EFFECTS OF MENTORING AND FIELD STUDY INSTRUCTIONAL STRATEGIES ON STUDENTS' LEARNING OUTCOMES IN CLIMATE CHANGE CONCEPTS IN SOCIAL STUDIES IN LAGOS STATE

BY

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ABSTRACT

Climate change is an environmental challenge that needs urgent attention. It is for this reason it is taught in Social Studies at the Junior Secondary School level to impart environmental knowledge. Literature was largely descriptive survey on awareness, perception and attitude to climate change without considering instructional interventions. This study determined the effects of mentoring and field study instructional strategies on students' learning outcomes in climate change concepts in Social Studies in Lagos State. It also examined the moderating effects of gender and school location.

The Constructivist, Eco-biological system and Social-learning theories provided the framework. The study adopted pretest-posttest, control group, quasi-experimental design of 3x2x2 matrix. Six public Junior Secondary Schools (JSS) were purposively selected from Lagos Island and Lagos Mainland Education Districts, Lagos State. The justification for the choice of these districts is that Lagos Island schools are mostly bounded by creeks and rivers while Lagos Mainland schools are mainly upland. Six intact JSS classes (one per school) comprising 284 students (143 males and 141 females) were randomly assigned to Mentoring (100), Field study (96) and Conventional (88) strategies. Treatment lasted ten weeks. Instruments used were: Students' Knowledge of climate change test (r=0.77); Students' attitude to climate change questionnaire (r=0.96); Climate change reduction practice questionnaire (r=0.96), and Instructional Guides for Mentoring, Field study and Conventional Strategies. Data were analysed using Analysis of Covariance and Scheffe post-hoc test at 0.05 level of significance.

Treatment had significant main effects on students' knowledge of climate change concepts ($F_{(2,271)} = 11.86$, $\eta^2 = 0.08$), attitude ($F_{(2,271)} = 8.74$; $\eta^2 = 0.06$), and reduction practices ($F_{(2,271)} = 12.72$; $\eta^2 = 0.09$). Students in mentoring strategy group had highest mean knowledge score ($\bar{x} = 12.35$), followed by their counterparts in field study ($\bar{x} = 11.88$) and control group ($\bar{x} = 10.67$). For students' attitude to climate change concepts, ($F_{(2,271)} = 8.74$; $\eta^2 = 0.06$), control group had highest score ($\bar{x} = 42.36$), followed by those in field study strategy group ($\bar{x} = 41.67$) and mentoring strategy group ($\bar{x} = 40.08$). Field study strategy($\bar{x} = 45.57$) and mentoring strategy group ($\bar{x} = 45.00$) scored higher than the control group ($\bar{x} = 40.86$) in climate change reduction practices.There was a significant interaction effect of treatment and school location on knowledge of climate change concepts ($F_{(2,271)} = 3.45$; $\eta^2 = 0.03$), and attitude scores($F_{(2,271)} = 4.37$;$\eta^2 = 0.03$) of students from Lagos Island and Mainland schools. There was no significant interaction effect of treatment and school location on the climate change reduction practices scores of students from Lagos Island and Mainland schools.The two-way interaction as well as the three-way interaction effects were not significant.

Mentoring and field study instructional strategies were effective in enhancing students' learning outcomes in climate change concepts in Social Studies in Lagos state, Nigeria. Teachers should adopt these strategies for effective teaching and learning of climate change concepts in Social Studies.

Keywords: Mentoring and Field-study strategies, Climate change concepts, Social studies, Lagos State, Nigeria

Word Count: 465

CERTIFICATION

I certify that thisresearch work was carried out by Olawale Oyemade Oyekanmi of Social Studies Education Unit in the Department of Teacher Education, Faculty of Education, University of Ibadan.

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DEDICATION

Thisthesis is dedicated to Almighty God for His loving kindness and faithfulness for giving me the golden opportunities to walk through thisprogramme successfully, also to my lovely and supportive late father and mother: Mr. and Mrs.Frances KokumoOyekanmi for sowing the seed that have now germinated, may God continue to grant them eternal rest in Jesus Name (Amen).

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Social Studies is an interdisciplinary subject which equips an individual with the knowledge, attitudes, skills, practices and capabilities needed to make a meaningful living in the context of his/her peculiar environment, and to solve the problems of the world. Social Studies is concerned mainly with the reciprocal relationship between human, social and physical environment, which encompasses climate and weather. Climate and weather are important natural phenomena. The study of climate and weather involves a number of elements such as the earth's energy, temperatures, wind systems and rainfall patterns. Human activities have an increasingly important impact on the environment, such as climate change, urban climates and the destruction of the ozone layer. Climate change is one of the most topical issues in the world today. Scientific evidence has revealed that it is an all-encompassing threat; it is considered the most serious threat to the survival and sustainable development of humanity, because of the human activities that release large volumes of gases (particularly carbon dioxide) into the atmosphere which cause changes in the earth's climate. Its impact is real and is being felt globally. Climate change as defined by UNCCC is a change of climate attributed directly or indirectly to human activities that alter the composition of the global atmosphere; observed over time (Mings, 2008).

Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report (AR4) and Intergovernmental Panel on Climate Change (2014)Fifth Assessment Report (AR5) gave one of the most acceptable definitions of climate change, as the mean and/or the variability of properties that persists for an extended period typically decades or a time. Climate change is a phenomenon that threatens human existence such as sea level rise, high temperatures, and changes in the frequency and intensity of tropical storms. These are the concerns and interest of Social Studies; the study of human being in totality. Also, it is the study of human being's influence on the physical and social environments and vice-versa (Akinlaye, Mansaray and Ajiboye, 1996). Human being's activities directly and indirectly influence the eco-system

resulting in climate change. Climate changes are already having or are likely to have, effects that can cause serious harm to humans and the planet - including rising seas that can flood low-lying areas, droughts, increased diseases, and extinction of many animal species. The fact that climate change is occurring as a result of human actions; coupledwith serious dangers, urgently calls for a change in people's behaviour.

The causes of climate change are as a result of anthropogenic factors. Research has shown that in the past few decades, anthropogenic factors like urbanisation, deforestation, population explosion, industrialisation and the release of greenhouse gases (GHGS) are the major contributing factors to the depletion of the ozone layer, its associated global warming and climate change (Buba, 2004; Odjugo, 2007).The on-going climate change and its associated global warming are expected to cause distinctive climate patterns in different climatic zones, which will impact negatively on the ecosystem (Mshelia, 2005). Perhaps this is the reason Ojo (1991) and Clerk (2002) advised that weather and climate should not be taken for granted in the pursuit of technological development, exploration and processing of environmental resources. Available evidences show that climate change is global, likewise its impact, but the biting effects will be felt more by the developing countries especially those in Africa due to their low level of coping capabilities (Nwafor, 2007). The greenhouse effect is a naturally occurring phenomenon, actually useful as it regulates atmospheric temperature to keep the temperature on our planet suitable for living things. However, the increase in the amount of GHGS is not good; it can cause the temperature of the earth to increase out of control (Papadimitriou, 2004; Odjugo, 2009; Oladipo, 2012).

Studies have shown that Nigeria is already being plagued with diverse ecological problems, directly linked to the ongoing climate change (NEST, 2003; Ikhile, 2007). These studies focused more on climatic impact. Studies that addresses climate trend in Nigeria cover either short period or small area (Oladipo, 2012)). Singer and Avery (2007) reveal that it takes at least a century of weather data to evaluate climate trend for appropriate conclusion to be drawn. Nigeria has a total area of 924,000 sq km and occupies about 14% of land area in West Africa. 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. Average maximum temperatures

vary from 32°C along the coast to 41°C in the far North, while mean minimum figures range from under 13^0C in the costal area to 21°C in the North. The weather of the country varies from a very wet coastal area with annual rainfall greater than 3,500 mm to the Sahel region in the North-West and North-East parts, with annual rainfall less than 600mm. With respect to the geographical features of Nigeria, and the country's high vulnerability index as a developing nation, the adverse impact of climate change will affect the core areas of our national circumstances (Adefolalu, 2007; Oladipo, 2012).

The location, size, characteristics and relief of Nigeria give rise to a variety of micro climates ranging from tropical rainforest climate along the coasts to the Sahel climate in the northern parts of the country (Oladipo, 2012). Based on 2006 census, Nigeria has a population of about 160 million people whose activities impact on the physical environment through their various activities within an area of about 924,000 square kilometers (FGN, 2006). This, coupled with variability in elements of climate such as rainfall and temperature expose several physical and socioeconomic sectors in the country to the impact of climate change. For instance, climate change will lead to a shift in the boundaries of major ecological zones, alter animal and plant composition, aggravate soil erosion and flooding in areas of higher rainfall, heighten drought and desertification in the marginal arid zones of the country as well as salt water intrusion along the coastal belt (Nwafor, 2006; Afiesimama, 2010). Climate change will also impact the agricultural sector. Agriculture remains a major source of food, industrial raw materials and a means of earning foreign exchange. It employs close to 70 per cent of the Nigerian population. Agricultural practice in the country is dominantly rain-fed and therefore particularly vulnerable to the impact of climate change (Odjugo, 2009; Oladipo, 2012).

Similarly, livestock production, which involves the herding of cattle, goats and sheep raised principally in the northern states, is also heavily dependent on rainfall (Olaniran, 2002).Apart from food supply, asny significant rise in marine and freshwater temperature as a consequence of climate change will impact adversely on fisheries just as saltwater intrusion would seriously damage inland fisheries in rivers, lakes and aqua-cultural installations leading to loss of job among fishermen (Ayoade,

2003). Although the country is well-endowed with water resources, the demand has always continued to outstrip the supply and it has been projected that by the year 2030, the demand for water will rise to 34,563 million litres per day while supply will only be 16,997 million litres per day. While one is tempted to assume that enhanced rainfall that may be associated with climate change may naturally benefit water resources sector, low groundwater, and low volume of water in the rivers to the extent of even impairing hydroelectricity generation with respect to energy. It is a two-way vulnerability for Nigeria (Adebayo, 1998; Oladipo, 2012). The increasing frequency of disasters and projections of likely impact of climate change indicated that our children are especially vulnerable and will bear the impact of climate change over their lifetime. It is evident that adults cannot exclusively decide on a matter that affects our present as well as future without the input from their children, who are enriched with knowledge, based on available information as to transform their attitudes and practices towards the environment.

One of the descriptive studies at primary education level was conducted by Bozkurt and Cansungu (2002); it shows that because the students were not well- informed about climate change and greenhouse effect, they had a lot of misconceptions about it. The other studies conducted at primary school level also reveal that students had considerably low level of knowledge about greenhouse effect, ozone layer and acid rains (Bozkurt and Aydogdu, 2004; Darcin, Bozkurt, Hamalosmanoglu and Kose, 2006). Another study shows that although the high school students had a good knowledge about the results of global warming and the precautions to be taken to slow it down, they had different conceptual misconceptions (Kilinc, Stanisstreet and Boyes, 2008). In the studies conducted at university level, the students had various misconceptions about ozone layer, biosphere, greenhouse effect, acid rain and the environmental education was inadequate (Erol, 2005; Pekel, 2005; Oztas and Kalipci, 2009).

Climate change is different from the generally known terms like climatic fluctuations or variability. Climate fluctuation or variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes) of the climate on all spatial and temporal scales beyond that of individual weather events.

Like climate change, variability may be due to natural internal processes within the climate system (internal variability) or variations in natural or anthropogenic external forces (external variability). The most crucial things about the concept of climate change is not only the time or periods involved but also the degree of variability that the change is subjected to as well as the duration and impact of such variability on man and the ecosystem. Consequently, Nigeria's efforts and actions must be informed by these realities. For example, it is estimated that in the Sudan-Sahel area of Nigeria, between 89,297 and 133,944 square kilometers of arable land would be at risk. It is estimated that the capital value at risk stands at about US$6.4 billion for the current level of development, (NCCC, 2003). Faced with such a threat, collective action among countries has become a necessity. Notably, a number of countries have been working together to reduce emissions: Vienna Convention in 1985, Montreal Protocol in 1987, Rio Declaration in 1992, Kyoto Protocol in 1997, Buenos Aires Climate Summit in 1998, Marrakesh Agreement in 2001, Bali-Climate Change Conference in 2007, and Ponzan Climate Conference in 2008. In December 2009, Nigeria like many other countries had the opportunity to address its climate change issues at Copenhagen, Denmark and recently, in Paris from November 30th to December 11th, 2015.

Nigeria is vulnerable to the adverse impact of climate change, in this regard, the most important significant impact of climate change on energy will include higher electricity demand for heating, cooling and pumping water; reduced availability of hydroelectricity and fuel woodas well as extensive damage on petrochemical industrial installations presently concentrated in the coastal belt. Inadequate supply of power could force closure of many industries, thereby rendering several Nigerians jobless. This, in turn, will aggravate the country's existing macroeconomic problem of unemployment. Products from such industries will become unavailable and where available through importation, the prices are beyond what an average Nigerian can afford. (Odjugo and Ikhuoria, 2003).The numerous industries clustering around Nigeria's seaports are seriously threatened by sea level rise. Most petrochemical industrial installations are concentrated along the coastal zones as offshore and onshore installations in the country. Accelerated sea level rise associated with climate change poses significant threat to all these installations. In an event of extreme

climate change hazard of sea level rise, not only will lives be lost, irreparable damages would occur in all the country's oil installations due to the rising ocean waves. The country's foreign earnings will also be affected, which in turn will affect the country's economic performances in the short and long runs (Chindu and Nyelong, 2005; Oladipo, 2012). It is now know, that children who are aware and involved in the knowledge gathering and sharing of the issues of climate change can be effective agents of change, hence the initiative to actively involve children in decisions and actions that will directly affect their future. Meanwhile, not much has been done in the area of climate change education, especially in experimenting in different strategies that can impact positively on the knowledge, attitude and practice of the citizens. Teachers'proficiency on their subject matter is one thing while knowing how to engage their students and transmit that knowledge is another. The instructional strategies necessary for teaching climate change concepts in Social Studies must have characteristics of giving students the freedom to build their understanding by actively using imagination, communication and thinking skills as it has been suggested by the constructivists' learning model.

Efforts to address the problem arising from climate change had led scholars to carryoutresearch on climate change education. Some of these researches focus mainly on the public perception of climate change issues in African cities (Adelekan and Gbadegesin, 2004), climate change adaptation and mitigation in the food and agriculture sector (FAO-ROME, 2008), climate and weather related issues, public attitudes and behaviour about climate change (Patchen, 2006), impact, adaptation and vulnerability to climate change (Hanson, 2007), reframing the climate change challenge in light of post-2000 emission trends (Anderson, 2008). In the school system, efforts to address climate change issues have led educators to use Social Studies as a subject for instilling knowledge, attitude and reduction practices towards climate change as well as climate change and the environment: the need for environmental education (Amosun and Oderinde, 2009), secondary school students knowledge of and attitude to climate change issues in Ibadan (Amosun and Aderinwale, 2012). Social Studies deficiency in fulfilling its objectives in this regard has been traced to the adoption of ineffective instructional strategies such as lecture method, dictation and note taking, for a subject that requires interactive techniques for

development and sustenance of problem solving skills has seriously impeded the learning outcomes (Okebukola, 2001; Amosun and Oderinde, 2009; Falaye and Okwilagwe, 2016).

Teachers have failed to connect the school with the societal needs and circumstances by concentrating only on available instructional materials provided by the school (Okebukola, 2001). These ineffective instructional strategies have failed to provide opportunities for students' to participate in inquiry processes; engage in problem-solving and decision-making. These teaching strategies are inadequate to facilitate optimal learning in students and positive modification of behaviours towards the environment. To address this problem, educators had worked on strategies to effectively teach Social Studies; among such strategies are field trip teaching and learning strategy (Olatundun, 2008); full and quasi participatory strategies (Ajitoni, 2005); concept mapping and problem solving (Adekunle, 2005). Though, useful contributions had been made to the teaching and learning of Social Studies as the study of man's influence on the physical environment and the influence of the physical environment on man inreturn over the years, it is worrisome that environmental problems are still on the increase, especially climate change threat and vulnerability.

Therefore, to develop an effective information and education action, there is need to apply a bottom-up approach, starting from the ideas, opinions and attitude expressed from the targeted population. Climate change reality with deleterious effects has become a matter of urgency for the general public. Nigerian youths are rich in knowledge of environmental concepts but lack the skills to make environmentally sound decisions (Oztas and Kalipci, 2009; Kola-Olusanya, 2006; Erol, 2005; Pekel, 2005; Okebukola, 2001), hence the need for activities-based strategies, two of such are mentoring and field study instructional strategies. Studies have revealed some positive effects in the use of mentoring and field study instructional strategies on students' performance in the teaching and learning process in Geography, Geology, History, Medicine, Nursing, Creative-art, Engineering, Ecology and Anthropology. This is as a result of combination of several tools in lesson delivery session to cater for all individual differences and also appeal to learners' imagination, curriculum

contents and desirable change in engaging, explaining, exploring, elaborating and evaluating learners' outcomes. Effective teachers select instructional strategies appropriate to the context of the students, which require an understanding of how students behave, work and think (Snowman, Dobozy, Scevak, Bryer, Bartlett and Biehier, 2009). Determining and selecting appropriate teaching strategies requires deep analysis of contexts and individuals within social environments. Targeting an individual students' intelligence, Gardner's multiple intelligences, Sternberg's triarchic theory, and Stemberg's mental self-governing styles (Snowman et'al, 2009) with consideration of gender equity, cultural inclusion and recognition of the preferred learning styles becomes a higher-order thinking challenge for teachers. In addition, such challenges are placed on teachers during their field experiences. Teachers should be urged to make their teaching relevant to real life situation. Climate change education ought to be taught as a separate subject in the curriculum and the methods should be varied, holistic, activity-based, participatory, problem-solving and research-inherent.

Teachers have opportunities to learn about teaching strategies and how these are used in different contexts, since climate change has become a topic of public discussion in the last few decades, a considerable number of studies have examined the impact on people's attitude and behaviour relevant to climate change. Personal pro-environmental behaviour (such as reducing energy use in the home) and support for green policies (such as high fuel standards for cars) have been shown to be affected by a variety of factors. These include: worldviews, such as those about the relation of humans to nature; perception of personal and social risks; political philosophy, knowledge; the personal discomfort of given actions; the perceived efficacy of one's actions; perception of personal responsibility and social norms (Patchen, 2006; Atasoy and Erturk, 2008). While these studies are very useful in helping build our knowledge base, some limitations remain to our understanding of attitudes and behaviours concerning climate change which calls for this study. Since schools provide a vehicle for connecting theory with practice; teachers are considered pivotal to the development, conservation and preservation of the environment. Therefore, students should be taught alternatives to damning our environmental practices including bush-burning, water-wastage, deforestation and waste-disposal because

theycan learn about climate change through the activities of the conservation club, climate change club, green club or environmental education club, the screening of films and videos, resource-person-mediated-lectures and talks, mentoring, field study, exchange of visits, school-initiated essays and quiz competition on the environment.

Previous studies have pointed out that instructional strategies and methods have a very important role in the elimination of misconceptions and the teaching of climate change related knowledge, attitudes and practices (Anderson and Wallin, 2000) and students-centred strategies are needed rather than traditional instructional strategies (Khalid, 2003; Papadimitriou, 2004; Oluk and Ozalp, 2007). For instance, it has been pointed out that ensuring active students participation in all activities, giving them an opportunity to work in small collaborative groups (Anderson and Wallin,2000), conducting related field study activities and introducing environmental problems, especially climate change through effective strategies that trigger students' curiosity and attract their attention (activities, video-show, diagrams, overhead-projector) may have positive effects on developing knowledge, attitude and practices related to climate change. Therefore, well-equipped teachers are needed to fulfill these tasks, so that students' awareness can be raised about climate change challenges, otherwise, students' will remain ignorant about climate change problems,hence, the researcher's choice of mentoring and field study instructional strategies to train teachers in the first place and students' in-turn to ensure a sustainable environmental-friendly society.

Mentoring is the process by which individuals share their experience, knowledge and skills with a protégé (mentee) to promote their personal and professional growth. Mentoring can also facilitate change, improvement and professional growth within teaching. There are conditions for effective mentoring such as: "(i) contextual support for mentoring; (ii) mentor selection and pairing; (iii) mentoring strategies and (iv) mentor preparation" (Hobson, Ashby, Malderez and Tomlinson, 2009), for which they demonstrated that the context for mentoring surrounds the mentoring process. Given that mentor selection occurs within the schools, either voluntarily or nominated by school executive, This study focuses on the mentor preparation and mentoring strategies within school contexts to cater for students' learning, as "it is important to understand whether and how differences in what is provided for students' affects their

work and satisfaction" (Kardos and Johnson, 2010, p. 41). The mentor's role and the teacher's mentoring experience can shed light on effective teaching of Social Studies.

Mentoring for effective teaching model (Hudson, 2010) has provided a framework for mentors to engage in purposeful mentoring practices. This model is statistically significant (Hudson, Skamp, and Brooks, 2005) and shows that the mentor's personal attributes surround the mentoring process with the mentor engaged in articulating system requirements, pedagogical knowledge and feedback. It also demonstrates how a mentor's modelling of teaching practices can aid students' development. This study draws upon the mentor's pedagogical knowledge as a framework for mentoring teaching strategies associated with students' learning on climate change. Within the model (Hudson, 2010), pedagogical knowledge entails: planning for teaching, time-tabling and timing teaching, preparation of resources, selecting teaching strategies, having appropriate content knowledge for student learning, problem solving, classroom management, questioning skills, implementation of the lesson structure and the mentor's viewpoints of teaching. Though organising human resources include the teacher's instructions, observations and intervention, it also involves students' enlisted as expert helpers, and support staff who scaffold students' learning. It shows that classroom management of students' (grouping students' and managing their behaviour) presented as a strategy towards scaffolding students' learning. Finally, hes highlighted that selecting and organising resources as teaching and learning aids (visual aids, auditory aids such as songs, rhymes, mnemonics, and games) were considered tools for engaging students' within their learning needs.

Field study strategy, is an instructional approach where teaching and learning process take place outside the four-walls of the classroom. Although, for any successful field study exercise to take place, there is need for adequate pre-field study preparation, field study planning and post-field study or follow-up activities. Field study relates to students' activities taking place in learning environments outside the traditional (conventional) classroom, such as office environments, his/hertorical areas, monuments and museums, national parks, zoos, wetlands, seaside and wildlife areas, etc. It is based on the supposition that the most valuable experiences of the students' are gained through images taken by the senses. It is connected with most educational

techniques and it often forms part of a project. It allows students' participate in the design of the educational activity and acquire in situ experience and knowledge through the research process (Kern and Carpenter, 1984; Moles, 1988). More particularly, it helps the students' acquire new knowledge and skills as well asdevelop interest and attitudes towards the study subject; in other words, it contributes so as the changes through learning to take place on knowledge, skills and attitudes levels (Knapp, 2000; Baron, 2010; Atchinson and Feig 2011). Field study is termed as one of the education methods (Hammerman 1980; McRae 1990; Priest 1993; Hammerman, Hammerman and Hammerman, 2000), which, according to Watts (Papadimitriou, 2002) are rooted in fields such as philosophy, epistemology and naturalism. Educationists such as Pestalozzi, Froebel, and Dewey were influenced by these fields and applied many of the ideas expressed therein in their teaching practice. Since the end of the 19th century, important educational movements have been developed in various countries focusing on the environment (the natural, in particular) as a learning field. Nowadays field study forms part of the curriculum of courses from a broad spectrum of sciences including geology, biology, archaeology, his/hertory as well as from various social sciences, while it is often implemented in many formal institutions' and adult education programme as part of the practical exercises undertaken by students. It appears that teaching strategies may be at the centre of effective learning, yet little is known about mentoring and field study instructional strategies for teaching and learning of Social Studies as a school subject which necessitated the use of these two strategies on the teaching and learning of climate change concepts in Social Studies, to bring about positive attitudinal change for sustainable existence and development in the environment through the learners' environmental-friendly attitudes.

