behavioural learning (Crick, Green, Barr, Shafr, & Peng, 2013; Gu & Johansson, 2013). The operating environment within schools has effects on the quality and degree of students' learning and academic outcome.

Student academic performance is actually a theory of a wide collection of skills, experiences and outcomes across a number of different domains, from social-emotional learning and health, to creative, critical thinking and qualities of democratic citizenship (Bascia, 2014).

The location of a school or better still the environment in which school is located determines to a large extent the level of student achievement. Orji (2013) opines that school location implies an urban-rural setting. Urban schools are those schools in the municipalities, or schools found within the towns and rural schools are those located in the villages or semi-urban areas. School location refers to the community in which the school is sited, such as a village, hamlet, or rural area with a population of less than three thousand people. For a small town a population ranges of about three thousand to fifteen thousand people, while a town has a population of about fifteen thousand to

about one hundred thousand people, and a city one hundred thousand to about one million people (Idialu, 2013).

On school location, either rural or urban, Fontana (2011) asserted that school location influences students' perception generally. The location of a school or better still the environment in which school is located determines to a large extent the level of student achievement. Orji (2013) opines that school location implies an urban-rural setting. Urban schools are those schools in the municipalities, or schools found within the towns and rural schools are those located in the villages or semi-urban areas. School location refers to the community in which the school is sited, such as a village, hamlet, or rural area with a population of less than three thousand people. For a small town a population ranges of about three thousand to fifteen thousand people, while a town has a population of about fifteen thousand to about one hundred thousand people, and a city one hundred thousand to about one million people (Idialu, 2013).

Fredrick (2011) saw school location as one factor that influences students' academic performance in some subject areas. He was of the opinion that parents consider such factors as the location of schools; urban or rural, and the proximity to the school before registering their wards in school (Fredrick, 2011). Idialu (2013), opined that provision of education in schools anywhere outside the urban areas (towns) is normally faced with challenges as teachers, the qualified ones in particular, turn down appointment and transfer to schools in rural areas. Even the rural dwellers refuse to send their children to school with the excuse that these children go on errands for them; parents are not well disposed to entrusting their female children to male teachers, while some rural areas have few children to be registered for primary school, non-availability of motorable roads, and scarcity of recommended books and instructional materials. Distance of school from home, unconducive environments and other factors are very likely to hamper effective teaching and learning. Therefore, Owioye and Yara (2011) observed that a good number of parents are of the opinion that learners whose schools are sited or located in urban areas or towns perform better than their colleagues in village schools or schools in rural areas. Iwuagwu, Don,

and Ojemhenkele (2016) argued that one of the factors that influence academic performance is where the school is sited.

Fontana (2011) observed that people living in urban areas typically are exposed to a wider range of experiences. The print and electronic media, information technology and fairly stocked libraries are available to them to boost their experience. Likewise, modern sanitary facilities such as water closets, incinerators, waste disposal trucks, sanitary officers, etc. are common in the urban areas. Therefore, schools in urban areas have the advantage of these facilities over students in rural school setting. Consequent upon this experience students in the urban centres are more likely to perceive the realities of environmental management better than their counterparts in rural areas.

Griffiths (2010) on his part observed that poverty, sterile environment and low standards of social services characterize rural environment to the extent that the residents' perception is jaundiced. Thus, the rural dwellers hardly see anything wrong with indiscriminate refusal and sewage disposals. The reverse is rather the case with those who leave in urban areas. In a similar vein, Ezewu (2009) concluded that some features of the rural environment impact on the students negatively, so much so that they influence their perception and consequently their environmental knowledge, attitude and eco-friendly practices.

2.9.3 Gender

Gender is a specially constructed phenomenon that is brought about as society ascribes different roles, duties, behaviours, and mannerisms to the two sexes. Gender is defined as social characteristics and prospects related with being male or female and the relationship between men and women, boys and girls are socially fashioned and are learned through the process of socialization (Yang, 2010). When addressing gender in the context of the environment, it is important to recognize that women and men are not homogenous groups. Where women and men live, their age, social class,

ethnicity, religion, sexual orientation and other variables, interact in shaping the links between gender and the environment.

The global environmental consequences of waste disposal are alarming. This is particularly true in the developing world's urban areas, where for example dumpsites have obvious, severe environmental and health effects. Women and men have different ways of handling waste, in private and public. Household waste management is often the unpaid work of women, but when it is mechanized - for example by the use of carts or delivery tricycles - and at the same time paid for, men often take over this work. However, a large proportion of waste management in developing countries is not mechanized, but instead collected, sorted, recycled and sold by hand.

Gender issues in education circles generate a lot of argument especially when it is related to academic performance, knowledge, and attitude to subjects. There is a growing scholarly concern over gender patterns in academic performance of late partly due to the belief that girls are now doing better than boys in some vital academic areas (Appak, 2016). Gender prescribes sets of role behaviours expected of male and females in their thinking, actions and feelings. According to the social cognitive theory, the adolescent's gender development is based on adolescents' observation and copying of other's behaviour, also by rewards and reprimands of gender-approach and gender-inappropriate behaviour. The issue of gender and students' academic achievement has remained a controversial one. While some propose that, males perform better than females in academics, others argue that, the reverse is the case.

Wang and Cheng (2010) submit that gender roles are learnt and vary widely between cultures and then gender roles can change. Macdonald and Hara (2010) reported that there was a significant difference in environmental attitude and practices of male and female students. Nkire (2011) who conducted research on impact of a participatory instructional programme in Oyo State non-formal adult learners' environmental knowledge, attitude and practices, revealed that gender did not have any significant influence on the adult learner's environmental knowledge, attitude and practices.

Obviously, the effect of gender on people's environmental knowledge attitude and practices is still a controversial issue. Calsmith (2007) explained that, the influence of gender and differences in academic performance is a complex task, thus many studies appear to be contradictory. Gender is a strong predictor of human conduct and many differences have been documented on attitude and behaviour that affect academic performance in between males and females.

This research work is interested in the effect of gender as it relates to students' environmental knowledge and attitude, therefore various scholarly work relating to gender, environmental knowledge and attitude shall be reviewed.

2.10 The History of Social Studies Education in Nigeria

There are many conflicting views as to when Social Studies made its debut in Nigerian schools. Ezegbe (1987) put it at the early 1960s. Osakwe and Itedjere (1993) put it at the mid-1960s. Bozimo and Ikwumelu (2009) noted that the new Social Studies dated back to 1958 when the former Western State of Nigeria first participated in the Ohio project while Obebe (1987) put it in the late 1960s as cited in Sofadekan (2012). In the same vein, Sofadekan (2012) opined that Social Studies was introduced into Nigeria during the colonial era as a result of the establishment of schools which were more or less the vestibules of the churches then. Social Studies was believed to have been integrated into the religious curriculum of that period.

Nevertheless, Mezieobi (2008) stated that the claim linking the origin of Social Studies to the colonial era is nothing but a mere fallacy. He asserted that Social Studies had been in existence in the period preceding colonial rule and that, prior to that rule, goals, content, methodology and evaluative practices met the aspirations at tribe level. Corroborating Mezieobi (2008) was Bozimo and Ikwumelu (2009) who claimed that traditional Social Studies holds way before the arrival of 'western' Social Studies; it is culture based and changes along culture boundaries.

2.10.1 Traditional Social Studies in Nigeria

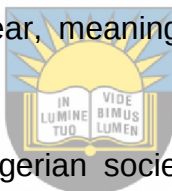
Traditional or indigenous Nigeria refers to the period before colonial rule. According to Bozimo & Ikwumelu (2009) the traditional or indigenous Social Studies cannot be successfully discussed without adequate knowledge of traditional education in Nigeria. Nigeria like any other country had a system of education through which it inculcated its values and beliefs in its citizens. Relevance and functionalism were the underlying features in the Nigerian indigenous education. In the words of Bozimo & Ikwumelu (2009) traditional or indigenous Social Studies education served the purpose of helping the people to understand themselves, their capabilities, as well as their society. It helped to instil in the people the spirit of oneness and co-existence which they needed to survive the vagaries of nature. Through the traditional Social Studies, culture of the people was transmitted to the younger ones through oral tradition, ceremonies, etc.

Mezieobi (2008) also observed that Social Studies has been an essential part of the Nigerian indigenous curriculum right from the earliest times except for certain modifications to accommodate societal dynamics and international prescriptions. He further observed that what was borrowed was the concept of Social Studies as a discrete subject in the curricula of primary schools.

It is of note that while culture transmission was encouraged, its transfer or contamination was jealously guarded against. This attitude is in contrast with the modern Social Studies programme which encourages cross-cultural studies, globalization and global citizenship education. The content of traditional Social Studies was situational in nature. It has no systematized form to be adopted by all at all times. Nevertheless, it followed the spiral formats, extending from known to unknown, from simple to complex.

According to Mezieobi, Reggie-Fubara and Mezieobi (2008) some of the content of traditional Social Studies included:

- The learning of the people's local and family history, myths, oral literature, proverbs and riddles, and the geography of the community and the adjoining neighbourhood;
- Respect to elders, honesty and truthfulness, fear of the gods/goddesses, learning of family gods and goddesses;
- Character values and virtues development and inculcation; which
- traditional religion encouraged and promoted; and
- Instruction on loyalty to the community, recognition of seniority, hospitality to people, cooperation in common tasks, respect for others. The contents above are in line with Bozimo and Ikwumelu (2009) who stated the contents to include respect for elders, names of the indigenous gods, names and achievements of great ancestors, community work, seasons of year, meaning of death, family lineage, farming and hunting techniques and so on.



Social Studies in indigenous Nigerian societies placed an emphasis on values or affective learning. Mezieobi et al. (2008) stated that the affective learning focused on:

- Appropriate ways to greet elders and during occasions;
- Respect to elders, constituted authority and obedience to them;
- Respect to one's seniors and mutual respect;
- Loyalty to the family and the community;
- Hospitality to people;
- Learning the myths and traditions of the people and appreciating the values therein;
- Avoidance of taboos;
- Unquestioning acceptance of the dictates of the elders;

- Familiarity with the people's culture, traditions; ethics, folklore and mores and manifest respect to them and conformity to them;
- Acceptance of the community's beliefs, values and practices;
- Acquisition of knowledge tied to 'special' education i.e. secret societies, divination;
- Learning the virtues of cooperation, perseverance or endurance, self-control or self-discipline; truthfulness, loyalty, patience, obedience, courage, bravery, kindness, dedication to duty, hard work or diligence, tolerance, love for others, fear of the gods and goddesses, mutual harmony and co-existence, and the recognition and pursuance of one's rights; and
- Knowledge of religious tenets, beliefs, practices as well as religious sanctions and knowledge of the consequences for violating them i.e. incurring the wrath of the gods.



Bozimo and Ikwumelu (2009) highlighted the methods of teaching to include games and simulation: creative activity and construction. They added that the guiding principle in the selection of appropriate methods in the traditional social studies included the age and sex of the learner; the social status of the learner's family; vocation of the learner (based on the prediction of oracle at his/her birth); and membership or otherwise of secret society.

Mezieobi (2008) pointed out that inquiry method- questioning of the teacher by the learner was not allowed in the traditional teaching-learning setting. However, as a person grew into adulthood, and especially after being initiated into the secret cult. This shows that the methods of traditional Social Studies were dependent upon the age of the learner. Evaluation of traditional Social Studies education was the responsibility of every older member of the immediate and distant family in particular and the entire community in general. How much a child had learnt was assessed through the way he responded to issues among his/her peers.

2.10.2 Social Studies in the colonial era

Social Studies in the formal school setting can be traced to the arrival of Christian missionaries in 1842 and the consequent establishment of the first primary school in Badagry (Mezieobi et al., 2008). The colonial curriculum at the time contained aspects of what we now know as Social Studies. For example, it was subsumed within the moral or religious curriculum and prepared Nigerians to be peace loving, respectful, obedient, humane, loyal, law-abiding, hardworking, conscientious and knowledgeable persons. Social Studies was also taught under the canopy of general knowledge, general studies, and civics education, British history, British geography, British politics, and British culture (Obebe, 1987 cited in Mezieobi, 2008).

In whatever form, Social Studies existed in the primary schools in the period before Nigerian's independence in 1960. However, Social Studies was culture bound and was not relevant to the needs and aspirations of a unified country. Those who were exposed to that colonial Social Studies curriculum, although Nigerian by birth, were British in outlook and behaviour. They understood British environments but knew little, if anything, of the country in which they lived. The beneficiaries of the colonial Social Studies curriculum viewed the knowledge they gained in terms of discrete subjects which made it impossible for them to view their world holistically.

2.10.3 Social Studies after independence

Most African nations achieved independence in the late 1950s and 1960s; and subsequently sought ways to change the educational systems they had inherited to make them more supportive of national developmental goals. For example, Sofadekan (2012) quoting Dondo, Krystall and Thomas (1974) argued that indigenous national heritage needed to replace colonial ones:

Inherited History, Geography courses needed to be revised to emphasize national heritage and achievements, and thereby develop national pride and identity. He stated further that there was agreement concerning the need to develop materials concerning cultural, tradition and peoples to promote inter-

tribal understanding, appreciation and national unity. He also emphasized the need to abandon traditional ways of teaching which emphasized skills of recall and he suggested new ways of learning which develop the skills of independent problem-solving and critical thinking (Op cit, 2012, p81).

In the early 1960s, this new approach to Social science content, methods and objectives became known in Africa as 'Social Studies' (Merryfield, 1988). Social Studies started to gain popularity on the continent of Africa after the Mombasa Conference of 1968, the Mombasa Social Studies Conference of 1968 selected four general objectives to give support and guide to the growth of Social Studies in Africa. They are:

- a. To create an awareness and an understanding of the evolving social and physical environment as a whole, its natural, man-made, cultural and spiritual resources. Together with the rational use and conservation of these resources for development.
- b. To develop a capacity to learn and acquire skills including not only the basics skills of listening, speaking, reading and writing, and of calculation, but also the skills of observation, analysis and inference which are essential to the forming of sound judgement.
- c. To ensure the acquisition of the relevant knowledge which is an essential prerequisite to personal development, as well as to the positive personal contribution to the betterment of mankind.
- d. To develop a systematic appreciation of the diversity and interdependence of all members of the local community, and of the wider national and international community.

These objectives were to be adapted to suit the individual needs of participating countries.

This conference also led to the establishment of Africa Social Studies Programme (ASSP) in 1969. This Programme (now known as Africa Social and Environmental

Studies Programme, ASESP) encompassed seventeen countries. Botswana, Ethiopia, The Gambia, Ghana, Kenya, Liberia, Lesotho, Malawi, Nigeria, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. One of the aims of the Mombasa conference of 1968 was to introduce Social Studies to the member countries. The Northern Nigerian Teacher project (NNEP), the Ayetoro Project and the African Social Studies Programme (ASSP) provided the syllabus, project materials and goals which enhanced the institutionalisation of Social Studies Education in Nigeria.

It is pertinent to acknowledge the efforts of educators from Ohio University which sought to introduce the teaching of Social Studies into the Teachers' College in the former Western Region of Nigeria. Their efforts in 1958 served as a catalyst for the introduction of Social Studies into the school curriculum immediately after independence. Its entry into the school curriculum at this time was short-lived because there were no schools in which to teach the subject. Social Studies re-surfaced in 1963 when the Comprehensive High School in Aiyetoro, was established as a new experiment in comprehensive secondary education; this put the subject firmly on its evolutionary course from 1963 onward (Adewuya, 1992; Busari, 1992 in Sofadekan, 2012).

The roots of contemporary Social Studies have been traced to indigenous education. The first post-independence Social Studies programmes were developed during two major experiments with educational reform in Nigeria. Growing out of the recommendations of the Ashby Commission, the Banjo Report and the Dike Report in the early 1960s was the concept of a school that would extend secondary education to the majority of boys and girls as opposed to the academic elite (Sofadekan, 2012).

From the Western region, Social Studies began to spread to other parts of the country. The Northern Nigeria Teacher Education Project (NNTEP) facilitated the introduction of Social Studies in the Northern region. Onyabe (1979) cited in Sofadekan 2012 stated that the NNTEP, co-sponsored by the Northern Region Ministry of Education and the University of Wisconsin, developed and tested primary school teachers'

education materials in five subject areas, including Social Studies. He further stated that, in 1969, the six northern states introduced Social Studies into their educational system under the auspices of Ahmadu Bello University, Zaria.

Later, the Comparative Education Study and Adaptation Centre (CESAC) at the University of Lagos in conjunction with the Ministry of Education in Kwara and Benue-Plateau states organised a dissemination workshop for secondary school teachers in August 1970. The dissemination workshop had a significant effect on the adoption of Social Studies across Nigeria. Adewuya (1992) cited in Sofadekan (2012) stated that one of the outcomes of the August 1970 dissemination workshop was that teachers felt challenged by the demands of the interdisciplinary approach of Social Studies and sought ways of increasing their knowledge. Indeed, he stated further that the Ministries of Education in some other states wanted their teachers to enter the mainstream of the new trends in curriculum innovation.

Social Studies found its way into the school curriculum in the Eastern Region of Nigeria in 1971 after the Social Studies Association of Nigerian's (SOSAN) conference that April. Before the advent of the 1977 National Policy on Education (revised in 1981) some schools did not teach Social Studies but rather taught History, Geography, Civics and the General Paper. The National Policy on Education (1977) was a watershed in the inclusion of Social Studies into the school curriculum in Nigeria because it approved the teaching of the subject in both primary and secondary schools. Ogundare (2011) pointed out that the implementation of the 1977 and 1981 National Policy on Education subsequently approved the teaching of Social Studies in both primary and secondary schools.

The Nigerian Educational Research Council (NERC), now known as the Nigerian Educational Research and Development Council (NERDC) organised a national workshop on primary school curriculum in 1971 to produce the first national Social Studies curriculum for primary schools in Nigeria. Ogundare (2011) pointed out that the 1971 national Social Studies curriculum for primary schools became the fountain from which all state Ministries of Education developed inspiration to produce their

particular Social Studies syllabuses. Publishers and writers also used the programme to write textbooks in Social Studies.

NERC organised further national workshops in 1972 and 1975 respectively for the successful implementation of the programme and also for standardizing the Universal Primary Education (UPE) teacher training programme in Social Studies.

The national primary school Social Studies programme lasted until 1983 when a revised version was published.

In 1981 NERC created a panel of experts on Social Studies known as the National Committee on Primary Education Social Studies Curriculum Project. The committee was set up to develop a suitable national Social Studies curriculum for all primary school classes, to conduct a critical review of the existing primary school Social Studies curriculum, (including the 1971 NERC curriculum guidelines) as well as to create instruments to refashion the teaching and learning of Social Studies in primary schools. This led to the 1983 national primary school Social Studies curriculum which lasted only for five years.

In 1988, the National Implementation Committee on National Policy on Education in conjunction with the National Primary Education Commission developed a National Social studies curriculum for primary schools and this lasted until 2007. In line with government's declaration for a 9-Year Basic Education programme the National Council on Education (NCE) directed the NERDC to restructure and re-align the existing primary and junior secondary school curricula to meet the targets of the 9-Year Basic Education in the context of the National Economic Empowerment and Development Strategies (NEEDS) and the Millennium Development Goals (MDGs) and this curriculum is still in operation today in Nigerian schools.

The composition and structure of the curriculum enable all teachers to teach the same topics in detail while aiming at achieving the same objectives and practicing the same learning activities. According to Adeyemi (2010) the Department of Social Studies of CHS, Aiyetoro prepared the first Social Studies programme for secondary schools in

Nigeria. It also produced instructional materials to be used for the teaching and learning of the subject. Falade (2007) highlighted that the Ministry of Education of the Western region, at a conference held in Ibadan, decided to draw an outline for a Social Studies syllabus for secondary school (year one and two), and gave the task of developing this syllabus to CHS, Aiyetoro. The Social Studies programme developed by CHS, Aiyetoro was used in most of the states that accepted the teaching of Social Studies until 1982. The Nigerian Educational Research Council also organized a series of workshops to design a curriculum for secondary education in Nigeria.

In a similar manner the Comparative Education Study and Adaptation Centre (CESAC) in 1982 organized a long vacation Social Studies course for Nigerian secondary school teachers in Kaduna. The ultimate purpose of the course was to improve the quality of Social Studies education in the secondary schools and also to introduce to the participants the Nigerian Secondary Schools Social Studies Project (NSSSSP). Participants were given copies of the national syllabus for junior secondary schools, which had been formally approved in 1982 by the Joint Consultative Committee on Education (CESAC, 1983).

In 1985, the Federal Government harmonized the existing subjects' curricula and came up with the National Curriculum for junior secondary schools. This curriculum consisted of six volumes covering all the nineteen subjects prescribed for the junior secondary schools scheme of the National Policy on Education, although, some states slightly modified this programme to suit their needs. As mentioned earlier, the 9-Year Basic Education programme and the need to attain the Millennium Development Goals (MDGs) and the critical targets of the National Economic Empowerment and Development Strategies (NEEDS) made it imperative to review, re-structure, and re-align the 1985 National curriculum for junior secondary schools in 2007 to fit into a 9-Year Basic education programme, and this is still in effect today.

The Nigerian Certificate of Education (NCE) Social Studies syllabus was subsequently developed and in 1974 examined at a workshop held at Ahmadu Bello University

Zaria. The leading roles played by the Nigerian Educational Research Council (NERC) now known as the Nigerian Educational Research and Development

Council (NERDC), the Comparative Education Study and Adaptation Centre (CESAC), CHS, Aiyetoro as well as the various Institutes of Education in the development of Social Studies cannot be under estimated. The Nigerian Educational Research and Development Council (NERDC) played a leading role in running workshops and seminars for leading curriculum specialists in primary, secondary and teacher training colleges.

The various university institutes of Education ran long and short term courses in the form of in-service training for practising teachers. The Institute of Education of Ahmadu Bello University was the first to run a Bachelor of Education degree in Social Studies. Many of the faculties of Education in Nigerian universities now run postgraduate degree programmes leading to the award of the postgraduate Diploma in Education, Masters Degrees and even Doctor of Philosophy degrees in Social Studies.

Edgar Wesley (1938) cited in Dibal (2010) was the first man to use the social studies for pedagogical purposes in the United States of America after the depression years and the appearance of the Soviet Sputnik. To him the new social studies was a programme meant to lead the boys and girls to find excitement and motivation in the process of social education via exploration, inquiry and discovery but with emphasis on developing competencies, values and attitudes essential for citizens in a free society. With time American social studies has evolved to prepare young Americans for future wars and to promote the spirit of nationalism, patriotism and loyalty to sensitize the youth on the concepts of self-reliance in food, resources conservation and increased productivity. Dibal (2015) came out with five (5) different definitions of social studies as “A spiral ecological study of man which starts from the self to family, hamlet, village, town, district, local government area, state, country, continent and the world at large.