Attitude could be defined as a consistent tendency to react in a particular way-often positively or negatively – toward any matter. Attitude possesses both cognitive and emotional components. Fazio and Roskes (1994) assert that attitudes are important to educational psychology because they strongly influence social thought, the way an individual thinks about and the processes of social information. Literature is replete with examples of how teachers' attitude affects their actions and students' achievement (Amosun, Oyekanmi and Ige, 2010). For instance, Raji and Ayoade

(2004) are of the view that positive attitudes are fundamental to effective teaching and learning. The teacher is expected to use methods that would arouse and sustain the interest of the students. These could be better achieved when teachers are enthusiastic, caring, firm, and democratic, among others. With regards to school location, Isiugo-Abanihe and Labo-Popoola (2004) assert that in Nigeria, there are many infrastructural, social and psychological differences between urban and rural neighbourhood, likely to influence students' development and, invariably their learning. Meanwhile, some studies have examined locational planning and their attendant consequences on the examined performances of students in various states of the federation. According to Mbaekwe (1986), these studies were intended to assist education authorities of various states to decide where a particular type of school should be located; the size of a school in each location; whether a new school should be built or otherwise among others. Boylan and Meswan (1978) reported that rural schools were inferior and lacking in the range of facilities with high staff turnover and suffering from lack of continuity in their curriculum.

Other variables that affect students' knowledge, attitudes and practices on climate change concepts in Social Studies include gender and schools location. Obe (1984) observes a significant difference between rural and urban academic performances of 480 primary six school finalists on the aptitude tests of the National Common Entrance Examination into Secondary Schools. He concludes that children from urban schools were superior to their rural counterparts. Owoeye (2002) held similar view as Obe that there was a significant difference between academic performances of students' in rural and urban areas in public examinations. Ajayi and Ogunyemi (1990) as well as Gana (1997) on the relationship between academic performances and school location reveal that, there was no significant difference between academic performances of students' in urban and rural schools. Ajayi (1999) find no significant difference between academic achievement of rural and urban secondary school students. Ariyo (2006) carried out a study on school location as a correlate of students' achievement and the findings indicate that school locations have effects on students' performances. Bradley (2005) opines that school location has a significant effect on the academic performances of students. Trickett in Freeman and Anderman (2005) found that students in urban schools were significantly more focused on

mastering the material or skill required in their school work than those in rural settings. According to Kardos and Johnson (2010), students' in rural schools perform below their urban counterparts, but other studies using the same national data set have reached different conclusions. This contradicts some findings which noted that, school location has no significant effect on academic performances of students (Yusuf and Adigun, 2010).

Some studies have shown that certain variables such as gender are capable of influencing learning outcomes. Macdonald and Hara (2010); Olatundun (2008) and Adekunle (2005) reported that female students had the higher environmental knowledge and attitude means' scores than their male counterparts. On the other hand, Wang (2010) and Abiona (2008) find there was no significant difference between the environmental knowledge and attitude of male and female students, though there was a slight difference in their performances. Thisconnotes that the influence of gender on learning outcomes in environmental education is still a controversial issue. There have been controversial issues on gender differences in academic achievement with respect to Social Studies. For instance, studies have shown that, on the average, girls do better in school than boys and complete high school at a higher rate compared to boys (Okpani, 2003; Oniye, 1993), and do better at spelling, literacy, writing and general knowledge (FGN/UNICEF, 2001; Ajayi, 2002; Okebukola, 2004). Moser and Dilling (2006) affirm that attitudinal behaviour towards climate change is determined by gender, because women are more vulnerable to climate change. Further research is, therefore, needed to examine whether gender could influence environmental literacy of individuals especially on climate change concepts. Wigfield, Battle, Keller and Eccles (2002)show that, on average, girls do better in school than boys. Girls get higher grades and complete high school at a higher rate compared to boys (Jacobs, 2002).

1.2 Statement of the Problem

Climate change is a natural phenomenon which has adverse effects on human's way of life, health, agriculture, urbarnisation and sustainable development. The increasing frequency of disasters and projections of likely impact of climate change indicate that

our children are especially vulnerable and will bear the impact of climate change inyears to come. Efforts to address problems arising from climate change had led scholars to research into climate change education. Such researcheshave focused mainly on the public perception of climate change issues, climate change adaptation and mitigation, climate and weather related issues, public attitudes and behaviour about climate change, other efforts which include sensitisation programme such as seminars and workshops. All these and others do not address the problem from classroom point of view. Also, the adverse effect of climate change has, led to inclusion of its concepts in Social Studies curriculum at the Junior Secondary School (JSS) level. Notably, these concepts are not properly handled due to the adoption of teaching strategies that do not allow students interact. It has been rightly suggested that group interactive strategies would be of tremendous benefit in helping students' learn climate change concepts better. Mentoring and field study instructional strategies are such interactive strategies that could be effective in teaching climate change concepts in Social Studies to fill observed gaps. Therefore, this study determined the effects of mentoring and field study instructional strategies on students' learning outcomes in climate change concepts in Social Studies in Lagos State. The moderating effects of gender and school location were also examined.

1.3 Hypotheses

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

Ho_1: There is no significant main effect of treatment on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_2: There is no significant main effect of gender on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_3: There is no significant main effect of school location on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_4: There is no significant interaction effect of treatment and gender on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_5: There is no significant interaction effect of treatment and school location on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_6: There is no significant interaction effect of school location and gender on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

Ho_7: There is no significant interaction effect of treatment, gender and school location on students'

(a) Knowledge of climate change concepts,

(b) Attitude to climate change, and

(c) Climate change reduction practices.

1.4 Scope of the Study

This study covered some selected secondary schools in Lagos State. The schools were selected from the five administrative divisions of Lagos State, consisting of Badagry, Epe, Ikeja, Ikorodu and Lagos, grouped into two, namely; Lagos Mainland and Lagos Island. It also examined students' knowledge, attitude and reduction practices of climate change problems. The following contents were covered: Meaning of environment, types of environment, for example, bio-physical and social environment, features of the bio-physical environment such as weather, climate, seasons in Nigeria (dry and wet), vegetation, (afforestation and deforestation), influence of human being on the bio-physical environment such as greenhouse gases and effects, ozone layer depletion, air-pollution and influence of the bio-physical environment on human activities such as global warming, flood, erosion, storm, drought and water supply shortage.

1.5 Significance of the Study

The aim of this study was to determine the effects of mentoring and field study instructional strategies on secondary school students' knowledge of, attitude to, and reduction practices of climate change problems in Lagos State. The expected findings of the study would have the following significance: It would create awareness on the level of students' knowledge, attitude and reduction practices of climate change problems. This study would generate useful information for educators and curriculum planners on social studies curriculum design. It would also be used as baseline information for researchers who want to conduct further researches into climate change. It would enlighten the teachers and students' about mentoring and field study instructional strategies in teaching and learning of climate change concepts in social studies. It would enhance students' active-participatory learning opportunities. It would educate the students on the need for gender equality in the teaching and learning of Social Studies. It would help inculcate in the students' attributes of a mentor-mentee relationship.

1.6 Operational Definition of Terms

Climate change: Thisis a change in climate attributed directly or indirectly to human activities that alter the composition of the global atmosphere, in addition to natural climate variability observed over comparable time.

Knowledge of Climate change: This is the state of acquiring ideas, and experience gained from exposure to activities in climate change concepts, which assist the students as individual or group in finding solution to climate change threat in the society.

Attitude to Climate change: This refers to students'state of acquiring mental predisposition to behave and show a sense of responsibility and urgency as wellas readiness to solve climate change problems.

Reduction practices: This practice refers to students' engagement or involvement in environmental protection activities to reduce the problem of climate change such as planting of trees, proper disposal of solid and liquid wastes as well as energy saving activities (switching off electrical gadgetswhen not in use).

Mentoring Instructional strategy: This is the process by which an experienced personnel guide a less experience one, sby way of example, support and guidance to ensure positivelearning outcomes. (Mentor is the teacher and mentee is the student).

Field Study Instructional Strategy: This implies students' learning activities taking place outside the conventional classroomenvironment. It is based on the supposition that the most valuable experiences of the students' are gained through images taken by them.

School Location: This implies the locality or environment where the school is sited or situated/built in particular. That is, Lagos Mainland and Lagos Island. Mainland is the upland areas of Lagos State and Island is the low land areas of the State.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews relevant literature to the study. Review of literature was done under the following sub-titles:

2.1 Theoretical Framework

The underlying premise for this study is founded in constructivist theory. Constructivism can be seen as a philosophy as well as a set of instructional practices. As a philosophy, constructivism suggests that although there is a real world out there, there is no meaning inherent in it. Thus, meaning is imposed by people and cultures. As a set of instructional practices, constructivism favour's processes over end products; guided discovery over expository learning; authentic, embedded learning situations over abstracted, artificial ones; portfolio assessments over multiple-choice examinations, and so on. This distinction may suggest that one can be a constructivist in philosophy without always using constructivist teaching methods.

Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of mental construction. Knowledge is not received from outside, but by reflecting on our experiences, by fitting new information together with what we already know; we construct knowledge in our head. Thus, we construct our own understanding of the world we live in. Learning is the process of adjusting our mental models to accommodate new experiences. Constructivist theorists support that people learn best when they actively construct their own understanding.

In the Constructivist theory emphasis is placed on the learner rather than the teacher. It is the learner who interacts with objects and events and thereby gains an understanding of the features held by such objects or events. The students' individually discover and transform complex information constructing their own conceptualisations and solutions to problems. In constructivist thinking, learning is also affected by the context, beliefs and attitudes of the learner.

There are two major strands of the constructivist perspective: Cognitive constructivism and social constructivism; although different in emphasis they share the same basic assumption about learning. Jonassen (1994) proposed that there are

eight characteristics that differentiate constructivist learning environments. These eight characteristics would be supported by social and cognitive constructivists:

1. Constructivist learning environments provide multiple representations of reality.
2. Multiple representations avoid oversimplification and represent the complexity of the real world.
3. Constructivist learning environments emphasise knowledge construction inserted of knowledge reproduction.
4. Constructivist learning environments emphasise authentic tasks in a meaningful context rather than abstract instruction out of context.
5. Constructivist learning environments provide learning environments such as real-world settings or case-based learning instead of predetermined sequences of instruction.
6. Constructivist learning environments encourage thoughtful reflection on experience.
7. Constructivist learning environments enable context- and content- dependent knowledge construction.
8. Constructivist learning environments support collaborative construction of knowledge through social negotiation, not competition among students for recognition.

A major theme in the theoretical framework of Bruner (1966) is that learning is an active process in which students' construct new ideas or concepts based upon their current/past knowledge. Bruner's work emphasised the importance of understanding the structure of a subject being studied, the need for active learning as the basis for true understanding and the value of reasoning in learning. His constructivist theory is a general framework for instruction based upon the study of cognition.

In Bruner's constructivist theory,students' engage in discovery learning obtaining knowledge by them. They select and transform information, construct hypotheses and make decisions, relying on a cognitive structure to do so. In order for discovery to occur,students' require background preparation in the form of a cognitive structure that provides meaning and organisation to experiences and allows the individual "go

beyond the information given".Bruner emphasised teaching as a means of enhancing cognitive development; hence the task of the teacher is to translate information to be learned into a format appropriate to the students' current state of understanding. The instructor should try and encourage students' to discover principles by themselves, and students' and teachers should engage in an active dialogue (Socratic learning). Curriculum should be organised in a spiral manner so that students continually builds upon what they have already learned.

Bruner (1968) states that a theory of instruction should address four major aspects:

1. Predisposition towards learning.
2. The ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner.
3. The most effective sequences in which to present material.
4. The nature and pacing of rewards and punishments.

Good methods for structuring knowledge should result in simplifying, generating new propositions, and increasing the manipulation of information. Social constructivism emphasises the importance of culture and context in understanding what occurs in society and constructing knowledge based on this understanding (Deny,1999; McMahon,1997).This perspective is closely associated with many contemporary theories, most notably the developmental theories of Vygotsky, Bruner and Bandura's social cognitive theory (Shunk,2000).

The philosophical paradigm of constructivism stresses the social construction and negotiation of meaning as part of constructivist epistemology (Cobb, Wood and Yackel, 1994, Cobb, 1995, Driver, 1989, Wheatley, 1991). Justification for this has come from several areas, ranging from psychology, philosophy to sociology of education. Wertsch and Toma (1994), in discussing the need for a sociocultural approach to learning in the classroom asserted that key aspects of mental functioning can be understood only by considering the social contexts in which they are embedded.Piaget (1970) using psychology and sociology as bases, argued that the collective intellect is the social equilibrium resulting from the interplay of the operation that enter into all cooperation. While Bruner's (1968) ideological shift to

construction of meaning is exemplified by his/her statement that; *I have come increasingly to recognise that most learning in most settings is a communal activity, a sharing of culture it is this that leads me to emphasise not only discovery and invention, but the importance of negotiations and sharing — in a word of joint culture creating (p.127).*Formal schooling is a sub-culture of the large society where a lot of activities are carried out (Hennessy, 1993) and a common knowledge about concept and ideas is meant to develop through organised activities (Edward and Mercer, 1987). In such a setting apprenticeship becomes a viable mode of learning. Apprenticeship takes place in the context of poor-interaction and collaboration. According to Hennessy (1993), discussions and negotiation in-group work situation will provoke a more meaningful engagement with the problem-solving processes that teachers want to encourage, as opposed to the conventional classroom situation in which individual learning, teacher's dominance and little interaction take place with regards to gender inequality. There are four major theoretical perspectives related to cooperative learning and achievement, these are motivational, social cohesion, cognitive developmental and cognitive elaboration (Slavin, 1995).

Motivational Perspective: motivational-perspective on cooperative learning focuses primarily on the reward or good structure under which students' operates (Slavm, 1995).

Social Cohesion Perspective: This holds that the effects of cooperative learning on achievement is strongly mediated by the cohesiveness of the group, in essence that students' will help one another learn since they care about one another and want one another to succeed.

Cognitive Developmental Perspective: one widely researched set of cognitive theories is developmental perspective (Daman, 1984). The fundamental assumption of the developmental perspective on cooperative learning is that interaction among students' around appropriate tasks often increases their mastering of critical concepts.

Cognitive Elaboration Perspective: This in cognitive psychology has long held that if information is to be retained in memory and related to information already in memory, the learner must engage in some sort of cognitive restructuring or elaboration of the material (Wittrock, 1986). One of the most effective means of elaboration is explaining the material to someone else.

Bruner (1973) stated that most constructivists, call for instructional intervention, that is, for teachers to provide learning activities designed not only to match but to accelerate movement through developmental stages. They also feel education should provide learners with more opportunities for cognitive growth through exploration, unstructured learning and problem-solving, since teachers could encourage active participation of students' in the teaching and learning process. Active- participation of students' was best achieved by providing discovering-learning environment that would let students' explore alternatives and recognise the relationship between ideas and skills.

Plato in Akinkuotu (2001) defined "good education" as providing for the body and the soul all the beauty and perfection of which they are capable. Education relates to some sort of processes in which a desirable state of mind develops, it implies the intentional bringing about of mind to call something education is to intimate that process and activities(Peters, 1967; Oyekanmi, 1998).Education is also seen as a process through which an individual becomes integrated into his society, becomes a promoter of his societal culture, a contributor to the development of his society and becomes an adult who will be able to stand on his/her own (Osokoya, 1987; Lawal, 2004; Babarinde, 2006). Bronfenbrenner (1990) affirmed in his ecological system theory renamed bio-ecological system theory that a child's maturing biology, his/her immediate family/community environment, and the societal landscape fuels and steers his/her development. Changes or conflict in any one layer will ripple throughout other layers. To study a students' development then, we just look not only at the learner and his/her immediate environment, but also at the interaction of the larger environment,the various terms in the diagram below explained their implications in the theory:

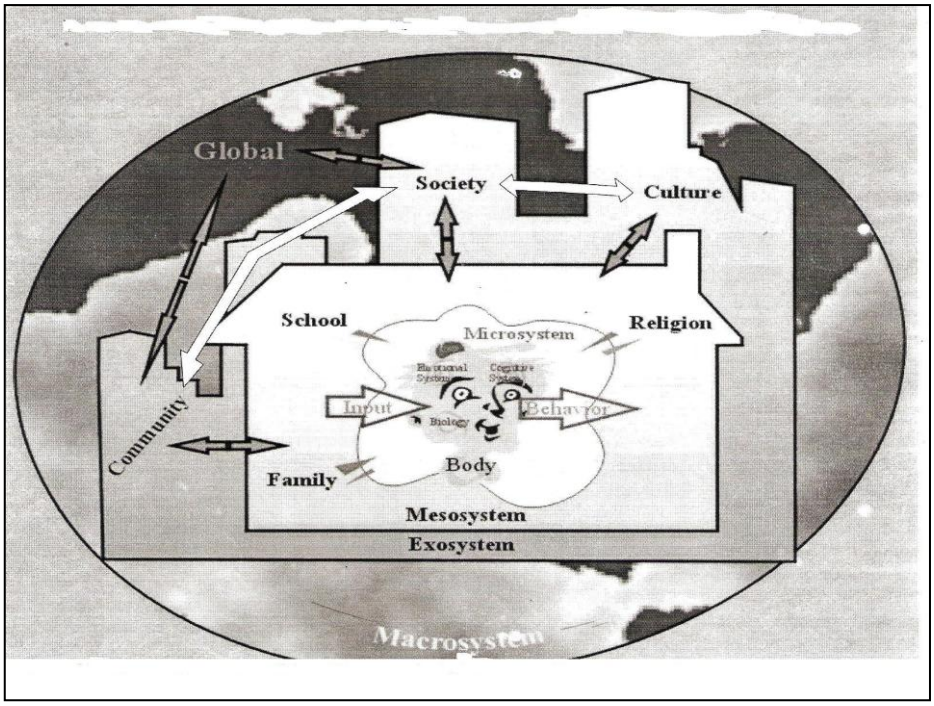

Fig 2.1 Bronfenbrenner's Structure of Environment (1990)

The Micro System: This is the layer closest to the child and contains the structures with which the child has direct contact. The micro system encompasses the relationship and interactions a child has with her immediate surrounding (Berk, 2000). Structures in the micro system include family, school, neighbourhood are childcare environments. At this level, the relationships have impact in two directions away from the child and toward the child. For example, a child's parents may affect his/her beliefs and behaviour; however, the child also affects the behaviour and belief of the parent. Bronfenbrenner calls these Bi-directional influences, and he shows how they occur among all levels of environment. The interaction of structures between layers is keen to this theory. At the micro system level the greatest impact is on the child. However, interactions at outer levels can still impact the inner structures.

The Meso-System: This layer provides the connection between the structures of the child's micro-system (Berk,2000), for instance, the connection between his/her church and neighbourhood.

The Exo-System: This layer defines the larger social system in which the child does not function directly. The structures in this layer impact the child's development by

interacting with some structure in his/her micro-system (Berk, 2000), parentsworkplace schedules or community-based family resources are examples. The child may not be directly involved at his level, but he/she does feel the positive or negative force involved with the interaction with his/her own system.

The Macro-System: This layer may be considered the outermost layer in the child's environment while not being a specific framework; this layer is comprised of cultural values, customs and law (Berk, 2000). The effect of larger principles defined by the macro-system has a cascading influence throughout the interactions of all other layers. For example, if it is the culture that parents should be solely responsible for raising their children, that culture is less likely to provide resources to help parents. This in turn, affects the structures in which the parents function. The parent's ability or inability to take careof their child within the context of the child's micro-system is likewise affected.

The Chrono-System: This system encompasses the dimension of time as it relates to a child's environment. Elements within this system can either be external, such as the timing of a parent's death, or internal, such as the physiological changes that occur with the aging of a child. As children get older, they may react differently to environmental changes and that change will influence them.

More modern child development theories accept that a child's biology and his/her environment play a role in change and growth. Theories flow focus on the role played by each and the extent to which they interact in ongoing development. Bronfenbrenner's ecological system theory focuses on the quality and context of the child's environment. He states that as a child develops, the interaction within these environments becomes more complex. This complexity can arise as the child's physical and cognitive structures grow and mature. So, given that nature continues on a given path, how does the world that surrounds the child help or hinder continued development as well as academic achievement? This is the question answered by Bronfenbrenner's theory, which has a correlate with the focus of this present study. However, it is clear that to bring about a desirable change in man (human being) as regardsthe transmission of knowledge, skill, value, custom, norms and tradition from one generation to another there is need for education via apprenticeship. Apprenticeship is an inherently social learning method with a long his/hertory of

helping novices become experts in fields as diverse as midwifery, construction and law. At the centre of apprenticeship is the concept of more experienced people assisting less experienced ones, providing structure and examples to support the attainment of goals. Apprenticeship has been associated with learning in the context of becoming skilled in a trade or craft—a task that typically requires the acquisition of knowledge, concepts and perhaps psychomotor skills and the development of the ability to apply the knowledge and skills in a context-appropriate manner—and far predates formal schooling as it is known today. In many non-industrialised nations, apprenticeship remains the predominant method of teaching and learning. However, the overall concept of learning from experts through social interactions is not one that should be relegated to vocational and trade-based training while secondary and higher educational institutions seek to prepare students' for operating in an information-based society.

Apprenticeship as a method of teaching and learning is just as relevant within the cognitive and meta-cognitive domain as it is in the psychomotor domain. In the last 20 years, the recognition and popularity of facilitating learning of all types through social methods have grown tremendously. Educators and educational researchers have looked to informal learning settings, where such methods have been in continuous use, as a basis for creating more formal instructional methods and activities that take advantage of these social constructivist methods. Apprenticeship— essentially, the use of an apprentice model to support learning in the cognitive, affective and psychomotor domainis one such method that has gained respect and popularity throughout the 1990s and into the 2000s.

Scaffolding, modelling, mentoring, and coaching are all methods of teaching and learning that draw on social constructivist learning theory, they promote learning that occurs through social interactions involving negotiation of content, understanding and learner needs and all three generally are considered forms of apprenticeship (although they are not the only methods). This chapter first explores prevailing definitions and underlying theories of these teaching and learning strategies and then reviews the state of research in these areas.

One of the challenges when researching or discussing apprenticeship in general, and the techniques of scaffolding, mentoring, and coaching in particular, is getting a clear sense of how the terminology is being used. There is no standard taxonomy or classification of these social constructivist methods; for example, some refer to mentoring and/or coaching as a form of scaffolding (McLoughlin, 2002), some refer to scaffolding as an aspect of coaching (Collins, Brown, and Newman, 1989), and others maintain that they are separate strategies falling under the larger classification of apprenticeship (Enkenberg, 2001). In addition, the terms, coach and mentor are commonly used in everyday practice to identify people who play particular roles regardless of whether the learning support they foster and provide truly falls within the pedagogical definitions of the terms. However, the work being done in this overall area appropriately tends to focus more on improving teaching and learning than on developing consistency in terminology, the terms nevertheless are important to our ability to discuss, share and further knowledge in apprenticeship. This section presents the dominant thought and definitions related to apprenticeship, scaffolding, modelling, mentoring and coaching.

Apprenticeship is learning that occurs when experts and novices interact socially while focusing on completing a task; the focus, as implied in the name, is on developing cognitive skills through participating in authentic learning experiences. Collins, Brown and Newman (1989, p. 456) succinctly define it as '"learning-through-guided-experience on cognitive and metacognitive, rather than physical, skills and processes." Core to apprenticeship as a method of learning are the concepts of situatedness and legitimate peripheral participation, both described by Lave and Wenger (1991). Situated learning occurs through active participation in an authentic setting, founded on the belief that this engagement fosters relevant, transferable learning much more than traditional information-dissemination methods of learning. However, it is more than just learning by doing; situated learning requires a deeper embedding within an authentic context. Human actions of any nature are socially situated, affected by cultural, historical, and institutional factors (Wenger, 1991). This situatedness is a key component of the learning environment and thus needs to be considered in apprenticeship.

Learning in apprenticeship occurs through legitimate peripheral participation, a process in which newcomers enter on the periphery and gradually move toward full participation. It is not a technique or strategy, as it tends to happen quite naturally on its own. Legitimate peripheral participation is perhaps easiest to understand through a workplace example of traditional apprenticeship. Lave and Wenger (1991) present an example of legitimate peripheral participation as apprentices learn the trade of becoming a tailor. For instance, the apprentices, whose involvement starts with both initial preparations for the tailors' daily labour and finishing details on garments. The apprentices progressively move backward through the production process to cutting jobs (This kind of progression is quite common across cultures and historical periods). Under these circumstances, the initial "circumferential" perspective—running errands, delivering messages, or accompanying others—takes on new significance: It provides a first approximation to an armature of the structure of the community of practice. (p. 96).

Basically, the apprentices learning about the overall process of the larger task and profession and criteria for evaluating performance through the completion of small tasks. As they gain experience, they are offered larger, more central tasks to complete. Their understanding of how these tasks affect the end product in a holistic manner supports their performance, as does their knowledge of the criteria that will be used to assess the end product.

What does this mean for school-based education? Brown (1998), "the central issue in learning is becoming a practitioner, not learning about practice" (p. 230). In argument for adopting apprenticeship in formal educational settings, Enkenberg (2001) criticises university education because the learning tends to occur separately from expert practice. This separation is problematic because expert practice is critical to real-world performance and is difficult to simply teaching by lecture or explanation. For many of today's students', skills and knowledge are being taught in an abstract manner, which makes it difficult for them to apply them in concrete, real-world situations (Collins et al., 1989). The implications of this problem, taken to the extreme, are that our schools could rely solely on information transmission methods of instruction and universities could rely solely on faculty and graduate students' who

know many facts but are ill prepared to apply them in a practical context to provide educational experiences. Although the reality is not this extreme, many students' still fail to see the relationship between traditional school-based learning and real-world applications, and many educators who are competent practitioners fail to provide learning experiences that adequately connect theory to practice. During the last two decades, educational researchers have been addressing this problem by looking for ways to integrate apprenticeship in the classroom, hence the need for this study: Effects of mentoring and field study instructional strategies on students' learning outcomes in climate change concepts in Social Studies in Lagos State.

Teaching and learning through apprenticeship requires making tacit processes visible to students' so they can observe and then practice them (Collins et al., 1989). The following methods support the goals of apprenticeship (Enkenberg, 2001, p. 503)

1. **Modelling:** meaning the demonstration of the temporal process of thinking.
2. **Explanation**: explains why activities take place as they do.
3. **Mentoring/Coaching**: meaning the monitoring of students' activities and assisting and supporting them where necessary.
4. **Scaffolding**: meaning support of students' so that they can cope with the task situation. The strategy also entails the gradual withdrawal of teachers from the process, when the students' can manage on their own.
5. **Reflection**: the student assesses and analyses his/her performance.
6. **Articulation**: the results of reflection are put into verbal form.
7. **Field study/Explorations:** the students' are encouraged to form hypotheses, to test them, and to find new ideas and viewpoints.

Enkenberg's list is not considered the definitive one, but it nevertheless presents various strategies that may be used in apprenticeship. Collins et al. (1989) refer to modelling, coaching, and mentoring as the predominant methods of apprenticeship, with scaffolding mentioned as part of the coaching process. Note that these strategies refer to the teacher's or expert's actions; the students' in apprenticeship are engaged in acts of observation before active participation.

2.2 Conceptual Review of Literature

2.2.1 Social Studies and Climate Change Education

Social Studies is concerned with the reciprocal relationship between man and his physical environment and how he in turn tries to exert his/her own influence on the environment. Social Studies is generally perceived as a discipline that deals with the interaction of man in his environment. Mansaray (1991), Akinlaye, Mansaray and Ajiboye (1996) view Social Studies as an attempt to foster in young students', a better understanding of man's interactions with his physical and social environment.

Mansaray (1991) affirmed that Social Studies is concerned with fostering certain knowledge, skills, attitudes and values in students'. He further argued that the overall aim of teaching Social Studies is to prepare young students' for effective participation in the society. The main purpose of teaching Social Studies is to provide our young students' with the relevant knowledge to better understand their physical and social environment. It also develops in students, the skills and competences that they would need to tackle the problems and issues of their environments and thereby live as more functional members of the society.

Mansaray (1991) grouped the objectives of Social Studies under three broad categories

1. **Knowledge**: Understanding the evolving social and physical environment, acquiring basic fact and information about our environment etc.
2. **Skills**: Acquiring such basic skills as listening, speaking, reading and writing, skills of observation, data collection, analysis and inferences which are essential to the forming of sound judgment.
3. **Attitude and values**: Developing positive attitudes of togetherness, comradeship and cooperation, the inculcation of values of honesty, integrity, hard work, fairness and justice etc.

It is very important to recognise that teaching Social Studies is not only for the purpose of getting our students' to acquire certain aspects of knowledge, we are also interested in developing certain skills, attitudes and values in them.In Nigeria, Social

Studies is conceptualised in educational circles as a subject suitable for fostering certain knowledge, skills, attitude and values which are consistent with national aspiration, development and general goals of education (Adeyemi, 1986 in Nwaubani, 1996).

It could be said that the type of education that should be given to students' especially the youth should be one that is capable of developing their skills, encompassing all the domains of learning, cognitive, affective and psychomotor.In other words, it should be the type of education that is capable of ushering all round development in the students'. Climate change represents a significant environmental, social and economic threat and is now recognised by majority of the world's governments and scientists as an issue of extreme concern for the planet (Oreskes, 2004).

Climate change is a major threat to sustainable growth and development in Africa, and the achievement of the millennium development goals. Students' environmental knowledge, attitude and actions are particularly important and it appears that to assess their knowledge, attitude and reduction practices are crucial to take corrective measures (Adelekan,2009).There is need to incorporate adaptation and mitigation reduction practices to students' so as to inculcate in them the right attitudes that enhance a healthy climate and also to make them effective problem solvers in their environment.

Bamikole (2001) cited in Adenisoye (2006) opined that Social Studies has its particular mission, the tasks of helping young people develop competences that enable them deal with and to some extent, manage the physical and social forces of the world they live in. If appropriate knowledge, attitude and environmentally sound reduction practices are instilled in students', they can provide knowledge-based solutions for the prevailing environmental problems through mentoring and field study instructional strategies. Figure 2.2 indicates that a person's environmentally relevant behaviour at a given time is affected most directly by **(a)** his/her emotions (concern, anger, etc.) about the conditions of the environment**(b)** the expected benefits and/or cost of specific actions **(c)** his/her perceived ability to take specific types of actions and(**d)**his/her habits with respect to various actions. These variables are likely to be

affected, in turn, by his/her appraisals of the situation (the seriousness of environmental problems, what others are doing, the effectiveness of alternative actions etc). For example, a person who believes climate change will bring flooding to his/her coastal city is likely to be fearful about this prospect. Appraisals of the situation may also affect behaviour directly. For example, a person who believes that reducing the use of oil is a good way to fight global warming is more likely to buy a hybrid car than someone who (mistakenly) thinks that equipping industry with more pollution controls is the best answer to this problem.

A person's appraisals of the situation are likely to be influenced by his/her personal characteristics and by the influences to which he/she is exposed. For example, his/her knowledge about the environment may affect his/her view of the seriousness of environmental problems and the norms of people with whom he/she associates may influence his/her appraisal of his/her own responsibility for helping to solve such problems. Personal and social influences also may affect the person's emotions, expected benefits and costs, and perceived ability to take specific actions, geographic location may affect the availability of social channels for action; age may affect one's ability to take actions (to bicycle rather ride to work); economic position may affect the tax benefits of getting a solar heating system.

A person's personal characteristics and the social influences to which he/she is exposed may have some direct effects onhis/herbehaviour. For example, a person whose city provides a convenient recyclesprocedure and whose neighbours' express their approval of thisprogramme, is more likely to recycle than someone for whom recycling is inconvenient and whose neighbours' ignore the matter. Figure 2.2 also shows that a person's relevance to climate change, like his/her other behaviour is affected directly by habit. For example, despite having heard that riding a bus to work is cheaper and less stressful than driving, a person who always drives his/her car to work may tend to repeat this behaviour, almost without thinking. Habits are formed by repetition of the same behaviour. Therefore, the same factors (emotions and appraisal) that affect behaviour will, in the long run, affect habits.

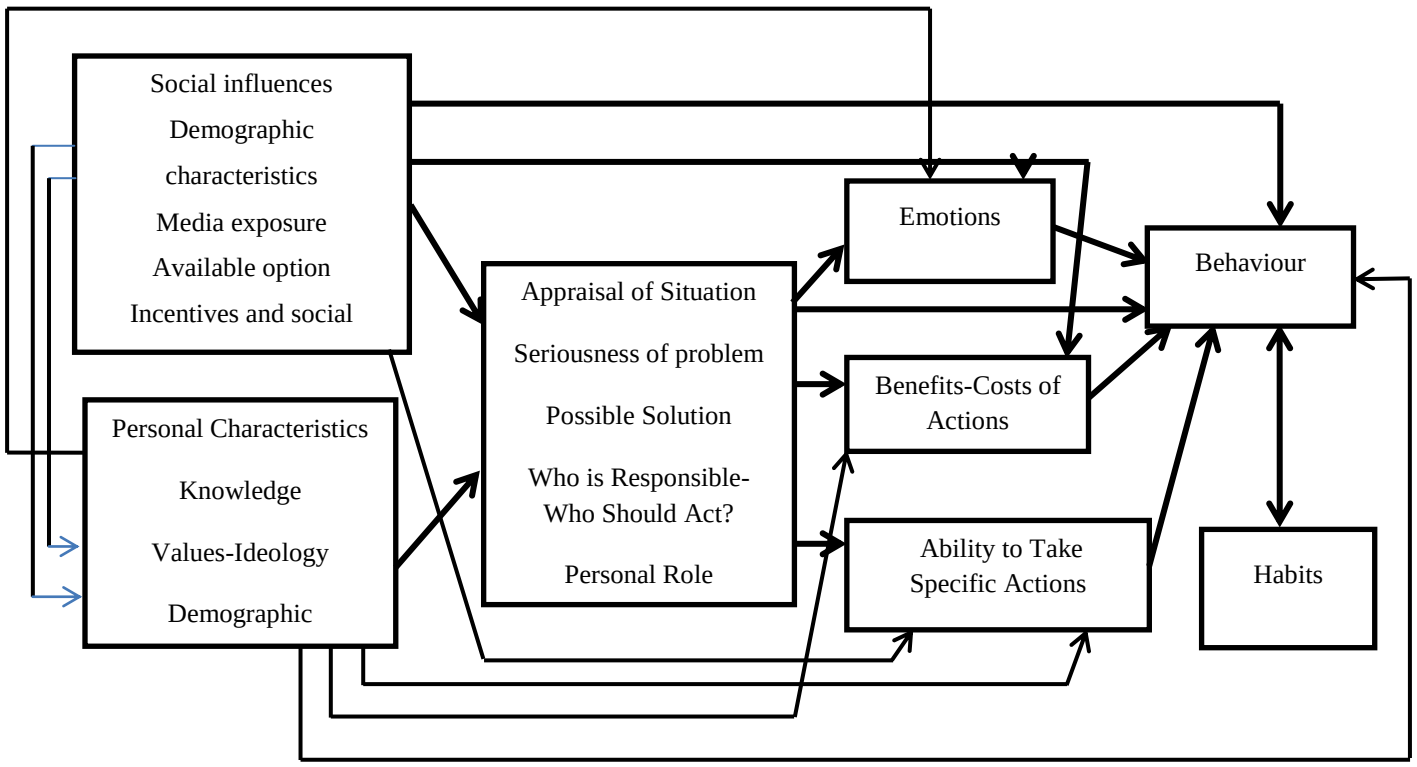

Fig2.2:Kollmuss and Agyeman's Model of Pro Environmental Behaviour (2002)

2.2.2 Historical Development of Lagos State

Lagos State is an administrative region of Nigeria, it is the smallest of Nigeria's states, the second most populous after Kano, and arguably the most economically important state of the country, containing Lagos, the nation's largest urban area. Lagos State was created on May 27, 1967 by virtue of State (Creation and Transitional Provisions) Decree No. 14 of 1967, which restructured Nigeria's Federation into 12 states, prior to this, Lagos municipality had been administered by the Federal Government through the Federal Ministry of Lagos Affairs as the regional authority, while the Lagos City Council (LCC) governed the city of Lagos. Equally, the metropolitan areas (Colony Province) of Ikeja, Agege, Mushin, Ikorodu, Epe and Badagry were administered by the Western Region. The State took off as an administrative entity on April 11, 1968 with Lagos Island serving the dual role of being the State and Federal Capital. However, with the creation of the Federal Capital Territory of Abuja in 1976, Lagos ceased to be the capital of the State which was moved to Ikeja. Equally, with the

formal relocation of the seat of the Federal Government to Abuja on 12 December 1991, Lagos ceased to be Nigeria's political capital; yet, Lagos remains the centre of commerce for the country. The State is essentially a Yoruba-speaking environment; it is nevertheless a sociocultural melting pot attracting Nigerians and foreigners alike. Indigenous inhabitants include the Aworis and Ogus in Ikeja and Badagry divisions respectively, with the Ogus being found mainly in Badagry. There is also an admixture of other pioneer settlers collectively known as the Ekos. The indigenes of Ikorodu and Epe divisions are mainly the Ijebus with pockets of Eko-Awori settlers along the coastland and riverine area(Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.1Geography and Early History of Lagos State

Lagos State has a land mass of about 3,577 square kilometers with about 787 constituting lagoons, swamps, marshes and creeks. It is regarded as the smallest state in the country; however, it has the highest population density in the nation. According to a 2006 census, it is considered the second most populous state in the federation. Lagos State borders Ogun State to the north and east, Atlantic Ocean to the south; it stretches for about 180 km along the Atlantic coast and also borders the republic of Benin to the West. Coastal areas of Lagos such as Badagry are situated in flat coastal plains and most areas in the state do not rise 700 meters above sea level. The state has about 22% of the nation's coast line mostly in Epe, Badagry, Ikorodu and Lagos. The state falls within the marine, brackish and freshwater ecological zones. Principal water bodies include Lagos, Lekki, and Ologe lagoons, Badagry and Porto Novo Creeks, Kuramo Waters and the RiversYewa, Ogun, and Osun.Early settlements around Lagos state was in Ebute Metta most likely in the 15th century when some Awori migrants left their hometown,Isheri during a period of war called Ogun Ajakaye . Ebute Metta was located along the Lagoon and quite fertile. Instability as a result of wars in Egba, Egbado and Ijebu areas further led to emigrants in areas such as Iddo, Oto, Ojora and Idido. Idido later become a market centre with a ruler called the Olofin. It was Aromire, Olofin's son who according to some Lagos traditions pioneered a farming and fishing settlement across the lagoon which became known as Oko. Many settlements in the burgeoning town became centres of commerce and soon attracted the Benin Empire from the east. Benin brought Lagos under its control and appointed Ashipa as Olorogun, the title later supplanted Olofin. Many settlers from

Benin later moved to the Enu-Owa region (Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

Lagos later grew in importance due to its strategic location along the lagoon. During the 18th century, the area became active in the slave trade. Lagos was later annexed by the British authorities in 1861. The area later witnessed significant growth and development in trade, politics, religion and commerce. New sets of Lagosians, mostly repatriated slaves soon became prominent community members towards the end of the 19th century. During the 1800s, Hausa settlers migrated to Lagos and many were re-settled in Obalende, some of the settlers became members of the colonial militia. In 1914, Lagos became the national capital(Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.2 Demographics

Lagos State being a former capital and the nation's leading commercial hub is a haven for migrants, wage workers and business people. Historically, the early settlers lived in areas known as Lagos Island, around Idumagbo, Isale Eko and Ebute Ero. A group of settlers from the Egbado areas settled in Isolo and Ikeja regions of the state, this group are called the Aworis. Other settlers include the Ijebus in Ikorodu and Epe, and Ogus in Badagry. Islam, traditional religion and Christianity co-exist in the state. Partly, due to the high influx of people coming to the state, there is tremendous pressure on land and high cost of living while many popular settlements gradually became populated and infrastructures were built contravening official planning regulations (Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.3 Urban Centres, Commerce, Industry and Agriculture

The Lekki zone of the state is arguably the fastest growing area in the state while significant population settlements abound all over the administrative divisions. Ajegunle and Mushin are popular slums; the former is close to Apapa, a port and wharf zone.Lagos State is Nigeria's largest commercial, financial and industrial hub. It has industrial zones around Ikeja, Apapa, Opebi, Ilupeju, Ogba, Matori, Oregun and Amuwo-Odofin with over 2000 small, medium and large scale industries. The location of major regional ports in Apapa and Tin Can Island has contributed to the

international significance of the state in West Africa(Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

The formal economic sector in the state is largely dominated by the service and manufacturing sector with metropolitan Lagos holding a large share of Nigerian banking and corporate entities. Other sectors include building and construction, transport, utilities and mining. The state also has a growing informal economy dominated by operators unable to be absorbed or employed by the formal sector, however, some government policies such as tax drives and planning violations seems to hint of intentions of discouragement. Many Lagos State residents work in the fishery, farming and the livestock industry. The government opened an abattoir in Agege and in Ojo to ease bottlenecks in the livestock trade. Small and large scale fishery is common in many coastal areas of the state including Badagry, Ibeju Lekki and Epe while rice farming occurs in Itoikin, Lekki and Epe. The State has five main agricultural zones: Badagry, Epe, Ikorodu, Lekki and Ikeja(Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.4 Arts, Culture and Tourism

Lagos state has attractive coastlines, mangrove swamps and various shopping centres that attracts would be shoppers and tourists to the city, it is also an international gateway to Nigeria. A National Museum located at Onikan holds various collections of Nigerian traditional and modern art, the various beaches in Lagos are also potential tourists havens among others such as Tinubu square, state ferry services, palace of the Oba of Lagos, the first story building in Nigeria, and the Eyo monument. Located in Agege Local Government are old Nigerian cinemas such as Pen Cinema. The Lagos beaches, Badagry, Bar, Eleko, Lekki and Tarkwa Bay are locations for many picnickers (Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.5 Education, Health, Sustainable Development and Environment

Lagos state hosts the publicly owned University of Lagos, it also has a State University, LASU, two Colleges of Education, two Polytechnics, and various Primary and Secondary schools. The state has a large concentration of private primary and secondary schools. The University of Lagos and the state university have teaching

hospitals. The state has a relatively high concentration of medical doctors.Lagos State is one of the few in the federation that has incinerators to help relieve of disposable wastes; it also utilises refuse sites and municipal landfills including one at Ojota. Some coastal areas of low lying plains are sometimes subject to flooding during the rainy season while discharge of industrial effluents into lagoons, indiscriminate dumping in open spaces and untreated waste into drainages has risen ecological and pollution concerns. A statutory body called the Lagos State Waste Management Authority is charged with managing waste. The private and informal sector through terms like the Wheelbarrow boys and licensed operators participate in waste disposal. In terms of urban congestion, many residents of the major growing areas of the state such as Lekki find it hard getting to work on time as transportation infrastructures seems inadequate. The road system has become more dilapidated as more urban settlements spring up and has great effect on the environment resulting in climate change which is the focus of this study (Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.2.6 Local Government Areas

Lagos State is divided into five administrative divisions, which are further divided into 20 Local Government Areas:

- Badagry Division (Ajeromi-Ifelodun, Amuwo-Odofin, Badagry and Ojo)
- Epe Division (Epe and Ibeju-Lekki)
- Ikeja Division (Agege, Alimosho, Ifako-Ijaiye, Ikeja (capital of Lagos State), Kosofe, Mushin Oshodi-Isolo and Somolu)
- Ikorodu Division (Ikorodu)

Lagos Division (Apapa, Eti-Osa - home of one of Lagos's largest business centres and of the upscale communities of Victoria Island and Ikoyi, formerly the residence of the Nigerian federal government, Lagos Island - the historical centre and commercial core of the Lagos agglomeration, Lagos Mainland and Surulere (Akeusola, 1994; Odumosu, 1999; Dioka, 2001).

2.2.3 Environmental Knowledge and Attitude

Environmental education aims to equip the individuals with knowledge, attitudes and skills in order to raise concern for the environment and to work towards solutions of environmental problems and the prevention of new ones (Stapp et al., 1969; UNESCO, 1977; Davis, 1998). So far, environmental education programme have mainly focused on increasing environmental knowledge to change environmental behaviour (Pooley and O'Connor, 2000). However, it is still been debated whether knowledge leads to changes in attitude and behaviour (Barraza and Watford, 2002). For example, Kuhlemeier et al, (1999) found out that the relationship between environmental knowledge and environmental attitude is weak. Kraus (1995) believes that attitude is the most important determinant for behaviour and lozzi (1989), stated that environmental education programme should address the affective (attitude) domain, rather than just relying on cognition (knowledge) (both cited in Pooley and O'Connor, 2000), therefore influence of environmental education on changing the lifestyles and attitudes of individuals is vital for altering future consumer behaviour (Szerényi et al., 2009). Knowledge, according to Bloom (1956) cited by Olaoye (2006) means factual information that is learned initially and then remembered. Some knowledge may be learned by role memory, but more of it may be learned through meaningful reception processes. Knowledge is distinct from and considerably more important than bits of information alone.

According to Bloom et al (1971) cited by Odinko (1999), knowledge in any subject field can be placed in three main categories: knowledge of specifics, knowledge of ways and means of dealing with specifics and knowledge of the universals and abstractions in a field. Bloom (1956) opined that intellectual abilities include comprehension, application, analysis, synthesis and evaluation. According to him, knowledge about something precedes full comprehension of it, while comprehension, in turn must precede application and higher intellectual abilities. According to Omekwu (2004) knowledge about something procedes full comprehension of it, comprehension in turn, must precede application and the higher intellectual abilities, It is therefore, important to realise that without having knowledge, the individual has nothing to apply or evaluate.

Traditionally, it was believed that we could change behaviour by making people more knowledgeable about the environment and its associated issues. The underlying assumption is that the more we know, the more aware we are, and that we then become motivated to act toward the environment in more responsible ways (Evans, 1998).In an attempt to find out the attitude of secondary school students' toward climate change, it is necessary to define attitude and its effects on students'behaviour as regards the concept, Leon and Leslie (2003) cited in Olaoye (2006) defined attitude as a learned predisposition to behave in a consistently favourable or unfavourable manner with respect to a given object. However, attitude though consistent is not necessarily permanent, it tends to change.

They went further to affirm that attitude changes are learned, they are influenced by personal experience and other sources of information; Personality affect the receptivity and speed with which attitudes are likely to be altered. Attitudes relate to the emotional aspect of children's personality, which has to do with the feeling and the kind of the mind that a person holds towards an idea or a phenomenon.