Many people today often get confused on the nature of social studies in our schools and colleges. The subject is relatively new in the school curriculum. It is a corrective study because it is a subject which is concerned with the problems of man's living in the society with a view of finding solutions to those problems. It is also a subject which concentrates on the three (3) areas of knowledge, cognitive, affective and psychomotor domain. Only few people think of the subject in a single form in USA, this is because many authorities see social studies as a plural subject. Sofadekan (2012) conceptualized social studies as "An organized, integrated study of man and his environment, both physical and social, emphasizing on cognition functional skills and desirable attitudes and actions for the purpose of producing an effective citizenry".

The Traditional Subject Specialists See Social Studies in the Following Ways:

(a) As a combination of selected aspects of social sciences without each of these different subjects necessarily losing their identity.

(b) As a replacement of the traditional subjects which constitute the humanities and the social sciences.

(c) As a distinct subject meant to displace or substitute for history and other traditional subject in the humanity and social sciences in the school curriculum. It is because of this that there was a continuous resistance of the traditional subject specialist to the introduction of social studies into the school curricula. According to the nature of social studies education, the subject has three (3) general perspectives:

2.10.4 The Uni-disciplinary Perspective

This is a separate subject approach which sees social studies as a combination of history, geography, economics, sociology, psychology, anthropology named among others. With this perspective, a time table is planned in the school in such a way that scholars or specialists in these subjects can come at different times in the day to teach the pupils or students content materials in the name of social studies. This approach is preferred by traditional teachers who have soft spot for social studies education as it is

less of a problem for them as it does not require the integration of forms of knowledge. Besides, the approach assures them of the continuity of their subject and job opportunity. However, the proponents of this perspective forget that life situation or experiences is not organized into component parts or subject compartments. Pupils or students do not think in terms of subjects but they learn in wholes and not discrete bits. In fact, solutions to societal problems are not sought through the aid of separate subjects.

2.10.5 The Multidisciplinary Perspective

This is where concepts (words) and content materials from more than one discipline or subject are taken and taught by one teacher for example.

- (a) Origin of our community (History)
- (b) Location of our community (Geography)
- (c) Resources in our community (Economics)
- (d) Different groups in our community (Sociology)
- (e) Interpersonal relationships in our community (Psychology)
- (f) Development of certain tools in our community (Anthropology).

2.10.6 The Interdisciplinary Perspective

This is sometimes called the unified approach or integrated approach which blends the contents of social studies and it is difficult to distinguish the original disciplines or subject responsible for them. In this approach issues like family, local community development, nation building, justice, freedom, equality, democracy, air pollution, urbanization, globalization to name a few are presented and discussed. Another example is the concept of “power” which can be developed throughout the primary school levels thus: -

Primary 1 – Power relationship in the family.

Primary 2 - Power relationship in the school.

Primary 3 - Power relationship in the local community.

Primary 4 - Power relationship in the state.

Primary 5 - Power relationship in the country.

Primary 6 - Power relationship in the continent of Africa.

2.10.7 Scope of Social Studies Education

Social studies is not static, it keeps on changing because of the factors of time and human development. It centres on the development of man, how man influences his environment and how the environment influences him in return. The subject exposes the child to problems of the society and how to solve those problems. The problems of the society include the following:

1. Bribery and corruption.

2. Religious fanaticism

3. Tribalism

4. Environmental issue

5. Greediness.

6. Dishonesty

7. Distrust

8. Stealing

9. Smuggling.

10. Child trafficking

11. Laziness

12. Moral laxity.

13. Drug abuse

14. Prostitution

15. Food shortage etc.

It is against this background that social studies will equip the child with the basic social habits and cultural values which will enable him to build a good society in the future. Social studies deals with the activities of man at home, in the family, in the village, in the school, at play, in politics, at work, in religion, in everything or wherever man is engaged in his efforts to survive in the environment in which he lives.

The goals and objectives of social studies education vary from society to society. Social studies curriculum for Nigeria should consider the peculiar problems of the country. The most serious problem facing Nigeria today is the problems of unity. As such the social studies programme should be planned in order to urge Nigerians to do things that will foster unity, peace and the development of the country.

The objectives of Nigerian social studies which are developed to reflect the spirit of Nigerian philosophy of education, lay emphasis on the integration of Nigerian citizens into sound and effective citizens. The national educational aims an objective from which social studies objective are drawn are stated in the National Policy of Education (2009). They are as follows:

1. The inculcation of national consciousness and national unity.
2. The inculcation of the right type of values and attitudes.
3. The training of the mind in the understanding of the world around.

4. The acquisition of appropriate skills, abilities and competencies necessary for the development of society.

Based on these national educational objectives, Nigerian Social Studies has developed some of the following objectives for teaching in the Nigerian schools.

1. To create an awareness and an understanding of our social and physical environment in order to conserve it for national development.
2. To develop a capacity to learn and acquire certain basic skills of literacy, numeracy and critical thinking essential to the forming of sound judgment concerning social, economic and political issues.
3. To teach the child to acquire a relevant body of knowledge and information necessary for personal development and contribution to the betterment of mankind.
4. To develop appreciation for the diverse nature and interdependence of Nigerian communities.
5. To develop in students, positive attitudes towards the spirit of friendliness and cooperation necessary for a healthy nation and to inculcate appropriate values of honesty, integrity, hard work, fairness and justice.

With these social studies objectives reflecting the needs of the society, one easily understands the usefulness of social studies as a process of education which examines ways of working in the society in order to understand social problems and thereby seek solutions to them. Social studies focus attention on the use of critical and reflective thinking to solve the problems of man's survival in the society e.g. a good citizen should be able to distinguish between facts from rumour or propaganda. Reflective inquiry is the ability to hypothesis, gather data, analyze, interpret, conclude and generalize based on collection of certain information or data.

To develop a capacity to learn and to acquire certain basic skills including not only those of listening, speaking, reading and writing and of calculation but also those of skills of hand and head, together with those of observation, analysis, and inferences

which are essential to the forming of sound social economic and political judgment. Students can learn by collecting data from say resource persons, analyze them and arrive at responsible conclusions, e.g. a problem related to the environment could be examined by going to resource persons within the community to collect data on it's possible solutions. By so doing, pupils are being developed into effective citizens who are less likely to become victims or target of indoctrination. Since social studies focuses on the use of critical and reflective thinking to solve the problems of man's survival, that is, it deals with how we can fit into the society by utilizing the necessary attitudes, values and skills. The teacher should be adequately familiar with the available instructional materials in social studies with emphasis on the relevant approach of problem-solving and evaluation of the attitudes, values and skills.

In order to expand horizon pattern of social studies education, one can see that it starts from man as a central figure. Therefore, all environmental influences are carefully arranged around him, which proceed from the home to the outside world. Specific to general, from known to unknown and from simple to complex. Social studies gives the child the knowledge of immediate to remote and enable him to the internal and external implications of national and international systems. It makes him aware of the outside world, friendly and hostile forces which influence his life for better or for worse.

Social studies as an interdisciplinary subject rely heavily on the content of social science and humanities to achieve the goals of preparing people to be good citizens of democracy. It links factors outside the individual, particularly the development and use of reflective thinking, problems solving, and national decision making skills for the purpose of creating involvement in socialization.

Social studies as problems-solving subject was used in different parts of the world in solving specific problems and for development of nation. In Britain social, studies is used as a citizenship education, in United States of America, social studies is used to inculcate democratic values. In Tanzania, social studies is used for inculcation of the spirit of African Socialism. In Nigeria, according to Dibal (2010), it was to heal the

wounds of the Nigerian civil war and inculcate the spirit of national consciousness, unity and patriotism. With the knowledge of social studies education, the student avoid the practice of these bad vices like child trafficking, drug trafficking, prostitution, bribery and corruption, etc and think positively and contribute to the development of the society.

Social studies and civic education are relatively new in the Nigerian schools programme. The introduction of social studies in Nigeria was due to the need for a more effective way of educating the citizens on the need to change their behaviour positively by making them look deeply into problems in different stages of their development and to enable the teachers to find out the right concept and inculcate same into the children so that they could develop right attitudes, values and skills necessary to make them survive in the system which they are (Ajiboye, 2010). This is the reason why social studies is described as a subject that aims at training the learners to acquire those civic traits that will enable them to participate effectively in a democratic setting. This could be seen in the views of Sunal and Haas (2008) that:

When Social Studies focuses attention on students' problems (social, economic, political and environment) students will naturally want to observe, ask questions, seek information, express observation and idea in drawings, argue for their view points, and act to change things. When students 'do' Social Studies, they draw on thinking skills and knowledge from the entire school curriculum as they construct an understanding of their social world and seek to solve the problems it presents'. Therefore, Social Studies play a critical role in preparing learners to become active social participants in the ways of life of their society (p.118).

Social Studies among other school subjects is primarily put in place to be taught in Nigerian schools to address the right type of values, attitudes and behaviour, and to develop these aspects of character in a positive and productive way (Ojo, 2007). Falade (2007) stated that, the development of values and attitudes occupy an integral place in Social Studies .He also stated that the overall aim of teaching Social Studies is to prepare its learners for effective participation in the society. Some of the values

that Social Studies seek to develop in learners are: obedience, hard work, togetherness, comradeship and cooperation, love of our physical environment, appreciation of our interdependence, honesty, loyalty, and respect for other people and their property.

Ige (2013) stated that the eclectic and inter-disciplinary nature of Social Studies allows it to accommodate a wide spectrum of ideas, issues, problems or topics, within which students could study and understand the complex nature of man's ever changing situation. Falade (2015) stated that a careful examination of the purpose of Social Studies vis-à-vis the objectives of Civic Education shows that there is high level similarity between these subjects. Oyetade (2010) stated that Social-Studies focuses attention on the immediate environment of the child and takes to a distant environment.

The subject proceeds from known to unknown, simple to complex, etc. Social Studies study man right from his home background through the school, community, state, nation or country and the world at large in order to meaningfully learn about man's interaction with his social and physical environments. All the relevant and important aspects of man that have been studied in disjointed and separate forms in compartmentalized disciplines have to be brought together for holistic study in a subject, which is why social studies evolved in the first instance. These explain why social studies contents are daily growing in leaps and bounds on the one hand, and why it is continually regarded as a 'life subject' on the other hand.

There is collaboration between Civic education and Social Studies Education in the sense that both inculcate and imbibe social participation, active student engagement and ethics. Thus, both can be seen as two sides of the same coin. That is Civic Education is a collaborative dimension of Social Studies in building and bringing about good citizenship. More so, in the context of schools in Nigeria, most Social Studies teachers seems not to grasps the values, skills and the global dimensions associated with the attainment of political ethics. This is consistent with the past study by Iyewarun, Keene, Baamphattha and Moffat (2013) that stated that Social Studies

teachers are more likely to do away with some components if they lack an understanding of the values, skills and global dimensions that underpin citizenship skills and ethics. The emphasis on political ethics was understandable. Presently, because of increased political violence in Nigeria, teachers are given the task of teaching and inculcating citizenship competences and political ethics in addition to their content areas. In response to political violence and economic inequities, educators rekindled ideals of political integrity, democracy and social reform.

The aforementioned is also made complex by the manner the subjects (Civic and Social Studies Education) are structured, implemented, the general lack of time as well as lack of pedagogy materials. It is not an overemphasis to state that such teachers lack efficiency and competence in the implementation of Social Studies programme because most social studies teachers are not innovative hence they end up indoctrinating their students rather than promoting the expected values.

2.10.8 Methods of teaching Social Studies

Social Studies is now a distinct part of the curriculum at all levels of the Nigerian educational system. Its relative newness in schools, coupled with the dearth of professionally qualified Social Studies teachers and the inevitable need to have teachers equipped with a high level of competence in the delivery of Social Studies, presents a number of challenges. Ideally, to ensure that Social Studies is taught very well, it is pertinent that methods of teaching it are explained. Often those who write about the Social Studies curriculum and teaching Social Studies confuse methods and techniques or use them interchangeably as synonyms. This misrepresentation of teaching methods and techniques applies also to the discussion of strategies for teaching the subject. For example, Ajiboye (2010) concluded that “a strategy is synonymous to a technique and can be used interchangeably with it and that strategies or techniques are subsumed in the application of a method”. Other scholars Nkire (2011), Ige (2013), Gbadamosi (2012), Olubela (2014) and 2015 have referred to strategies as both methods and techniques in the delivery of Social Studies. In clustering or crowding together Social Studies methods and techniques, the methods

(i.e. the way) of teaching Social Studies are misrepresented as skills (i.e. techniques) and the latter are often blurred or neglected. Consequently, it is pertinent to discuss a number of the methods that are appropriate for Social Studies teaching and point out their relationships with strategies and techniques.

2.10.8.1 Teaching methods

In Greek 'Metahodos' means 'a way' (Esu & Inyang-Abia, 2004) cited in Sofadekan (2012). Thus, a teaching method can be said to be a chosen, systematised and ordered way through which the 'act of teaching' is performed in order to accomplish the set objectives of instruction. Generally, instructional methods can be described as the procedure through which content is presented in order to achieve instructional and programme objectives. Bozimo and Ikwumelu (2009) argued that instructional or teaching methods are used to help students gather data, develop comprehension, present results of conclusions of their study. Methods are broad ways or means by which interactive teaching-learning activities are carried out to achieve educational goals. While some methods relatively have more teacher participation, some others are learner oriented and dominated.

The relevance of teaching methods according to Mezieobi et al., (2008) is as follows:

- i. It makes teaching and learning very simple and easy;
- ii. It enables more learning to take place;
- iii. The time taken to achieve more learning outcomes is very short. This is particularly so when the learning experiences are interesting and are tailored to the needs and maturational level of the learners;
- iv. Teaching methods help to implant what is pleasantly learned in the memory of the learners and makes for their easy recall;

v. People who are taught with teaching methods get to realise their import and may in the end acquire them for use in their interactive session in the classroom if they are student-teachers or serving teachers;

vi. The use of teaching methods keeps the learners alive to the teaching-learning process
vii. Teaching methods have the potential of reducing learners' classroom disruptive behaviours to the barest minimum and therefore, contribute quite positively to the desired effective classroom management; and

viii. The choice of an appropriate teaching method, to suit a given teaching learning encounter keeps the teacher professionally alive in his preparations to teach very well.

2.10.8.2 Social Studies teaching methods

Methods of delivering Social Studies can include a number of presentational styles.

These are:

- 
- i. Presentations (e.g. Lecture, Storytelling, Illustrated talk, Demonstration, Visiting speaker);
- ii. Creative activities (e.g. Drawing and painting, Poster, Creative writing, Cartoons, Costume making);
- iii. Discussions (e.g. Brainstorming, Small group discussion, Debate, Panel discussion, Devil's advocate);
- iv. Dramatizations (e.g. Miming, Playlet, Role playing, Monologue / Dialogues, Puppetry); and
- vi. Inquiry/problem solving activities (e.g. Field trips, Quizzes, Puzzles, Sorting, Opinion polls) (Olatundun, 2009).

2.10.8.2 Teaching techniques in Social Studies

A teaching technique is a specific way or aspect of a given method of teaching Social Studies which is chosen, organised and delivered by a teacher in his or her interaction with students. Mezieobi (2011) observed that techniques are embedded in methods, and are thus narrower in scope than methods. It is in fact the technique, appropriately utilised by the professional Social Studies teacher, that gives meaning to teaching, teaching skills can determine the extent of achievement or otherwise of the instructional objectives. Techniques are specific instructional tasks and devices used to effect learning. Techniques are usually applied when teaching a lesson with clearly stated objectives to be accomplished.

Figure 2.1: The teaching strategies in Social Studies with their corresponding teaching methods and teaching techniques are illustrated below.

Table 2.2: Teaching methods

Teaching strategies

Teaching Methods

Teaching Techniques

Presentation Methods

- i. Lecture;
- ii. Story telling;
- iii. Illustrated talk;
- iv. Demonstration; and
- v. Visiting speaker.

Creative activities methods

- i. Drawing and panting;

- ii. Poster;
- iii. Creative writing;
- iv. Cartoons; and
- v. Costume making

Discussion methods

- i. Brainstorming;
- ii. Small group discussion;
- iii. Debate;
- iv. Panel discussion; and
- v. Devil's advocate.

Dramatization methods

- i. Miming;
- ii. Playlet;
- iii. Role playing;
- iv. Monologues / Dialogues; and
- v. Puppetry.



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Inquiry problem-solving methods

- i. Field trips;
- ii. Quizzes;
- iii. Puzzles;
- iv. Sorting; and
- v. Opinion polls.

2.10.8.3 Presentation methods

The presentation method is also known as lecture method and is an age old traditional method of teaching where knowledge or information are presented, conveyed, imparted or transferred to learners by the teacher who dominates the teaching-learning process, acts as a repository of knowledge, and expects students to listen passively and unquestioningly. The expectation of the teacher and the student is that the latter should be able on demand to regurgitate the stored knowledge presented by the teacher. Ajitoni and Olubela (2010) attested to the fact that most Social Studies teachers today employ the lecture method.

However, the lecture method in the Social Studies classroom staffed by a specialist Social Studies teacher who is committed to the task, does not necessarily represent the classic lecture where learning is teacher centred and the learners are passive. It can be an interactive process where there is:

- i. Two-way knowledge or information sharing between the teacher and the students or among the students where the atmosphere is collaborative and where the learner is an active participant;
- ii. The teacher or the learners act as sources of knowledge stimulation; and
- iii. Knowledge, facts or information learned are not just acquired, but are critically reflected upon and geared towards problem resolution, as pointed out by Sofadekan (2012) who argued that facts were not always important in their relationship to problem(s) in terms of total elimination or amelioration. Lecture method is very important in the Nigerian educational system considering the fact that instructional resources are largely inadequate.

2.10.8.4 Creative Activities methods

These are simple forms of mental stimulation, allowing the students to use their imagination about the topic chosen for discussion. They elicit the creative capacities of the students via their active participation in the creative classroom activities. In Social Studies, creative activities and learning experiences are emphasised in order to develop the intellectual skills of the learners. The significance of making activities a central part of the teaching interaction in the Social Studies classroom is to foster the creative abilities of the learners. This points to the fact that activities in Social Studies are aimed at producing creative and productive citizens who are adaptive and can meet any challenge. For example, students can model a mock parliament, a popular event in the country such as the Aba riot or Benin massacre.

2.10.8.5 Discussion methods



The discussion method can be described as an organised, pre-determined procedure of teaching where participants put their heads together and contribute worthwhile ideas or personal views that aid them in arriving at a conclusion on a topic (Sofadekan, 2012). In a discussion setting, the teacher should be an integral part of the discussion group placing him/her in the discussion circle and not standing in front of the class. Here the discussion group is comprised of equals where a visitor would not at first sight identify who the teacher is other than by his/her age. The physical setting of the discussion would be such that each of the discussants can see each other's face as the process progresses. Sitting in a circle would be the most appropriate arrangement provided the number of students in the class is manageable. In large groups the teacher should organise the students into manageable discussion groups. In a discussion where only the teacher is versed in discussion skills, he or she should lead at first and then step back allowing pupils to introduce points and counter points. The teacher should retain an element of control however to ensure that basic courtesies are observed and that everyone is given an opportunity to contribute.

2.10.8.6 Dramatization methods

Dramatization is a method whereby students act out events, situations, emotions or feelings or characters in stories by taking on roles. It involves the students in many activities that they can participate in physically, emotionally and mentally but it is a method that has to be carefully prepared if maximum benefit is to be derived from it. Even though the method is practice oriented, the teacher should consider its suitability in terms of practicability so that difficult or frightening roles should not be used for dramatization.

As well as providing students with fun during the lesson, it brings out the best in children, it aids their cognitive development and self-expression, it encourages the use of their initiative; gives them the opportunity to identify with what is good and positive; develops in them the spirit of cooperation and team work and trains them to speak clearly so that all members could hear but in the event of bad handling of the dramatization method, the effects could be negative. Students can become obsessed with the process of dramatization rather than the message in it.

2.10.8.7 Inquiry-based problem solving methods

Inquiry-based problem solving is an activity-oriented, thought provoking creative method in which students, out of curiosity and on their own, or with the guidance of a teacher, probe, investigate, and interpret relevant issues and problems with a view to providing a solution through reflective thinking and rational decision-making which this method develops in the inquirer. As is evident from this method, rather than the teacher being a knowledge encyclopaedia or the giver of knowledge, the students strike out on their own, individually or in a group, to seek solutions to problems while the teacher acts as a facilitator of learning or a collaborator in learning.

It is through exposing students to the more or less independent activities which the inquiry method entails that the students develop the intellectual skills essential for

problem solving. Inquiry-based problem solving inculcates reflective thinking in the learners and ultimately makes them critical thinkers but it is time consuming. It also entails patience or endurance on the part of the teachers and the students who on losing their patience in the face of seemingly difficult problems may see their situation as frustrating.

Summary of teaching methods

It could be reliably gathered from the literatures above that the teaching methods are the veritable instruments used to achieve specific instructional objectives, therefore, the social studies teachers should hold with high esteem the role they play in the teaching and learning processes. They should rather be facilitators of learning whose aim is to change the totality of the learner's behaviour and attitudes positively through the adaptation of appropriate teaching methods.

2.10.9 Appraisal of Literature Reviewed

The concept of environment embraces everything within and around man that may have effect on or be affected by human beings. It is every person's duty and responsibility to find ways through which to develop an understanding of how humans are linked to the natural order and how people can use their intellect to remedy the effects of destructive actions. Over the last three decades or so, more and more writers and scholars link the current global environmental problems to modern living. Such writers argue that the environmental problems are a product of industrialization and inappropriate development. Environmental education then, according to such an argument, must respond by addressing the destructive nature of modernity.

Cooperative Learning is part of a group of teaching/learning techniques where students interact with each other to acquire and practice the elements of a subject matter and to meet common learning goals. It is much more than just putting students into groups and hoping for the best. Furthermore, values can be preserved through passing the achievements of a particular generation to their children. Moreover, human society functions by its members performing certain roles in the community.

The skills needed to perform these functions or roles do not come naturally but have to be taught and acquired through learning.

2.11 Chapter summary

The foregoing gives a summary of all the relevant literature reviewed under different headings and sub-headings on the effect of two learning strategies on students' environmental knowledge, attitude and practices, as well as the effect of gender and school location. This study focused on filling the knowledge gap by the way of examining the effect of service and collaborative learning strategies on students' environmental knowledge in selected junior secondary schools in Oyo State, Nigeria.



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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The intention in this chapter is to give an explanation of the research methodology and procedures that were adhered to in the course of gathering data to enable the researcher address the research hypotheses. The explanation covers the following; the research paradigm, research approach, research design, population, sample and sampling techniques, selection of participants, the research instruments (structured questionnaires and achievement tests), validity and reliability of the test instruments, general procedure for data collection, as well as the procedure for data analysis. The chapter also did a good explanation of the variables involved in the study.