Attitude refers to inclination to react in a certain way to certain situations; to see and interpret events according to certain predispositions; or to organise options into coherent and interrelated structure. Values are inextricably related to attitudes (Badran, 1995).According to Bradly et al, (1999), Eagles and Demares (1999 in Ehrampoush, 2005) environmental attitude of young people appears to be crucial as they ultimately play a direct role in providing knowledge based solutions to incoming environmental problems.

The concept of attitudes is helpful in understanding how individuals interpret and respond differently to the same information, since preexisting beliefs and views (attitudes) have been shown to bias perceptions and guide behaviour: people are more attentive to, and accepting of, attitude-consistent information and tend to ignore or reject dissonant information.

Ayenigbara (1998) states that attitude is usually considered as one's mood or feeling towards a person, groups, object, situation or value. Encyclopedia of Education

(1971) cited in Ayenigbara (1998) showed that attitude refers to how we think, feel about and act toward our fellow human beings and how they think, feel about and act towards us. From these definitions of attitude, there is stress on the integration of thought, feeling and deed. In other words, what I think about a person, thing or situation shows how I feel or will feel towards the person or thing and which will determine my action towards the person.

Psychologists believe attitude cannot be directly observed, but can be inferred from observable behaviours such as verbal statements or opinions. The quality of one's attitude though can be judged from the observable, evaluative responses such an individual makes. It is possible that attitude held by some others are directly observable and so must be inferred from behaviour thus investigators heavy dependence on the use of questionnaire. Attitude formation process is continuous, that is it is believed to continue from early childhood through adolescence to adulthood.

2.2.3.1 Climate Change

The climate varies continuously, but according to climate scientists, it is now changing with unprecedented rate. Since the end of the 19th century, the mean global temperature has increased from 0.3 to 0.6^{0}C. In addition, the global sea level has risen from 10 to 25 cm. Regional changes in temperature and precipitations are also evident. Evidence suggests there is a discernible human influence on the global climate. This conclusion was drawn by the Intergovernmental Panel on Climate change (IPCC, 2007 and 2014). The IPCC was established in 1988 by two United Nations Organisations, the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) to assess available scientific information on climate change, to estimate the environmental and socio-economic impact of climate change, and to formulate response strategies. The assessment reports of the IPCC are written and reviewed by prominent scientists and other experts from all over the world. They are considered standard works of reference.

According to the IPCC (2007) , the composition of the earth's atmosphere is changing due to human activities. Atmospheric concentrations of greenhouse gases have grown significantly. These gases tend to have a warming effect by absorbing infrared

radiation from the earth's surface and then re-radiating it. Atmospheric concentrations of aerosols have generally grown as well. Aerosols are microscopic airborne particles that, on balance, tend to have a cooling effect. Although locally, the cooling effect due to aerosols may be large enough to offset the warming effect due to greenhouse gases, this does not hold globally. Taking into account the effects of greenhouse gases and aerosols, human interference is projected to increase the mean temperature on earth. Nations from all over the world are taking counsel together on how to ameliorate climate change.

The third Conference of the Parties in Kyoto has resulted in new agreements between industrialized nations to decrease their emissions of greenhouse gases (CoP 3, 1997). The Netherlands agreed to reduce aggregate anthropogenic carbon dioxide (CO_2) equivalent emissions of greenhouse gases by at least 8 per cent below 1990 levels. This reduction should be realised between 2008 and 2012 and maintained thereafter.World Summit on Sustainable Development(WSSD) Johannesburg (2002),held a meeting to review progress on sustainable development made since the landmark 1992 Earth Summit held in Rio de Janeiro, Brazil. The WSSD was attended by more than 110 heads of state, as well as over 50,000 delegates and members of non-governmental organisations (NGOs) to emphasise largely on "New development models towards sustainable development". The Bali Action Plan (BAP) adopted in 2007 at COP-13 in Bali, was a continuation of the global action against climate change. It significantly identified the building blocks required for a strengthened future response to climate change, in preparation for the Copenhagen Conference in 2009. The whole world had hoped that Copenhagen (COP) of 2009 was going to produce a turnaround in climate change negotiation in such a way as to create a definite future for the earth's climates. The 17th Conference of the Parties (COP-17) and the 17th meeting of the parties to the Kyoto Protocol (COP/MOP -7) in Durban in December 2011 provided, a very crucial opportunity for the whole world to negotiate a second commitment period for the Kyoto Protocol, which expires in 2012.It is geared towards the sustenance of global actions to reduce the emission of greenhouse gases, which are known to be responsible for global warming and climate change.

As appears from the expression of reduction targets in CO_2equivalents, one of the most important anthropogenic greenhouse gases is CO_2(Fransen and Janssen, 1998). Emissions of $CO_2$are mainly due to the combustion of fossil fuels for the generation of energy. The global demand for fossil fuels has grown for almost two centuries and is expected to continue to grow at least through the first half of the next century. Unless measures are taken, this means atmospheric concentrations of CO_2 will also continue to grow. Significant reductions in CO_2 emissions can be achieved by replacing current technology with more energy efficient technology and by switching to low-carbon fossil fuels and non-fossil fuels. In the longer term, renewable energy sources such as solar, wind and biomass technologies could meet a considerable part of the world's energy demand.

Climate change is a global problem which affects everyone, but not equally (Rana, 2007). Geographic location is a key factor; some areas are simply more affected than others through their physical characteristics and the interaction between local climate systems. The IPCC 2007 report that 'the list of hottest years on record is dominated by years from This millennium, each of the last 12 years (2001-2012) features as one of the 14 warmest years in the instrumental record of global surface temperature (since 1850). Warming is most pronounced in higher northern latitudes, and land areas have warmed faster than oceans. There is evidence that the significant increases in precipitation observed in eastern parts of North and South America, northern Europe as well as northern and central Asia, and the declines in the Sahel, the Mediterranean, southern Africa and parts of southern Asia over the last century have been exacerbated by anthropogenic climate change. Anthropogenic climate change is more likely than not responsible for the increase in areas affected by drought in the last 40 years. These trends are likely to continue and it is very likely that hot extremes, heat waves and heavy precipitation events will become more frequent.

Earth's average temperature has risen to about 1 degree Centigrade in the past 100 years and is projected to rise another 3 to 10 degrees Centigrade in the next 100 years. While Earth's climate has changed naturally over time, the current rate of change due to human activity is unprecedented. The projected range of temperature rise is wide because it includes a variety of possible future conditions, such as whether or not we

control greenhouse gases emissions and different ways the climate system might respond. Temperatures over the US are expected to rise more than over the globe as a whole because land areas close to the poles are projected to warm faster than those nearer the equator.

Climate change is expected to increase the frequency and intensity of severe weather events. Poor countries lack the infrastructure necessary (e.g. storm walls, water storage) to respond adequately to such events. Diseases such as malaria are likely to have wider ranges, impacting more people in the poorest regions of developing nations that are already most affected by such diseases. Changing rainfall patterns could devastate rain-fed agriculture on which so much of the populations in developing countries depend to survive. In Africa, for example, only 4% of all cropped land is irrigated (Adelekan and Gbadegesin, 2004; Oladipo, 2012).

There is scientific consensus that global warming is real, is caused by human activities, and presents serious challenges. Scientists working on this issue report that the observed global warming cannot be explained by natural variations such as changes in the sun's output or volcanic eruptions. The most authoritative source of information is the IPCC 2007, 2009, 2011, 2012, 2013 and 2014 which draws upon the collective wisdom of many hundreds of scientists from around the world. The IPCC projects global temperature increases of 3 to 10 degrees Centigrade in the next 100 years and states that human activity is the cause of most of the observed and projected warming.

Each of us can reduce our contribution to global warming by using less greenhouse gases producing energy: driving less, choosing fuel efficient cars and appliances (like refrigerators and water heaters), and using solar energy where feasible for water and space heat. We can encourage our political and business leaders to institute policies that will save energy and develop alternative energy sources that do not release carbon dioxide. We can preserve existing forests and plant new ones. But even if we take aggressive action now, we cannot completely prevent climate change because once carbon dioxide is in the atmosphere, it remains there for about a century, and the climate system takes a long time to respond to changes. But our actions now and in the coming decades will have enormous implications for future generations.

2.2.3.2 The Greenhouse Effect

Although some people use greenhouse effect to mean the same thing as global warming, it has a more specific meaning. Greenhouse effect is a natural warming process, in which a layer of 'greenhouse gases' act as the glass panes of a greenhouse which allow solar radiations to pass through and heat the surface of the earth but do not allow the heat radiated from the ground to pass through thereby trapping it in the process.This heat trapping phenomenon is known as greenhouse effect. There are three main sources of greenhouse gases: Solar, volcanic and biospheric or industrial sources (Stiling, 1996 and Rana, 2007)

2.2.3.3 Global Warming as a threat

Human activities — especially the burning of fossil fuels (coal and oil) intensifies the greenhouse effect. These are the three most important greenhouse gases (Rana, 2007 and Stiling, 1996):

1. Carbon dioxide (CO_2) is released by all living things as a product of respiration. When we burn fossil fuels (particularly in car engines), we also add a lot of CO_2 to the atmosphere. Plants use up CO_2 during photosynthesis. So when we humans cut down trees around our own homes or cut down whole forests, we increase the level of CO_2 in the atmosphere.
2. Methane (CH_4) is an important part of natural gas. It is also formed when plants decay in places where there is very little oxygen (e.g. wet-rice paddies and landfills). Ruminants (e.g. cows, sheep and goats) release a large amount of CH_4.
3. Chlorofluorocarbons. A chlorofluorocarbon (CFC) is any compound in a group of manufactured organic compounds that contain chlorine, fluorine and carbon. The two most common chlorofluorocarbons are trichlorofluoromethane and dichlorodifluoromethane, we use CFCs as coolants in air conditioners and refrigerators, and as propellants in aerosol spray products (e.g. insect spray cans). Other greenhouse gases include nitrous oxide (N_20), water vapour and ozone. Ozone is a form of oxygen. An oxygen molecule (0_2) has two oxygen atoms. An ozone molecule, however, has three oxygen atoms, so its chemical formula is 0_3. In the lower atmosphere (troposphere), ozone is a pollutant because it contributes to global warming.

But in the higher layers of the atmosphere (e.g. the stratosphere), ozone is an important gas because it forms a layer (the ozone layer) that protects living things on earth from the sun's ultraviolet (UV) radiation.

It is not only gases that contribute to the greenhouse effect. Other contributors include clouds, soil and dust particles (Rana, 2007 and Stiling, 1996).

2.2.3.4 The Causes of Climate Change

Variations in atmospheric concentrations of greenhouse gases (GHGs) and aerosols, those in volcanic activity and solar radiation and changes in the earth's land cover have an impact on the climate system. But since industrial times, GHGs due to human activities have had a greater impact because of their unprecedented growth (there has been an increase of 70% between 1970 and 2004) and the climatic research gathered by the IPCC up to 2007 showed there is a correlation between this increase and climate change.

The IPCC therefore showed in its conclusions that:

- Global atmospheric concentrations of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) have increased markedly as a result of human activities since 1750 and now exceed pre-industrial values determined from ice cores spanning the last 800,000 years.
- Of the GHGs, carbon dioxide is the most important anthropogenic GHG. Its annual emissions grew by about 80% between 1970 and 2004.
- Atmospheric concentrations of CO_2(379 pm) and CH_4 (1174 ppb) in 2005 exceed the natural range over the last 800,000 years.

These increases have several causes:

- Global increases in CO_2 concentrations are due primarily to fossil fuel use by humans with land-use change providing another significant but smaller contribution;
- It is very likely that the observed increase in CH_4 concentration is predominantly due to agriculture and fossil fuel use. CH_4 growth rates have declined since the early 1990s, consistent with total emissions (sum of anthropogenic and natural sources) being nearly constant during This period;
- The increase in N_2O concentration is primarily due to agriculture.

The IPCC 2007, 2012 and 2014 therefore has “very high confidence that the net effect of human activities since 1750 has been one of warming and that it is very likely due to the observed increase in anthropogenic GHG concentrations”, because if one confined oneself only to natural causes during the past 50 years (impact of volcanic activity and fluctuations in solar radiation), the climate would likely have cooled. Observed global warming and its changes are simulated only by models that include anthropogenic forces. On the other hand, difficulties remain in simulating and attributing observed temperature changes at smaller than continental scales.

2.2.4 Climate Change Mitigation and Adaptation Measures

Two main ways to respond to global climate change are through mitigation and adaptationSmeasure. Mitigation involves attempting to slow the process of global climate change by lowering the amount of greenhouse gases in the atmosphere. Within the framework of the UNFCCC, countries around the world are working to reduce their carbon emissions. There are also many actions individuals can take,for example, reducing their own energy consumption, using renewable carbon dioxide from the air and storing it in the soil or in their trunks and roots. However, it is necessary to appreciate the inevitable nature of climate change, some aspects of which (sea level rise) will continue for centuries even if greenhouse gases concentrations were stabilised now (Rana, 2007 and Stiling, 1996).

Adaptation relates to how to live with the degree of global warming that cannot be stopped. It involves developing ways to protect people and places by reducing their vulnerability to climate impact. Examples of adaptation include building seawalls or relocating buildings to higher ground to protect communities against increased sea flooding. Other adaptation measures may simply be an extension of sound development practice such as keeping beaches and coastal waters clean, planting trees and green plants (reuse, recycle, renew and reduce) (IPCC, 2007 and 2014; Olorunfemi and Raheem, 2010).

The IPCC2007, 2012 and 2014 defines adaptation as adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects (Rana, 2007 and Stiling, 1996). It includes adjustments to moderate harm from, or to benefit from, current climate variability as well as anticipated climate change. Adaptation can be a specific action, such as a farmer switching from one crop

variety to another that is better suited to anticipate conditions. It can be a systemic change such as diversifying rural livelihoods as a hedge against risks from variability and extremes. It can be an institutional reform such as revising ownership and user rights for land and water to create incentives for better resource management. Adaptation is also a process. The process of adaptation includes learning about risks, evaluating response options, creating the conditions that enable adaptation, mobilising resources, implementing adaptations, and revising choices with new learning. But the conception of adaptation as a process is often the most important for formulating public interventions that will have lasting benefits.

Adapting to climate change is one of the most challenging problems facing humanity (IPCC, 2014). The time for adaptation action to ongoing and future climate change involves reconsidering our lifestyles and goals for the future, which are linked to our actions as individuals, societies and government worldwide. Warming of the climate system is unequivocal; however, at the local level the information required to make conventional planning decisions is lacking at the level of certainty required by those who need it. This demands an approach to adaptation that manages uncertainty and fosters adaptive capacity. Adaptation is therefore not a choice between reducing general vulnerability or preparing for specific hazards, such as floods; adaptation requires an ongoing change process whereby people can make informed decisions about their lives and livelihoods in a changing climate. Learning to adapt is as important as any specific adaptation intervention.

An approach to adaptation that works, even with uncertainty, combines activities that:

- Address current hazards, increased variability, and emerging trends;
- Manage risk and uncertainty and
- Build adaptive capacity.

We can adapt to climate change and limit the harm, or we can fail to adapt and risk much more severe consequences. How we respond to this challenge will shape the future in important ways.The climate is already hazardous and hasalways been. Variations and extremes of climate disrupt our production of food and our supplies of

water, reduce our incomes, damage our homes and property, impact our health, even take our lives. Humans, in an unintended revenge, are getting back at the climate by adding to heat trapping gases in the Earth's atmosphere that are changing the climate. But the changes are amplifying the hazards to humans. We cannot order a stop tothis.

The physical and social processes of climate change have a momentum that will continue for decades and beyond. This undeniable momentum does not imply that efforts to mitigate climate change, that is to reduce or capture the emissions of greenhouse gases that drive climate change, are wasted, nor, is a call for adaptation a fatalistic surrender to This truth. The magnitude and pace of climate change will determine the severity of the stresses to which the world will be exposed. Slowing the pace of human caused climate change, with the aim of ultimately stopping it, will enable current and future generations to better cope with and adapt to the resulting hazards, thereby reducing the damages and danger. Mitigating climate change is necessary. Adapting to climate change is necessary too. The challenges are substantial, particularly in the developing world (IPCC, 2014). Developing countries have a high dependence on climate sensitive natural resource sectors for livelihoods and incomes and the changes in climate that are projected for the tropics and sub-tropics, where most developing countries are found, are generally adverse for agriculture. The means and capacity to adapt to changes in climate are scarce due to low levels of human and economic development and high rates of poverty. These conditions combine to create a state of high vulnerability to climate change in most of the developing world such as Nigeria and Lagos State in particular. Thus, climate change control effort in Lagos State includes use of Buses Rapid Transportation (BRT) system, Green Tree planting, Expansion of roads, Drainages construction, clearing of blocked water channels and Public awareness campaigns (Olorunfemi and Raheem, 2010).

2.2.5 Implications of Climate change for Education and Learning

Education for Sustainable Development (ESD) seeks to enable individuals make informed and responsible decisions and actions, now and in the future. Educating about climate change builds the skills and attitudes needed to question the way we think, the values we hold and the decisions we make in the context of sustainable

development. The integrated, multifaceted vision provided by ESD is particularly well-suited to address climate change in terms of understanding its causes, recognising its impact and effects as well as preparing and implementing appropriate responses (UNESCO, 2009).

Climate change has become one of the most urgent challenges of sustainable development and is one of the key action themes of the UN Decade of Education for Sustainable Development (DESD, 2005-2014). During the extensive consultations with United Nations agencies, national governments, civil society organisations, experts and specialists for the drafting of the International Implementation Scheme for the DESD, the issue of climate change emerged as one of the main strategic perspectives to inform education and learning for sustainable development. (UNESCO, 2009, Sustainable Development Goals 2015-2030).

Climate change issues need to be part of public awareness, learning and education for a sustainable future so that sustainable behaviours become daily habits. The DESD provides a framework for adaptation to and mitigation of climate change by enhancing and promoting active learning and innovative ways of framing climate change issues so that they make sense in the context of people's everyday lives, helping to translate passive awareness into active concern.

ESD is an approach to teaching and learning that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future. It prepares people of all walks of life to plan for, cope with, and find solutions to issues that threaten the sustainability of our planet, and encourages changes in behaviour that will create a more sustainable future.

Education needs to take into consideration the following implications of climate change, all of which are characteristics of *ESD:*

- All levels and forms of existing education as well as teaching and learning programme need to be reviewed and re-oriented to address the causes and consequences of climate change.
- Climate change requires educators to include new content into education, training and public awareness programme.

- Creativity, problem solving and social transformation skills need to be developed and nurtured.
- Positive participatory action and solution-centred approaches to education and learning need to be developed.

Education systems everywhere will need to include a focus on the causes, consequences and solutions to climate change, if the necessary changes in society are to be effected in time. Addressing the causes and the consequences of climate change requires content and methodologies that will address the causes (mitigation), since the causes of climate change are human-induced and directly linked to human actions, these actions need to be identified and changed. Education programme can help people identify the causes of climate change and mitigate them. Practically, this involves learning actions to reduce energy consumption, use renewable forms of energy, design and use greener technologies, make changes in consumption patterns, mitigate biodiversity loss, etc., while ensuring quality of life. At a societal and cultural level, This means learning how to change cultures, lifestyles, economies and social structures that are based on excessive greenhouse gases production. Education systems that address climate change will promote different cultures, aspirations, purposes, value systems and future visions to those established in the 18th to 20th centuries (which were oriented towards expanding the consumption and production patterns that have caused climate change). These approaches to climate change education will be **transformative,** and not merely technical.

Addressing the consequences (adaptability), some of the impacts of climate change are already visible, some are predominant and some are unknown. These impacts will manifest differently in different parts of the world and governments everywhere are beginning to prioritise adaptation to climate change. Unique and locally relevant solutions as well as adaptation reduction practices are needed, alongside efforts to share and transfer knowledge, social strategies, economic models and technologies that provide new solutions across the world. Consequences can be addressed at a technical level (e.g. through the introduction of new energy technologies), but will also need to be addressed at a wider societal and cultural level, where adaptation practices (new and adaptive, drought resistant farming practices) will need to become part of, or replace, existing cultural practices and traditions. Such approaches will be

transformative, and not just technical to build capacity in society for mitigation, adaptation and transformation.

Climate change education should be integral to ESD that helps people develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future and to act upon these decisions (UNESCO, 2009). Climate change education requires people everywhere to understand and respond to the nature, causes and consequences of climate change.

Education has a central role to play in understanding, mitigating and adapting to the changing climate. While education at all levels and in formal and informal settings is needed, instilling climate change awareness and understanding at a young age is ultimately the best way to change behaviours and attitudes. What children learn today will shape tomorrow's world.Education is believed to be where a lasting solution to the challenges of global warming and climate change can be found. However, the urgency of climate change and the imminent threat it poses to our existence as a unique group of people, calls not only for new 'solutions', but for new questions. We need to understand how well core ideas and skills have actually been understood and practiced by every learner. Further, we also need to understand how the formal curriculum, at all levels of education has changed in response to climate change.

Education systems should see climate change as an opportunity to utilise the principle of ESD to structure a curriculum response to combat climate change. There are numerous successful interdisciplinary climate change initiatives in the informal education sector — in our villages, and communities, in some non-governmental organisations (NGO), and in youth groups. Sadly, however, there is the belief that interdisciplinary efforts to combat climate change have not been too successful in the formal education sector.

The compartmentalisation in the existing curriculum on the ground of subject disciplines unavoidably lead to an exam-oriented education system that treats climate change as a 'science-only' issue or in some cases an 'extracurricular' component of students' learning experiences. Regardless of the level of education at which we operate, our hope for successful climate change initiatives, hinges on the existence of

an inclusive interdisciplinary curriculum framework that is grounded on the values and principles ofESD. It is only through young people learning to know, learning to do, learning to be, and learning to live together sustainably that real and fruitful efforts to counter climate change can ever take place.Climate change education needs to promote a range of outcomes beyond just technical understanding of climate science,hence the need for instructional intervention that is pro-active, This brings to mind mentoring and field study instructional strategy.

2.2.6 Definition of Mentoring Instructional Strategy

According to DuBois, David and Michael (2005), mentoring is a process for the formal and informal transmission of knowledge, social capital, and the psychosocial support perceived by the recipient as relevant to work, career or professional development. Mentoring entails informal and formal communication, usually face- to-face and during a sustained period of time between a person who is perceived to have greater relevant knowledge, wisdom or experience (the mentor) and a person who is perceived to have less(Mentee). According to Nelson (2003), mentor is a more experienced individual willing to share his/her knowledge with someone less experienced in a relationship of mutual trust in mixture of parent and peer, the mentor's primary function is to be a transactional figure in transformation of an individual's development. Kutilek and Earnest (2001) stated that a mentor, by its most basic definition, is one who mediates expert knowledge for novices, helping that which is tacit to become more explicit. The two most common uses of the word, mentoring are to describe (a) a professional development relationship in which a more experienced participant assists a less experienced one in developing a career and (b) a guiding relationship between an adult and a youth focused on helping the youth realise his/her potential and perhaps overcome some barriers or challenges. In both cases it is the mentor who provides advice and support and may serve as a role model. These examples generally imply long-term relationships, mentoring can be used as an instructional strategy on a smaller scale.

In a phonological review of the mentoring literature, Roberts (2000, p. 151) noted that there are eight "attributes" of mentoring that commonly appear.

1. A process form,
2. An active relationship
3. A helping process
4. A teaching-learning process
5. Reflective practice
6. A career and personal development process
7. A formalised process
8. A role constructed by or for a mentor

Certainly notions of helping, teaching and learning as well as reflection all seem central to mentoring, which is a process that involves relationships. Not mentioned directly, but implied, is the concept of expertise. Mentors are expected to provide expert knowledge to protégés (mentee), which involves that they both have same expertise and know how to effectively share it with others (Little, 1990). Mentors may use strategies such as verbal descriptions and diagrams to help concretise or reveal expert knowledge such as why things are done in a certain way and the relationship between parts. However, mentors should not take an overly directive role with mentees; instead they should use strategies like questioning to help mentees articulate their understanding, a process that supports the development of inter-subjectivity as well as assessment of progress (Billet, 1994).

Emerson (2001) pointed out those teacher-centred terms like sage, actor and pedagogue which had long been used as metaphors for the teacher's role and suggest that the mentor more appropriately puts the focus on the learner. Essentially, the teaching- learning situation changes from being about teacher performance to being about learner needs. One may act without an audience and it is not possible to mentor without a mentee. One might evaluate an actor's performance without regard for the audience's reaction, but a mentor cannot effectively be evaluated without consideration of the mentee.

For most people, the term coach initially brings to mind sports. Coaching also is commonly heard in reference to technology (people who provide just-in-time, task-based assistance) and business settings (people who are hired to provide guidance on a particular task at the individual or organisational level). Collins et al. (1989) quite simply described coaching as assistance from a master. In many ways a coach and a mentor do the same thing and in practice the terms are often used interchangeably, so how do we differentiate them? Parsloe and Wray (2000), who discuss practical applications of coaching and mentoring in the learning process, distinguish coaching from mentoring by suggesting that a mentor is one who provides support of a more general nature in an ongoing capacity and a coach is typically focused on assistance for meeting a particular goal. By this definition, within the context of career development, a mentor would help guide the career choices and workplace skills of the mentee, while a coach would be involved in more concrete, goal-oriented tasks such as getting a new job or promotion.

Burton, Brown, and Fischer (1999, p. 149) state that there are four goals for a coach to accomplish:

1. ensure that appropriate sub-skills are acquired,
2. design appropriate exercises and supply the required technology,
3. demonstrate the students' performance in the interest of highlighting problems,
4. Provide clear explanation and instruction.

Additionally, a coach maintains focus on the goal, determining when learner exploration is fruitless and when a learner is ready to move onward.Still others rely on a more modest definition of coach, considering it a scaffold and believing that coaching is the process of helping a student work through an activity (Guzdial, 1995; Jarvela, 1995). The difference here seems to be in designating coaching as technique—one of many strategies an expert might use to assist someone who is more novices from coaching as career.

Therefore, a mentor is one who mediates expert knowledge for novices, helping that which is tacit to become more explicit. Although it appears that there is not a single,

accepted conception of mentoring. This perhaps explains why many involved in the mentoring movement feel the need to state a specific definition of mentor and the related terms, mentoring and mentorship (McPartland and Nettles, 1991; Parkay, 1989; Yamamoto, 1989). For this study, the researcher borrowed from Brodkin's and Coleman's (1996) definition of mentoring.

Mentor, in this study, will refer to "one, who provides one-on-one or one-to-group support and attention, is a friend and a role model, boosts a child's self-esteem, and enhances a students' educational experience. A mentoring relationship means meeting regularly over an extended period of time with the goal of enabling a special bond of mutual commitment based on the development of respect, communication and personal growth" (p. 21). Mentee, sometimes referred to in the literature as protégé is the person being mentored.

Brodkin's and Coleman's (1996) interpretation of mentor and mentoring was chosen for three reasons. First, it uses the word, children and this study is about children. Second, it is directly related to enhancing the social-emotional development of children which is another focus of this study. Third, it empasises the personal and assumes commitment, that is, responsibility for the development of a trusting, personal relationship and, again, This most closely parallels the concerns of my study because climate change poses greater threat to the future of today's children. In the opinion of Bullis and Bach (1989,2012), the model of mentoring include – cloning model which is about the mentor trying to produce a duplicate copy of himself or herself; Nurturing model which is more of a parent figure, creating a safe open environment in which mentee can learn and try things for himself or herself; Friendship model which is more peer focused rather than being involved in a hierarchical relationship; and Apprenticeship model which is about less personal or social aspects and the professional relationship is the sole focus.

2.2.6.1 Mentoring Techniques

Mentoring techniques in the opinion of Bullis and Bach (1989,2012) include the following:

1. Accompanying: making a commitment in a caring way, this involves taking part in the learning process side by side the learner.
2. Sowing: mentors are often confronted with the difficulty of preparing the students' before he or she is ready to change .Sowing is necessary when you know that what you say may not be understood or even acceptable to the learner at first but will make sense and have value to the mentee when the situation requires it .
3. Catalysing: when change reaches a critical level of pressure, learning can escalate. Here the mentor chooses to plunge the students' right into change, provoking a different way of thinking, a change in identity or a re-ordering of values.
4. Showing: This is making something understandable or using your own example to demonstrate a skill or activity. You show what you are talking about, you show by your behaviour.
5. Harvesting: here the mentor focuses on picking the ripe fruit, it is usually used to create awareness of what was learned by experience and to draw conclusion. The key questions here are-What have you learned? And how useful is it?

2.2.6.2 MentorshipinEducation

Bullis and Bach (1989, 2012) stated that mentoring in education includes:

- Peer Mentoring
- Blended Mentoring
- Reverse Mentoring
- Business Mentoring

2.2.6.3 Characteristics of a Mentor

Whether you are working with beginners or experienced students', there are some common characteristics of a good recruiter/mentor.

Mentors should...

Be enthusiastic about social issues and teaching social studies; Be willing to reflect on their own practice; Be prepared to examine critically, with their mentees, their own practice; Be able to articulate their professional knowledge; Be open minded with the

view that their approach to teaching and learning is not the only one; Be willing to develop their own skills in and understanding of geography teaching and learning; Be accessible, with a sympathetic and understanding approach to beginning teachers; Have a positive and encouraging attitude; be supportive; Have the ability to be critical in a constructive manner; Be a good communicator and a good listener; Be committed to their role as a mentor; Be aware of "best practice" and innovation in geography education and able to relate these to their practice. Mentors should be excellent teachers, Able to plan and implement organised and academically stimulating lessons. Mentors should be able to interact, work well with others and be available. Mentors need to be able to listen and define a problem, generate alternative solutions, and suggest a viable course of action. Mentors need to make these suggestions and offer possible solutions without encroaching on the fragile and vulnerable autonomy of the teacher with which they are working. This is not an easy task for a confident, competent, expert teacher who may be more inclined to tell the teacher who is new to climate change model what needs to be done or how to best solve the problem. Thus, guiding is better than directing.

i) Mentor as W*i*se Teacher, Guide, and Friend

A wise teacher, a guide, or friends are often used to define a mentor. Smink (1990), for example, defines mentor as; *A wise and loyal advisor, teacher or coach, any caring person who develops an on-going, one-on-one relationship with someone in need.*

A mentor encourages, listens and gives advice, advocates, acts as a role model and shares information and experience. Smink's conceptualisation of mentor includes a number of the more commonly mentioned elements of what characterises a mentor or mentoring. This definition is very similar to interpretations shared by many, particularly those involved in school mentorship programme with at risk children. Freedman (1993) has been involved in the mentoring movement for many years. He argues that if "one-on-one" is not protected in the definition, the meaning and purpose of mentoring will lose its significance and importance.

According to Freedman (1996), mentoring is a "sustained, close, developmental relationship between a more experienced individual and a younger person (p. 4) .The meaning of many terms in these definitions are not self-evident. What does "sustained" mean in a mentoring relationship? When is a relationship qualified as being 'close"? When do a series of visits count as a relationship? Is it 8 weeks, 12 weeks, 24 weeks, a year, or longer? How does trust develop and grow in a mentoring relationship between a young child and an adult? Smink's (1990) definition identified advocacy as one of the functions of a mentor. There has been considerable discussion about whether the terms "mentor" and "advocate" need to be differentiated.

ii) Mentors as Advocates

Advocacy has been a controversial issue in the mentoring movement and has raised questions for researchers who are concerned that mentoring has been misconstrued as advocacy (McPartland and Nettles 1991; Legters and McDill, 1995). They feel mentoring and advocacy has been used synonymously and would like to maintain a distinction between them. To distinguish between mentoring and advocacy, Legters and McDil (1995) suggest that mentoring is commonly defined as a one-on-one relationship between an adult volunteer and a student who needs support for achieving academic or personal goals. Advocacy is defined as a continuing set of relationships between an adult (volunteer or paid) and members of a group of students', in which the adult provides support and services by intervening on the students' behalf, monitoring participation in programme, or brokering additional services (mp.7). McPartland and Nettles (1991) also argue that the two terms are different and warrant clarification. They offer the following contrasting definition;

Mentoring is commonly defined as a one-on-one relationship between a caring adult and a student who needs support to achieve academic, career, social or personal goals. Mentor-student relationships can develop naturally or within structured interventions through activities designed to arrange, sustain and monitor matches ... [whereas advocacy is a supportive relationship wherein a resourceful adult (who may be called an advocate, programme coordinator, youth worker or counsellor) works with the same group of students' over a specified period of time and provides intensive instrumental, material and emotional support that can include assessing

students'needs for academic and social services, intervening on the students' behalf in schools and other institutions, monitoring students' participation in programmeas well as identifying and brokering formal services (p. 568-569).

In these definitions, mentoring empasises a one-on-one relationship while advocates may provide support for all members of a group of students'. Is advocacy a critical part of a mentor's role? Does this depend upon the context of the mentoring?

iii) Mentors as Tutors

Some would argue that the word mentor is a glorified title for a tutor. In existing programme, distinctions have been made between mentoring intended to improve children's' academic grades and mentoring intended to enhance social emotional development in children. Is this distinction made because the first is associated with tutoring and the latter associated with mentoring? Should these be separated? Can a mentor not enhance a Childs social emotional development as well as the child's academic grades? Does academic growth not improve as social emotional growth improves? Does one not have an effect on the other? What does it mean to a child who is not progressing well in school to have a mentor? These questions deserve careful exploration given their significance for programme development.

Confusion also arises with tutoring. What is the role of a tutor? Are all mentors also tutors? What is the difference between an advocate, a mentor, and a tutor? What is the difference between being a mentor to a child and being a tutor to a child? Flaxman and Ascher (1992) observed that when children received care from people in remedial programme, it was fortuitous and unplanned and not considered or counted as part of the programme' effects. How far can the definition of mentorship be stretched or reduced before it loses useful meaning?

Although different conceptions of mentoring exist in current or recent programme, there are a number of characteristics that are most commonly referred to in related literature to describe and define mentors. These include someone who: advises, teaches, coaches, encourages, listens, shares information and experience; is caring, trusting, acts as a role model and is committed to establishing a regular, on-going close relationship with a mentee. The role of the mentor may indirectly involve

advocacy in the sense that advocacy implies representing someone's interests, that is, looking out for another person. It may also entail tutoring because mentors engage in a variety of activities with the mentees, one of which may include assisting with school work. Mentoring has also been described as a process which involves giving and receiving. This dimension helps to explain what makes mentorship work, or what sustains mentoring. The following section deals with the giving and receiving in mentoring relationships.

2.2.6.4 Mentoring Involves Giving and Receiving

In a search for the critical attributes of mentorship, I have also encountered the idea that in mentoring relationships, both parties give, gain and receive. This may very well be the most key feature of mentoring relationships.

Mentoring has been studied in business organisations for adult career development by Nykodym, Freedman, Simonetti, Nielson, and Battles (1995). These researchers understand mentoring as "a process whereby a person with experience and knowledge helps someone new and less experienced become acquainted with an organisation" (p.70). They also claim that "in a true mentoring relationship, both parties gain from the alliance, though it may seem as if the protege is the only one receiving benefits (p.170). What is gained in a mentoring relationship between a child and an adult? What does the child gain? What does the mentor gain? In an attempt to fully understand how mentoring might be experienced this way, I turned to philosophical discussions of mentorship.

Gerhke (1988-1989) offers a philosophical interpretation of what she feels mentoring should be, using the metaphor, "gift-giving." The definition should capture the giving and receiving, the awakening and the labour of gratitude. The mentor's relationship with the learner can be seen as gift giving in the gift exchange economy (p. 194). Thus, Gerhke (1988-1989) suggests that the relationship is the gift from the mentor. She also argues that mentoring relationships go through different stages.

The first is the creation of the gift by the one who will ultimately be the giver. Awakening is a second characteristic phase of gift giving. The next phase is the

receiver's commitment to labour to deserve the gift. The final phase of working up to the level of the gift is passing the gift, now increased in worth through one's own labour on to a new recipient (p. 192).How might in-school mentoring designed to assist at-risk children be conceived of as gift-giving? What gift is created, exchanged in the mentor/child relationship? What does the mentor give to the young child that inspires or enables the child to give back or to 'labour'? Is the "awakening phase" discernible? Brendtro, Brokenleg and Long (1990), asserted that while there are not 10 easily identifiable steps in relationship building, relationships develop through action and this action involves a process of giving. Frornm (1956) cited by Yamamoto(1988/1989), also thinks of mentoring as giving. In his attempt to capture the essence of mentoring, he posed the question:

What does one person give to another? He articulated the following response. He gives of himself, of the most precious he has, he gives of his life....he gives him of that which is alive in him; he gives him of his joy, of his interest, of his understanding, of his knowledge, of his humour, of his sadness - of all expressions and manifestations of that which is alive in him. In thus giving of his life, he enriches the other person; he enhances the other's sense of being alive. He does not give in order to receive; giving is in itself exquisite joy. But in giving he cannot help bringing something to life in the other person, and this which is brought to life reflects back to him; in truly giving, he cannot help receiving that which is given back to him...in the act of giving something is born, and both persons involved are grateful for the life that is born for both of them (p. 188).

What is born between the mentor and the child in an in-school mentoring programme when the mentor spends time with the child each week? How do the child and mentor experience this birth? Does giving and receiving mark the point at which the relationship has been established? How does the relationship change from being one of giving to one of giving and receiving? How does one know that it has changed? Answers to such questions could help us make sense of what may or may not be happening in in-school mentoring programme for young children.

A mentor has been described as a caring person who assumes the role of a wise teacher, a guide, a friend, an advocate, a tutor and a giver and recipient of gifts. In this study the researcher hopes to learn what these descriptions may or may not mean for young children and adults paired in an in-school mentoring programme. The following section provides a beginning definition for mentor and mentoring.

2.2.6.5 The Process of Mentoring

According to Moery, K. (1995), mentoring is a tool used by various organisations and other entities for the personal development and empowerment of their employees. Mentoring is a powerful process and an effective approach in helping individuals developing their careers. Mentoring is a partnership between the mentor and the mentee who share similar experiences or who are in the same field of work. Apart from personal development, it is about relationship building. This is basically what distinguishes mentoring from coaching.

Successful mentoring is based on a step-by-step process which has the role to build the relationship and conduct the mentoring session effectively. Just as coaching follows a structured process, mentoring is also conducted through a process. Lack of planning in mentoring obviously does not generate a successful and productive outcome.

2.2.6.6 Effective Mentoring Process

Moery (1995) stated that for a successful mentoring relationship, a four-step process may be used as guide:

1. Building the Relationship

The mentor-mentee relationship is the first vital aspect of mentoring that needs to be established. This first step is not to be rushed, not even skipped. Time and effort must be invested in building a good relationship. The mentor and mentee must take their time in getting to know each other and build a foundation of trust. With this, mentoring is an easier activity to do.

2. Negotiating Agreements

The next step is to establish a set of agreements to be implemented and followed during the mentoring relationship. This would include defining the roles, setting

schedules for mentoring sessions, identifying limitations and mentoring style preferences. Doing so paves the way for a smooth and harmonious mentoring relationship.

3. Developing the Mentee

This is the longest step of the mentoring process since the focus is now on the functions of mentoring. During This stage, the mentor and the mentee will define mentoring goals, create a list of mentoring drills and activities to achieve their goals, and keep a constant communication with each other.

4. Ending the Relationship

The mentoring process ends with a celebration of the accomplishments and an evaluation of the outcomes. The mentoring relationship must end on a highly positive note for a gradual transformation into a casual partnership rather than closing abruptly. In certain cases, mentoring relationships develop into something more solid.

2.2.6.7 A Working Model for Mentoring Process

The working model has been developed over time .based on the experiences of several mentors and has been applied in many mentoring sessions of various organisations. The stages in the working model represent the whole mentoring process and are set for a 1 to 3year period. The meetings have to be scheduled depending on the mentoring goals and the need for the mentee to develop performance. The communication has to be constant so the mentoring relationship will continue to flourish during the mentoring process.

Stages in the Mentoring Process Working Model

Stage 1: Introduction

As the initial stage, the objective of the introduction is to build a connection and start the relationship between the mentor and mentee. This is a good time to get to know each other better before starting the mentoring sessions and to create a comfortable relationship with each other as the mentoring process progresses.

Stage 2: Foundation

This stage entails an agreement about the mentor and mentee roles and sets the expectations for the mentoring process.

Stage 3: Orientation

The mentee is oriented to the process in order to lessen the tension and increase motivation.

Stage 4: Collaboration

The mentor works together with the mentee and is seen as a caring partner.

Stage 5: Problem Solving

At This stage, the mentor helps the mentee identify the issues about his/her skills and performance.

Stage 6: Personal Framework

The mentoring relationship is strengthened and the mentor is regarded as a trustworthy partner.The mentor makes an effort to help develop the mentee's confidence and self-esteem.

Stage 7: Professional Framework

At This stage of the mentoring process, the mentee views the mentor as a role model and now the focus is set on skill improvement and performance progression.

Stage 8: Transition

This last stage encourages the interdependence of the mentor and mentee. The mentee is taught to work independently, but the guidance of the mentor is still there.

2.2.6.8 Teachers as Mentors-

Mentoring involves a caring and supportive relationship between a youth and a non-parental adult. The positive effects of mentoring are generally thought to be derived from the support and role modelling these relationships offer. However, little attention has been paid to delineate how these processes work to bring about change. Rhodes (2002, 2005) has proposed that mentoring affects youths through three interrelated processes: (1) by enhancing youth's social relationships and emotional wellbeing, (2) by improving their cognitive skills through instruction and conversation, and (3) by promoting positive identity development through serving as role models and advocates. These processes are likely to act in consonant with one another over time. Further, the effectiveness of each of these three processes is likely to be governed, at least in part, by the quality and longevity of the relationships established between young people and their mentors.

DuBois, Holloway, Valentine and Cooper (2002) point out that there are differentiations between teaching and mentoring. A teacher has greater knowledge than a student; a mentor has greater perspective. Teachers have the ability to impart knowledge and skills that one lacks. Teachers are typically experts in a particular field or were trained to teach a certain skill. The relationship between a student and a teacher tends to be more subservient since the student is not technically at the same level of skill with the teacher.

On the other hand, a mentor imparts wisdom of experience and guides the mentee down a path that allows him or her master the skills required for success. The central focus of mentoring is the empowerment of the student, through the development of his/her or her abilities. To do this effectively, it is required that the mentor respects the uniqueness of that person. Dysfunctional teaching manifests when students' appear to be little more than mirror- reflections of their teachers. The idea of ageless wisdom, passed down from Sage to Neophyte is an endearing one, but it is inaccurate in a world of constant and accelerating change. Mentoring requires work and responsibility for both parties in the relationship. It is a partnership between mentor and student, based on mutual respect (Dennison, 2000), hence, mentoring is based on a friendly, informal and formal relationship.

2.2.6.9 Teacher's Stage of life and Mentoring

It may help you recruit teachers to climate change model by knowing something about their career path and level.Think about where you are in your career. Reflect on ways that this might influence your ability to be an effective climate change model mentor.Researchers have identified common stages that majority of teachers pass through (Brock and Grady,1997).

Stage	**Stage Characteristics**
Stage 1	Initial Idealism
Stage 2	Period of survival (get by and get through)
Stage 3	Mastery (or at least basic level of competence)

Then, depending upon contexts, circumstances, or personalities

Stage	Stage Characteristics
Stage 4	EITHER rest OR. work to develop, improve, and advance

When teachers are promoted, change grade level, move to new school, or begin to teach a new subject, the process may repeat. So it goes on...

Stage	Stage Characteristics
Stage 5	Coasting

Followed by:

Stage	Stage Characteristics
Stage 6	Winding down
Stage 7	Withdrawal
Stage 8	Pre-retirement, and finally
Stage 9	Retirement

These stages are not definitive but they do give an idea of the sorts of needs and concerns teachers are likely to have at various stages of their careers. You can pitch your recruiting and mentoring to match the stage. Climate change model may be an ideal way to re-excite a "winding down" teacher or appeal.

2.2.6.10 Mentoring Beginners (Students')

In the opinion of Brock and Grady, 1997; novice geography teachers typically move through three stages in their first year or two of teaching.

1. Focus on self-adequacy.

   Am I doing a good job in the eyes of my principal and fellow teachers? Do they like me?

   School procedures, classroom management, climate change policies and record keeping are important concerns.

2. Teaching task concerns.

   Am I teaching geography well?

   Skills in planning and organising student activities, grading, and knowing the curriculum and what to teach are important concerns in the second stage.

3. Concern for impact on students'.

   Ok, I can survive in the classroom, but are the kids really learning anything? Trying new and more effective teaching strategies to better serve students' needs become significant in the third stage.

"The teacher is interested in the intellectual and emotional wellbeing of his or her students'. Now the teacher is ready to explore issues basic to student learning such as motivational techniques, individualising teaching and diagnosing learning problems" (Brock and Grady 1997, 68).

2.2.6.11 Needs of New Mentors

Coppock, 1995; DuFour, 2004; Bottery and Wright, 2000 stated that 'New mentors" need assistance in these areas.

(i) Discipline and classroom management
(ii) Emotional support
(iii) Responding to varying levels of student abilities
(iv) Planning and organising
(v) Communicating with students', parents, faculty, administrators
(vi) Assessing student work
(vii) Adjusting to the teaching profession
(viii) Understanding the culture of their school as well as its policies and procedures
(ix) Obtaining resources
(x) Using effective teaching strategies

Helping a beginning teacher to be successful is a great gift a master teacher can give to "pass it on." Climate change model is a resource. Working with a novice teacher to conduct a mission will help that newborn learn about planning and organisation, communication, classroom management, and effective teaching strategies.

2.2.6.12 Models of Mentoring

Mentors counsel, act as resource people, help, mediate and model. Good mentors are good listeners, provide concrete feedback, engage in problem solving with colleagues, know where to obtain resources, and demonstrate good teaching and professionalism.

2.2.6.13 The Furlong and Maynard Model

Two other educators Bozeman, and Feeney (2007), building on the work of Anderson and Shannon asserted "Like any form of teaching, mentoring must be built on a clear understanding of the learning processes it is intended to support." They suggest a staged model of mentoring.

Stage 1: modelling

Stage 2: coaching

Stage 3: critical friendship

Stage 4: co-inquirer

Climate change model is an ideal opportunity to co-inquire with a colleague, either beginning or experienced. As you work to involve teachers in climate change model the stage model suggested here might be useful. Start by modelling, showing how it is done. Then, assist a colleague in his/her classroom, coaching them along. Comment on ways to improve the experience for students' (stage 3) and finally, combine classes with a colleague and work on this as a shared project. Of course, adapt these models and strategies to your liking. Hudson (2010),empasised a three stage mentoring instructional strategy model as Pre-action (before teaching), In-action (teaching) and Post-action (after teaching).