3.2 RESEARCH PARADIGM



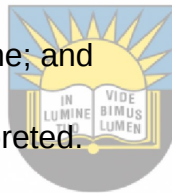
Okeke and Wyk (2015) have described paradigms a way of looking at the world, or the world view that moulds what we consider to be true. They explain further that a research paradigm outlines specific ways of engaging in research. According to Amemie de vos, Strydom and Fouche (2011) the understanding of the paradigm a researcher is working with enables him to keep communication clear and unambiguous. In other words, paradigm can be referred to as the lens through which we view the world around us and consequently base our judgment of that world on what we perceive. Dibete (2015) explained a paradigm to be a set of assumptions or beliefs which have to do with fundamental aspects of what we consider reality and which subsequently give rise to a specific view of the world.

According to Vos, Strydom and Fouche (2011) the term *paradigm* has its origin in linguistics, where it refers to the different shapes a word can take in a particular language. For example, a word can take the form of a noun or a verb depending on

the usage; the word school can stand as a noun when it refers to an educational institution or a verb when it means to educate.

The fields of science, social science, and educational research credited the term paradigm to the work of Thomas Kuhn (1970) titled, 'The structure of scientific revolutions'. Kuhn examined the history of natural sciences as it goes through changes, he identified series of patterns that are responsible for the progress of the natural sciences. Towing the line of Kuhn's work is Okeke and Wyk (2015) who said research paradigm outlines a specific way of engaging in research. Research paradigm explains the perception of researchers concerning the way the task of research should be done or what it should be. Bryman (2016) considered a paradigm to be a cluster of beliefs and dictates which have an influence on the following:

- i. what is to be studied;
- ii. how research should be done; and
- iii. how results should be interpreted.



Scholars are definitely unanimous in what a research paradigm ought to be as the understanding of it enables a researcher to keep communication clear and unambiguous (Amemie de Vos, Strydom & Fouche, 2011).

An understanding of research paradigm will no doubt help in piloting the direction of a research work. Although Bhattacharjee (2012) warned that paradigms are often difficult to identify because they may be taken for granted as they are assumed and implicit, but they are essential to making sense and restoring differences in perceptions about social phenomenon.

Table 3.1 presented below provides an overview of the three major paradigms and their respective ontological, epistemological, axiological, and methodological philosophical assumptions.

Table 3.1: Major research paradigms and their philosophical assumptions

Descriptive	Positivism	Post-Positivism	Interpretivism	Critical Theory	Pragmatism
Synonym	Verify	Predict	Understand / Interpret	Emancipate	Dialectic
Ontology What is real?	Objectivist, findings are the whole truth, which is realism	Modified objectivist, findings are probably true, and there is transcendental realism	Local, relative, co-constructed realities. There is subjective, objectivity and realism	Historical/virtual realism shaped by outside forces, material subjectivity	Constructed based on the world we live in and explanations that produce the best desired outcomes
Epistemology What is true?	The only knowledge is scientific knowledge-which is truth, reality is apprehensible	Findings approximate truth, reality is never fully apprehended	Co-created multiple realities and truths	Findings are based on values and local examples of truth	Objective and subjective points of view
Axiology What is the role of values?	Value- free, propositional knowing about the world is an end in itself, is intrinsically valuable.	propositional knowing about the world is an end in itself, is intrinsically valuable.	Value-laden, and biased. Propositional , Transactional knowing is instrumentally valuable as a	Propositional , transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable. Usually Qualitative, but also Quantitative	Multiple stances, e.g. researchers include both biased and unbiased perspectives .
Methodology How do I examine what is real?	Quantitative- Primarily Experimental, Quasi-Experimental	Usually Quantitative- Experimental with threats to validity. Qual- a case study	Means to social emancipation. Often Qualitative and/or Quantitative		Quantitative & Qualitative Together (Mixed Methods Approach)

Source (Aliyu, Muhammad, Rozilah & David, 2014: 80)

Ontology

Ontology refers to the claims and assumptions that people make about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other (Cohen, Manion & Morrison, 2012). In other words, ontology refers to people's understandings of the entities they encounter, including the meanings of those entities. This means ontology is all about the nature of the world around us. As a philosophical assumption, ontology addresses the question: What constitutes reality and how can we understand its existence? Within pragmatism, a particular ontological position was chosen and this is realism. This view holds that the world comprises objectively given objects and structures independent of the researcher (Johnson and Christenson, 2017).

Epistemology

Epistemology is defined as responding to the question of what is (or should be) regarded as acceptable knowledge in a discipline (Bryman 2016) and is also concerned with how knowledge can be created, acquired and communicated to other human beings (Cohen, Manion & Morrison, 2007). In other words, epistemology is all about, what it means to know. It should be noted that the kind of epistemological assumptions a researcher makes or holds about knowledge profoundly affect how they will go about uncovering knowledge of social behaviour.

Axiology

Axiology refers to the analysis of values to better understand their meanings, physiognomies, origin, acceptance as true, as well as their influence on people's daily experiences (Creswell, 2014). It is a branch of philosophy that studies judgment about value. In other words, it is all about the role of values in research. Researchers demonstrate axiological skill by being able to articulate their values as a basis for making judgments about what research they are conducting and how they go about doing it. The seminal axiological question is: 'What is the ultimate purpose of the inquiry?'

Methodology

Methodology is concerned with strategy or plan of action which lies behind the choice and use of particular methods. It addresses the why, what, from where, when and how data is collected and analyzed. The important question of a methodology is: 'How can a researcher discover whatever he/she believes can be known?'

The following section gives a brief outline of two major research paradigms, describing their principles and explaining the ontological, epistemological, axiological, and methodological positions of each.

3.2.1 Types of paradigm

Scholars have identified various paradigms in research, such as positivism, interpretivism, post-positivism, critical theory and post-structuralistic paradigm (Amemie de Vos, Strydom and Fouche, 2011; Bhattacharjee, 2012; Ntsele, 2014).

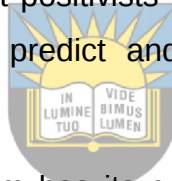
3.2.2 Positivism Paradigm

Positivism is based on the works of Auguste Comte, a 19th century French philosopher. According to Auguste Comte, positivism turns to observation and reason as a way of comprehending behaviour, explanation is said to be in progress by way of scientific description (Cohen, Manion & Morrison 2007)

Johnson and Christenson (2017) explained positivism further by saying that positivism is the idea that only what we can empirically observe is important and that science alone is the authentic origin of knowledge. It can therefore be said that reality depends on the one observing it. Positivism give credence to science as the most distinct possible ideal of knowledge (Cohen, Manion & Morrison, 2007). Positivism approaches social research by applying natural science way of investigation to phenomena that are social (Bhattacharjee, 2012). Bryman (2016) outlined five (5) principles that are guiding positivism:

1. Only phenomena and hence knowledge confirmed by the senses can genuinely be warranted as knowledge (the principle of phenomenalism);
2. The purpose of theory is to generate hypotheses that can be tested and that will hereby allow explanations of laws to be assessed (principle of deductivism);
3. Knowledge is arrived at through the gathering of facts that provide the basis for laws (the principle of inductivism);
4. Science must (and presumably can) be conducted in a way that is value free (that is subjective); and
5. There is a clear distinction between scientific statements and normative statements and a belief that the former are the true domain of the scientist.

Motubatse (2016) concluded that positivists aim to test a theory through observation and measurement in order to predict and control the factors that influence its surroundings.

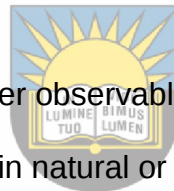


However, the positivism paradigm has its criticisms. Bryman (2016) warned against treating positivism as being synonymous with science or scientific because philosophers in science and social science differ greatly on what characterize scientific endeavour. Cohen, Manion and Morrison (2007) said scientific mentality has been elevated to an almost unassailable position- almost to the level of a religion (scientism) as being the only epistemology of the west. Habermas(1972) in Cohen, Manion and Morrison (2007) opined that equating all knowledge with scientific knowledge make us neglect hermeneutic, aesthetic, critical, moral creative and other forms of knowledge.

This research employed positivism paradigm. As earlier stated, positivism seeks to apply the natural science style of investigation to investigation of social phenomena, as well as its meaning. Positivism provides support for quantitative research because it establishes that empiricism can be applied in studying social phenomena just like the one this study embarks upon. The research adopted positivism because every

step follows the principle of positivism as stated by Bryman (2016). More-so, the quantitative research aligns with the opinion of Babbie and Mouton (2010) and Molubatse (2016) and is concerned with positivism. Vermeulen (1998, p.14-15) described the quantitative research paradigm in-depth as follows:

- It is an inquiry that assumes an objective social reality;
- It assumes that the social reality is relatively constant across time and settings;
- It views casual relationships among social phenomena from a robotic direction;
- It studies populations or samples that represent populations;
- It takes an objective, detached stance toward research participants and their settings;
- It studies behaviour and other observable phenomena;
- It studies human behaviour in natural or artificial settings;
- It analyzes social reality into variables;
- It uses preconceived concepts and theories to determine what kind of data will be collected;
- It generates numerical data to represent the social environment;
- It uses statistical methods to analyze data;
- It uses statistical inference procedures to generalize findings from a sample to a defined population;
- It prepares impersonal, objective reports of research findings;
- Its procedures are highly formalized;
- It is more explicitly controlled;



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- It uses a deductive form of reasoning through data collection for the assessment of preconceived models, hypotheses and theories;
- It tests hypotheses that the researcher triggers off his/her study with;
- When using quantitative research paradigm, observations are systematically undertaken in a standardized manner;
- Its concepts are in the form of distinct variables;
- Data are presented by means of exact figures elicited from precise measurement;
- The researcher's role is that of an objective observer;
- The research is standardized based on fixed procedure and can therefore be replicated;
- Studies are focused on specific questions or hypotheses that remain constant throughout the investigation;
- Data collection procedures and types of measurement are constructed in advance and applied in a standardized manner; and
- Measurements are focused on specific variables that are quantified through rating scales, frequency counts and other means.

In addition, the similarities between the mode of this research and the characteristics of positivism as outlined by Baruth (2013) informed the choice of this paradigm by the researcher. The characteristics are as follows:

- i. The research endeavours objectivity and precision;
- ii. It focuses on scientific enquiries, facts, theories, laws and predictions
- iii. It makes use of experiments, quasi-experiment, surveys and correlational studies;

- iv. The researcher is detached from the study and stays outside the research to maintain objectivity;
- v. Phenomena are predicted through various quantitative methods;
- vi. It employs systematic quantitative methods to conduct research, and collects and records the data systematically;
- vii. It uses empirical tests to verify accuracy and its aim is to test hypotheses in order to predict the truth;
- viii. It approaches the research by looking at the cause and effect of test results through deductive reasoning, observations, numerical data, large sampling and hypotheses testing to predict results
- ix. Results are always obtained through statistical analysis and numerical data and therefore remain guaranteed; and
- x. The results can be applied and generalized to other practices.

In conformity with the characteristics stated above, in this study there was empirical observation. This study used treatments on experimental and control groups in classroom settings and thereafter analyzed data gathered from the observation using inferential statistics to get results in establishing some facts.

3.2.3 Interpretivism Paradigm

Bryman (2016) called interpretivism an epistemology that contrasts with positivism. In the words of Bryman (2016), interpretivism denotes an alternative to the positivist orthodoxy that has dominated the social sciences for decades. Interpretivism requires the researcher to have a grasp of the subjective meaning of social action. Interpretivists argument is based on the assumption that reality can only be understood through the subjective exposition of and intervention in reality. This is supported by Bhattacharjee (2012) that interpretivism is based on the assumption that social reality is neither singular or objective, but rather shaped by human experiences

and social contexts. Hence, the best way to study it is through socio-historic settings, bringing together the subjective interpretations of various participants.

Cohen, Manion and Morrison (2007) opined that the central endeavor in interpretive paradigm is to understand the subjective world of human experience. Interpretivists believe that the study of phenomena in their natural environment is essential, and that scientist cannot but influence the phenomena they are studying. To the interpretivist, the mind is active when it comes to the construction of knowledge. An interpretivist will rather focus on interpretive inquiry as this is understood as knowledge.

However, Baruth (2013) cautioned that the disadvantage of using the interpretive paradigm is based on human errors and flows that can be found resulting in complexities.

3.2.2 Limitations of Interpretivism

Interpretivism has a limitation because it does away with the scientific processes of verification and therefore results cannot be generalized to other situations. In addition, interpretivism ontological assumption is said to be subjective rather than objective. Every researcher can be said to be subjective because once a researcher decides on the paradigm or approach to employ in a study, definitely, subjectivity or bias has crept in. The major point put up against interpretivism is its inability to accept the political and ideological impacts on knowledge and social reality (Wyk, 2010).

In view of the criticisms of the interpretivist paradigm, this research work therefore made use of the positivist paradigm as a result of the fact that it employs the scientific procedure of natural science to investigate human activity using objective enquiry and striving to investigate and confirm the pattern of behaviour in testing theories and hypotheses (Creswell, 2014). The positivism paradigm is said to mostly involves quantitative methodology (Vos, Strydom, Fouche, & Delport, 2011; Bryan, 2016) and focuses on seeking generalizations and quantitative data (Wellington, 2015). It is in view of this argument that this paradigm is found suitable in investigating the effect of service and collaborative learning strategies on students' environmental knowledge.

3.2.4 Post-positivism

In post-positivism, the research is an approximation of reality. It ensures that reality exists through qualitative methods that are rigorous. Positivism argues that reality can be studied, captured and apprehended, whereas post positivists contend that it is not possible to fully apprehend reality for it can only be approximated (Amemie de Vos, Strydom & Fouche, 2011). In post-positivism, the research focus is on the understanding of the study as it develops in the course of investigation and, therefore, commences with an area of the research and the relevant things to that area for a better knowledge thereof.

A low level statistical and frequency counts is used. Post-positivism gives social scientists the opportunity to carry out research on a small scale with very innovative methodologies.

Nevertheless, Amemie de Vos, Strydom and Fouche (2011) highlighted the following criticisms of post-positivism:

- i. The level of honesty of the researcher may be questionable in this kind of research; and
- ii. Subjectivity in a research can make the data useless.

There are different paradigms, but the paradigm employed in this study was positivism. Positivism as a research paradigm seeks to apply the natural science (physics, chemistry and biology) style of investigation or model of research to investigations of social phenomena, as well as its explanation. Positivism lends credence to quantitative research as it establishes that empiricism can be applied in studying social phenomena like the one this study embarked upon. Therefore, the reality of carrying out an experiment in studying the different variables in this research is justifiable as they are observable with the aid of instruments to be conducted for the purpose of this research.



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The assertion of positivism and its methodology sound very relevant to the current study which sought to determine the effect of service learning and collaborative learning strategies on students' environmental knowledge in selected junior secondary schools. There was empirical observation in this study in line with the theory of positivism. This study used treatments on experimental and control groups in a classroom setting and thereafter analysed data gathered from the observation using inferential statistics to get results to establish some facts.

3.3 RESEARCH APPROACH

There are three major approaches in educational research namely quantitative research approach, qualitative research approach, and mixed method research approach. At this juncture, it is imperative to explain the three research approaches before giving justification for the choice of research approach in this study.

3.3.1 Quantitative research approach

Quantitative research approach concerns itself with collection of information in numeric form. Johnson and Christensen (2017) also expressed that quantitative research rests upon the gathering of data that are quantitative in nature, in other words, gathering of numeric data. It can be argued that quantitative research approach majorly follows scientific inquiry in its search for truth and fact, it lays emphasis on testing hypothesis and theory. Quantitative research deals with gathering information in numeric form. It usually gather data with the aid of more structured instruments of research. This instruments aid the researcher to extract information that are germane to testing formulated hypotheses and theories.

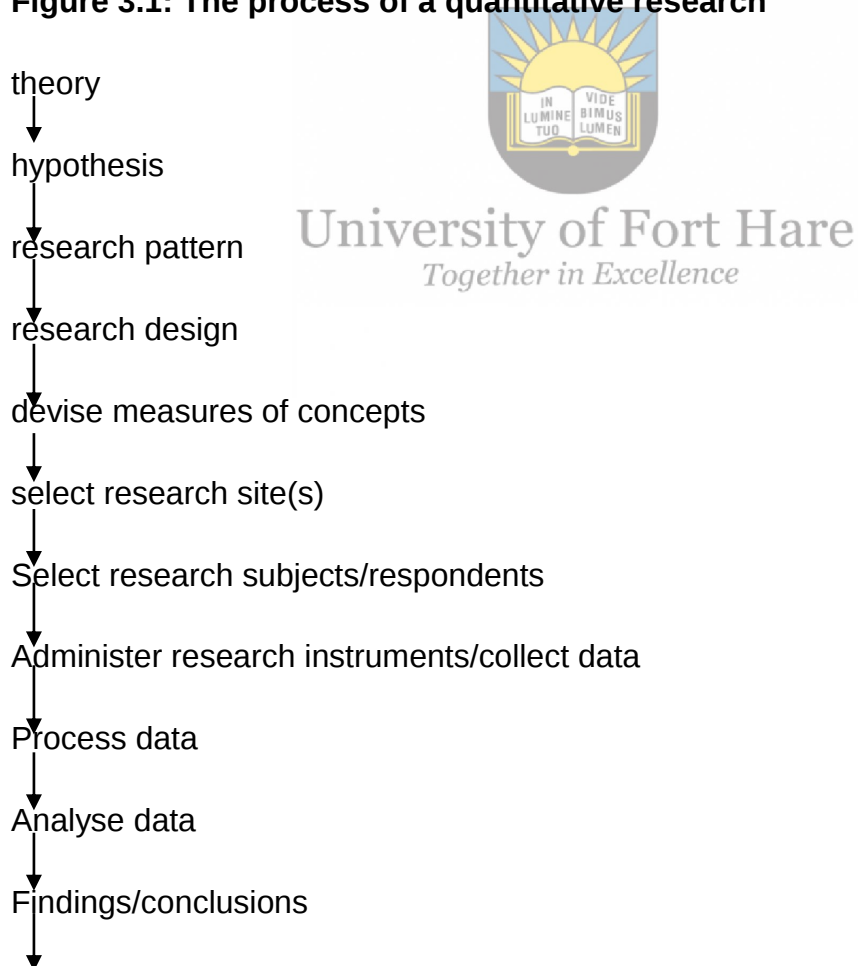
A quantitative researcher considers stating his/her hypotheses and then subjects such hypotheses to test with empirical data to establish whether they can be supported or not. In other words, in quantitative research, you initially formulate hypotheses in relation to the social phenomena been study and then collect data from the

representative sample of your target population in order to see if the hypotheses can be supported.

In quantitative research results are based on larger sample sizes that are representative of the population. Cohen, Manion and Morrison (2007) expressed this as tendency to have a small field of focus, fragmenting the observed into minute chunks that can subsequently be aggregated into a variable. Quantitative researchers work with a few variables and many cases or subjects.

In quantitative research, the result can more often be replicated, and this gives it high reliability. Furthermore, the analysis of the result is more objective. Bryman (2016) summed up quantitative research with the aid of a diagram that shows the process of a quantitative research:

Figure 3.1: The process of a quantitative research



Write up findings/conclusions

Source: Bryman (2016).

3.3.2 Qualitative research approach

Qualitative research approach is said to be orientated towards words rather than numbers or quantification in the collection and data analysis (Bryman, 2016; Johnson & Christensen, 2017). Qualitative research involves gathering of narrative data in a natural context as a way of gaining understanding of phenomena of interest. Johnson and Christensen (2017) corroborating this explanation of qualitative research stated that it is used to describe what is seen locally and sometimes to come up with new hypotheses and theories.

It is designed purposely to reflect individual's cognizant events in their everyday life. This is buttressed by Johnson and Christensen (2017), Bryman (2016) and Cohen, Manion and Morrison (2007) that qualitative research is engaged in order to comprehend people's experiences and to also express their perspectives. This may lead a qualitative researcher to study many variables over an extensive period of time in order to find out the way things are, how and why they came to be that way, and what it all means.

In qualitative research, the researcher attempts to be close enough to the participant, so that he/she can have an understanding of the participant's world view (Johnson & Christensen, 2017). There is an underlying premise that the social world must be interpreted from research subject's view rather than seeing the subject as being incapable of his/her own reflections on the social world (Bryman, 2016). The most common methods of data collection in qualitative research are interviews, observations and focus group discussion.

Scholars have listed some of the criticism against qualitative research to include difficulty in replicating the research; lack of transparency, difficulty in generalization; and been too subjective.

3.3.3 Mixed method research approach

This is a research approach that combines both quantitative and qualitative research approaches. Greene, Krelde and Mayer (2008) described mixed method research approach as the planned use of two or more different types of data gathering and analysis techniques, and often rarely distinct types of inquiry designs within a study. In similar vein, Johnson and Christensen (2017) explained that mixed method involves the mixing of quantitative and qualitative research methods. It can be seen as a compound of both quantitative and qualitative research methods. According to Bryman (2016), mixed methods research has become an accepted approach to conducting social research.

However, it has been argued that when researchers are combining participant observation with a questionnaire, they are really not combining quantitative and qualitative research, because paradigms are incompatible. Therefore, the amalgamation or integration is only at a shallow or superficial level (Bryman, 2016).

For the purpose of this research, the quantitative research approach was chosen. The choice of quantitative research was informed by the way quantitative research is structured which enabled the researcher to examine the concepts and issues that have been pre-determined to be focus of this study. More so, the approach enabled this research to make justification through empirical confirmation of stated hypotheses (Johnson & Christensen, 2017). Consequently, the researcher gathered data using structured research instruments (structured questionnaire and performance test) on both the control and experimental groups.

Furthermore, this research will make use of a sizeable sample size that is representative of the population of the study. Hence, the choice of quantitative research approach which will enable the study to make generalization.

Finally, this study is a field experiment that used variables, and treatments on control and experimental groups.

As a consequence of the chosen paradigm, the quantitative research approach will be used in this research work to determine the effect of service learning and collaborative learning strategies on students' environmental knowledge in selected Junior Secondary Schools in Oyo State, Nigeria. This approach will be suitably used because of the way the data will be collected through the use of structured questionnaire and performance test on both the control and experimental groups.

3.4 TYPES OF RESEARCH

Research in education can take different methods, and this depends on the problem to be investigated. Researchers in education often times use the following types of research in education:

3.4.1. Historical Research

This is a type of research that relies essentially on secondary sources of data like archival records and is sometimes supplemented with questionnaires or interview. It involves the examination of past events and experiences to obtain evidences; weighing the evidences in terms of validity of the source of data; interpreting the weighed evidences, and drawing of conclusion based on the weighted evidence. The purpose of this research is to re-construct the past objectively and accurately often in relation to the tenability of a hypothesis. A typical example of a research topic that requires the application of this designed is "The impact of the first and second world war on the agitation for political independence in Africa".

- Historical research depends upon data observed by others rather than by the researcher.
- Historical research must be rigorous.
- Historical research depends upon two kinds of data; primary source and secondary source.

- Two basic forms of criticism weigh the value of the data: external criticisms, which asks, “is the document or relic authentic? And internal criticism which asks, if authentic, are the data accurate and relevant?”
- Historical research is similar to the “reviews of the literature” which precede other forms of research; it has an approach that is more exhaustive, seeking out information from a larger array of sources.

3.4.2. Survey Research

Survey research involves the collection of data to accurately and objectively describe existing phenomena. Studies that make use of approach are employed to obtain a picture of the present conditions of particular phenomena. Babbie (2013) describes the survey research as that which is directed towards determining the nature of a situation, as it exists at the time of investigation. He further describes it as a type of research that studies large and small populations by selecting and studying samples chosen from the population to discover the relative incidence, distribution, interrelations of sociological and psychological variables. Examples of topics requiring survey research design are:

- A survey of students attitude to science;
- Perceived instructional needs of language teachers;
- Pattern of academic achievement of students in mathematics;
- The status of social science teaching in secondary schools; and
- Voting pattern of elites in local government election.

Survey research is therefore very useful for opinion and attitude studies. It depends basically on questionnaires and interviews as means of data collection. This types often deals with many variables for which information are needed and can cover whole population, in this case it is called a sample survey. To increase the validity of the study the sample has to be representative of the population. Survey research according to Creswell (2014) consists of the following steps:

1. Planning: This involves the determination of what population is to be studied and what topic is to be investigated. In this stage, one also decides on the methods and procedures that will be used to gather data.

2. Sampling: This involves decision-making about which people from the population of interest are to be included in the survey. If one is to generalize from the sample to the population, it is essential that the sample selected be representative. The sampling procedure that is most likely to yield a representative sample is some form of random sample.

3. Construction of the data-gathering instrument: This is where one decides on writing of the statements/questions and plans the format of the instrument to be used. Among the data-gathering techniques used in surveys are personal interviews, questionnaires and telephone interviews.

4. Carrying out the survey: This includes the pre-testing of instrument to determine whether it will obtain the desired data, training the users of the instruments to determine whether it will obtain the desired data, training the users of the instruments (for example, interviewers), interviewing subjects or distributing questionnaires to them, and verifying the accuracy of the data gathered.

5. Processing the data: This stage includes the coding of the data, computer processing of the data, interpreting the results, and reporting the findings.

3.4.3 Case Study

The purpose in this type of research is to study intensively the background, current status and environmental interaction of a given social unit: an individual, group, institution or community. Case studies focus on providing in-depth and comprehensive data about a social unit, which may be an individual, a group of individual, family, community or an institution. Case studies are in-depth investigations of a given social unit resulting in a complete, well organized picture of that unit. Depending upon the purpose, the scope of the study may encompass an entire life cycle or only a selected

segment. It may concentrate upon a specific factor or take in the totality of element and events.

Case studies therefore differ from surveys in terms of the degree of intensity and depth of investigation. In case studies, the unit of study is thoroughly investigated taking cognisance of many variables that are important to the existence and functioning of the unit. Compare to survey study, which tends to examine a small number of variables across a large sample of units, the case study tends to examine a small number of units across a large number of units across a large number of variables and conditions.

Case studies make use of a number of data collection techniques such as questionnaires, observation, interviews, test etc. The particular technique used in a particular study depends largely on the objectives of the study.

3.4.4. Correlational Research

Correlational research seeks to investigate the extent to which variations in one factor correspond with variations in one or more other factors based on correlational coefficient. A typical correlational study seeks to provide answers to questions like: is there any relationship between years of drinking and decline in intelligence? Or relationship between a father's intelligence and his son's intelligence one cannot perform experiments to find out answers to such questions, but he can investigate such relationships.

When the relationship between variables is important to investigate, psychologists compute a statistic called correlation coefficient or index. The correlation research is an important approach, for there are many studies that do not allow for experimentation. Suppose one wants to determine how much brain injury affects speech, obviously you could not produce brain injury in your subjects for this purpose, but you could study people who already have brain injury and speech impairment.

Sometime things happen in life that cannot be duplicated but that can provide enough evidence and the correlation method can be used in these naturally occurring

experiments to interpret the results e.g. no one would manipulate people's lives for the sake of psychological knowledge but the psychologist might use correlation to study circumstances where these occur.

Correlational research is appropriate where variables are very complex and/ or do not lend themselves to the experimental method and controlled manipulation. It permits the measure of several variables and their interrelationships simultaneously and in a realistic setting. Some of its shortcomings are: it is prone to identify spurious relational patterns or elements, which have little or no reliability or validity. It only identifies what goes with what, it does not necessarily identify cause and effect relationships. It is less rigorous than the experimental approach because it exercises less control over the independent variables.

3.4.5. Ex-Post Facto Research



The Ex-post facto research basically studies phenomena after they have occurred. Sambo (2007) defined it as a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulation. Inferences about relations among variables are made without direct intervention, from concomitant variation of independent variables.

It is similar to experimental study, since it involves the investigation of relationship among variables. It differs however from the experimental study because there is no manipulation or control of the independent variables. A researcher may be interested in investigating the effect of kindergarten experience on learning outcome in secondary school. The researcher does not need to assign subjects to either kindergarten or non-kindergarten experience because the students have already passed through that experience prior to the time of the study on the basis of the type of education they received during their childhood. The unique nature of this type of

research poses a problem of classifying it as either experimental or non-experimental design.

3.4.6. Experimental Research

An experimental research is the one which allows for variables (independent) to be manipulated and their effect on some other variables (dependent) observed or measured. In an experimental study, the independent variables are assigned some values or levels and subjects are randomly assigned to these different levels. The assumption is that if differences, on a criterion measure exist between or among groups, then the observed differences are attributable to the experimental condition. Consider a case whereby a researcher is interested in finding the most effective method of teaching reading skills to primary school pupils in primary three. This may be achieved by identifying, say two teaching methods. To each of these methods the pupils may be randomly assigned. These groups are then known as treatment group or levels of the independent variable (teaching method). To find out how those in these two groups differ in terms of reading skill, an achievement test or oral examination in reading is administered. A significant difference in mean scores between the two groups gives an indication that the manipulation of the independent variable has given rise to changes in the dependent variable (reading ability).

If the experimental study is adequate, then the researcher can say with high degree of certainty that the treatment actually made a difference in the pupils' reading ability. This requirement that seeks to discover if significant differences in say, the test scores, existed across the groups is known as internal validity.

3.5 RESEARCH DESIGN

A research design is a master plan outlining the activities that will enable the research to answer the research questions. Bhattacharjee (2012), in his opinion, described research design as a process concerned with creating a blueprint of the activities to take in order to satisfactorily answer the research question identified in a research. In a

similar vein, Bryman (2016) defined research design as a framework for the generation of evidence that is chosen to answer the research question(s) in which the researcher is interested. No matter the angle from which it is viewed, it is certain that research design is about guidelines, framework or blueprint for arriving at a logical conclusion in research. Therefore, it is evidently a general plan of data collection and analysis. In summary, a research design states in detail the steps to follow in accomplishing the stated research objectives as well as appropriate strategies that could be employed in confronting challenges that might come up during the research.

Bryman (2016) identified five research designs: experimental design; cross sectional or survey design; longitudinal design; case study design and comparative design.

3.5.1 Experimental design

Experimental design gives room to the researcher to deliberately manipulate or control the independent variable or the conditions which determines the events in focus in order to determine the influence of such on the independent variable (Cohen, Manion & Morrisn, 2012; Bryman, 2016). The main aim is to test causality in other words, search for any causal links among the variables that are relevant to the research problem. Experiment can be defined as controlling an independent variable in order to see how it affects a dependent variable, and simultaneously controlling effect some extraneous variables might have on such process.

Characteristics of experimental design

- It requires rigorous management of experimental variables and conditions either by direct control/manipulation or through randomization;
- It typically uses a control group as a baseline against which to compare the group(s) receiving the experimental treatment;
- Internal validity is the *sine qua non* of research design and the first objective of experimental methodology;

- External validity is the second objective of experimental methodology. It asks the question: how representative are the findings and can the results be generalized to similar circumstances and subjects?
- In classic experimental design, all variables of concern are held constant except a single treatment variable, which is deliberately manipulated or allowed to vary; and
- Concentrate on the control of variance to maximize the variance of the variable(s) associated with the research hypotheses; to minimize the variance of extraneous or unwanted variables that might affect the experimental outcomes, but are not themselves the object of study; and to minimize the error of random variance, including so called errors of measurement.

Experimental design is a strategy for fashioning an experimental context such that a change in a dependent variable is attributable mainly to the change in an independent variable. In educational experimentation, we may have the following experimental designs according to Johnson and Christensen (2017), Bryman (2016), Cohen, Manion & Morrison (2012):

- i. The true experiment which is controlled experiment in laboratory conditions with two or more groups;
- ii. The field or quasi-experiment which is not in a laboratory but a natural setting where variables can be isolated, controlled and manipulated. It is a real world rather than a simulated world of the laboratory; and
- iii. The natural experiment which does not allow for isolation and control of variables.

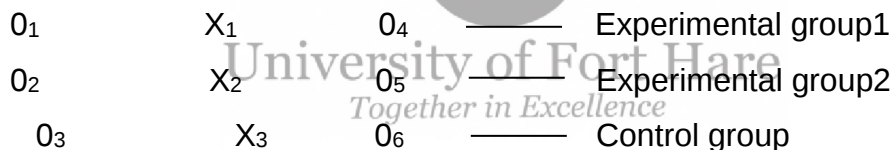
Scholars are concerned about the issue of internal validity in quasi-experimental design because random assignment is not used with it. However, they are equally of the opinion that there may be ways of addressing some of the concerns that have to do with internal validity.

This study adopted a quasi-experimental design. The study specifically made use of pre-test, post-test control group experimental design to determine the effect of service and collaborative learning strategies on students' environmental knowledge in Oyo State, Nigeria. This design was adopted for the following reasons.

1. The experiment was carried out in a school, using students in regular classroom setting (field experiment);
2. There were experimental and control groups;
3. The opportunity to manipulate variables involved in the study in order to ascertain whether there are any effects; and
4. The study tested causality.

The design is schematically presented as follows:

The study adopted a pretest-posttest control group quasi-experimental design. The design is represented schematically as follows:



Where O₁, O₂, and O₃ are pre-test measures/observations of experimental groups 1, 2 and control respectively. O₄, O₅, and O₆ are the post-test measures/observations of experimental groups 1, 2, and control respectively.

X₁ = Service learning strategy.

X₂ = Collaborative learning strategy.

X₃ = Conventional learning strategy (control).

The design adopted a 3x2x2 factorial matrix as shown in Table 4.2

Table 4.2: 3 x 2 x 2 Factorial Matrices

Treatment	Gender	School Location	
		Urban	Rural
X ₁ - Service learning	Male		
	Female		
X ₂ - Collaborative learning	Male		
	Female		
X ₃ –Conventional learning	Male		
	Female		

3.6 VARIABLES

A variable in the words of Cohen, Manion & Morrison (2012) is a construct, operationalized construct or particular property in which the researcher is interested. Johnson and Christensen (2017) described a variable as a condition or characteristics that can take on different values or categories. And Bryman (2016) saw it as an attribute on which cases vary.

Variables are expected to have two attributes. The first attribute is that variables are considered measurable. The second attribute is that the proxy variable must act as a proper indicator of the hypothetical variable which the researcher is investigating.

Types of variable include quantitative variable and categorical variable, these could be further broken down into independent variable, dependent variable, moderator variable and extraneous variable. A variable can take a value when measured, observed, or manipulated. Examples of commonly used variables are age, gender, weight, religion, height, social class, etc. A variable can take on different values, for example, gender as a variable can take on two values, that is, male or female.

There are also two classifications of variable: quantitative and categorical variables. A quantitative variable is a variable that changes in rank or amount. In the words of

Johnson and Christensen (2017), a quantitative variable involves numbers. For example, wage as a variable takes on numbers hence it is a quantitative. A categorical variable varies in type or kind, for example, gender, varies in type, that is, male or female.

The variables emphatically referred to in this study are explained below.

3.6.1 Independent variable

This is the variable that is supposed to influence the dependent variable. It is the variable the researcher determines to manipulate in a research. In an experimental research, like this study, a variable such as class size, teaching method, teacher-pupil ratio, etc. may be manipulated to examine its effect on academic performance of students. Manipulating or varying the teacher-pupil ratio may bring an improvement in the academic performance of the subjects or participants. In other words, manipulating the independent variable is expected to cause a change in the dependent variable. It may also be referred to as treatment variable. In this study the research attempts to find the effect of two teaching strategies on students' knowledge and attitude: the teaching strategies of service and collaborative learning strategies are the independent variables in this study.

The independent variables are specified in the hypotheses. Johnson and Christensen (2017) identified three ways of manipulating the independent variable:

- i. Presence or absence technique: This implies one group receives the treatment while another does not receive the treatment. For example, this study applied certain teaching strategies in teaching some classes while others were not taught using those strategies, but their performance was still measured with the same instruments.
- ii. Amount technique: This implies varying the amounts of the independent variable. For example, if you think teacher-pupil ratio affects academic performance. This manipulation would involve varying the number of pupils in the classroom.

iii. Type technique: This technique involves manipulating the type of condition presented to the participants.

This study employed the first technique as the independent variables were applied to some participants while others were excluded. The independent variables of service learning and collaborative learning strategies were used in teaching the experimental group while the control group was exempted from any of the two teaching strategies.

3.6.2 Dependent variable

A dependent variable in experimental research is a variable within the research hypotheses that depend on another variable (independent). It is presumed to be influenced by the independent variable(s), dependent variable is regarded as the presumed effect or the consequences. It is sometimes referred to as outcome variable (Johnson & Christensen, 2017; Cohen, Manion & Morrison, 2012), because it helps to measure the effect of the independent variable.

For example, in this study, knowledge is the dependent variable because it depends on the teaching strategies of service learning and collaborative learning.

3.6.3 Moderator variable

This is the variable that brings about changes in the relationship among other variables. In other words, it modifies the effects of another variable, and consequently cause statistical interaction. Moderator variables can be deliberately introduced into a study. Moderating variables are variables that have effect on which direction the relationship between independent and dependent variables take or the strength of the relationship between independent and dependent variables or act on moderating the influence of the independent variable on the dependent variables in a study (Thompson, 2006). The moderator variables in the study are *gender* and *school location*.

3.6.4 Extraneous variable

Extraneous variable is an unwanted variable that may affect the variables that are been studied. It is the variable that is different from those variables that are the focus of one's study. This variable must be taken care of in order to prevent its confounding effect on the outcome of the research. It is also referred to as confounding variable. The extraneous variables taken care of in this study are religion and socioeconomic status.

3.6.5 Variables of the Study

The following variables were involved in this study.

A. Independent Variable

There is one independent variable (instructional strategy) manipulated at three levels as follows:

1. Service learning strategy;
2. Collaborative learning strategy; and
3. Conventional Learning strategy (control).



B. Moderator Variables

Two moderator variables were involved in the study at two levels each.

1. Gender (Male and Female); and
2. School Location (Urban and rural).

C. Dependent Variables

These are:

1. Students' environmental knowledge; and
2. Students' environmental attitude.

These variables are presented diagrammatically below:

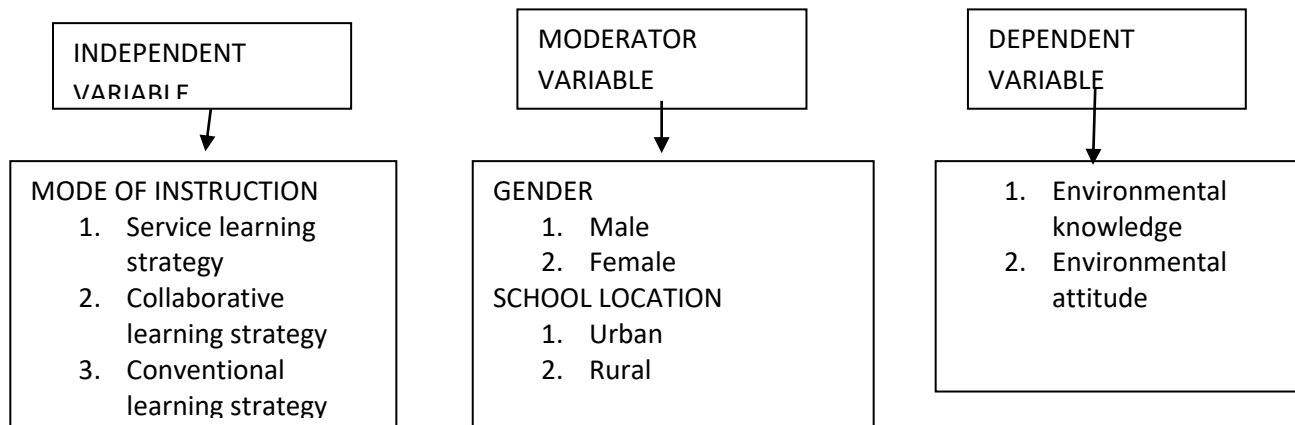


Figure 3.1: Framework of the Variables in the Study

3.7 POPULATION



Population can be described as total number of subjects in a specific area. For example, the number of people living in Queenstown. It could also be described as a collection of subjects sharing particular characteristics. For example, the total number of medical doctors in East London, they are a population within the larger population of East London residents but they share a particular characteristic (medical profession) that separate or distinguish them from the larger population. However, population in research is seen as aggregate of all elements or subjects with a specified set of one or more mutual definite attributes about which the researcher wants to generalize. An element in research refers to a single unit or member of a given population.

Research population, according to Barnerjee and Chaudhury (2010), refers to the totality of all items about which the researcher intends to draw a result. There are two types of population in research, a continuous population and a discrete population. A continuous population refers to a very large or limitless group while a discrete population refers to a specific group such as a class in a school which may be used

for study. In empirical research there is the need to specify and define the population for a study.

3.7.1 Sample and sampling techniques

Often times, there are constraints of time and money which do not allow for the whole population to be used in a study. It is therefore necessary that a sample of that population that will reasonably represent the total population be selected. This process of sampling involves firstly defining the population, and choosing a sample from the population defined and making statistical inference. Sample is a set or actual units taken from a larger population which a researcher can reasonably work with. A sample is a part of the study population that typifies that population (Babbie 2013). A sample is advisable for purpose of feasibility (Latham, 2007).

It is therefore essential that one should be meticulous when choosing a sample so as to make it a representative of the population. That is, the sample should reflect the characteristics of the elements of the defined population. Latham (2007) said this is necessary because the population might be too large. The larger the sample size the more accurate the generalization to the population (Sanders, Lewis & Thornhill, 2009). Burns and Bush (2010) in the same tone stated that the sample size in a study has considerable effect on how the sample findings precisely portray the population of that study.

Hammed and Popoola (2007) identified five stages in sampling process, these are

- i. Definition of study population;
- ii. Specification of a sampling frame. That is, a list of all the elements from which the researcher pulls the sample;
- iii. Sampling and data collection;
- iv. Specification of sampling method for selecting items or events from the frame; and

v. Review of sampling process.

There are two approaches to sampling under which fall different sampling techniques. The two are probability and non-probability sampling.

3.7.2 Probability sampling

Probability sampling refers to the possibility that each unit in the study population can be selected in the sample. Sanni (2011) noted that in most situation the possibility of selecting one is equal to the possibility of selecting any other unit. Probability sampling allows the researcher to make inferences from information which is about a random sample to the study population from which it is drawn. That is, generalization can be made to the population from the sample. The various probability sampling techniques are simple random sampling, systematic sampling, systematic sampling, stratified random sampling and multi-stage sampling. With probability sampling we can generalize finding derive from a sample.

3.7.3 Non-probability sampling

This is simply the opposite of probability sampling. It refers to all forms of sampling that are not according to the principles of probability sampling. The sampling techniques here include convenience sampling, snowball sampling, quota sampling and purposive sampling. Babbie (2010) and Latham (2007) agree to the appropriateness of non-probability sampling when the study focus is just to answer a particular research question.

3.7.4 Probability sampling techniques

3.7.5.1 Simple random sampling

This technique allows all possible elements of a population to have a chance of being selected as part of the sample. It can be referred to as the most basic probability sampling technique, and it is also called the cornerstone of sampling theory (Ogundipe, Lucas & Sanni, 2007). It is about selecting participants or respondents from a sampling frame

The key steps in devising simple random samples are outlined by Bryman (2016):

- i. Define the population;
- ii. Devise a sampling frame that is comprehensive;
- iii. Decide the sample size;
- iv. List all the units in the population and assign them consecutive from 1 to 'N';
- v. With a table of random numbers, select the quantity 'n' that corresponds to your pre-determined sample size; and
- vi. The units to which the 'n' random numbers refer make up the sample.

In simple random sampling, there is little or no room for human bias, as the selection is not based on subjective criteria. The inferences are highly generalizable more than other sampling techniques. However, this technique is not advisable where there is a large population because the selection process maybe cumbersome, burdensome, and time and energy consuming.

3.7.5.2 Systematic random sampling

For the fact that simple random sampling may become expensive and difficulty in obtaining list if the population is large, a researcher may use systematic random sampling. Systematic random sampling is sometimes referred to as interval sampling because of the interval involved in selection. In this technique, elements are selected at interval from the sample frame. Systematic random sampling usually begins with a random start and thereafter selection is made at interval.

The strategy is to select items for inclusion in the sample, this is obtained by dividing the study population (N) by the sample size which gives the item to be selected (Kth), $Kth = N/n$. assuming we are to select 200 elements from a population of 4000. Going by the formula $Kth = N/n$, the interval for selection will be $Kth = 4000/200$ therefore $Kth = 20$. This means we would make a random start between 1 and 20, and thereafter pick every 20th item until we have the 200 elements/items.

This sampling is often employed in industries where they select items from production lines for the purpose of quality control and assurance. Systematic sampling is useful if the list of the study population is available to the researcher. Systematic random sampling erases overrepresentation. In addition, it is easier than simple random sampling when a large sample size is involved.

3.7.5.3 Stratified random sampling

This is one of the techniques in probability sampling. This technique allows for heterogeneous population or heterogeneous sample frame to be divided into homogeneous subgroups (strata) with no overlapping significant attributes/characteristics. Ogundipe, Lucas and Sanni (2007) asserted that when there is heterogeneity in a population it might be essential to stratify by division into a set of mutually exclusive subpopulations or strata. These strata could be academic qualification, social status, sex, race, and religion. Anemie Vos et.al (2011) opined that this technique is suitable for heterogeneous population as it allows for adequate representation of all subgroups. For example, if a sample size of 200 is to be taken from a sample frame of 4000 that consists of four strata of 700,1300,1100 and 900, The researcher may decide to select the sample size using either proportional stratified or non-proportional stratified sampling. If the proportional method is selected it will go thus:

Subgroup 1. $700/4000 \times 200 = 35$

Subgroup2. $1300/4000 \times 200 = 65$

Subgroup 3. $1100/4000 \times 200 = 55$

Subgroup 4. $900/4000 \times 200 = 45$

The proportional selection will give $35+65+55+45 = 200$ sample size. It is proportional because all the subgroups are proportionally represented. It is believed to be a little more efficient than simple random sampling.