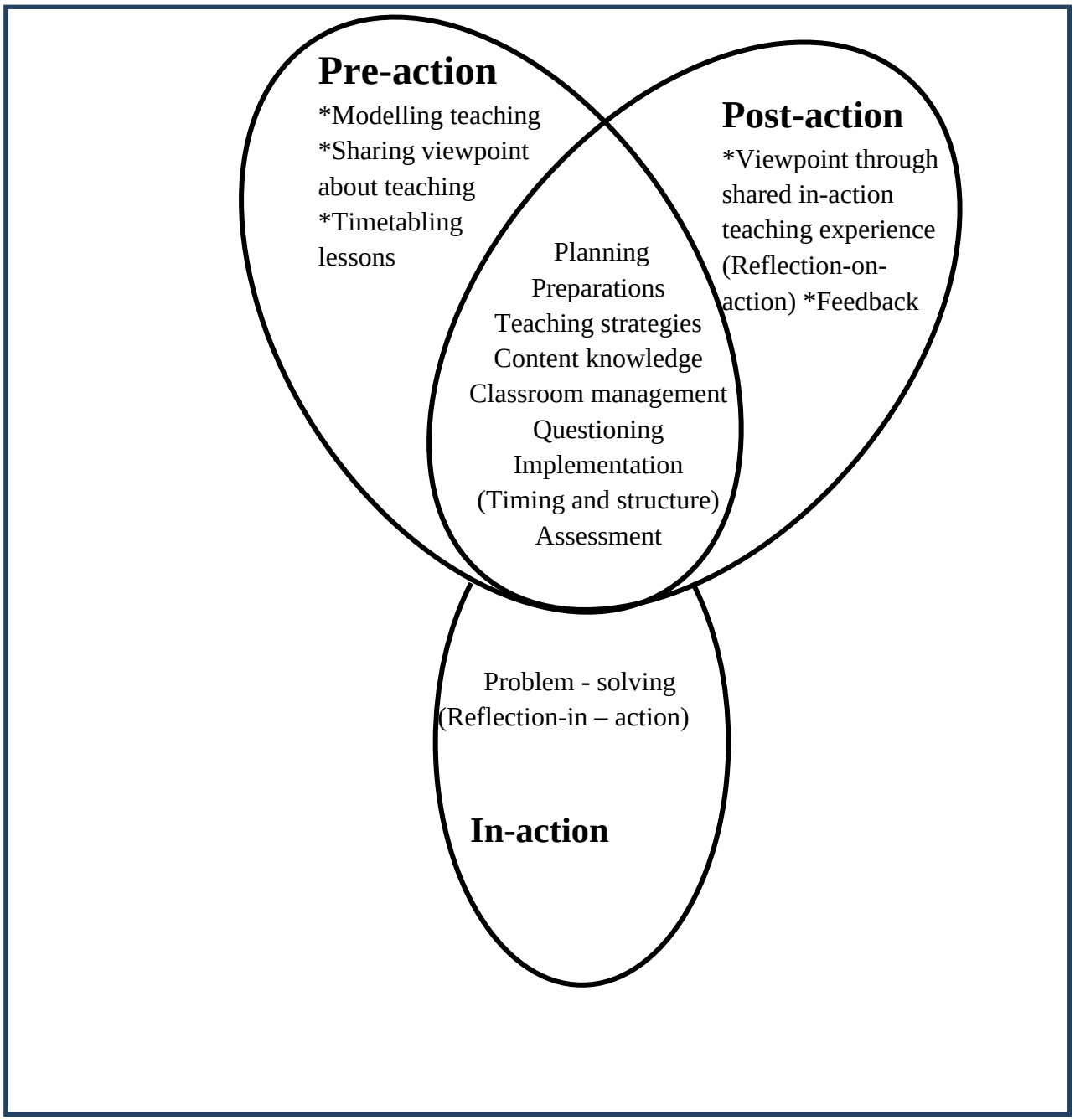

Fig.2.3: Mentoring Instructional Strategy Model (Hudson, 2010).

Hudson (2010) affirmed pedagogical knowledge to include planning for teaching, timetabling and timing teaching, preparation of resources, selecting instructional strategies, having appropriate content knowledge for student learning, problem solving, classroom management, questioning skills, implementation of the lesson

structure, assessment of and for learning, and the mentor's viewpoints of teaching. These cut across Pre-action, In-action and Post action stages as shown in Figure 2.3.

Pre-action

*Modelling teaching

*Sharing viewpoint about teaching

*Timetabling lessons

In-action

*Problem solving (reflection-in-action)

Post-action

*Viewpoint through shared in-action teaching experience (reflection-on-action)

*Feedback

Prerequisite for Pre-action, In-action and Post action stages

Planning

Preparations

Teaching strategies

Content knowledge

Classroom management

Questioning

Implementation (timing and structure)

Assessment

2.2.6.14 Examples of Mentor

These include the following:

- Big Brothers Big Sisters of America
- Coaching
- Peer Mentoring
- Youth Mentoring
- eMentors/eMentoring
- Maybach Foundation
- New Teachers Centre
- Father Complex

2.2.6.15TheFour Stages of a Mentoring Relationship

In the opinion of Boyle, While and Boyle, 2004; Campus Compact, 1994 and DuFour, 2004: Any successful mentoring relationship willmove through four definite stages as discussed below. The timespent in each one of these areas willdiffer from relationship to relationship, but the progression is uniform.

Stage 1

The mentor and the mentee become acquainted and informally clarify theircommon interests, shared values and future goals and dreams. If taking time to become acquainted with one another's interests, values, and goals is given high priority, the relationship seems to get off to a better start.

In this stage, there may be lack of communication or difficulty in communicating. Mentees may be reluctant to trust mentors and may attempt to manipulate them. The relationship may remain in thisstage from one to six meetings.

In the professional world, individuals who have desired to become mentors have analysed aspiring newcomers in their field and have selected promising young protégés/mentee to nurture. Most of these relationships work out very well, though the commonalities between the mentor and the mentee in a community mentoring setting may be less than that of a mentoring pair in a business setting, the methods of mentoring remain similar (Nobauer and Genetti, 2008). Mentors must be careful not to allowtheirpreconceptions to dictate how they will approach the relationship and define who theythinkthe mentee shouldbecome. While charting a course for his/her approach to the relationship, the mentor must consider three factors:

- The relative eagerness the mentee brings to this relationship.
- The similarities in personal styles (animated, low-key; spontaneous, reflective; gentle, harsh; reticent, boisterous).
- The similarities in expected short- and long-term goals.

Stage 2

The mentor and mentee communicate initial expectations and agree upon some common procedures' and expectations as a starting point. In the less likelyevent that the two

individualsmay not be compatible, the pair is able to part on a friendly basis. In stage 2, there willbe more listening, sharing, and confiding in one another. Values willbe compared and personal concerns willbe expressed. During this stage, the mentor willlikely be introduced to the mentee's family.The relationship may remain in this stage from one to three months (Campus Compact,1994).

Stage 3

The mentor and the mentee begin to accomplish the actual purposes of mentoring. Gradually, needs become fulfilled, objectives are met and intrinsic growth takes place. New challenges are presented and achieved. Stage 3 is the stage of acceptance, but it is also a stage of change, where a mentee is more likely to exercise self-discipline (Campus Compact,1994).

Stage 4

The mentor and the mentee close their mentoring association and redefine their relationship. Follow-up is conducted. In summary, in the four stages the mentor and mentee will acquaint themselves with one another, determine values and goals, achieve those goals and close their relationship.

Getting Acquainted in Stage 1

There is no specific formula to integrate the proper personal and professional qualities to create a successful mentoring relationship. Some individuals are attracted to opposites; others are attracted to those with similar interests, styles, and backgrounds. Regardless, implementing the following suggestions will facilitate relationship development.

- Introduce yourself to your mentee and let him/her know how to address you. Be confident and smile!Learn how to pronounce your mentee's name. Write it down correctly and phonetically. Give your mentee the confidence that you will be dependable and willbe coming to see him/her on a regular basis. Tell him/her the method of notification to use if either of you is unable to attend a scheduled appointment. Encourage your mentee to give you a tour of the school. Use an icebreaker activity and tell about yourself and allow your mentee to tellabout him/her. Accept your mentee as he/she is. Be nonjudgmental and maintain composure if he/she initially acts in a shocking manner. The mentee may try to test your limits. Use positive reinforcement: For example, "You are a great tour

guide. You made me feel welcome.""It has been fun getting to know you through this exercise." "I will be looking forward to next week." Avoid allowing the mentee to lead you into talking negatively about other students', teachers, or the administration. Ask open-ended questions that cannot be answered simply with a "yes" or a "no." Let your mentee specifically know when the next meeting will be. Begin the second week by reviewing the past week's activities. Try to learn more about your mentee. Help your mentee to understand the rationale for and value of goal planning. Get him/her to think about a long- or short-term goal that he/she would like to plan for the next meeting. End every session on a positive note.

Goal Setting in Stages 2 and 3

Once the relationship has been established and trust and confidentiality created, mentor pairs will begin to outline goals for the relationship and the year ahead.Mentor and mentee willcreate a "contract" for their relationship that willoutline personal, social, and educational goals for the year. Each month the pair will assess their successes and failures, chart their resultsand reaffirm the value of their goals. For each level of accomplishment, mentors and mentees can reward one another in any way they choose. A mentee's goals must be his/herown defined goals, not the goals the mentor would set for him/her. It does not matter how outrageous these goals may seem. It is not the responsibility of the mentor to evaluate the goals of the mentee, but to help him/her decide how to attainthose goals, or whether these goals areeven feasible.

Outlandish goals give great opportunities for present-day planning. If the mentee wishes to livein a condo in a ski resort in the Swiss Alps, then the mentor can show the mentee how valuable an education will be so that the mentee can make enough money to afford the condo. This encouragement can be linked to lessons in studying foreign languages, learning how to ski, and observing foreign cultures.(Campus Compact,1994).

The following problem-solving model is designed to assist the mentor with a step-by-step approach in formulating effective individual goals. Once individuals have decided upon their values, self-identity, and future ideals, they will need to establish the goals to carry them on the way to success. But, because most at-risk middle school students' have not assessed themselves in such depth, defining values will be a continuous exercise throughout the relationship.

Through goal setting, mentees will discover their values. Campus Compact (1994), affirmed that, to set effective goals, it is important to observe the following guidelines. Therefore a goal must be:

Conceivable: One must be able to conceptualise the goal and clarify what the first step or two will be.

Believable: In addition to being consistent with one's own personal value system, one must believe that he/she can reach the goal. If the mentee has a low self-concept or is from an economically disadvantaged area, this may affect his/her goal setting.

Achievable: The goals that one sets must be accomplished within his/her given strengths and abilities. To determine the mentee's strengths and abilities, set a goal, and then look at the individual components of that goal. Does the mentee have what it takes (physically, mentally, materially) to achieve this goal? Even if a goal is believable, it is not always achievable.

Controllable: Sometimes goals involve others. If the others do not care to participate, then the goal is not controllable.

Measurable: There must be some standard of measuring the progress achieved on a goal. Goals are measurable when they are broken down into intermediate steps with deadlines. Have mentees taken steps to complete their goals and have they completed them at the expected time?

Desirable: It may sound obvious, but a goal must be something that the mentee absolutely wants to accomplish. Often, mentees set goals merely to meet the expectations of others.

Stated with No Alternative: The mentee should work toward only one goal at a time. Research shows that a person who says he/she wants to do one thing *or* another seldom gets beyond the "or." Even though the mentee may set out for one goal, he/she can stop at any time and drop it for a new one. Always discuss why the original goal did not work. But when the mentee changes goals, the new goal must be stated with no alternative.

Conducive to Growth: The goal should never be destructive to the mentee, others, or society. If a student were seeking a potentially destructive goal, he/she should be encouraged to consider a different goal.

The mentees willbe encouraged to set goals using the mnemonic, "S.M.A.R.T" (Specific, Measurable, Action-Oriented, Realistic, and Timely). These five areas cover allof the necessary parameters in goal planning while helping mentees to memorise those parameters. (Campus Compact,1994)

Communication in Stages 2 and 3

Effective verbal and nonverbal communication is paramount to the success of the mentoring relationship. Mentors have the responsibility of effective communication because they are the primary source of support and challenge to the mentees. Because the mentees willmost likelybe different from the mentors in age, and sometimes culture, race, and gender, the mentors must know the different nuances of communication and interpretation particular to the mentee. Part of thisunderstanding willbe gained through trial and error in the relationship, but there are also factors to consider beforehand: How do I perceive myself in the many roles a mentor plays? How well do I understand my mentee's overall expectations for our mentoring relationship? In general, is my communication with him/her effective, including my nonverbal and verbal communication? What is my objective in thyis conversation? Am I too formal or informal? What assumptions have I made in this conversation? What kind of response do I expect from my mentee? Am I prepared for a very different kind of response? Do I give him/her enough time to respond or ask questions? If I think I have been misunderstood, can I clarify and paraphrase? Am I willingto set aside my agenda to listen to him/her at any time?

Closure in Stage 4

Closure in the relationship occurs in two major places. Naturally, closure occurs when the relationship is redefined (Stage 4) at the end of the mentoring term. But, proper closure needs to be achieved after each meeting with the mentee.(Campus Compact,1994).

Weekly Closure

The following steps should be taken during or after each meeting with thementee:During the first meeting, mentors should tell their mentees how long they willbemeeting. Mentors should remind their mentees each week about the duration of the meeting. If the mentor lets the mentee know that he/she has another appointment five minutes before the normal ending of the session, then the mentee willfeel unappreciated. Givingthe notification prior to the meeting will meet expectations and avoid disappointment. Before leaving each week, mentors should discuss achievements and give some positive feedback to their mentees. Mentees needs positive closure to make them feel upbeat, to look forward to the next week, and to motivate them towork harderduringthe week to please the mentor. The mentor and the mentee should keep a mutual calendar that shows thementee when the meetings willtake place. Their calendar should include vacations, business-trips, holidaysand other events that would disturb the normal

routine. The mentor should remindthe mentee once again, a week in advance of departing, and should then send a postcard while away. Mentors should not overstay their welcome by trying to fill extra time if they do not have activities to last throughout the duration of the meeting. If mentors do thisfrequently, mentees may find them boring. The best solution is to be over-prepared. The mentor should take this mentorship and the weekly commitment seriously.These students'do not need one more insincere or unreliable relationship in their lives, climate change is ***Real***.

Redefining the Relationship

To have a satisfactory redefinition of the relationship at the end of the agreed term, thementee must experience a sense of closure. The mentee should feel a sense of accomplishment, knowing that he/she is headed in the right direction toward achieving his/her goals. Many of the youths pass through difficult situations; they naturally feel a sense of abandonment at the conclusion of the mentoring term. For this reason, they must know that the relationship is changing not because it was unsuccessful, but because they have succeeded and it is timefor them to pursue goals in a different way. This will be achieved through verbal communication and a little extra effort as well as planning on the part of the mentor. The mentor should not be limitedby the following suggestions, but should rely on his/her own creativity to determine what would be fun and beneficial to the mentee. The mentor and mentee should swap some sort of an item or souvenir that would remind them of the positive experience they shared. The pair should have their picture taken, the mentor can have it framed and given to the mentee. The mentor might also prepare a scrapbook or photo album for the mentee. The entire groups of mentors and mentees should have a final banquet, picnic or awards ceremony for the last meeting. The mentor must redefine the relationship. While the mentee is stillin middleschool, he/she can only be considered a "friend" to the mentor, but that does not keep the pair from usinga more creative definition such as being "associates" or "partners." The mentor must assure the mentee of future communication and accountability. They must decide on their method and frequency of future communication. Such end-of-the-year activities can be effective ways to redefine the relationship, leavingit on a happy note.

(Points adapted from the *Resource Manual for Campus-Based Youth Mentoring Programme*[81-83].)

2.2.7 Field Study as an Instructional Strategy

Field study relates to students' activities taking place in learning environments outside the traditional (conventional) classroom, such as office environments, historical areas, monuments and museums, national parks, zoos, wetlands, seaside and wild life areas, etc. It is based on the supposition that the most valuable experiences of the students' are gained through images taken by the senses. It is connected with most educational techniques and it often forms part of a project. It allows students' to participate in the design of the educational activity and to acquire in situ experience and knowledge through the research process (Kern and Carpenter 1984, Moles 1988). More particularly, it helps the students' acquire new knowledge and skills and formulate interest attitudes towards the study subject; in other words, it contributes so as the changes through learning to take place on knowledge, skills and attitudes levels (Rogers 1996, Knapp 2000,Baron 2010,Atchinson and Feig 2011). Field study is termed as one of the education methods (Hammerman 1980, McRae 1990, Priest 1993, Hammerman, Hammerman and Hammerman, 2000), which, according to Papadimitriou, 2002; are rooted in fields such as philosophy, epistemology and naturalism. Educationists such as Pestalozzi, Froebel, and Dewey were influenced by these fields and applied many of the ideas expressed therein in their teaching practice. Since the end of the 19th century important educational movements have been developed in various countries focusing on the environment (the natural, in particular) as a learning field. Nowadays field study forms part of the curriculum of courses from a broad spectrum of sciences including geology, biology, archaeology, his/hertory as well as from various social sciences, while it is often implemented in many formal institutions' and adult education programme as part of the practical exercises undertaken by the students.

The work that the students' undertake in the field can vary since they may be involved in the description of a place, the comparison of visual or other data, in some kind of research or a survey in general, in other words, things which cannot be achieved as effectively in the traditional classroom (Davidson 1981). However, many teachers consider the field study as a waste of time. They maintain that using less time in the traditional classroom, for example, by means of a lecture supported by suitable audiovisual material, such as a film or slides, the students' can achieve better results

in the cognitive fields, not to mention that they do not have to move (Jacobson 1986). On the other hand, as it is evident from the results of many researches, the students' learn particular subjects of various cognitive areas faster and more efficiently if they are found in an appropriate field study environment rather than in a traditional classroom (Mason 1980, Kern and Carpenter 1986,Baron 2010).

Adopting the field study as a suitable educational method in education depends on the learning object, the aim and objectives of the learning process, the learning styles and the educational characteristics of the students, the competency of the teacher, the learning environment, the time available and the particular moment, as well as the resources available.

In any case, it is useful since it can relate to many of the conditions for effective learning in **social studies** education such as the active participation and the activation of the students' existing schemata (Atchinson and Feig 2011). More specifically, in field study the students' are offered ample opportunity for active participation since they are called upon either in groups or individually to plan, implement, apply, re-plan and evaluate certain activities relating to the theoretical background of their studies. The learning aimed at through field study is concerned with consolidation of knowledge acquired and the acquisition or development of skills and attitudes.

Some education institutes organise field studies relating to their programmeduring the **course session/ class session** or even on weekends. On environmental issues, for example, the students' have the opportunity to observe and collect data from the study area, exchange their views with members of environmental organisations, representatives of the Local Authorities as well as the residents, thus ascertaining the differences in views (Filho 1998). Further, students' involvement in field studies .could be achieved by enriching the activities suggested in the course books (and the assignments) with subjects for whom field study is necessary (Blackmore 1998),this way, studying becomes more active and experience-related with emphasis on the local environment (Clover 1998).

Like all participatory techniques, the field study requires systematic and careful preparation on the part of the tutor, for the field study to be effective thetutor must take

care such thatthe work is well defined, the students' activities must be clear and well planned in advance and the output well prepared (Orion 1993, Priest 1993, Baron 2010, Atchinson and Feig, 2011).

2.2.7.1 Process of Application

As in traditional education (Orion 1993, Orion and Hofstein 1994, Baron 2010**),** field study comprises of three stages: preparation, implementation and composition - presentation. In this section we are describing these stages with reference to the role of teachers andstudents.

This description refers to students' who participate forthe first time in field study**.** Alternatively, if they are experienced, it is expected thatthey take initiative in the organisation as well as in the implementation stages of thesfield study.

Stage 1: Preparation

Preparation involves action on the part of the teachers within and outside the class session. More specifically, the teachers:

Outside the Contact Sessions

- Studies the course books and locates subjects suitable for field study
- Studies the places of the students' areas of residence and explores all possible places for field study in those areas.
- Locates those areas within the town where the class session takes place, which are suitable for study.
- Creates an archive containing the name and place of the area, as well as what this area can offer in terms of learning together with any other useful information.
- Makes a preliminary visit to «the field study» in order to familiarise himself /herself with the study object should it be exploited by the entire group of the students'or during the class session.
- Prepares activities for the students' with a list of the requiredmaterials.
- Secures cooperations and selects the best time for implementation.
- Secures the relative permits (if necessary) for the visit and explores the best possible wayof transportation with the cost involved.

However, the teachers can inform the coordinator of the module aswell as cooperate with otherteachers. It should be noted that, depending on the object of the study, the teacher could ask for the students' opinion on the fields suitable for study within their area of residence (Baron, 2010).

In the Contact Sessions

The teachers explain the field study technique and set the rules. More specifically, the teacher organises a preliminary discussion for the determination of:

- The subject of the field study
- The aim and the goals of the field study
- The place where the field study is to be carried out
- The activities to be carried out (if group work is involved,every group must be assigned certain activities).
- The duration of the field study and the sources to be utilised and the final product.

The teachers determine his/her own roles as well as that of the learners and encourage the students' active involvement in the teaching and learning process. Finally, prior to the visit to the place to be studied, a relevant projection (either in the form of a film, CD-ROM, or slid**es)** can take place within the class session. This is quite important since the students' interest can be raised and they could start processing the questions to be answered as a result of the observations to take place in the field (Falk and Balling, 1980; Atchinson and Feig, 2011).

Stage 2: Work on the Field

On the field, the students', either in groups or independently, are assigned certain activities. These activities can vary and their nature depends on their aims and objectives as well as the opportunities offered by each particular field. Activities on the field can include observation and comparison, mapping, sample taking, taking of photographs, (Baron, 2010).

Stage 3: Composition and Presentation within the Contact Sessions.

After the on-the-field work has been completed, processing of the data collected follows leading to composition (analysis and interpretation of the collected data). During This stage, the students' could either carry out one or more activities included

in their course books, or prepare a report containing the basic points of their research, draw up a brochure containing photographs, diagrams, sketches, plans, histograms or they could merely exhibit the material they have collected by means of written texts, and so on. The electronic or otherwise communication between the students' is considered important at this stage (Vassala, 2003).The students'can use elements from the field study for their assignments. The presentation of these assignments in the class session is considered exceptionally useful.

According to Brian and Linda (2004), the use of educational field study has long been a major part of the education programmeming for youth and adults. However, due to funding limitations, time constraints, and increased liability concerns many education professionals balk at requests for field study. In spite of these concerns, well-planned field study can be a valuable tool in the extension agents /educational toolbox.An educational field study- trip can be an integral part of the instructional programme. Good field study-trips provide participants with first-hand experience related to the topic or concept being discussed in the programme. They provide unique opportunities for learning that are not available within the four walls of a classroom. An example of this would be a turf grass management programme visiting a golf course. A field study- trip such as this would allow participants to see first-hand the many principles of plant growth and management, pest control, and watering techniques discussed in the programme (Baron, 2010; Atchinson and Feig, 2011).

As with any type of educational programme component, field study- trips should be designed around specific educational objectives. A field study- trip should be designed so participants can easily make connections between the focus of the Field study and the concepts they are learning in the rest of the educational programme. Numerous research studies in science education have documented significant increases in participant's factual knowledge and conceptual understanding after participation in well-planned field study. When planning and organising a successful field study- trip, three important stages should be included: pre-field study-trip, field study- trip, and post-field study-trip (Baron 2010; Atchinson and Feig, 2011).