In a non-proportional or disproportionate sample, the number of elements chosen from each subgroup is disproportionate to its size in the sample frame. Going by the previous sample frame given, selecting 200 from the four strata of 700, 1300, 1100 and 900 requires that one divides the sample size by the number of strata $200/4 = 50$. This means 50 elements are selected from each stratum or sub-group, irrespective of the size of each stratum or subgroup. What this portends is that the stratum with the least size has more representatives, in practice, than the largest stratum.

Stratified sampling ensures that the sample is representative of the population. Stratified sampling is possible when data available allow ready identification of elements of the population in terms of the criteria.

3.7.5.4 Multistage sampling

Simple random sampling, systematic random sampling and stratified sampling can be combined to conduct multi-stage sampling. Ogundipe, Lucas and Sanni (2007) advised that when a population is largely heterogeneous and developing a sample frame of individual element is difficult it might be expedient to select random samples in stages. In a situation where a large population is involved in a study, it may be difficult and expensive to identify every sampling unit therefore, multistage sampling may be more appropriate. Multistage sampling is a probability sampling technique where the entire population is divided into clusters, then a random sample is drawn of these clusters using stratified sampling and so on.

Just as the name implies, multistage sampling is a melting pot of probability sampling techniques, the sampling is done in stages till all the samples involved in the study are represented. This technique can help reduce the cost of sampling a population that is scattered across a wide geographical area because it is cheap and easy economical technique of collecting data. In this technique, the total study population is subjected to groupings that is divided into a series of relatively small subgroups that are also clusters of smaller groups. For example a researcher considering a city might divide the city into districts within the city at the first stage, progressing to the next stage, the

researcher might randomly select some schools from the selected districts and finally randomly select some students within the selected schools.

This technique is mostly used by those taking opinion polls or those in market research. It is a subjective technique of selecting samples from a given population. In quota sampling, the study population is divided into mutually exclusive subgroup, and then the researcher determines the number of elements that should be in each group, and then goes ahead selecting a convenience sample of members for each of the groups (Johnson & Christensen, 2017). Often times, in this technique, the population of interest is great and there are no pre-determined lists of names available from which the researcher might pick randomly.

In quota sampling, it is difficult to estimate population parameters and sampling errors with statistical procedure developed based on random sampling. The two types of quota sampling are identifiable, proportional and non-proportional quota sampling. Main characteristics of the population are sampled through a proportion in proportional sampling. However, non-proportional quota sampling is a little bit less restrictive because it does not emphasize proportional representation as long as it meets a minimum size in each of the subgroups.

Sambo (2007) asserted that non-proportional quota sampling may be useful because it gives room for capturing the opinions of small and underrepresented groups by oversampling.

3.7.5.5 Convenience sampling

Convenience sampling is also known as either accidental sampling or availability sampling. This technique affords the researcher the opportunity to include in their sample people who are at hand, readily available or convenient to recruit and also volunteer to take part in the research. For instance, a researcher may stand outside a lecture theatre in a University and hand out questionnaire to students who walk in or even decide to interview them as they walk in or out, the sample obtained in this kind

of situation is a convenience sample. This is a non-probability sample because the researcher has excluded all students who belong to other faculties or those who do not have classes at that moment.

Technically speaking, it is not advisable to generalize to a population from convenience sample. Kerlinger and Lee (2007) warned that convenience sampling technique should be avoided when conducting a study except when there is no other random sampling technique that is more suitable for the study. Although practical constraints may push a researcher to use convenience sample, it may be used for pilot testing, because the goal is likely to test instrument or validating measurement rather than making generalization from inference. It is of note that it is practically not easy to estimate population parameters and sampling errors with statistical procedures developed on the basis of random sampling when using convenience sampling in education research.



3.7.5.6 Snowball sampling

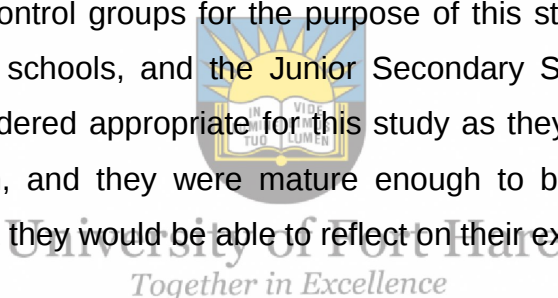
In this technique, a researcher first identifies few participants for inclusion in the study, and the participants are asked to identify others that may meet the selection criteria. As each participant suggests another that may be interested in the study and also fit in the sample becomes larger, this technique may prove useful in reaching the hard-to-reach populations.

3.7.5.7 Purposive sampling

Purposive sampling is sometimes referred to as judgmental sampling. In this technique, the researcher only selects a group of people that meet the pre-defined criteria. Sambo (2017) said that this is a technique often used in place of random sampling to select a sample that will be representative as long as there are certain known characteristics of the population. For example, a researcher may be interested in investigating political education as a determinant of political participation among university students. The researcher is definitely looking for students who have been exposed to political education. Just like other non-random sampling techniques, it

shares their limitations. Generalizing from a sample to a population based on single research, according to Jonson and Christensen (2017), is severely limited.

The target population for this study comprised all Junior Secondary School Students in Ibadan, the capital of Oyo State. Multi-stage sampling technique was employed. Stratified sampling was used to select two (2) local government areas out of eleven local government areas in Ibadan; one each from urban and rural areas. Six (6) secondary schools that are co-educational from Ibadan were purposively selected based on presence of environmental challenges in their immediate environment. These are three (3) schools from Ibadan city (urban area of Ibadan) and three (3) from Ibadan less city (rural area of Ibadan). The schools have to be co-educational to ensure that the treatments are applied simultaneously to both genders (male/female) under the same condition. The sample schools would be randomly assigned to experimental and control groups for the purpose of this study. The intact class were employed in these schools, and the Junior Secondary School 2 students in these schools were considered appropriate for this study as they are not preparing for any unified examination, and they were mature enough to be taken out of the school environment so that they would be able to reflect on their experiences.



3.7.6 Environmental concepts

In a survey carried out by Fafioye and John-Dewole (2013), it was revealed that Ibadan and its environs were facing series of environmental degradation, this finding corroborates the works of Venass and Doris (2006) and Adu, Olatundun and Oshati (2014). Despite various efforts made by individuals and government problems still exist. Such issues and problems were re-examined in the study in relation to Junior Secondary School 2 Social studies to include:.

1. Human Environment: natural and human-made;
2. Types of resources: renewable and non- renewable; and

3. Environmental problems (Natural and Man-made) flooding, soil erosion, deforestation and pollution.

3.8 Research instruments.

The following five research instruments were used for the study

1. Environmental Knowledge Test (EKT);
2. Environmental Attitude Questionnaire (EAQ);
3. Service Learning Guide (SLG);
4. Collaborative Learning Guide (CLG); and
5. Conventional Learning Guide (CLG).

3.8.1 Environmental Knowledge Test (EKT)

This is a 20-item multiple choice test adapted from Venas and Doris (2006). It was adapted to make it suitable for the Junior Secondary School students. Each item has four options with only one option being the correct option. The instrument consists of two sections. Section A contains the demographic data such as gender and location of the respondent's school. Section B was used to measure the level of environmental knowledge possess by the pupils. Test content covered the environmental concepts in the study at the three levels of cognitive domain of remembering, understanding and application. The EKT was graded by allotting one (1) mark to each correct option selected.

3.8.1.1 Validity and reliability of EKT

The Environmental Knowledge Test was validated by the test developer. And to ensure that the instrument maintained its status, it was further subjected to re-validation using peer review before it was presented to the researcher's supervisor for necessary adjustment. The various suggestions given to the researcher were used to modify the

test items appropriately. The internal consistency reliability measure was calculated using Kuder-Richardson 20 (KR-20). The KR-20 value of 0.76 was obtained.

3.8.2 Environmental Attitude Questionnaire (EAQ)

The Environmental Attitude Questionnaire was adapted from the environmental attitude scale developed by George Street Research Limited (2006) to measure necessary environmental attitudes. The instrument was divided into two sections. Section A was made up of the personal data such as gender, school location of the respondents. Part B has 25 item questions used to assess the participants' attitude to environmental issues. The items were arranged in a four option Likert scale of 'Strongly Agree' (SA), 'Agree' (A), 'Disagree' (D) and Strongly Disagreed (SD).

3.8.2.1 Validity and reliability of Environmental Attitude Questionnaire

Environmental Attitude Scale, which was validated by the researcher. In order to further ensure the instrument's content validity, it was subjected to peer-review before it was forwarded to the research supervisor for final input. The input made by the researcher was used to modify the instrument appropriately. The internal consistency reliability measure was calculated using Cronbach alpha. The Cronbach alpha value of 0.85 was obtained.

3.8.3 Service Learning Guide (SLG)

SLG was prepared using Kristine and Elizabeth's model (Kristine & Elizabeth, 2007), which touched the eight key elements of successful service learning projects: Engaged participation, Collaboration, Integration, Preparation, Action, Reflection, Evaluation and Celebration. The guide was used to sensitize and enlightened the teachers on what was expected of them at each period.

3.8.4. Collaborative Learning Guide (CLG)

The preparation of copies of instructional guide for collaborative learning strategy (CLG) was guided by the 9-Year basic education curriculum (Social Studies) for Junior Secondary 1-3 by Nigerian Educational, Research and Development Council

(NERDC) and Universal Basic Education Commission (UBEC) given to the supervisor of this study as well as lecturers in the field of Social Studies as a result of their vast knowledge in the subject area.

3.8.5 Conventional Instructional Strategy Guide

This was developed in line with common classroom teaching, which is a teacher-centered approach; it focuses more on the teacher and his activities in the classroom, where the learners are only passive receivers of the teacher's information.

- The teacher introduces the concept;
- The teacher discusses facts or idea on the concepts in steps;
- The teacher gives notes on the concepts;
- The teacher ask questions; and
- The teacher gives assignment to students.



3.8.6 Validity and Reliability

3.8.6.1 Validity

Validity refers to the extent to which an indicator designed to measure a concept measures and performs what it is designed to do (Johnson & Christensen, 2017; Bryman, 2016; Babbie, 2012; Sanni, 2011). A researcher determines the validity of an instrument by subjecting it to certain procedures which enables him/her to check for accuracy of research findings (Adefioye, 2015). A research instrument is said to be valid when the instrument is accurate, authentic, sound and truthful, that is to say it measures what it is designed to measure. It is also the extent to which it can be said that the result of a measurement accurately reflects the conceptual variables under investigation.

The instrument for this study was validated by giving a draft copy to the supervisor and other experts in the field of research studies for their perusal and necessary corrections. The content validity was ensured by pilot-testing the research instruments. After validation, the instrument was subjected to pilot-testing to establish its reliability. Validity is the extent to which an instrument measures what it is supposed to measure.

According to Ogundipe, Lucas and Sanni (2007), a test can be considered valid if it successfully measures what it claims to be measuring. Validity is simply an evidence of the relationship that exists between the data collected from an instrument and the reason for which the test was actually designed. An instrument designed to measure listening skill should measure listening skill only, and should not measure other things like reading skill or spelling skill. Talking about a standardized test, in order to ensure its validity there is the need to ask and answer the following questions:

- What does the test measure?
- Does it, in fact, measure what it is supposed to measure?
- How well, how comprehensively, and how accurately does it measure what it supposed to measure?

Validity invariably considers the end results of measurement.

Validation of an instrument has to do with the collection and analysis of data which will enable someone to assess the accuracy of that instrument. Numerous statistical tests and measures abound to assess the validity of quantitative instruments, which generally involves pilot testing.

Internal validity is basically about the independence from bias in forming conclusions about the data. The internal validity of an instrument is the nearness to the truth about inferences drawn regarding causal relationship; this is why internal validity is very relevant in research studies with the aim of establishing a causal relationship. The internal validity tries to establish the fact that there is evidence that what was done in the study caused what the researcher observed. In other words, it attempts to establish that the changes in the dependent variables are as a consequence of the influence of the independent variable, and not because of the way in which the research was designed. If internal validity is increased, external validity is reduced.

External validity is about generalizing. It is the extent to which the conclusions in a research can be generalized to other persons in other places at all times. That is, can

the conclusions drawn be generalized to other cases elsewhere? Three major threats to external validity are people, places or times. It is advisable that the researcher draws his/her sample carefully from the population with the aid of random sampling technique in order to solve the problems of external validity

3.8.6.2 Types of Validity

There are several ways of testing measurement validity. They are here referred to as types of validity, and are identified and discussed below:

3.8.6.3 Face Validity

A researcher should ensure that his/her measure have face validity, at least. Face validity talks about how appropriate a measure is in terms of its overall outlook as well as the apparent appearance of the face value of a measurement procedure (Vos et al., 2011; Babie, 2010). The purpose of face validity is to show that the test meets the expectation of the user. Face validity of an instrument is better established by experts in that field (Kraska-Miller, 2014); the researcher might ask other people for their input on whether the measure is really focusing on the concept, and this is best done by an expert in that field. Essentially, face validity is about what a test appears to measure. Therefore, a researcher must ensure that his/her instrument is measuring what it is supposed to measure, and that the sample been measured is adequate or representative of the trait been measured. Bryman (2016) called it an intuitive procedure.

3.8.6.4 Content Validity

Babie (2007) made it clear that the extent to which items in an instrument deals with or reflects everything about the concepts in a universe. In other words, content validity refers to the accuracy with which an instrument measures the factors been investigated. The researcher intentionally focuses on the opinion and evaluation done by experts in the topic area on the validity of the measure.

An instrument with items that only reflect few content areas neglecting others may be regarded as not valid. The essence of content validity is to reflect how a test adequately covers the domains of a subject it is meant for. This type of validity demands that the instrument must show that it fairly and comprehensively has coverage of items it claims to cover. Just like face validity, an expert opinion may be employed to assess content validity of constructs (Bhattacharjee, 2012).

3.8.6.5 Criterion Validity

Criterion validity has to do with whether a particular measure connects well with a current or future criterion. It is a way of predicting accurately on based on the result of a new test. Another name for criterion-related validity is predictive validity. According to Thatcher (2010), predictive validity implies the extent to which data obtained from an instrument predicts future events or performance. A good example is the use of Matric exam in South Africa to predict academic success of students in the university. The researcher is expected to identify a relevant criterion or standard that would be reliable and valid in providing an independent verification of the new instrument. The main purpose is to establish how fine the test will work when it is used to determine success or otherwise of an instrument. The data of the measuring instrument should correlate highly with equivalent data of the criterion. It is very good especially for aptitude testing.

3.8.6.6 Construct Validity

Some experts advise that the researcher should estimate the construct validity of a measure also. Construct validity refers to the extent to which a research instrument measures a theoretical concept or construct that is been investigated (Sanni, 2011; Vos et al., 2011). Constructs are human traits and they are about attitude, anxiety, honesty, motivation, intelligence, creativity and self-concept, prejudice, and conformity to mention just a few. It is the degree to which a test actually describes an individual in terms of a specific human attribute. Construct validity is complex and difficult to determine (Babbie, 2007). For example, a test expert may be interested in classifying

students into honest and dishonest groups. If the expert succeeds in describing the subjects with respect to the construct honesty, with the aid of an instrument, it therefore implies that the construct honesty really exists. The use of correlation with other instruments such as factor analysis and internal consistency methods are means of obtaining evidence of construct validity. Essentially, construct validity is about psychological qualities an instrument measures, and it is evaluated by demonstrating that certain explanatory constructs account to some extent for outcome on the instrument.

So far, the researcher has discussed face, content, criterion (predictive) and construct validity that involves a systematic process in which each builds on the other because each one requires more detailed information than the previous ones. Following this, the meaning of reliability, and methods of estimating the reliability of an instrument will be explained. In a quantitative research such as this, both the validity and reliability of the test instrument must be ensured to give credence to the quality of the research work, hence the need to explain the two concepts clearly.

3.8.7 Reliability

The term *reliability* refers to the degree of consistency between two sets of data or observations obtained with the same instrument or equivalent forms of the instrument (Sanni, 2011; Akinsola & Ogunleye, 2004; Isangedighi et al., 2004). Simply put, reliability is all about the level to which the measure of a construct is consistent or reliable. In determining the reliability of an instrument one may ask this question. Do the measurement procedures assign the same value to characteristics each time it is measured under essentially the same circumstances? Reliability occurs when an instrument is able to measure the same thing over and over and also produces the same result.

An instrument can be said to be reliable if it is consistent in measurement under different conditions each time it is applied except when the variables are changed.

Reliability indicates consistency and not accuracy. A weight scale is expected to give the same measurement of an object provided the object has not been tampered with between the measurement. Nonetheless, if either the scale or the object has been tampered with the issue of consistency may no longer be possible. Therefore, the result of a research is reliable if the same results are got in similar situations but under different circumstances.

Babbie (2012) argued that reliability is the degree of consistency shown by an instrument when it is repeatedly used, and it gives the same result every time it is used.

In order to increase the reliability of instruments, the following procedures are suggested by Vos et al. (2011):

- i) The number of items or observations must be increased;
- ii) Remove ambiguous items;
- iii) Increase the level of instruments or measurement;
- iv) Use standard conditions for the test;
- v) Maintain a moderate difficulty level for the instrument;
- vi) Reduce external influence;
- vii) Instructions must be standard;
- vii) Consistent scoring techniques must be followed; and
- viii) Pilot test the instrument (Vos et al., 2011, p.177).

3.8.7.1 Methods of estimating reliability

The following five methods of used in estimating reliability, as enumerated below, are explained purposely for this research work.

3.8.7.2 Test-Retest reliability

In a test-retest reliability method, it is expected that an instrument is administered twice to the same subjects at different times within some time interval. The interval depends on the researcher and could be as short as one day and as long as two weeks (Cohen, Manion & Morrison, 2012). An appropriate interval will depend on the type of instrument as well as the purpose for which the test has been designed. A too long interval may create unpleasant chance of having two different observations due to random error. Test-retest reliability is also referred to as a measure of consistency between two measurements of similar construct conducted on the same sample at two different points in time (Bhattacharjee, 2012). The correlation in measured between both tests is an estimate of test-retest reliability. The correlation of outcomes in the two tests conducted will give a measure of how reliable the instrument is.



3.8.7.3 Split-Half Reliability

The split-half reliability method dictates that results are divided into halves (sub sets) and compared to see if the results are similar either on the basis that one subset contains all even number items and other subset odd number items (Cohen, Manion and Morrison, 2012; Sanni, 2011; Akinsola & Ogunleye, 2004).

For instance, if you have 20 items, the first half of the items can be regarded as one subset and the second half as another subset; items 1-10 are taken as the first subset, while items 11-20 are the second equivalent subset. Each of the halved subset measurement is scored independently. This enables the researcher to produce two equal halves from one instrument, which are independently scored and then the results correlated to obtain an index of its reliability.

3.8.7.4 Equivalence form Reliability

Equivalence form reliability is also known as the alternate or parallel form. In this method of reliability, two equivalent instruments are administered to the same subjects

at immediately after one another (Cohen, Manion & Morrison, 2012). The two instruments are based on the same content but are not the same although they measure the same thing. The two results obtained from the two administrations are correlated to obtain an index of its reliability.

3.8.7.5 Internal Consistency Reliability

Internal consistency reliability refers to a measure of consistency which is present between different items that have the same construct. The relationship between each item and the whole instrument is determined. Instruments used in determining this include the Kuder-Richardson formula (KR 20-21) and Cronbach coefficient alpha.

(a) Kuder-Richardson: This formula was developed in 1937 by Kuder and Richardson. It employs the use of psychometric data obtained from one test administration (Isangedighi et al., 2004). It is assumed that items in the instrument are similar and therefore contain inter-item consistency. One formulae, KR-20, provides the mean of all possible split-half coefficients, while the second formulae, KR-21, may be substituted for KR-20, if it can be assumed that item difficulty levels are very similar.



(b) Cronbach coefficient alpha method: The Cronbach coefficient alpha was developed in 1951 by Lee Cronbach. This formula was developed from a previous internal consistency formula credited to F. Kuder and Richardson. Cronbach coefficient alpha reveals the extent to which the items are interrelated.

It is assumed that items requiring responses such as "strongly agree", "agree", "disagree" and "strongly disagree" do not align with the regular right or wrong pattern, and so coding may be difficult. For example, for all positively worded items, the "strongly agree" response may attract 4 points, 3 points for "agree", while 2 and 1 respectively are scores for "disagree" and "strongly disagree".

The scoring order is reversed for all negatively worded items (Cohen et al., 2012). Instruments with such negatively worded items used Cronbach's alpha as a measure

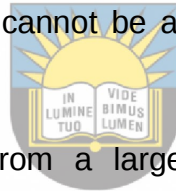
of reliability. Conclusively, an instrument may be reliable but not valid for the purpose intended since an instrument may be consistent, even if it measures the wrong thing, but a valid instrument is reliable. Coefficient alpha strength lies in its versatility.

This study ensured reliability of the data collection instruments through the employment of test-retest and Cronbach's alpha.

Questionnaire

The questionnaire is a powerful evaluation tool in behavioural sciences. If well designed, it can be a very reliable, veritable and optional tool:

- a. To complement facts emanating from either diagnosis or clinical findings;
- b. To validate the authenticity of a statement, findings for generalization etc;
- c. When rigorous experimentation cannot be adopted (i.e. intervention studies are not needed);
- d. When information is needed from a large audience or participants to facilitate statistical analysis of results from opinion survey; and
- e. To correlate performance and perhaps, satisfaction with a test system among different group of users especially if the questionnaire has sections on demographic questions about the participants;
- f. If the issues do not concern internal but external validity;
- g. Necessary for testing hypotheses (statistical hunches) to establish the continuous relevance of a theory;
- h. To corroborate other findings;
- i. When both resources and time are inadequate;
- j. To protect the identity or privacy of the respondents (participants);



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Although, a well-designed questionnaire can be ascertained to possess clearly stated goal and purpose, it can either be open-ended type and/or closed-ended questions.

The open-ended type of questionnaire:

As its name implies, the open-ended format constitute the unrestricted and sometimes endless views or opinions of a respondent or group of participants in a study expressed in the space provided in the questionnaire. The open-ended items are used when the researcher either want s the respondents to respond in their own words and, or when the research does not know all of the possible alternative responses. The open-format can, additionally, provide the researcher the opportunity for correcting an already ingrained beliefs in the respondents by way of intervention studies. In open-ended questions, there are no pre-determined set of responses and participants are free to answer in what manner they chose. It easily provides a rich opportunity for wide variety of responses.



The closed-ended format:

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The closed-ended items are used when there are a fixed number of alternative responses. In adopting this format, the respondents are asked to select an answer from among a list provided by the researcher. In survey studies especially, the closed-ended questions (or question-statements) are particularly popular because they provide a greater uniformity of responses and are also easily processed. Unlike the open-ended, the responses from survey utilizing closed-ended questions are easily transferred directly into the computer format for analysis. The ease with which information from the closed- ended format are utilized facilitates the usage of the fixed response format called the Likert scale.

Likert scales are lists of statements on which respondents indicate whether they "strongly agree ' agree, "disagree", or strongly disagree". Structured fixed-response items are favourably adopted when the question has a fixed number of responses and the participant (or respondent) is to choose the one closest to the right one. The

closed-ended format has the advantage of simplifying the respondent's tasks as well as the researcher's analysis of results.

Example of closed-ended and open-ended questions

Closed-ended (Likert-type scale)

A. As the current Dean of Faculty, how happy are you with your position?

1. Very happy.
2. Moderately happy
3. Cannot say
4. Moderately unhappy
5. Very unhappy



Closed-ended:

A. On an average, how many abstracts of thesis for doctoral students does your faculty take to the Postgraduate School Executive Committee meetings?

- (i) 1 to 3
- (ii) 4 to 6
- (iii) 7 to 9
- (iv) 10 to 12
- (v) 13 to 15
- (vi) More than 15 including conversion cases
- (vii) More than 15 excluding conversion cases

B. Would you characterize your achievement as:

- (i) Too bad
- (ii) Bad
- (iii) About good
- (iv) Good
- (v) Excellent

Open ended:

- A. How would you describe the outcome of each meeting at your faculty?
- B. What is your opinion about corporal punishment in schools?



Pitfalls in Questionnaire Construction

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Whether the goal (objectives) of a well-designed questionnaire is known and adequately stated or not, there are some obvious and non-easily avoidable pitfalls when it is used. Such pitfalls are usually the result of the type of format (i.e. open-ended and closed-ended) adopted in the construction of its items. Whenever the open-ended format is followed, the likely pitfalls of these are:

- a. The composition of the items which demand that the responses following them must be read individually may not be after all.
- b. There may be no easy way to automatically tabulate or perform statistical analysis on the items.
- c. The interpretation of the items may demand some special skills which the researcher may not possess.

- d. The item-response may be the subject of multiple interpretations as no two people will read and interpret any information the same way.
- e. Both the time and money as well as other resources needed for its successful completion may be in inadequate supply.
- f. The type of information expected by the researcher may be too tasking on the part of the respondents. If the item-statements are too loaded and many, the chances that several items may be returned unattended could be high.
- g. Interpretation can also be researcher's bias.
- h. Very irrelevant and incoherent responses can be provided by the respondents which may be outside the scope of the researchers' intention.

Pitfalls using the closed-ended format

These include:

- a. Restriction in terms of the information that can be provided by the respondents on a particular subject-matter when the researcher structures the responses.
- b. The researcher's failure to use another category labeled as other (please specify.....) in opinion survey.
- c. The answer or response categories may not be mutually exclusive. In ensuring that answers are mutually exclusive, the researcher should carefully consider each combination of categories to avoid more than one answer. This can be effectively done by providing useful instruction to the question asking the respondent to select the one best answer.

Critical variables to questionnaire construction

Questionnaire design is a long process that demands careful attention. Though a questionnaire is only as good as the questions it contains, there are certain guidelines

(otherwise, variables) that must be met before any questionnaire can be regarded as a sound research tool. Some of these are:

- a. Clarity: The major hurdle in questionnaire design is on how to make it clear and understandable to all. For any questionnaire to be relevant, it must be clear, succinct, and stated in an unambiguous manner. When items in a questionnaire are well stated, the aim is to eliminate the chance that the question will mean different things to different people. As part of clarity, colloquial or ethnic expressions that may not be equally understood by all the participants should be avoided.
- b. Avoidance of double-barreled questions
- c. Asking leading questions.
- d. Short items rather than clumsy statements.
- e. Use of appropriate phrases.
- f. Avoid embarrassing and hypothetical questions as well as biased items.



3.9 Research procedure

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This study covered a period of ten (10) weeks. The outline of activities for the period is given below:

Table 3.3: Field activities

S/N	WEEK	RESEARCH ACTIVITIES
1	1 st & 2 nd week (2weeks)	- Selection and training of Research Assistants. - Selection of schools - Categorization of schools into experimental and control groups - Random selection of students - Selection and training of teachers
2	3 rd week	Administration of pre-test to the experimental and

	(1week)	control groups
3	4 th -9 th week (6weeks)	Provision of treatment to experimental and control groups
4	10 th week (1week)	Administration of post-test to the experimental and control groups
TOTAL	10 WEEKS	

3.8.1 Procedure for Experimental Group 1: Service Learning Instructional Strategy

Phase 1: Preparation

Attendance of students was taken at the beginning of every teaching session. All students received briefing. The steps involved in this strategy were as follows:

Step I: The teacher guides students to link the concept with environmental issue in their community.

Step II: The teacher guides the students to mention the areas experiencing environmental issues for the study, the student's personal observation.

Step III: student discuss the causes of the environmental problems such as causes of pollution, erosion, problem of waste disposal in the community.

Step VI: The teacher guides students to discover the importance of solving the identified environmental problems in the community.

Step VII: Students decide on what they would do to solve the problem (services to perform).

Phase 2: Action

Step1: The teacher assisted the students to organize the project themselves and develop a work plan. The work plan involved initial action steps to begin the work; set a realistic timeline for getting the work done, set goals for the project and how to do it.

Step II: The facilitator guided student to develop pre-reflection activities whereby pupils thought about what they would gain in solving the problem before engaging in it.

Step III: The students carried out service such as making sand bags, planting trees to control erosion, picking litter and so on.

Phase 3: Reflection

The facilitators provided structured time for students to think, talk and write about what they did and observed during the service activity.

Phase 4: Demonstration/ Celebration

The students organized presentations on what they have learnt and how the project affected them.



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3.8.2 Experimental Group 2 (Collaborative Learning Strategy)

Attendance of students was taken at the beginning of every teaching session. All students received briefing. The steps involved in this strategy were as follows:

Presentation –

Step I: The teacher discusses the relevant concepts.

Step II: The class was divided into groups and teacher/facilitator leads the students in class discussion to identify the areas experiencing environmental issues for the study and the students' personal observation.

Step III: Students were guided in identifying major situations facing their communities and the country in general.

Step IV: Each group was given tasks/questions to deliberate upon and share their ideas, experience, interest and knowledge on the environmental challenges around them.

Step V: The teacher explained the importance of collaborative learning to solving environmental issues (cooperation, unity, mutual trust, inter-personal relationship).

Summary: The teacher summarized the lesson by highlighting important points after groups presented their submissions.

Evaluation: The teacher asked a number of questions from the students on the concepts treated.

3.8.3 Control Group – Conventional Learning Strategy (CLS)

Attendance of students was taken at the beginning of every teaching session. Steps involved were:

Step I: Teacher introduced the lesson of the day.

Step II: Students were asked to mention various issues and problems relating to the concepts of the environment.

Step III: Teacher taught the lesson and called for students' participation.

Step IV: Teacher talked, wrote on the board and dictated notes to the students who made little or no contribution to the lesson.

Step V: Teacher evaluated the students to ascertain achievement.

Step VI: Teacher rounded off the lesson.

3.10 GENERAL DATA COLLECTION PROCEDURE

The researcher sought permission from the Ministry of Education and from the principals of the schools used for this study with the ethical clearance certificate letter from the University Research and Ethics Committee (UREC) of the University of Fort Hare, South Africa as a research student. Teachers and students whose school met

conditions for participation in the study were given orientation before the commencement of the field work.

3.10.1. Pre-Experimental Activities

The researcher selected and trained twelve (12) undergraduates as research assistants. The research assistants were trained on the nature and purpose of the research. They were informed where their assistance would be needed during the course of the study. Some of these areas included the administration of pre-test and post-test, arrangement of students into the classrooms and rendering assistance to both the facilitators of the experimental groups as well as the teachers of the control groups.

Thereafter, the researcher visited the schools that were randomly selected for the study. The researcher obtained the approval from Ministry of Education and principals of schools that were selected. Six (6) schools were selected from two local governments in Ibadan. That translates to three (3) schools from each local government, one (1) local government in urban and another one (1) in the rural area. Three (3) of the schools were randomly assigned to the experimental group while the other three (3) schools were randomly assigned to control group. Simple random sampling was adopted to select intact classes that participated in each school. This was followed by the recruitment and orientation/training of the facilitators and teachers involved in the study for both control and experimental schools.

Recruitments and Training of participating Facilitators and Teachers

Facilitators were recruited from tertiary institutions in the state with relevant discipline to the concepts under study, in the same vein; the participating teachers were recruited based on their teaching subjects, willingness and readiness to participate in the study. In all the schools involved, social studies and civic education teachers were recruited for the study. The qualifications of all the teachers appointed were Bachelor of Education. The researcher trained the teachers in their respective schools.

Group 1: Participating Facilitators in the Experimental Schools. The nature and purpose of the research were explained to the facilitators in the experimental schools. The highlights of the weekly activities that were to be carried out and the extent of their involvement were discussed with them. They were also allowed to ask questions and offer suggestions on how best the participatory activities could successfully be carried out in their schools.

Group 2: Participating Teachers in the Control Schools. These teachers were not actually trained. They were informed to use conventional teaching method guide to teach topics in the lesson plan which has been designed by the researcher and given to them. However, each lesson, for five weeks, was discussed with the teachers to ensure that they do not stray from the content to be taught.

Administration of pre-test

A preliminary quantitative survey of the prevailing knowledge and attitude of the students to voter and political issues was carried out at the three experimental and three control schools before the commencement of the activities by administering the pretest. The administration of the pre-test was carried out using the instruments designed for the study.

C. The Main Treatment

The researcher, facilitators, participating teachers and students in both the control and experimental schools were involved in specific activities for the next five weeks.

Control Schools

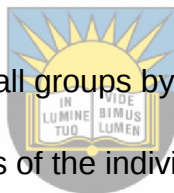
Using the conventional teaching method guide the participating teachers in each control school taught the students that were selected for the study. The concepts were taught using the conventional teaching method for a period of five weeks in each control schools. The conventional teaching method used provided for:

- Teacher introducing the concepts;

- Teacher discussing facts or ideas on the concepts;
- Teacher giving notes on the concepts;
- Teacher asks questions; and
- Teacher gives assignment to students.

Experimental Schools and Workshop

Before the commencement of the activities, a workshop was organized in the experimental schools. The workshop was organized to sensitize, orientation and train the students and their facilitators on the objectives and nature of the programme. It was also meant to equip the students with the attitudes and skills needed for the participatory activities. The facilitators, therefore, used the participatory learning guide as indicated below:



- Organizing learners into small groups by facilitator;
- Group activities by members of the individual small groups;
- Group presentation to the whole class by group representatives or the entire members of a group;
- Whole class input/discussion by all the participants in the class to freely contribute, critique and clarify issues on the presentations by the group where necessary;
- Summary by facilitator and participants; and
- Evaluation by facilitator and participants.

3.11 Formulation of hypotheses and Method of data analysis

A hypothesis is a tentative or intelligent guess, an idea that is suggested as a possible way of explaining a situation which can be tested by facts that are known or can be obtained. Hypotheses, therefore, represent some form of theoretical models, which are specifically meant to coordinate and give direction to the research (Ogundipe,

Lucas & Sanni, 2007). Moreover, a hypothesis is seen as a conjectural statement, guess or proposition of the likely outcome from the problem question, it predicts the result of the study. As a scientific guess, it forms the basis of theory though not a theory, a hypothesis is the beginning in the development of a theory. Hypothesis is usually formulated from question since it is intended to supply answers to research question. This is because research questions make problems more specific, limited in scope and amenable to verification.

A hypothesis, in other words, translates the problem statement into a precise, unambiguous prediction of expected outcomes. It is the hypothesis rather than the problem statement, which is subjected to empirical testing through the collection and analysis of data.

Let us look at an example of some research questions drawn from the topic “Effects of socio-cultural animation and shade tree theatre community-based approaches on social competence of street children in Oyo” The first research question by the researcher is:

Research question 1:

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Are there any effects of socio-cultural animation and shade tree theatre community-based approaches on street children social competence?

The corresponding hypothesis formulated reads:

H0: There is no significant main effect of treatment on social competence of street children.

Research question 2:

Is there any effect of gender on social competence of street children?

The corresponding hypothesis is stated thus

There is no significant main effect of gender on social competence of street children.

There is a complementary relationship between the questions and the hypotheses generated. There are also two types of variables in problem questions – the independent variables and the dependent variables. These are:

- a) Independent variable - social cultural animation and shade tree theatre community-based approaches; and
- b) dependent variable - social competence.

A well stated hypothesis must test the relationship or association between two or more variables. Thus, it analysed the relationship between the independent variable(s) and the dependent variable(s) of the research, as indicated by the title or as contained in the general and/or specific objectives of the research.

For example, in a study of some factors affecting adult learner's performance in English examinations in some advanced literacy classes in Oyo State, the dependent variable here is learner's performance in English. To find a suitable hypothesis here is to look for the relationship between the dependent variable as indicated and some set of independent variables which may interest the researcher, such as the students' age, height and gender. Thus we can state:

There is no significant relationship between the height, age and gender of the adult learners and their performance in English examinations in Oyo State.

The significance of the relationship between independent variables of the research (height, age and gender) and the dependent variable, adult learners' performance in English, is being tested.

Ask yourself the following questions: **what is (or are) dependent variable(s) of the study?**

3.11.1 Functions of the Research Hypothesis

The major function of any hypothesis is to guide scientifically, other purposes of the research hypothesis according to Ogundipe, Lucas and Sanni (2007) include the following:

- a) **Unification of theory and reality** – Hypotheses are the conclusions that follow from the premises or assumptions inherent in the theory. The validity of a theory is never examined directly, but rather, it is through hypothesis that the worth can be evaluated. Thus, hypotheses are the vehicle through which theories are linked to real-world situations.
- b) **Research direction** – problem statements typically are more vague than the research hypothesis. A critical function of hypothesis is to provide direction to the research design and to the collection, analysis and interpretation of interest through statements of formal relationships. It is these relationships that are subjected to an empirical test.



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3.11.2 Characteristics of Workable Hypotheses

- a) **Statement of anticipated relationships** – An essential characteristic of a usable research hypothesis is that it states the predicted relationship between two or more variables. Example; there is increasing evidence that unemployment leads to poverty. We thus say in scientific parlance there is an empirical relationship between unemployment (variable x) and poverty (variable y).
- b) **Testability** – An acceptable scientific hypothesis must be testable. This implies that the variables under consideration must be amenable to observation, measurement, and analysis through the collection of data.
- c) **Justifiability** – A hypothesis should be based on a sound, justifiable rationale. The criterion of justifiability implies that a good hypothesis should be consistent with an existing body of research findings.

3.11.3 Types of Hypothesis

There are two major types of hypothesis normally used in educational research. They are the null and the alternative hypotheses (H_0 and H_1). This is testing the hypothesis statistically. The null hypothesis is the decision that there is no significant difference between two or more variables. If there is a significant difference between the variables, the researcher rejects the null hypothesis

Null hypothesis can be stated thus:

H_{01} : There is no significant difference in the performance of men and women in English

H_0 : There is no significant difference in the behaviour patterns of teacher husbands who are financially weaker than their wives.

An alternative hypothesis (H_1) claims that there is a significant difference between two variables e.g.:

H_1 : There is a significant difference in opinion between student leaders and university administration on student protest behaviour

H_1 : There is a significant difference between men and women in preference for colour of ice cream

In the hypothesis, the researcher is reluctant to take a position or predict the expected outcome directly, as if he is not sure of the likely result. He is thus on a safer ground to either retain his earlier proposition for the alternative hypothesis which the researcher may accept if he rejects the null hypothesis.

In null hypothesis, a critical level is usually specified; it is called level of significance or confidence limit. The levels are usually 5% and 1%. Beyond the specified level, the null hypothesis is rejected and the alternative hypothesis is upheld. The 5% (or 0.05) level of significance means the probability that an observed difference or relationship would be found by chance only 5 times out of every 100. The level of significance 0.05

is related to the 95% confidence level. The null hypothesis is rejected when a research occurs by chance 5% of the time or less (Ogundipe, Lucas & Sanni, 2007; Wellington, 2015.).

A more rigorous significance level is a 0.01 probability of significance level of 1% (0.01) means the probability that an observed difference would be found by chance only 1 time out of every 100. The level of significance 0.01 is related to the 99% confidence level.

Rejecting or not rejecting null hypotheses

A major concern in hypothesis testing is the decision to reject or not to reject a null hypothesis. In both cases, the researcher is taking a risk. In deciding to reject or not to reject the null hypothesis, there is a risk in making a wrong decision. There are therefore two types of errors. They are the Type I Error and the Type II Error.

Type I Error: The risk of rejecting the null hypothesis instead of accepting it.

Type II Error: The risk of accepting the null hypothesis instead of rejecting it.

The following steps should be taken in making a decision to reject or not reject a null hypothesis.

1. Have a specified level of significance e.g. 0.05 or 0.01;
2. Compute the value for the significance test used in testing the hypothesis of t- test, chi- square test etc; and
3. Find the value for the significance test at the level of significance already specified e.g. 0.05.

If the computed value is greater than the table value, at the specified level of significance, reject the null hypothesis. If the computed value is less than the table values at the specified level of significance, do not reject the null hypothesis

Some Principles of Hypothesis Formulation

Some of the principles of hypothesis formulation are that the hypothesis must:

- a) Relate to the problem;
- b) Be simply worded, brief and clear and should involve a few variables at a time;
- c) Be testable. If it cannot be verified, then it is not empirical or specific;
- d) Be stated to predict methods to be used for its testing;
- e) Be operationally stated i.e. it should be quantifiable;
- f) Appear to be explanation to the problem; and
- g) Not be in opposition to established principles, laws or generalization.



Data collected were analyzed using both descriptive and inferential statistics. Analysis of Covariance (ANCOVA) was used in testing the seven formulated hypotheses. The Multiple Classification Analysis (MCA) aspect of ANCOVA was used to determine the magnitude of the performance of the various groups. Scheffé Post-hoc analysis was carried out to determine the source of significant effect of treatment. Estimated Marginal Means (EMM) was used to make pairwise comparisons and contrasts between groups. Significant interaction effect was described using graphical representation. All hypotheses were tested at $P < .05$ level of significance.

3.12 Ethical issues

In order to protect the dignity and integrity of the participants, and to accord respect to their moral and cultural values, a number of ethical issues were considered and strictly adhered to.

3.12.1 Ethical Considerations

Cohen, Manion and Morrison (2012) opined that ethical issues in research may come as a result of problems investigated by researchers and the techniques employed in

obtaining valid and reliable data. Fouka and Mantzorou (2011), in their opinion, described ethics as a matter of moral sensitivity to the right of others. Top priority must be given to the wellbeing of all participant in research, especially in the social sciences and education. Ethical considerations in this research were based on permission, acquisition of informed consent, confidentiality, anonymity, and avoiding harm to participants. Vos et al. (2011) made it clear that research must “be based on mutual trust, acceptance, cooperation, promises and well-accepted conventions and expectations” among all the people who have one role or the other to play in a research.

Therefore, this research accorded participants’ wellbeing a top priority. The researcher ensured that research ethics are adhered to as the participants’ physical and mental dignity and integrity were protected while also giving due regard to their moral, cultural and religious values, as well as philosophical convictions.

This researcher regards ethics as an integral aspect of research, Therefore, it is imperative to assess the level of risks and benefits involved for participants, and in so doing, respect the decision of the participants to continue or withdraw his or her involvement in the study. Ethical considerations in this research are explained below.

3.12.2 Informed consent

Informed consent is the procedure in which individuals choose whether (or not) to participate in an investigation after being informed of the facts that would be likely to influence their decisions. To ensure informed consent in this study, the researcher shared with participants what the study is all about and what it seeks to find out. The participants’ informed consent was sought before the commencement of the study to avoid frustrations of both parties in the following processes. The researcher requested participants to sign forms of informed consent before the data collection process.

Therefore, researchers must emphasize complete and accurate information to give participants full awareness of what the study entails. This allows the participants to make their own voluntary decision on whether to be involved or not (Vos et al., 2011). However, Johnson and Christensen (2017) explained that informed consent regularly

involve a brief summary of the general purpose of the research without giving information about the study's specific hypothesis.

According to Leboea (2008), obtaining informed consent implies the following:

- All possible information on the goal of the investigation be known to participants;
- The anticipated length (days, weeks or months) of the participants' involvement;
- The procedures that will be followed during the study;
- The possible merits and demerits and likely dangers the respondents might be exposed to; and
- Credibility of the researcher be rendered to potential subjects or their legal representatives.

3.12.3 Confidentiality

Confidentiality is described as the protection of study participants such that individual identities are not linked to information provided and are never publicly revealed. This definition is also supported by Macmillan and Schumacher (2014) who said that confidentiality can be guaranteed by making sure that every data collected cannot be linked to individual participants by name. In this research, the researcher, without mincing words, assured the participants that no unprofessional ways would be used to access information from them. Likewise, assurance that gathered data was only used for the purpose of the study.

Macmillan and Schumacher (2014) gave the following points in order to maintain confidentiality:

- Data collected must be anonymous;
- The researcher can use an interim system of names that are linked to data and destroy those names later on;
- Participants can adopt pseudo names during the period of the study;

- The researcher can use a third party to link names to data and can receive results without names; and
- The researcher can also report group instead of individual results (McMillan & Schumacher, 2014, p.134).

Leboea (2016) suggested that questionnaires and data should be made identifiable by means of numbers instead of participants' names, and that data and questionnaires that have been responded to should be destroyed once the research work has been concluded, and the information thereof used. Research data must be protected from unauthorized access at all times (Leboea, 2016). The right to self-determination and confidentiality can be viewed as being synonymous.

In this research study, the researcher ensured that care was taken to avoid attaching names to returned questionnaires. The principal researcher, that is, the researcher and the supervisor were the only ones who had access to the research data including returned questionnaires. The questionnaires will be destroyed after data obtained therein would be used and the research project concluded. The very act of using questionnaires pointed to the fact that data were collected anonymously, while results were aggregated per group as against individual participant's responses. This further keeps the data collected confidential.