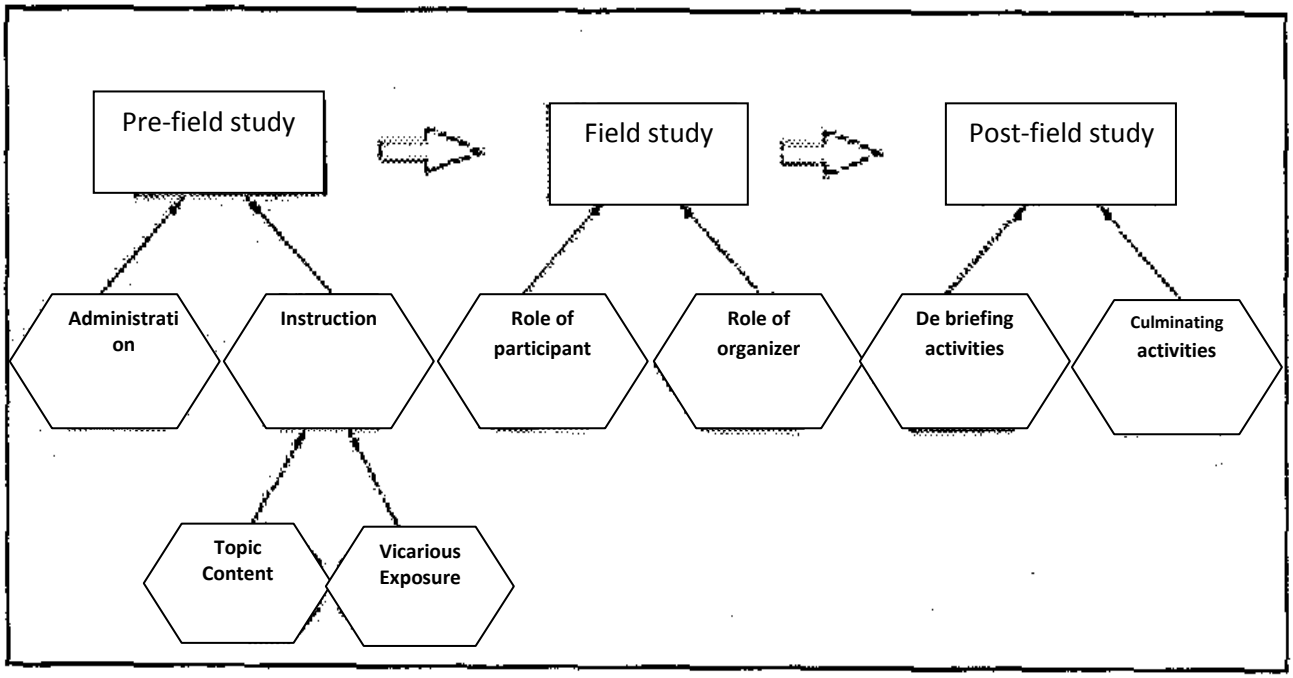

Fig. 2.4 Field Study Planning Model (Modified from Salako, 2014)

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Pre Field Study Stage

The pre-field study-trip stage of a field study involves two major components: administration and instruction. The administration component involves all the steps taken by the field study- trip organiser to arrange the logistics of the field study. Steps include securing permission from appropriate administration, organising transportation to and from the field study- trip location, contacting those concerned as regards the field study-trip location to verify the schedule and activities and obtaining signed permission slips from parents/guardians of youth attending the field study- trip. Unfortunately, many organisers only focus on administrative concerns during the pre-field study stage of field study planning. Although the activities of the administration component are important, if organisers only focus on logistics, a major segment of the pre-field study stage is missing and field study-trips may not be educationally successful.

The instruction component of the pre-field study-trip stage is critical in preparing participants for the experience. Numerous research studies have shown that

participants, especially youth, often have high levels of anxiety when going on a Field study. Anxiety levels can be especially high for field study- trips to novices, unfamiliar settings. Often a field study- trip is the first experience a person has with a particular location. When individuals experience high levels of anxiety, learning cannot take place. To reduce anxiety, field study-trip organizers need to make participants feel comfortable and safe at the location of the field study-trip just as they would in a typical classroom (Atchinson and Feig 2011).

One method of accomplishing this goal is to provide participants with vicarious exposure to the field study-trip site as part of pre-field study-trip instruction. Vicarious exposure could involve the organiser showing participants photographs, drawings, or a videotape of the site to be visited. This can occur at a meeting prior to the field study- trip or materials may be sent to participants prior to the event. Another option would be to post important field study- trip information on the Internet so that participants can visit a website prior to the experience. Items such as the location of restrooms and basic features of the site should be identified. If participants will be at the field study- trip site during a meal time, such arrangements should also be discussed. Studies in science education have shown time and again that providing participants with vicarious exposure prior to a field study- trip significantly reduces individual anxiety and increases overall trip effectiveness (Baron 2010).As part of instruction, the organisers should also review safety and behaviour rules and expectations with youth. These items should also be included in permission slip letters to parents/guardians of participants.

To increase the educational effectiveness of field study- trips, pre-field study-trip instruction should also focus on the content topics and concepts that participants will be investigating during the field study- trip. It is important for field study- trip organisers to give participants verbal clues regarding what to look for during their activities. Pre-field study-trip instruction makes it easier for participants to focus on the educational goals of the field study-trip. As part of pre-field study-trip lessons, organisers should demonstrate the use of any equipment and explain in detail any activity that will be occurring during the field study (Atchinson and Feig 2011).

Research has clearly shown that during field study-trips, learning activities involving groups of 2 to 3 individuals are most effective. These groups should be assigned during the pre-field study-trip stage. Specific roles of each group member during activities (such as observer, recorder, and graphic artist) should also be explained in advance (Atchinson and Feig 2011, Baron 2010).

Field Study Stage

The second stage of a successful field study- trip is the field study. Two components should be addressed during this stage: the roles of the participant and the organiser. The role of the participant is accomplished by establishing a field study- trip agenda and sharing this agenda and fieldstudy- trip objective with the participants. A suggested agenda for a field study- trip starts with a brief amount of free time for individuals to explore the site on their own. This open exploration may not be appropriate in all locations. For example, individuals may not be able to roam freely inside an equipment manufacturing plant. They could however, have free time to view items in the visitor area or lobby prior to the guided tour. This exploration time allows participants to get comfortable with their surroundings. Once the basic curiosity of the facility is satisfied, students' are better able to focus their attention on the content topics to be learned.

The second phase on the agenda is often a whole-group **guided-tour**. During the tour, the organiser or tour leader can point out specific items that relate to the educational goals of the trip. This also provides an opportunity for participants to ask any question they may have developed during their exploration time. The third phase of a suggested field study agenda is a small group learning activity. Working in pre-assigned groups of 2 to 3, participants can complete an activity such as a short worksheet or scavenger hunt. The worksheet should be designed in a manner that is challenging to students' yet not frustrating. The worksheet should clearly relate to the educational goals of the field study- tour (Baron, 2010; Atchinson and Feig, 2011).

The role of the organiser is also an important consideration during the field study- trip stage. Although monitoring and management of the experience is important monitoring participant learning is also a major organiser responsibility. Throughout the field study- trip, the organiser should be actively engaged in teaching activities.

However, on field study-trips the organiser should utilise different teaching approaches than those used in traditional classroom settings. Organisers should interact with participants to help answer questions they might have. Organisers should also initiate discussion with small groups of participants by asking them questions. During field study- trips, organisers should function more as facilitators or guides rather than directors. By playing an active rather than a passive role during the field study- trip, organisers can increase students' interest and learning.

Post Field Study Stage

The third and final stage of a successful field study- trip is the post-field study stage. Like the stages before it, this stage also contains two components: debriefing and a culminating activity. During the debriefing session, participants should be encouraged to share and discuss their experiences during the field study- trip. This could include sharing and discussing data or results of assigned small group activities as well as sharing feelings about specific aspects of the trip or overall impressions. Participants should also be given the opportunity to identify and discuss problems (Baron 2010, Atchinson and Feig 2011).

2.2.7.2 Benefits of Field Study Instructional Strategy

Atchinson and Feig 2011; affirmed that field experiences and field study strategy provide(s) the following benefits:

(i) Experiences- real world knowledge about life
(ii) Real Practical examples of information discussed in the classroom
(iii) Opportunities for sharing different perspectives and views on important topics
(iv) Locations to gather real ecological field data
(v) Interactions from which you can discover your strengths, limitations, abilities and skills
(vi) Integration of concepts and information from various disciplines
(vii) Personal. exposure to people and other places, cultures, ecosystems through travelling
(viii) Increased knowledge and broadened understanding of the world and its workings
(ix) Integration of introductory and advanced principles

(x) The first exploratory course in a discipline for many students' - open door courses

(xi) Professional experiences required by many related jobs

(xii) Extended laboratory experiences

(xiii) Formation of instant learning communities

(xiv) First-hand observations of human interactions with the environment

(xv) Places to learn and practice professional sampling and field collecting techniques, illustrations of real world complexities

(xvi) Application of theoretical or classroom knowledge to real situations, critical thinking problems involving complex and current issues waiting to be solved

(xvii) A chance to put one's life into a realistic perspective.

(xviii) Study of the earths global systems of interaction, explorations into the natural elements involved in change and stability within the environment, openings for students' of all disciplines to come together.

(xix) Opportunities for personalised learning.

(xx) Appreciation for the natural world, its resources and history.

(xxi) Real subjects to study and to improve observational skills.

(xxii) Learn to live and work with others, supporting each other during group learning activities.

(xxiii) Direct exposure to museums, businesses, and other centres of learning.

(xxiv) Increased access to current research, guest speakers, community programme and special events, teamwork activities that result in enhanced learning outcomes for all.

(xxv) Chance to work with diverse people focused on a common goal.

(xxvi) Opportunities for personal growth, developments of a person's perceptions and perspectives.

(xxvii) Appeal to students' and community participants that would not otherwise become involved.

(xxviii) Increase writing and communication skills-critical verbal and writing skills.

(xxix) Enjoyable learning experiences, and.

(xxx) Time to appreciate the beauty of the world in which we are involved (Atchinson and Feig 2011).

2.3 Empirical Review

A constant across research in apprenticeship is consideration of learning environment and context; in other words, it is an awareness of the situated nature of learning. Roth (2001) suggested that in any instance of educational research, observation must be considered as a result of the interaction of three factors: the activity the individual, and the community. These elements are interrelated, continuously changing and affecting each other and, thus, the learning that results.

Research interests in apprenticeship grew throughout the late 1980s and early 1990s, with studies largely focused on children's learning processes (e.g. Palincsar andBrown, 1984; Palincsar et al., 1993; Rogoff, 1990; Rogoff, Mosier, Mis-try, andGoncu, 1993). This growth pattern is no surprise, as the roots of the field grew out of renewed interest in Vygotsky's (1977, 1978) work on the social nature of cognitive development in children that came about as part of the constructivist movement. Eonk and Kim (1998), in a review of research, found little research looking at socio-cultural theory as it relates to adult learning in formal settings; instead the focus tends to be on school environments. They suggest that more research is needed to determine if adult students' benefit from the same forms of scaffolding as children; if there are differences in needs among young, middle and adult students'and how to determine the ZPD in adult students'. Such research conducted in higher education and adult learning settings has grown with advances in technology; educational researches have seized the challenge of determining how technology can help offer learning experiences that use apprenticeship strategies that are simultaneously more effective than traditional instruction and more efficient than non-computer-based methods (DuFour 2004; Fletcher 2012; Hairon and Dimmock; 2012).

Research on apprenticeship has taken various approaches. For organisational purposes, it can be divided into three groups that are representative of the kinds of research that has been done in the last 20 years.

1. ***In Situ research.*** This type of research seeks to capture elements of apprenticeship for the purpose of documenting a learning experience and guiding further work, in theory and practice. These studies do not have designed interventions or experimental groups and favour a case study

methodology. Also included in this category are evaluations-both formative and summative of mentoring programme.

2. ***Designed interventions and experimental studies.***This group includes experimental studies and studies of prescriptive instruction designs. In addition, to determine whether particular interventions are effective, some studies have sought to find out how apprenticeship based classroom experiences compare to more traditional ones.
3. ***Research on technology and how it might support apprenticeship.***This category of research includes studies of technology used as a teaching enhancement, with participants collocated in a live setting; as a teaching medium, with participants potentially located in different settings and communicating through the computer and as a teacher, in which students' receive support from the computer.

Each category of apprenticeship research is discussed separately, although the technology studies certainly do overlap with the other two categories.

2.3.0.1 *In Situ* Studies

In Situ studies of apprenticeship can be important to our understanding of how students' best learn. Lave and Wenger (1991) suggest that the analysis of legitimate peripheral participation may uncover aspects of the learning experience that have previously been overlooked. The research done in this area is responsible for the initial theories of apprenticeship. It has served to develop knowledge bases of expert performance and preliminary recommendations of what methods are likely to work under particular conditions and in particular setting (Ingersoll and Smith, 2003; Fletcher 2000; Washburn-Moses, 2010).

In a study of a community of writers at an urban nonprofit organisation, Beaufort (2000) explored the roles the writers played and how new writers were integrated into the community following an apprenticeship model. Fifteen roles were observed in this example, ranging from observer, reader/researcher, and clerical assistant on the novice end up to author, inventor and coach on the expert end. New or less experienced writers learned the process through taking on roles such as the clerical assistant (a role reserved for new members), which allowed for extended observation

of the expert writers at work. New employees gained experience and responsibility as time passed through this model, which exhibited Lave and Wenger's (1991) legitimate peripheral participation. Although the act of learning was not formalised or labeled by participants, and much learning occurred through observation, more experienced employees would serve as mentors and illuminate the tacit components of the writing process as needed. This model of learning worked for most participants, but one employee did not succeed and was let go. The results suggest that learning writing through a social process with authentic tasks is effective, and the researcher states that a similar model may be useful in school settings, where writing has traditionally been an individual, general skills learning activity.

Similar to analysis of legitimate peripheral participation, analysis of expert performance can be used to help determine ways in which novice performance may be supported. For example, the process of *In Situ* knowledge construction by a competitive table tennis player was documented through the player's reflective commentary on watching a videotape of a recent match (Sèvc, Saury, Thereau, and Durand, 2002). The player was able to articulate the underlying thought behind his/her actions during the game, demonstrating points at which he was learning about his/her opponent's game and strategies and integrating that knowledge with his/her knowledge about the game in general as well as his/her past experiences competing against This opponent. The knowledge generated by this study—and in-depth exploration of situated actions—can be used to build a model of expert actions 'within table tennis. Such models are useful for teachers and coaches to draw on and use to support their students' (Ingersoll and Smith, 2003; Fletcher, 2000; Washburn-Moses, 2010).

2.3.0.2 *In- Situ* Reduction Practices and Effects of Mentoring Programme

Traditional programme pair up mentors and mentees, often considering personal preferences and interests in the process. Programme may have guidelines for the pairs to follow, training for the mentors, and/or points at which their progress is reported or evaluated. It is these programme that tend to be researched as we seek to find out what types of interactions occur, which ones are effective, and how the participants perceive the usefulness of the relationship. Evaluations also tend to be conducted on

funded mentoring programme to determine whether or not the funding is well spent or the programme is meeting its goals. Not all mentoring occurs within a programme, but studies on informal mentoring reduction practices are less common. Many mentor-protégé pairs develop informally; not only would locating such pairs and determining how representative they are be difficult, but also identifying the participants of informal mentoring would affect the nature of their interaction by making them consider labels and roles for their intuitive relationship. A third area of potential study is technology-mediated mentoring, which is discussed later.

The results of a review of 10 evaluations of youth mentoring programme (Jekielek, Moore, Hair, and Scarupa, 2002) found that their impact fell into multiple areas, including academic achievement (in terms of attendance, attitudes, and continuing education, although not necessarily grades), health and safety (in terms of preventing and reducing negative behaviours), as well as social and emotional development. Productive mentoring reduction practices were found to be structure, regular meetings, mentor training and preparation and a focus on the mentees' needs rather than the mentors' expectations.

Lucas (2001) studied an after-school mentoring programme for sixth-grade students'. Mentors were college undergraduates who were enrolled in a for-credit course. This mentoring programme, called Project Mentor, was voluntary and extracurricular for the mentee participants but promised them support for academic achievement. Lucas suggested based on her research that there is true interdependence between the role of mentor and that of mentee. She found that the relationship between mentor and mentee is heavily based on individual factors including personal preferences, prior experiences, as well as goals and expectations; essentially, the nature of the experience transcends any traditional definition or training that may take place and is heavily shaped by the individuals who are involved in it. Lucas also found a much greater desire to engage in mentor-mentee interaction when it was focused around an activity that the mentee could not successfully- complete alone. She also found that successfully collaborating on such activities generally created a closer relationship between the mentoring pair.

Langer (2001), in his/her study of the nature of mandatory mentoring at SUNY empire State College (ESC), found a gap between his/her results and the predominant views in the theoretical Literature about mentoring. While the literature base tends to place a heavy emphasis on the close interpersonal relationships developed between mentors and mentees, Langer observed a process that was focused almost exclusively on goal attainment. This is not to say that faculty mentors and their students' at ESC never develop close relationships but that the task focus and school- year time frame relegate the development of a social bond to a secondary status. What Langer and ESC are referring to as mentoring might better fit the definition of coaching, which is more task-focused than relationship-focused.

Billet (2000) studied the learning process of mentees in a formal work place mentoring programme over a 6-month period. This prolonged engagement allowed him to identify learning sources and strategies that were influential on the mentees' development. Mentors were trained in workshops that introduced guided learning strategies such as questioning, modelling, and coaching and helped them to identify ways these strategies might be used in their workplace. Engagement in everyday work was found to have the greatest influence on mentee development, supporting the concept of situated cognition;Billet suggested that the guided learning strategies were used to enhance this engagement. A specific analysis of guided learning strategies showed that the ones that were used most frequently, such as questioning, modelling, and coaching, was perceived as the most useful. Less-used strategies, such as diagrams and analogies, were less valued by the mentees; mentors reported greater challenges finding ways to draw upon and use these strategies spontaneously with their mentees (Ingersoll and Smith, 2003; Fletcher, 2000; Washburn-Moses 2010).

Young and Perrewé (2000) looked at career and social support factors and their effects on participant perceptions of the success of a mentoring relationship, finding that mentors' expectations generally were met when a protégé was involved in career support behaviour. Conversely, protégés tended to measure the success of their mentoring relationship in terms of the amount of social support they received. Young and Perrewé hypothesise that this difference in perception may be due to the mentors' established status, which may have them focused on successes directly related to the

mentoring goal (career enhancement), whereas their more novice protégés may not yet be able to predict the impact of particular career-related behaviours but will look for encouragement and friendship as indicators that they are performing as expected.
Although none of the results presented in this section is generalisable, given the methodologies used, they are nonetheless quite valuable to the field. They confirm theoretical principles and strategies and represent what is possible in everyday educational settings with regular teachers and students'.

2.3.0.3 Designed Interventions and Experimental Studies

An organised programme of experimental studies is much needed at this point in the development of apprenticeship theory and practice. The various theories of how apprenticeship works and the results from *In Situ* research need to be studied with rigour in the interest of attaining generalisability. Small pockets of experimental studies have been conducted to date, but many of these occur in isolation rather than in a related series, hence this present study "Effect of Mentoring strategy on students' knowledge of and attitude to climate change concept in Social Studies in Lagos State.

To gain support for a paradigm shift regarding methods of learning and instruction, it is necessary to demonstrate the effectiveness of apprenticeship. Hendricks (2001) conducted an experimental study to determine whether situated instruction was more likely to result in transferable knowledge than traditional instruction. The content area was causality, with a learning goal focused on students' being able to determine whether or not a cause-effect relationship was present in particular research studies. The control group received "abstract instruction" in the form of a lecture and practice activity whereas the treatment group's situated instruction" followed the instructional model set forth by Brown et al. (1989), beginning with discussion, then modelling, and, finally, coaching and scaffolding to assist the students' in applying the knowledge. Scaffolding was• faded and control ceded to individual students' as they demonstrated the ability to identify causality, and, finally, students' were asked to reflect aloud, articulating what they had learned. The results demonstrated that students' in the treatment group outperformed the control group on a posttest administered at the end of the instruction, but there was no significant difference in performance on a far-transfer task two weeks later. However, the results still show

that the differences in instruction had some effect, only two students' successfully completed the transfer task, both had been in the treatment group and both indicated that they had already applied the learned information at home. Additionally, students' in the situated group had a more favourable reaction to the instruction than those who received the lecture and practice intervention. Hendricks suggested that although these results counter claims that situated learning is more likely to result in knowledge that is transferable to real life, they may simply be indicative of how challenging it is to produce far transfer given any kind of instruction and may be affected by the use of a fabricated situation to measure transfer.

The use of expert concept map structures as a form of scaffolding has been demonstrated to be effective. Chang, Sung, and Chen (2001) studied the impact of three variations of a concept mapping activity on student learning in a biology class. In one treatment, called "construct by self," students' had access to a computer-based concept mapping tool that had hints built into the system; the hints compared the students' concept map with that of an expert. In the other treatment, called "construct on scaffold," students' were given a blank outline of an expert's concept map to fill in using the same computer-based tool. The control group was asked to create a pencil-and-paper concept map with no form of assistance. Results of a posttest showed that there was no significant difference in terms of performance of the students' in the control group and the construct-by-self treatment group. The construct-on-scaffold treatment group, however, had a higher level of mastery. A post survey of student impressions of concept mapping showed that students using the computer-based tool in either treatment group preferred concept mapping as a learning activity much more than those using pencil and paper in the control group. The researchers theorise that the students' in the construct-on-scaffold group learned more because the expert's outline helped reduce their cognitive load while keeping them focused on the material that was relevant to learning biology(Ingersoll and Smith 2003, Fletcher 2000, Washburn-Moses 2010).

Coltman, Petyaeva, and Anghileri (2002) conducted a study of the impact of adult support in a discovery learning process for young children. In the study, children were given building blocks and were asked to complete abstract tasks related to three-

dimensional shapes, such as recognising size and shape equivalence in different formations of building blocks. All subjects were pretested to ensure novice status in this area. Students' in the control group were to complete the tasks unaided; those in the treatment group were offered graded levels of support. There were four support levels, starting with contextualisation of the task, followed by guided reflection, modelling, and, finally, direct demonstration. In practice, the second level (reflection) was sufficient scaffolding for 28% of the students' in the study, and the remaining 72% performed the task correctly when modelling was offered; the fourth available support, demonstration, was not used with any subject. Posttest 3 clays after the task intervention were used to measure learning gains. Children in the treatment group outperformed those in the control group, with respective posttest task completion rates of 90.7% and 33.3%, respectively. This study suggests that discovery alone is not sufficient to ensure that learning will take place and demonstrates the value of scaffolding—particularly in the form of modelling— in the learning process of children.

In a study of mathematics learning in peer groups, Webb, Troper, and Fall (1995) found that the level of help students' received (ranging from none to receiving just the right answer to various levels of explanation of the concepts) is a predictor of their engagement in constructive activity, which in turn is a predictor of their achievement. Students' who received no help or who were told the right answer tended to avoid engagement with the learning exercise, whereas those who received explanations engaged in activities like reworking a problem. Essentially, these results support using level-appropriate explanations to scaffold mathematics instruction, as they foster a learning climate that may lead to greater student achievement. Similarly, King (1994) found that when students' are guided by lesson-based questions and questions that cue and connect prior knowledge with the present lesson, they perform better than students' who have only the lesson-based questions. These results suggest that providing students' with help oriented toward making connections with material and conceptual support rather than answers is a useful form of scaffolding (Ingersoll and Smith, 2003; Fletcher, 2000; Washburn-Moses, 2010).

2.3.0.4 Inter-subjectivity*:* Mutual understanding is a key part of being able to communicate clearly and to ensure that learning goals have been met, but exactly how this understanding is developed remains somewhat of a puzzle. Illustrating this challenge is a study conducted by Hallam and Hazel (1998) in which postgraduate students' with similar backgrounds were paired. Each person individually read a text and then discussed it with his/her or her partner. The results showed that the individuals were likely to have differences in understanding and interpretation of the passages read, particularly in parts that were connected to areas in which they had prior knowledge or experience, although the participants generally expected their partners to have a common understanding. Given the frequency with which students' are asked to read passages and then participate in class discussions, lack of mutually agreed-on interpretations of readings is particularly problematic.