3.12.4 Anonymity

This is closely related to the aspect of confidentiality, but empathizes on privacy. This ensures that all participants have the right to privacy, anonymity and confidentiality. It suggests that the final research report or paper cannot link a given response to a particular respondent. The information that each participant shares with the researcher should not be passed on to others in any form, unless specific consent has been given. To ensure this consideration, no real and actual names were used in both data collection and data analysis processes. Instead, coding was employed. No names were indicated on the questionnaires or performance test in order to maintain the principle of anonymity.

Every individual is entitled to his/her privacy and is the sole prerogative of individuals to decide when, where, to whom and to what extent his or her beliefs, attitudes and behaviours are revealed (De Vos et al., 2011).

3.12.5 Avoiding harm to participants

Research that has a potential to cause harm to participants is looked upon as unacceptable. Ethical principles guiding research suggests that participants suffer no physical or psychological harm (Babbie, 2007). The obligation of the researcher is to ensure that participants are protected within all possible reasonable limits against any form of physical or emotional discomfort which may be as a result of involvement in the study. McMillan and Schumacher (2014) were of the opinion that participants or subjects in a research study must be shielded against physical and mental discomfort, harm and danger, and that perhaps there is a likelihood of any of the foregoing to happen, the participants must be duly informed by the researcher of any impending risk. The latter view is shared Vos et al. (2011). McMillan and Schumacher (2014) added that protection from harm means not “revealing information that may bring about shame or danger to family life, educational performance, friendships, and the likes, as well as negative consequences”.

Although the ethical issues in educational research may not be as challenging as those of medical research or the sciences, however, Johnson and Christensen (2017) cautioned against been complacent. Interview may bring strong emotional feelings or unpleasant memories. According to Vos et al. (2011, p.115), participants must be fully briefed before the commencement of the study about the impact of the study; this will enable the respondent to disengage from the study anytime he/she wishes.

In this study, the paper embodying the questionnaire was a standard, A4 size type of paper that educators often used at school without any harmful chemicals. Participants were kindly asked to use their own pens whose ink would be guaranteed not to cause any harm to them. No grotesque, potentially dangerous equipment or harmful

chemicals that could compromise the welfare of participants were involved or used in the execution of the current study.

There is no doubt that the data collection method of quasi experimental may result in potential consequences for the participants. The adopted research design provides the opportunity to answer the identified problem through learners' interaction. The class discussion among learners provoked strong emotional feelings. In light of this observation, excessiveness in learners' participation in this study was control by the facilitator and the participants were given the freedom to withdraw at any time of their choice without suffering any victimization or harm.

3.12.6 Voluntary Participation

Every participant in a research should have the freedom to either participate or not participate in a research without any unpleasant consequences. Babbie (2007) opined that no one should be coerced to take part in a field study but rather, it should be voluntary. The researcher should make it a point of duty to explain the details about the research to the participants, thereafter, the participants may choose not to participate in the study. They should not be forced or coerced into the study. However, in some cases where participants have been fully informed, they might still assume that they have an obligation to take part (Babbie, 2007).

3.12.7 Permission

The researcher sought and obtained clearance from the Faculty Research Ethics Committee and Institutional Research Ethics Committee of the University of Fort Hare. Furthermore, permission was sought from the Ministry of Education before the schools were accessed for the purpose of this research.

3.13 Chapter Summary

The purpose of this chapter three was to present the quantitative research methodology that has been used in this work. This chapter gave a step by step analysis of the procedure followed in carrying out this research work, it explored the

following major aspects that gave a clear picture of the whole work; these are the research paradigm, research approach, population, sample and sampling techniques; ethical considerations, and the data collection instruments that were structured questionnaires and achievement tests, as well as validity and reliability of the instruments. To put it succinctly, chapter three provided the guideline that ensured this research achieved its purpose and objectives. The next chapter is chapter four; it contains the result of the study; it features the findings of the research work. Simply put, it is the chapter that explains what was found on the field as a result of the data collected from the field.



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CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF THE FINDINGS

4.1 INTRODUCTION

The purpose of this research was to investigate the effect of service and collaborative learning strategies on students' environmental knowledge in junior secondary schools. The preceding chapter, that is chapter three, involved an explanation of the research procedure which included the justification for the choice of research paradigm and approach chosen, as well as the methodological decisions taken. This chapter four presents the analyses of all the data gathered, using questionnaire and achievement test, from the field in the course of carrying out this research work in line with the hypotheses formulated and consequently tested. The analyses was done using quantitative analyses, while descriptive statistics were employed in explaining and comparing the pre-test and post-test scores of the different groups. Inferential statistics were applied to test the hypotheses in this work.

4.2 Testing of Null Hypotheses

Ho1a: There is no significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental knowledge

Table 4.1: Analysis of Covariance (ANCOVA) of Post-Knowledge by Treatment, Gender and Location

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16114.926	12	1342.911	651.738	0.000	0.931
Intercept	3317.677	1	3317.677	1610.127	0.000	0.735
PreKnowledge	13175.432	1	13175.432	6394.268	0.000	0.917
Treatment	3399.747	2	1699.874	824.978	0.000*	0.739
Gender	8.221	1	8.221	3.990	0.046*	0.007
Location	.164	1	0.164	0.080	0.778	0.000
Treatment x Gender	.188	2	0.094	0.046	0.955	0.000
Treatment x Location	.513	2	0.256	0.124	0.883	0.000
Gender x Location	6.983	1	6.983	3.389	0.066	0.006
Treatment x Gender x Location	.577	2	0.288	0.140	0.869	0.000
Error	1199.215	582	2.061			
Total	129662.000	595				
Corrected Total	17314.141	594				

R Squared = 0.931 (Adjusted R Squared = 0.929) * denotes significant $p < 0.05$

Table 4.1 revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental knowledge ($F_{(2,582)} = 824.98$; $p < 0.05$, partial $\eta^2 = 0.739$). The effect is 73.9%. This indicates that 74.0% variation in junior secondary school students' environmental knowledge is accounted for by the treatment. Thus, hypothesis 1a was rejected. In order to determine the magnitude of the significant main effect across treatment groups, the estimated marginal means of the treatment groups was carried out and the result is presented in Table 4.2.

Table 4.2: Estimated Marginal Means for Post-Knowledge by Treatment and Control group

Treatment	Mean	Std. Error
Service Learning strategy (SLS)	17.70	0.13
Collaborative Learning Strategy (CLS)	13.54	0.14
Conventional Strategy (CS)	10.30	0.12

Table 4.2 revealed that students in Service Learning strategy (SLS) treatment group 1 had the highest adjusted post-achievement mean score in environmental knowledge (17.70) followed by Collaborative Learning Strategy (CLS) treatment group 2 (13.54), while the Conventional Strategy (CS) control group had the least adjusted post-achievement mean scores in environmental knowledge (10.30). This order can be represented as SLS > CLS > CS.



Table 4.3: Bonferroni Post-hoc Analysis of Post-Knowledge by Treatment and Control Group

Treatment	Mean	SLS	CLS	CS
Service Learning strategy (SLS)	17.70		*	*
Collaborative Learning Strategy (CLS)	13.54	*		*
Conventional Strategy (CS)	10.30	*	*	

Table 4.3 revealed that the post-knowledge of students exposed to Service Learning strategy (SLS) was significantly different from their counterparts taught using Collaborative Learning Strategy (CLS) and Conventional Strategy (CS) in their mean scores in environmental knowledge. Furthermore, the post-achievement of students exposed to collaborative learning strategy was significantly different from their counterparts taught using conventional strategy. This indicates that the significant difference revealed by the ANCOVA was as a result of difference between the treatment groups (service and collaborative learning strategies) and the control group

(conventional strategy) and between the two treatment groups as students' post-achievement in environmental knowledge is concerned.

Ho1b: There is no significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental attitude

Table 4.4: Analysis of Covariance (ANCOVA) of Post-Attitude by Treatment, Gender and Location

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	213549.478	12	17795.790	625.346	0.000	0.928
Intercept	32161.527	1	32161.527	1130.159	0.000	0.660
PreAttitude	116905.917	1	116905.917	4108.084	0.000	0.876
Treatment	75002.283	2	37501.141	1317.793	0.000*	0.819
Gender	14.320	1	14.320	0.503	0.478	0.001
Location	271.363	1	271.363	9.536	0.002*	0.016
Treatment x Gender	16.849	2	8.424	0.296	0.744	0.001
Treatment x Location	311.650	2	155.825	5.476	0.004*	0.018
Gender x Location	65.144	1	65.144	2.289	0.131	0.004
Treatment x Gender x Location	115.564	2	57.782	2.030	0.132	0.007
Error	16562.280	582	28.458			
Total	2515804.000	595				
Corrected Total	230111.758	594				

R Squared = 0.928 (Adjusted R Squared = 0.927) * denotes significant $p < 0.05$

Table 4.4 revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental attitude ($F_{(2,582)} = 1317.79$; $p < 0.05$, partial $\eta^2 = 0.819$). The effect is 81.9%. This means that 81.9% variation in junior secondary school students' environmental attitude is

accounted for by the treatment. Thus, hypothesis 1b was rejected. In order to determine the magnitude of the significant main effect across treatment groups, the estimated marginal means of the treatment groups was carried out and the result is presented in Table 5.

Table 4.5: Estimated Marginal Means for Post-Attitude by Treatment and Control group

Treatment	Mean	Std. Error
Service Learning strategy (SLS)	72.82	0.46
Collaborative Learning Strategy (CLS)	68.96	0.49
Conventional Strategy (CS)	44.74	0.39

Table 4.5 showed that students in Service Learning strategy (SLS) treatment group 1 had the highest adjusted post-attitudinal mean score in environmental attitude (72.82) followed by Collaborative Learning Strategy (CLS) treatment group 2 (68.96), while the Conventional Strategy (CS) control group had the least adjusted post-attitudinal mean score (44.74). This order can be represented as SLS > CLS > CS.

Table 4.6: Bonferroni Post-hoc Analysis of Post-Attitude by Treatment and Control Group

Treatment	Mean	SLS	CLS	CS
Service Learning strategy (SLS)	72.82		*	*
Collaborative Learning Strategy (CLS)	68.96	*		*
Conventional Strategy (CS)	44.74	*	*	

Table 4.6 indicated that the post-attitudinal mean score of students exposed to Service Learning strategy (SLS) was significantly different from their counterparts taught using Collaborative Learning Strategy (CLS) and Conventional Strategy (CS) in environmental attitude. Furthermore, the post-achievement of students taught using

collaborative learning strategy was significantly different from their counterparts exposed to conventional strategy. This implies that the significant difference revealed by the ANCOVA was as a result of difference between the treatment groups (service and collaborative learning strategies) and the control group (conventional strategy) and between the two treatment groups as students' post-attitudinal mean scores in environmental attitude is concerned.

Ho2a: There is no significant main effect of gender (male/female) on junior secondary school students' environmental knowledge

Table 4.1 revealed that there was a significant main effect of gender (male/female) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 3.99$; $p < 0.05$, partial $\eta^2 = 0.007$). The effect is 0.7%. This indicates that 0.7% variation in junior secondary school students' environmental knowledge is accounted for by gender. Thus, hypothesis 2a was rejected. In order to determine the magnitude of the significant main effect across gender, the estimated marginal means of the treatment groups was carried out and the result is presented in Table 7.

Table 4.7: Estimated Marginal Means for Post-Knowledge by Gender

Gender	Mean	Std. Error
Male	13.71	0.10
Female	13.98	0.09

Table 4.7 revealed that female students had the higher adjusted post-achievement mean score in environmental knowledge (13.98) while their male counterparts had the least adjusted post-achievement mean scores in environmental knowledge (13.71).

Ho2b: There is no significant main effect of gender (male/female) on junior secondary school students' environmental attitude

Table 4.4 showed that there was no significant main effect of gender (male/female) on junior secondary school students' environmental attitude ($F_{(1,582)} = 0.50$; $p > .05$, partial $\eta^2 = 0.001$). Hence, hypothesis 2b was not rejected. This implies that gender (male/female) had no effect on junior secondary school students' environmental attitude.

Ho3a: There is no significant main effect of school location (urban/rural) on junior secondary school students' environmental knowledge

Table 4.1 revealed that there was no significant main effect of school location (urban/rural) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 0.08$; $p > .05$, partial $\eta^2 = 0.00$). Hence, hypothesis 3a was not rejected. This implies that school location (urban/rural) had no effect on junior secondary school students' environmental knowledge.

Ho3b: There is no significant main effect of school location (urban/rural) on junior secondary school students' environmental attitude

Table 4.4 indicated that there was a significant main effect of school location (urban/rural) on junior secondary school students' environmental attitude ($F_{(1,582)} = 9.54$; $p < 0.05$, partial $\eta^2 = 0.016$). The effect is 1.6%. This means that 1.6% variation in junior secondary school students' environmental attitude is accounted for by school location. Thus, hypothesis 3b was rejected. In order to determine the magnitude of the significant main effect across school location, the estimated marginal means of the treatment groups was carried out and the result is presented in Table 4.8.

Table 4.8: Estimated Marginal Means for Post-Attitude by School location

School location	Mean	Std. Error
Urban	62.97	0.26
Rural	61.38	0.44

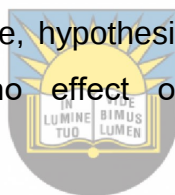
Table 4.8 showed that urban students had the higher adjusted post-attitudinal mean score in environmental attitude (62.97) while their rural counterparts had the least adjusted post-attitudinal mean score (61.38).

Ho4a: There is no significant interaction effect of treatment and gender on junior secondary school students' environmental knowledge

Table 4.1 showed that there was no significant interaction effect of treatment and gender on junior secondary school students' environmental knowledge ($F_{(2,582)} = 0.05$; $p > .05$, partial $\eta^2 = 0.000$). Hence, hypothesis 4a was not rejected. This implies that treatment and gender had no effect on junior secondary school students' environmental knowledge.

Ho4b: There is no significant interaction effect of treatment and gender on junior secondary school students' environmental attitude

Table 4.4 showed that there was no significant interaction effect of treatment and gender on junior secondary school students' environmental attitude ($F_{(2,582)} = 0.30$; $p > .05$, partial $\eta^2 = 0.001$). Hence, hypothesis 4b was not rejected. This means that treatment and gender had no effect on junior secondary school students' environmental attitude.



Ho5a: There is no significant interaction effect of treatment and school location on junior secondary school students' environmental knowledge

Table 4.1 indicated that there was no significant interaction effect of treatment and school location on junior secondary school students' environmental knowledge ($F_{(2,582)} = 0.12$; $p > .05$, partial $\eta^2 = 0.000$). Hence, hypothesis 5a was not rejected. This means that treatment and school location had no effect on junior secondary school students' environmental knowledge.

Ho5b: There is no significant interaction effect of treatment and school location on junior secondary school students' environmental attitude

Table 4.1 shows that there is a significant interaction effect of treatment and school location on junior secondary school students' environmental attitude ($F_{(2,582)} = 5.48$, $p < .05$, partial $\eta^2 = 0.018$). The effect size is 1.8%. This indicates that 1.8% variation in

junior secondary school students' environmental attitude is accounted for the interaction of treatment and school location. Thus, hypothesis 5b was rejected. This implies that school location had effect on junior secondary school students' environmental attitude. In order to explore the interaction effect, Figure 1 presents the interaction in line graph.

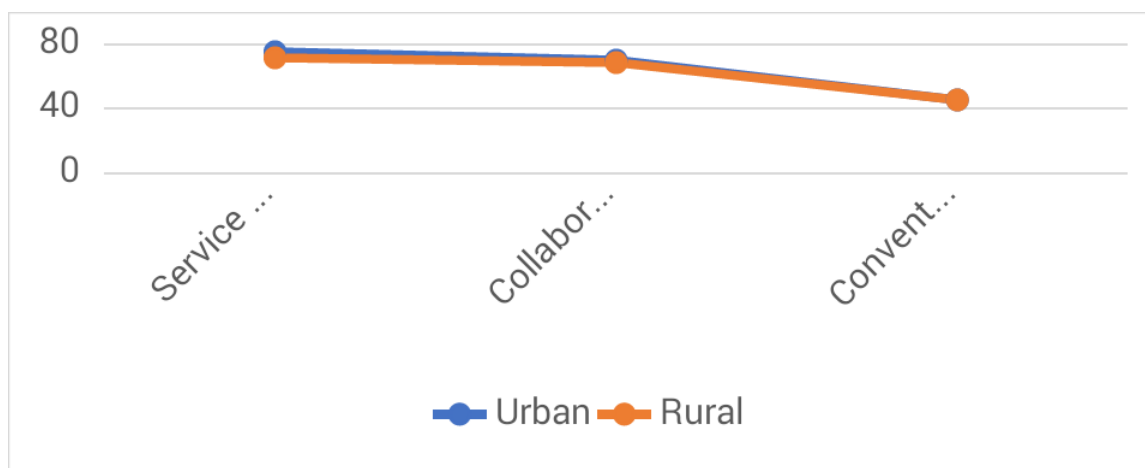


Fig. 4.1: Treatment and School Location on Students' Environmental Attitude

Figure 4.1 showed that urban students in service learning strategy had better environmental attitude mean score (74.73), followed by rural students in service learning strategy (70.92), urban students in collaborative learning strategy (69.51), rural students in collaborative learning strategy (68.41), rural students in conventional strategy (44.82), while urban students in conventional strategy had the least attitudinal mean score in environmental attitude (44.67). The interaction is di-ordinal. This implies that based on the school location, it is not the same group of students across the strategy that had better environmental attitude mean scores.

Ho6a: There is no significant interaction effect of gender and school location on junior secondary school students' environmental knowledge.

Table 4.1 showed that there was no significant interaction effect of gender and school location on junior secondary school students' environmental knowledge ($F_{(1,582)} = 3.39$; $p > .05$, partial $\eta^2 = 0.006$). Hence, hypothesis 6a was not rejected. This indicates that

gender and school location had no effect on junior secondary school students' environmental knowledge.

Ho6b: There is no significant interaction effect of gender and school location on junior secondary school students' environmental attitude

Table 4.1 showed that there was no significant interaction effect of gender and school location on junior secondary school students' environmental attitude ($F_{(1,582)} = 2.29$; $p > .05$, partial $\eta^2 = 0.004$). Thus, hypothesis 6b was not rejected. This indicates that gender and school location had no effect on junior secondary school students' environmental attitude.

Ho7a: There is no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental knowledge

Table 4.1 showed that there was no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental knowledge ($F_{(2,582)} = 0.14$; $p > .05$, partial $\eta^2 = 0.00$). Thus, hypothesis 7a was not rejected. This means that treatment, gender and school location had no effect on junior secondary school students' environmental knowledge.

Ho7b: There is no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental attitude

Table 4.1 showed that there was no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental attitude ($F_{(2,582)} = 2.03$; $p > .05$, partial $\eta^2 = 0.007$). Thus, hypothesis 7b was not rejected. This means that treatment, gender and school location had no effect on junior secondary school students' environmental attitude.

4.2 Discussion of Findings

4.2.1 Main Effect of Treatment on Students' Knowledge of Environmental Concepts

The results revealed a there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental knowledge ($F_{(2,582)} = 824.98$; $p < 0.05$, partial $\eta^2 = 0.739$). The effect is 73.9%. This indicates that 74.0% variation in junior secondary school students' environmental knowledge is accounted for by the treatment. This result corroborates the findings of Bates (2009) that service learning is an instructional approach that engages students in service related activities while connecting the experience to course curricula so students have the opportunity to learn academic content while applying that knowledge in service to their community. Cox (2017) also asserted that service learning affords learners the opportunity of honing their skills of problem solving, critical thinking, cooperation as well as planning and management, and civic responsibility. There is always the problem of taking service learning for community service.

Furthermore, this result gives credence to the study of Springer (2015) and Lai (2011). Collaborative learning activities allow students to provide explanations of their understanding; this can help students elaborate and reorganize their knowledge. Collaborative learning by nature creates opportunities to develop students 'cognition by actively communicating with more proficient peers and thereby expanding conceptual potential (Springer, 2015). Moreover, collaboration involves participants working together on the same task, rather than in parallel on separate portions of the task (Lai, 2011), and this learning style builds team spirit, cooperation, togetherness and unity. Moreover, students learn best when they are actively involved in the process. Researchers report that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats. Students who work in collaborative groups also appear more satisfied with their classes.

4.2.2 Main Effect of Treatment on Students' Attitude to Environmental Education

The results revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental attitude ($F_{(2,582)} = 1317.79$; $p < 0.05$, partial $\eta^2 = 0.819$). The effect is 81.9%. This means that 81.9% variation in junior secondary school students' environmental attitude is accounted for by the treatment. This may not be unconnected with the fact that both strategies Oladapo (2012) suggested that environmental concerns are formed only when people see themselves as an integral part of nature. Macionis (2007) stated that lack of favourable attitude was the result of individualistic postures adopted as people put themselves first over communal and environmental goals.

Welch found out that education had a significant influence on environmental attitude. The study carried out by United Nations Environment Programme (UNEP, 2014) investigated the cognitive and affective bases of environmental attitudes to indicate that, it is what people feel and believe about the environment that determines their attitudes toward it. Attitude scores also showed that cooperative learning experiences benefit intergroup relations. Ajitoni (2011) asserted that students in such learning experience as these displayed greater knowledge and attitude scores and better out-of-class inter-ethnic interaction than those in the conventional classroom practices. Similarly, the findings showed positive change in attitude towards fellow students from similar and different cultural groups and towards teachers from different social class displayed by students in the cooperative learning group. The findings also support the findings of Ogunbiyi (2006) who found that value clarification strategy had significant main effect on pre-service teachers' attitudes to environmental education.

4.2.3 Main Effect of Gender on Students' Knowledge of and Attitude to Environmental Concepts

The findings showed that there was a significant main effect of gender (male/female) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 3.99$; $p < 0.05$, partial $\eta^2 = 0.007$). The effect is 0.7%. This indicates that 0.7% variation in junior

secondary school students' environmental knowledge is accounted for by gender. However, there was no significant main effect of gender (male/female) on junior secondary school students' environmental attitude ($F_{(1,582)} = 0.50$; $p > .05$, partial $\eta^2 = 0.001$). This implies that gender (male/female) had no effect on junior secondary school students' environmental attitude.

A study carried out by Lieberman, Hoody and Lieberman (2005) suggested that gender is an influential factor in gaining environmental knowledge. According to them, the number of science classes taken by students factored into the differences in knowledge between gender, but did not account for the entire difference. Bartosh, Tudor, Ferguson and Taylor (2005) in their study revealed that out of a group of high school students questioned about energy and pollution issues, 29.2% of female had satisfactory knowledge as compared with almost 44% male students. Some studies, however, insisted that there were no significant differences between the gender in terms of science and environmental education. They further said that, one study about influential factors of learning environment, showed that gender was not one of the top three factors related to attitudinal outcomes (Duffin, Phillips & Tremblay, 2006).

4.2.4 Main Effect of school location on Students' Knowledge of and Attitude to Environmental Concepts

The results showed that there was no significant main effect of school location (urban/rural) on junior secondary school students' environmental knowledge ($F_{(1,582)} = 0.08$; $p > .05$, partial $\eta^2 = 0.00$). This implies that school location (urban/rural) had no effect on junior secondary school students' environmental knowledge. However, there was a significant main effect of school location (urban/rural) on junior secondary school students' environmental attitude ($F_{(1,582)} = 9.54$; $p < 0.05$, partial $\eta^2 = 0.016$). The effect is 1.6%. This means that 1.6% variation in junior secondary school students' environmental attitude is accounted for by school location. The findings are in consonance with the findings of Oginni (2008) who suggested that school location could predict school achievement in sciences.

Owoeye and Yara (2011) found that students in urban areas had better academic achievement than their rural counterpart. School location was found to have no significant main effect on students' knowledge of environmental concepts in Social Studies. Balogun (2012) asserts that one's residential/school location influences his/her perception generally. He noted that people in urban areas are typically exposed to a wider range of experiences than people in rural areas. To Ekujumi (2011), those living in the urban centres or cities have wider access to sanitary facilities, and the level of their compliance with environmental laws and regulations are higher than those in the rural centres.

4.2.5 Two-way interaction effects of treatment and gender on Students' Knowledge of and Attitude to Environmental Concepts

There was no significant interaction effect of treatment and gender on junior secondary school students' environmental knowledge ($F_{(2,582)} = 0.05$; $p > .05$, partial $\eta^2 = 0.000$). This implies that treatment and gender had no effect on junior secondary school students' environmental knowledge. There was no significant interaction effect of treatment and gender on junior secondary school students' environmental attitude ($F_{(2,582)} = 0.30$; $p > .05$, partial $\eta^2 = 0.001$). This means that treatment and gender had no effect on junior secondary school students' environmental attitude.

4.2.6 Two-way interaction effects of treatment and school location on students' Knowledge of and Attitude to Environmental Concepts

The results of the study revealed that the interaction effects of treatment and school location was not significant on students' knowledge of environmental concepts ($F_{(2,582)} = 0.12$; $p > .05$, partial $\eta^2 = 0.000$) and attitudes to environmental education ($F_{(2,582)} = 5.48$, $p < .05$, partial $\eta^2 = 0.018$) respectively while the interaction effects of treatment and school location was not significant on students' environmental practices. The results further revealed that urban students have better knowledge of environmental concepts and attitude to environmental education scores than their rural counterparts.

4.2.7 Two-way interaction effects of Gender and school location on students' Knowledge of and Attitude to Environmental Concepts

There was no significant interaction effect of gender and school location on junior secondary school students' environmental knowledge ($F_{(1,582)} = 3.39$; $p > .05$, partial $\eta^2 = 0.006$). This indicates that gender and school location had no effect on junior secondary school students' environmental knowledge. Furthermore, there was no significant interaction effect of gender and school location on junior secondary school students' environmental attitude ($F_{(1,582)} = 2.29$; $p > .05$, partial $\eta^2 = 0.004$). This indicates that gender and school location had no effect on junior secondary school students' environmental attitude.

4.2.8 Three-way interaction effects of treatment, gender and school location on students' Knowledge of and Attitude to Environmental Concepts

The result obtained shows that for the three-way interaction there was no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental knowledge ($F_{(2,582)} = 0.14$; $p > .05$, partial $\eta^2 = 0.00$). This means that treatment, gender and school location had no effect on junior secondary school students' environmental knowledge. There was no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental attitude ($F_{(2,582)} = 2.03$; $p > .05$, partial $\eta^2 = 0.007$). This means that treatment, gender and school location had no effect on junior secondary school students' environmental attitude.

4.3 CHAPTER SUMMARY

This chapter presented, analysed and discussed the findings from quantitative data. Questionnaires were administered to students, as well as a 20-item multiple-choice test. The discussion of the findings was done in the context of the research questions and hypotheses generated in Chapter 1, and in relation to local and international literature and to theory. The next chapter, which is the last chapter, presents the summary, conclusion and recommendations of the study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This study investigated the effect of service and collaborative learning strategies on students' environmental knowledge in junior secondary schools. The preceding chapter was on presentation and analyses of the data gathered through structured questionnaire and achievement test conducted on the study participants who were junior secondary students. This chapter 5 presents a summary of findings which were discussed, not forgetting conclusions and recommendations based on the findings, as well as suggestions for further studies.

5.2 SUMMARY OF FINDINGS

The summary of findings from this study is presented as follows:

1. The results revealed that there was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental knowledge;
2. There was a significant main effect of treatment (service and collaborative learning strategies) on junior secondary school students' environmental attitude;
3. There was a significant main effect of gender (male/female) on junior secondary school students' environmental knowledge;
4. There was no significant main effect of gender (male/female) on junior secondary school students' environmental attitude;
5. There was no significant main effect of school location (urban/rural) on junior secondary school students' environmental knowledge;
6. There was a significant main effect of school location (urban/rural) on junior secondary school students' environmental attitude;
7. There was no significant interaction effect of treatment and gender on junior secondary school students' environmental knowledge;

8. There was no significant interaction effect of treatment and gender on junior secondary school students' environmental attitude;
9. There is no significant interaction effect of gender and school location on junior secondary school students' environmental knowledge;
10. There was significant interaction effect of gender and school location on junior secondary school students' environmental attitude;
11. There is no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental knowledge; and
12. There is no significant interaction effect of treatment, gender and school location on junior secondary school students' environmental attitude.

5.3 CONCLUSION

Based on the findings of this study, it was established that service learning and collaborative learning strategies take pride of place. These strategies can develop children's curiosity toward helping them in scientific inquiry, a focused and systematic approach to observation, documentation and investigation. Service learning is an idea whose time is here, and its use has increased in educational institutions all over the world. Service learning involves learners in community activities that are organized by the school. Service learning is an instructional approach that engages student in services related activities while connecting the experience to course curricula so student have the opportunity to learn academic content while applying that knowledge in services to their community. Service learning dwells on the idea that education is meant to develop social responsibility and prepare learners to be active citizens.

5.4 CONTRIBUTIONS TO KNOWLEDGE

1. The findings from this study would expose the students to the knowledge of the environmental challenges that daily confront them thereby creating the awareness in them that they are problem solvers and not just helpless victims of the environment.

2. This study would make the students move from passive citizens to active citizens with positive attitude towards the physical environment. It would also awake their consciousness to the fact that they can make changes in their environment, society and the world at large. Furthermore, the students would understand the nexus between human action and consequences of such action on the physical environment.
3. This study will inspire the teachers to see the need to provide students with real life experiences that can help bridge the gap between what is learnt in the classroom and the real world. This would bridge the gap between theory and practice.
4. The findings of this study would help the society at large, as it will enable the school to place more emphasis on participatory learning that would improve the knowledge of the coming generation about their environment and as well inculcate the right attitude into them for the greater benefit of their society thus raising a generation of humans that are committed to sustainable development.

5.5 EDUCATIONAL IMPLICATION OF FINDINGS

This study examined the effects of service and collaborative learning strategies on junior secondary school students' environmental knowledge in Oyo State, Nigeria. The findings of this research showed that exposure of the learners to service learning and collaborative learning strategies has been found to positively affect the enhancement of students' knowledge of and attitude to environmental concepts. The findings have therefore revealed importance of using teaching strategies that are participatory and learner-centred where learners are trained to take control, construct and direct their own learning processes for effective learning. The findings of this study have shown that environmental concepts are better taught using service learning and collaborative learning strategies than the conventional strategy in junior secondary schools.

Service learning strategy has been established to be very effective in enhancing the environmental knowledge and attitude of students. There is the need for stakeholders in the field of education; curriculum planners/developers, teachers, and government

agencies/departments of education to adopt and promote teaching strategies and learning activities that are participatory, as well as problem based in approach.

The implication of this research work is that the students under this strategies of learning were able to acquire the values and trait of group roles like positive use of knowledge, patience, consideration of others, cooperation, love, unity and loyalty by students. The participatory approach to learning assisted the students to acquire values and traits that will no doubt develop their interest in protecting their environment as well as working together as a team in protecting the biodiversity.

The study also revealed that there is need to incorporate in our educational system the service learning and collaborative learning strategies as strategies that could help in improving students' environmental knowledge and attitude. There is need for training and retraining of teachers for professional developments on the use of active and participatory-based learning strategies in teaching and learning of environmental concepts. There should be a nexus between what is learnt in the classroom and real life situation.



5.6 RECOMMENDATIONS

In view of the findings of this study, the following recommendations were made that:

1. Teachers should adopt service learning and collaborative learning strategies in the teaching of environmental concepts and problems in Social Studies in order to improve students' performance in Social Studies.
2. Teachers should facilitate the use of service learning and collaborative learning strategies in schools to improve students' environmental solving problem skills and their achievement in the subject.
3. Government and professional bodies should organize a form of re-training programme for Social Studies teachers in order to expose them to the use of service learning and collaborative learning strategies through seminars and workshops and in teacher training institutions to facilitate teaching of Social Studies, especially environmental concepts and also for better performance of junior secondary school students.

4. Teaching institutions should not only include service learning and collaborative learning strategies in their curriculum but should endeavour to provide practical experience for pre-service teachers to be well grounded and equipped on the use of these strategies.

5.7 LIMITATION OF THE STUDY

The study was limited to only six public junior secondary schools out of the various junior secondary schools in Oyo State. The number could be increased in further studies. The study could also measure students' environmental behaviour/performance, as an extension to the environmental knowledge and attitude. Gender and school location were the only moderator variables considered among other moderating variables that could have affected the outcome of the research. It is possible to use many other moderator variables like, age, ability levels, cognitive styles, personality traits, ethnicity, etc. In schools used, principals were demanding incentives for their schools while some of the research assistants were reluctant to teaching the concepts under investigation in this study to the students. However, despite these limitations and constraints, the finding of the study constitutes important milestone in the quest for improved teaching and learning of Social Studies in junior secondary schools to further improve students' knowledge of and attitude to environmental concepts.

5.8 SUGGESTIONS FOR FURTHER STUDIES

Future research should focus on the use of service learning and collaborative learning strategies on social studies emerging trends such as civic competence, moral education, population education, etc. It is also suggested that similar studies could be extended to the likes of inclusion of moderator variables of ability levels, cognitive styles, personality traits, ethnicity, among others. The study could also be replicated in all the six geopolitical zones in Nigeria; using more local governments, states, schools, teachers and students so that a more generalization would be made.

5.9 CHAPTER SUMMARY

This chapter gave a presentation of the summary of the findings, discussions, conclusions of the study and recommendations and the educational implications of the study, including suggestion for further study. The study's purpose was to investigate the effect of service and collaborative learning strategies on students' environmental knowledge in selected junior secondary schools.

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LIST OF APPENDICES

APPENDIX 1

SECTION A

Please tick (X) in the appropriate boxes.

1. Sex: Male () Female ()
2. Location of School: Urban area () Rural Area ()

Instructions: Each question is followed by FOUR (4) options lettered a to d. Circle the correct answer for each question.

ENVIRONMENTAL KNOWLEDGE TEST (EKT)

1. The concept of Environment comprises:

- a) Industry
- b) Water
- c) Air
- d) All the above



2. Environmental Problems are seen at the:

- a) Local level
- b) Neighbourhood level
- c) Regional level
- d) Global level

3. Ecological balance refers to:

- a) Survival of plant life
- b) Survival of Animal life
- c) Appropriated form of each element of environment
- d) None of the above

4. Environmental Degradation occurs due to:

- a) Rainfall
- b) Population

- c) Un-controlled human activities
 - d) Technological developments
5. Green House effect is:
- a) Cooling of atmosphere
 - b) Warming of atmosphere
 - c) Increasing water vapours in the atmosphere
 - d) Reducing of gases in atmosphere

6. Acid rain

- a) Threatens human and aquatic life
- b) Destroy forests and crops
- c) Damage monuments
- d) All the above.

7. Ozone layer is getting depleted due to:

- a) Dust particles
- b) Water vapors
- c) Aerosols
- d) Atomic explosion



8. Forests are to be protected for:

- a) Checking the soil erosion
- b) Conservation of moisture
- c) Protection of wild life
- d) All the above

9. Which one of the following is not a soil pollutant?

- a) Domestic wastes
- b) Greenhouse effect
- c) Industrial wastes
- d) Acid rain.

10. Air pollution can be minimized by:

- a) banning the fossil fuel for energy
- b) developing an alternative for energy

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- c) developing an awareness on the environmental problems
- d) none of the above

11. Which one of the following is environment-friendly for energy?

- a) The use of bio-gas
- b) Nuclear energy
- c) Thermal power
- d) Solar power

12. Ultra violet rays of the sun are filtered in the atmosphere by:

- a) Nitrogen
- b) Hydrogen
- c) Ozone
- d) All the above

13. The main source of water pollution is:

- a) Industrial effluents
- b) nuclear and thermal plant discharges
- c) pesticides, insecticides and fertilizers used in the agricultural fields
- d) Domestic wastes

14. The unfavourable alteration of environment due to human activities is termed:

- a) ecological disturbance
- b) catastrophe
- c) ecological degradation
- d) pollution

15. Which of the following is the major cause of pollution?

- a) plants
- b) man
- c) fungi
- d) hydrocarbon gases

16. The objective of Environmental Education is to:

- a) Raise consciousness about environmental education
- b) Teach environmentally appropriate behaviour



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- c) create environmental ethics that foster awareness about ecological inter-dependence
- d) all of the above

17. The study of the interaction between living and non-living organisms and environment is called:

- a) Ecosystem
- b) Ecology
- c) Phytogeography
- d) Phytosociology

18. The environment which has been modified by human activities is called:

- a) Natural environment
- b) Anthropogenic environment
- c) Modern environment
- d) Urban environment

19. Physical and chemical components of an ecosystem constitute:

- a) Biotic structure
- b) Abiotic structure
- c) Both of the above
- d) None of the above



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20. A major concern of environmental education is:

- a) keeping the environment safe
- b) ecosystem and species
- c) degradation and deforestation
- d) food chain and food web

APPENDIX 2

ENVIRONMENTAL ATTITUDE QUESTIONNAIRE (EAQ)

Instruction:

This questionnaire is designed to assist the researcher to determine the effect of service and collaborative learning strategies on students' environmental knowledge in selected Junior Secondary Schools in Oyo State, Nigeria. Please read each statement carefully and indicate your level of agreement or disagreement on the modified four points Likert- scale provided.

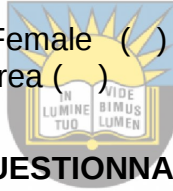
Each response shall be treated with every confidentiality it deserves. The researcher wishes to state it clearly that no response is traceable to you.

Note: SA - Strongly Agree; A – Agree; D – Disagree; SD – Strongly Disagree.

SECTION A

Please tick (X) in the appropriate boxes.

1. Sex: Male () Female ()
2. Location of School: Urban area () Rural Area ()



ENVIRONMENTAL ATTITUDE QUESTIONNAIRE

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		SA	A	D	SD
1	Environmental education deals with the global as well as local environmental issues				
2	Seminars and workshops on environmental education are to be organized for the teachers and students to update their knowledge				
3	Environmental education will prepare the students to tackle the various environmental problems				
4	Environmental education enables the students and teachers to take active participation in environmental policies and programmes.				
5	Family planning is not relevant to environmental protection				

6	I like to work voluntarily in environmental preservation activities				
7	I prefer to avoid products that cause ozone depletion				
8	I never took part in any environmental activities				
9	Activities of non-governmental organizations raise awareness on environmental issues				
10	I collect garbage and keep the environment clean				
11	I educate people about environmental issues				
12	Government is solely responsible to solve environmental issues				
13	I usually read labels on products to see if the content is environmental safe				
14	I usually purchase products that can be recycled				
15	I usually try to learn what can be done to reduce environmental issues				
16	Compulsory laws and regulations need to be taken to reduce air pollution				
17	Paperless administrative work is most suitable to reduce paper waste				
18	Mining should be done in all possible areas to support our economic system				
19	I can help people who are working on solving environmental problems				
20	I am willing to encourage other people to do things that help to protect the environment				
21	I would be willing to talk with government officials about environmental protection.				
22	Natural resources should be carefully handled.				
23	For preventing erosion and landslide, more trees should be planted.				

24	I am willing to take steps to prevent environmental problems such as recycling not, littering etc.				
25	I consider myself to be very sensitive towards the environment.				



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APPENDIX 3

INFORMED CONSENT FORM FOR RESPONDENTS

Research Title: **Effect of service and collaborative learning strategies on students' environmental knowledge in selected Junior Secondary Schools in Oyo State, Nigeria**

Conducted by: ALALADE Olufiropo Emmanuel

Supervisor: Prof. Adu, E. O.

I clearly understand the purpose of this research and the level of my involvement as explained to me. I hereby voluntarily agree to take part in the study without any reservations.

I have the understanding that I have the freedom to withdraw my participation from this study at any given time without any consequences. I also understand that this consent form will not be linked to any of the research Instruments in order to ensure that my participation remains confidential.

I have been duly informed that upon completion of the research, feedback will be availed to my school on the findings to improve our school environments.

I herein undersign and give my essential details as a way of showing my willingness to take part in the research.

Full Name:

Signature:

Date:-----

APPENDIX 4

ETHICAL CLEARANCE CERTIFICATE



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ETHICAL CLEARANCE CERTIFICATE REC-270710-028-RA Level 01

Certificate Reference Number: ADU191SALA01

Project title: **Effect of service and collaborative learning strategies on students' environmental knowledge in selected junior secondary schools in Oyo State, Nigeria.**

Nature of Project PhD in Education

Principal Researcher: Olufiropo Emmanuel Alalade

Supervisor: Prof E.O Adu

Co-supervisor: N/A

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above-mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

Special conditions: Research that includes children as per the official regulations of the act must take the following into account:

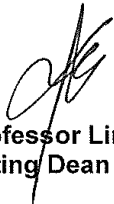
Note: The UREC is aware of the provisions of s71 of the National Health Act 61 of 2003 and that matters pertaining to obtaining the Minister's consent are under discussion and remain unresolved. Nonetheless, as was decided at a meeting between the National Health Research Ethics Committee and stakeholders on 6 June 2013, university ethics committees may continue to grant ethical clearance for research involving children without the Minister's consent, provided that the prescripts of the previous rules have been met. This certificate is granted in terms of this agreement.

The UREC retains the right to

- Withdraw or amend this Ethical Clearance Certificate if
 - Any unethical principal or practices are revealed or suspected
 - Relevant information has been withheld or misrepresented
 - Regulatory changes of whatsoever nature so require
 - The conditions contained in the Certificate have not been adhered to
- Request access to any information or data at any time during the course or after completion of the project.
- In addition to the need to comply with the highest level of ethical conduct principle investigators must report back annually as an evaluation and monitoring mechanism on the progress being made by the research. Such a report must be sent to the Dean of Research's office

The Ethics Committee wished you well in your research.

Yours sincerely



Professor Lindelwa Majova-Songca
Acting Dean of Research

08 September 2017

APPENDIX 5

REQUEST FOR PERMISSION FROM THE MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

Alalade Olufiropo Emmanuel,
Department of Social Studies,
Federal College of Education (Special)
Oyo, Nigeria

21st January, 2018

The Permanent Secretary

Ministry of Education, Science and Technology

Secretariat, Ibadan

Oyo State, Nigeria



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Dear Sir/Madam,

REQUEST FOR PERMISSION TO UNDERTAKE RESEARCH STUDY IN SELECTED JUNIOR SECONDARY SCHOOLS IN OYO STATE

This correspondence serves to request for your permission to conduct a research study in some selected junior secondary schools in Ibadan, Oyo State. The research study is in fulfillment of the requirements of Doctor of Philosophy degree in Education (Instruction and Curriculum).

The research title is: **Effect of service and collaborative learning strategies on students' environmental knowledge in selected junior secondary schools in Oyo state, Nigeria.**

Data collection will involve students in Junior Secondary School II in six Junior secondary schools in four local government areas in Ibadan (Ibadan South-East, Ibadan North, Ona Ara, and Egbeda).

Attached herewith are the **Ethical Research Clearance Certificate** from the host University, University of Fort Hare, South Africa and copies of my research instruments.

A copy of this thesis will be submitted to the Ministry of Education in order to improve teaching and learning in our Junior Secondary Schools in particular, and the entire secondary school system in general. I will greatly appreciate the permission to conduct this research.



Yours faithfully,

University of Fort Hare
gether in Excellence

Alalade, Olufiropo Emmanuel (Mr.)

ropoalalade@yahoo.com

APPENDIX 6: LANGUAGE EDITOR CERTIFICATE

23 Elfin Glen Road, Nahoon Valley Heights, East London, 5200



To whom it may concern:

This document certifies that the PhD thesis whose title appears below has been edited for proper English language, grammar, punctuation, spelling and overall style. The editor, Rose Masha, is a member of the Professional Editors' Group whose qualifications are listed in the footer of this certificate.



**EFFECT OF SERVICE AND COLLABORATIVE LEARNING STRATEGIES
ON STUDENTS' ENVIRONMENTAL KNOWLEDGE IN SELECTED
JUNIOR SECONDARY SCHOOLS IN OYO STATE, NIGERIA**

Author:

ALALADE, OLUFIROPO EMMANUEL

Date Edited:

30 March 2019

Signed

A handwritten signature in black ink, enclosed within a diamond-shaped border. The signature appears to be "Rose Masha".

Dr. Rose Masha

B. Library & Inf. Sc.; HDE; Hons. ELT; M. Phil. Hyll.; PhD Ed.

APPENDIX 7: PERMISSION LETTER FROM THE DEPARTMENT

TELEPHONE: IBADAN

PRIVATE MAIL BAG NO 5014



MINISTRY OF

EDUCATION

SCIENCE AND TECHNOLOGY

SCHOOLS DEPARTMENT

IBADAN, OYO STATE OF NIGERIA

Your Ref. No

All correspondence should be
addressed to the Hon. Commissioner

Quoting.

Our Ref. No

EDU.215/VOL.VI/12

Date 29th January, 2018

Alalade Olufiropo E.
Department of Social Studies,
Federal College of Education (Sp),
Oyo State.

RE: PERMISSION TO COLLECT DATA

I am directed to acknowledge the receipt of your letter dated 21st January, 2018 on the above subject and to convey the Ministry's approval on your request to collect data for your project.

2. However, you are to note that the information obtained is to be used strictly for the purpose it is meant for.
3. Furthermore, you are to liaise with the Local Inspectors of Education (LIE) of the concerned Local Government Areas for necessary assistance.
4. Please note that you are to submit to the Ministry a copy of the result of the research and findings to assist in policy formulation in the education sector.
5. Thank you.

A handwritten signature in black ink, appearing to read "C. O. Bolaji".

For: Ag. Permanent Secretary