Jarvela (1995) studied the relevance of social interactions between students' and teachers based on apprenticeship model used in a technologically rich environment. Jarvela was interested in the key parts of shared cognition in learning interactions and in how much the expert should be controlling the interaction. Specifically, Jarvela studied the work of modelling, scaffolding, and reflection fostered appropriate task involvement; whether apprenticeship fostered worthwhile social interactions for teachers and students'; and how the technology affected the learning interactions. Findings indicated that a reciprocal understanding of the task at hand was important; if teacher and student did not conceive of the task similarly, scaffolding and modelling might fail. Students' who did not share their teachers' understanding tended to be frustrated when modelling occurred and when reflection was required; indeed, it was found that teacher modelling did not create reciprocal understanding. In This study, the technology was found to be of assistance to the learning process because it fostered reflection activities and thus made students' thought processes more visible to the teacher.

As shown through the studies by Jarvela (1995) as well as Hallam and Hazel (1998), much remains to be known about how inter- subjectivity can be efficiently developed in a classroom environment with multiple participants. Although the consequences of our failure to do so seem to highlight its importance very effectively, and we have

been able to document when it does and does not occur, we do not yet know how to develop and support inter-subjectivity efficiently among participants in a learning Situation(Ingersoll and Smith 2003, Fletcher 2000, Washburn-Moses 2010).

2.3.1 Studies on knowledge of Climate Change, Attitude to Climate Change and Reduction Practices

The potential threat that climate change poses to mankind and the systems we rely on necessitates further research so that informed steps towards mitigating it can be instituted. There is the need to understand the attitudes and reduction practices of people in relation to climate change and in what ways knowledge of the issue may inform these attitudes and reduction practices. This becomes especially important when one considers that "Previous studies had focused on environmental awareness instead of trying, to change people's attitudes and values about it" (Budak et al., 2005, p: 1224). For a process of climate change mitigation to occur, across all levels, research undertaken must have an end goal of not only being informative but proactive in offering possible solutions to changing perceptions and ultimately behaviour towards the environment.

To achieved the above, research must be undertaken at the local level, "understanding the dynamic interaction between nature and society requires case studies situated in particular places and cultures" (Berke and Jolly, 2005, p: 18). This is because specific areas will suffer from different climatic variations and specific cultures hold individual beliefs which ultimately inform attitudes and reduction practices, therefore, addressing the different levels of knowledge and types of attitudes and reduction practices people have towards climate change must initially be dealt with at the local level where such specific variations can be accounted for. Once research has been undertaken at the local level it can later inform decisions and policy at the regional, continental and global levels on how to incorporate such specific variations within the greater context of the global threat.

Lagos State as a commercial centre in Africa is one of the world's biggest receivers of climate change impact. "According to the Climate Change Summit held in Johannesburg - June 2008 -Africa has been rated as the world's 13th biggest emitter

of greenhouse gases by the IPCC" (Greenprint, 2009, p: 1). In view of this, it is of the utmost importance that Africa's educational institutions not only provide the facilities to promote behavioural changes within their students and staff but also commit themselves to reducing their impact on the environment, in particular, their contributions to climate change.

Further"As declared in Agenda 21, schools are directly challenged to increase their responsibility in developing environmentally literate citizens. In particular universities were asked to play prominent roles in preparing citizens to analyse and resolve environmental issues. Universities are obliged to help students' to be part of society, while they are also assumed to be leaders in creating a culture of environmental stewardship in our society" (Budak et al., 2005, p: 1224).Therefore, the purpose of This research is to address the knowledge, attitudes and reduction practices (KAP) of students' and staff in Lagos State towards global climate change. This is an important task because Lagos state, the students' and staff it accommodates have significant impact on the environment.

This includes their high consumption levels of water, paper and electricity as well as their high output levels of waste and greenhouse gases. Ultimately their actions play a role in contributing to climate change. However, it becomes prudent to understand what levels of knowledge and what types of attitudes and reduction practices students and staff ascribe to, in order to guage their impact on global climate change.

In particular it is the aim of this study to provide some basic framework for advocating change with regards to KAP of students towards climate change in Lagos State. Therefore through gathering information about the levels of knowledge and the types of attitudes and reduction practices that Lagos State populace ascribe to, in particular students', This study will try to account for these findings and offer solutions for amending undesirable situations, as well as provide a framework for future research on climate change.

There has been much debate over whether or not knowledge of a subject automatically results in better reduction practices. Most sociologists argue thatthis is

too simplistic a relationship to generalise when a person's attitude and reduction practices are an outcome of a huge range of factors such as culture and experience (Steel, 1995).Moreover, for this study it can be stated that a connection was found between a person's level of knowledge on climate change and his/her proactive behaviour. This is very similar to Bandura's self-efficacy construct. 'This self-efficacy construct is within the framework of Bandura's Social constructivism theory of self-regulation (1991, but dates back to 1977 and his work on self-efficacy. Self-regulation in the Social constructivism theory has two elements: self-monitoring and self judgement. Self-monitoring provides the contextual information (or 'reference value') while self judgement sets the target level (as 'input value' or 'standard'). Standards thus have psychological meaning in this version of a self-regulating system; they are self-set by individuals. Bandura's theory (1977, in Jackson, 2005) ,builds on his work in Social Learning, in which behaviour is learnt through observing and 'modelling' the behaviour of others. Unlike Control theory, which is concerned with the ongoing flow of behaviour, Social constructivism theory is explicitly about behaviour change: Bandura states that altering our standards and goal setting is essential for 'self-directed change" (Bandura 1991).

Bandura's theory also includes a reward element as the purpose for the goal-setting process; these tend not to be tangible rewards, but loose psychological ones based on a sense of achievement. In his/her work on self-efficacy, Bandura comments that a sense of personal mastery can be acquired through achieving a succession of small tasks, not just a few big, ones (Bandura 1977). Self-efficacy is given as the key example of the self- regulating system in action. The effort to be expended on behaviour is based on an assessment of the gap between current and desired level. Goal setting is the key means of driving action: increasing the standard to be achieved continually motivates action. Self-efficacy comes from achieving the standards, but is also recursive as efficacy is derived from experiences of achievement. Further studies based on this theory found a trend of linear progression whereby "educating people about environmental issues would automatically result in more pro-environmental behaviour" (Kollmuss and Agyeman, 2002, p: 241). It can be said that inhabitants of Lagos State are more knowledgeable individuals generally and more willing to get involved in climate change mitigation. This has important implications for how the

people can address the KAP of students'; when impacting their knowledge which will most likely influence their attitudes and reduction practices.

2.3.2 Mentoring Instructional Strategy and Students' knowledge of Climate Change

A huge number of schools mostly in the Northern hemisphere outside the shore of Nigeria have responded to the threats posed by climate change by integrating this issue into their educational systems (Capdevila, Bruno and Jofre, 2002,). It has been found that for people to really begin changing their attitudes and reduction practices towards climate change, their educational systems need to have mainstreamed this issue into the syllabuses (Orr, 1995; Ajiboye and Silo; 2006; Ajiboye, 2008).

One of the most prominent findings from this study is the role education plays with regard to students' knowledge and reduction practices towards climate change. The results show that with more knowledge on the subject,students' are more willing to participate. Majority of students obtained their knowledge from educational facilities and knowledge was improved if the issue was made part of their subjects. From this it can be said that students' will greatly benefit if there is a move towards greening the school's curriculum even in Lagos State and Nigeria as a whole.

It is important that the university move away from a discipline-centred approach to subject material where climate change is often restricted to science-based faculties. Climate change is an issue that should have no disciplinary boundaries as it is something that will affect everyone in the future (Orr, 1995, p: 43). Fortunately, it was found that many disciplines are already teaching about climate change, with humanities being the most prominent faculty .It was found that though these students' generally do not have a scientific background on the issue, when it is included in their courses they show significantly higher levels of knowledge on the subject .The success of moving towards greening the university's curriculum is very much dependent on academic and support staff participation (Capdevila et al.,2002), although, there was no significant difference between staff and students' opinions where all members generally agreed on taking this step. Once support from the staff is secured, it is important that the university set up staff training and provide material on

climate change. Greening of curricula in other countries has involved the university setting up teaching guidelines or curriculum greening plans where experts in the field compile valuable resources for lecturers (Capdevila et al., 2002).

Once the university has facilitated the teaching of climate change in university subjects it is likely that there will be improved involvement from students' in mitigating activities, as reflected in the linear progression models, which calls for mentoring and field study instructional strategies.

2.3.3 Mentoring Instructional Strategy and Students' Attitudes to Climate Change

A person's attitude or belief in climate change has been found to directly correlate with his/her motivation to take mitigating action (Blennow and Persson, 2009). However people's attitude towards climate change will only change if they are exposed to the issue on a regular basis (Wilson, 2003).Studies have found that public exposure to climate change has almost solely come from media coverage of the issue (Wilson, 2003). This reliance on media to obtain information on the subject was found to be true for the student body at Rhodes University Looking at students' knowledge of international policies, it can be said that exposure to climate change issues through advertisement has a significant impact on students' awareness. The study suggests that University has the potential to influence students' knowledge, practices and most importantly attitudes towards climate change if they initiate awareness programme on campus. This can be achieved through a wide range of means such as the university newspaper, posters and emails.

However, it is important that raising awareness be done in conjunction with other strategies as advertising alone rarely provides thorough understanding of a subject (Bostrom et al., 1994). Results found that students awareness of a subject does not equate to their ability to apply this information (students' know about carbon footprints, but could not explain the concept), therefore, advertising alone is not enough to ensure an adequate understanding of climate change and its associated issues (Bostrorn et al., 1994), hence, the need for mentoring.

The impacts of mentoring on the attitude and behaviour of students has been noticed and studied to some extent among primary school pupils and high school students, showing lower risk of school failure and dropping out. A published study by Ajiboye and Silo, 2006;Ajiboye, 2008;Ajiboye and Silo, 2008 about primary school pupils indicated that having a mentor appears to have a positive effect on learners at risk of academic failure. Other studies have shown that the primary cause for hindering career development, research publishing and progression in academics is lack of mentoring (Rhodes etal, 2000). For instance, Kennelly, Taylor and Jenkins (2008) cited in Ajiboye (2008),affirmed that teachers interviewed unanimously believed that meaningful engagement of, students,that is, students becoming involved and gaining ownership of a project, was associated with their motivation. They noted further that to engage and motivate students, most teachers stressed the importance of involving them in every stage of a project, not only the action phase, but also phases that involved identification and decision- making.

There appears to be value in having the guidance of an intelligent, dedicated, encouraging and genuine mentor. The participants in mentoring programme develop a sense of personal transformation and empowerment. Also, an effective mentor takes pride in the growth and accomplishments of the mentee, as such; there is need for quantitative assessment of the need for and benefit of mentoring programme.

2.3.4 Mentoring Instructional Strategy and Students' Reduction Practicestowards Climate Change

It can be said that to influence student reduction practices towards climate change, the university will need to make these changes part of their everyday social norms. A social norm in This case will reflect students' adopting uniform behaviours towards a more environmental friendly way of life (Young, 2008). These changes in students' lifestyles may come about from the university setting up an environment where climate change activities are practiced and widely adopted throughout the university.

However, it was found that there is a significant difference between staff and students' willingness to donate either money or time. Students' were more willing to volunteer their time to activities, whereas academic staff indicated a preference to donate money. This may be due to higher income levels for academic staff. In light of

this it would be appropriate to base strategies for student reduction practices around projects that will involve their time rather than financial contributions. The university currently runs a community service system for students' who do not follow the disciplinary code of conduct. This service currently includes activities such as working in the kitchens, for the campus protection unit and grounds as well as garden maintenance. Community service could be extended to adopt more beneficial reduction practices towards climate change. Students, instead could be put into mitigating activities such as planting trees, which is a lifestyle change most students' were willing to get involved- in.

Community service in environmental projects has been found to be very successful for university students' (Astin and Sax, 1998). Students' engaged in this form of service feel more motivated and eager to help the community (Astin and Sax, 1998). In the long run,this approach will allow students' to actually see the impact of their reduction practices, they will be able to step back and see the flints of their labour. "Outside of climate change, a large literature dealing with human decision- making and action suggests that motivation and perceived abilities are important determinants of human action" (Grothmann and Patt, 2005).

New arrivals will be introduced to a culture where all students' pick up rubbish, recycle and positively impact the environment and thus feel frowned upon if they do not conform to the social norm. Once a particular way of doing things becomes established as a rule, it continues in force because we prefer to conform to the rule given the expectation that others are going to conform (Lewis, 1969).

The results from this study have shed new light on previous perceptions of individual's KAP towards climate change. Previous KAP studies have found that a person's education level does not imply greater understanding of global warming (Bostrum et al., 1994). Further it has been, found that there is the tendency for the general public to mistrust climate change findings in light of the many uncertainties that are present (Imrnerwahr, 1999). This study has found that neither of these generalisations can be applied to students' at the university. Students' were found to

be more willing to get involved in mitigating activities with greater understanding on the subject and for the most part trusted that enough evidence is available.

2.3.5 Field Study Instructional Strategy and Students' Learning Outcomes

There is much anecdotal evidence about benefits of field study education experiences; teachers, for example, often speak of the improvement they have in relationships with students's following a trip. However, had evidence showing that field study education has a demonstrable long-term effect on behaviour or educational achievement is harder to identify; this may be in part because of the difficulty involved in conducting studies which separate the effects of field study education on meaningful outcomes.

A major meta-analysis of 97 empirical studies indicated a positive overall effect of adventure education programme on outcomes such as self-concept, leadership and communication skills (Hattie, Marsh, Neill and Richards, 1997). This study also indicated that there appeared to be ongoing positive effects. The largest empirical study of the effects of field study education programme (mostly Outward Bound Programme) found small-moderate short-term positive impacts on a diverse range of generic life skills, with the strongest outcomes for longer, expedition-based programme with motivated young adults, and partial long-term retention of these gains (Neill,2008). In "Adventure in a Bun", Loynes (2002) has suggested that field study education is increasingly an entertainment park consumption experience. In a paper entitled "The Generative Paradigm", Loynes (2002) has also called for an increase in "creativity, spontaneity and vitality". These dialogues indicate the need for those working in field study education to examine assumptions to ensure their work is educational (Khalid, 2001).

Field study education has been found more beneficial to those students' who find classroom learning challenging (Ajitoni, 2005; Gbadamosi, 2012 and Salako, 2014). Maynard, Waters and Clement (2013) found that, resonating with their previous findings, the teachers in their study reported "that when engaged in child-initiated activity in the field study environment, over half of the children who in the classroom were perceived to be 'underachieving' appeared to behave differently". Their work aims to support that the more natural field study spaces in which child-initiated

activities take place directly and indirectly diminish the perception of underachievement. This is important because a number of studies have shown that an expectation based on perception of students' is important for student teaching (Monroe, 2004).This may also be due to a non-academic family background, a personal psychological trait such as attention deficit hyperactivity disorder, or because they are boys (Sax, 2001).

When German children from forest kindergartens went to primary school, teachers observed a significant improvement in reading, writing, mathematics, social interactions and many other areas. A yearly long study was done where a group of 9^{th} and 12^{th} grade students' learned through field study education. The focus was on raising the critical thinking skills of the students as a measure of improvement, where critical thinking was defined to be, "the process of purposeful self-regulatory judgment and decision making". The problem solving capabilities included the ability of students' to interpret, analyse, evaluate, infer, explain and self-regulate. Researchers found that 9^{th} and 12^{th} graders scored higher than the control groups in critical thinking by a significant amount (Monroe, 2004). Using the environment as an Integrating Context for Learning (EIC) is the foundation of a substantial report (Lieberman and Hoody, 1998) which found benefits in learning outside the classroom on standardised measures of academic achievement in reading, writing, mathematics, science and social studies; reduced discipline problems and increased enthusiasm for learning andpride in accomplishments. There are several important trends and changing circumstances for field study education, including; Climate change, nature deficit disorder, physical fitness, rationalisation (sociology), and standards-based education reform.

2.3.5.1 FieldStudyInstuctionalStrategyandStudents'KnowledgeofClimateChange

Descriptive studies carried out at primary education level revealed that the students had limited knowledge and information as well as different conceptual understanding about the problem of climate change and global warming (Anderson and Wallin, 2000). In another study conducted, it was found that the high school students had some scientific knowledge about greenhouse effect but they also had a lot of wrong information and knowledge (Papadimitriou, 2004). Also, Khalid (2001 and 2003) who

conducted two different studies in the USA found out that the teacher and student had a lot of misconceptions about climate change, global warming, greenhouse effect, greenhouse gases, ozone layer depletion, and acid rain. He stated that the reason for these misconceptions resulted from the teachers having superficial knowledge about these subjects and not completing their lack of knowledge from field study, visual and print media. The two different studies conducted in Greece introduced that not only the students but also the teachers had inadequate information and knowledge about climate change, green house effect, acid rain and the thinning of ozone layer (Papadimitriou, 2004; Atasoy and Erturk,2008; Knapp,2000). Oluk and Ozalp (2007) determined that field study through collaborative learning environment had a positive and meaningful effect on the individual differences and perceptions of the students about global warming. It was stated in another study that doing social activities will increase the attention of the students about the social problem (Neill, 2008; Khalid, 2001; Papadimitriou, 2004).

Students at every level and age, as well as participants taking part in the researches usually think global warming will increase because of the thinning of ozone layer, but, one of the most frequently encountered misconceptions is to think that "the increase in the temperature due to greenhouse effect and global warming will lead to skin cancer". This misconception exists in the studies which were carried out in schools (Khalid, 2001; Papadimitriou, 2004).

Neill (2008) viewed field study as an away from school activities demanding functional ability. It involves taking students out of the school to places of interest within the geographical environment where they would have contact with some teaching and learning resources, human, materials and equipments (Knapp, 2000). These places of interest include conservation centres, beautification gardens, archaeological sites, nature trails, dump sites, zoo and wildlife forests. Researches revealed that field study instructional strategy is rarely used in schools as a result of many factors. These factors include failure of resource person to be of assistance, failure of schools authorities to take travelling risk and lack of adequate preparations in acquisition of the needed skills, methodology, planning and evaluation of students

learning activities before, during and after field study (Neill, 2008; Gbadamosi, 2012; Salako, 2014).

However, the inclusion of field study instructional strategy into school curriculum empasisedits educational purpose and established it as an expansion of the classroom curriculum. Field studies afford the students opportunity to draw upon real-life situation and authentic experiential learning to enhance classroom learning by complementary activities on the field, because the strategy usually connects school work with global realities (Ajitoni, 2005; Gbadamosi, 2012; Salako, 2014). Therefore, students need to be encouraged to embrace out- of- classroom learning as an integral aspect of their overall education (Anderson and Wallin, 2000).Actually, to successfully address the need of these students with respect to climate change issues, teachers must alter instructional practices, materials and strategies through instructional intervention (Neill, 2008; Gbadamosi, 2012; Salako, 2014). Previous studies have pointed out that instructional strategies have a very important role in the elimination of misconceptions about climate change issues in relation to students knowledge, attitude and practices (Knapp, 2000), and that student – centreed strategies which are activity-based should beemployed rather than traditional strategy (Ajiboye, 2006; Ajiboye and Silo, 2008; Amosun and Oderinde, 2009; Amosun and Aderinwale, 2012; Falaye and Okwilagwe, 2016).

2.3.5.2 FieldStudyInstuctionalStrategyandStudents'AttitudetoClimateChange

Field study instructional strategy afford the students opportunities to interact with graphics , photographs, concept maps, films, power-point presentation, computer and television images as well as real-life animate and inanimate objects (Knapp, 2000). Real life visit to places of interest and video films documentary are powerful visual tools that may present different places and events, offering unrivalled experiences which facilitate learning through behavioural or attitudinal changes (Davis, 1998; Debessay, 2004), since field study makes learning fun and motivatesstudents to learn experientially by enriching their beliefs, imaginations and values that influences their behaviour (Bandura, 1977, 2006).

Previous studies showed that courses taught using field study strategy impart better cognitive and attitudinal outcomes on students than traditional teaching strategy (Debessay, 2004; Oluk and Ozalp, 2007). To rectify the misbehaviour of students, as a result of misconceptions, the school curriculum should be revised to cope with the present challenges in society (Amosun, 1999; Falaye 2006; Amosun and Oderinde, 2009; Amosun and Aderinwale, 2012; Falaye and Okwilagwe, 2016) and field as well as pedagogical knowledge and practices should be offered with the help of experts (Ajitoni, 2005; Ajiboye and Silo, 2008; Gbadamosi, 2012; Salako, 2014). Considering that traditional instructional strategy may not be effective in teaching climate change concepts, new strategies and techniques where students are active and not passive should be used (Oluk and Ozalp, 2007) and interactive activities in laboratory and field work should be conducted to enhance behavioural changes which are positively motivated towards a sustainable environment (Atasoy and Erturk, 2008).

In addition, experimental and quasi experimental studies on teaching environmental problems especially climate change, have positive effects on students (Paul and Volk, 2002), field study activities increased students self-competencies, effectiveness and efficiency in the discussion of climate change concept in and outside the classroom (Papadimitriou, 2002; Patchen, 2006). Various designed climate change educational programmes impart students' awareness of, attitude to and practices towards climate changeissues (Said, 2003; Falaye, 2006; Patchen, 2006; Falaye and Okwilagwe, 2016). It has also been documented that strategies and techniques such as field study, modelling and problem-solving impart better learning outcomes than teacher- centred instruction on environmental education, especially climate change (Amosun, 1999; Ajitoni, 2005; Ajiboye and Silo, 2008; Amosun and Oderinde, 2009; Amosun and Aderinwale, 2012; Gbadamosi, 2012; Falaye and Okwilagwe, 2016).

2.3.5.3 FieldStudyInstuctionalStrategyandStudents' Reduction Practices towardsClimateChange

Cimer et'al (2011), affirmed that students in both groups for the study, in their practices did not show an accurate understanding of climate change and global warmingas well as its relationship with the concepts of ozone layer depletion, greenhouse effect and greenhouse gases. They had various misconceptions and

concern because all the students in both groups were of the impression that climate change and global warming was the result of increased ultraviolet radiation due to the ozone layer depletion. Hence, the main cause of global warming was considered to be the 'ozone hole'. They believed that the ozone layer formed a cover–over the earth and when there was a hole in this cover, Sun's- rays entered the earth directly and that was what caused climate change and global warming. That is why it was a common practice and idea in the students accounts that aerosol sprays and air pollutants contributed to the global warming as it adversely affect the ozone layer, and that greenhouse effect was something harmful to the earth.

The students in the study knew little about greenhouse effect and could not identify greenhouse gases beyond carbon dioxide. They were of the opinion that greenhouse effect was completely an anthropogenic phenomenon rather than a naturally occurring process. Some of them indicated that the greenhouse effect caused climate change and global warming, while some thought that global warming and climate change resulted in greenhouse effect (Cimer et'al, 2011; Bozdogan, 2011)

Conversely, the greenhouse effect is a naturally occurring phenomenon which is actually useful as it regulates atmospheric temperature to keep the temperature on our planet suitable for living things. However, what is not good is the increase in the amount of greenhouse gases, which can cause the temperature to increase out of control.On the whole, the findings of the study showed that both groups of students had unempirical conceptions about climate change and global warming, and related issues. The level of knowledge, attitude and practices of year five students seems higher than those of year one students. According to Rickinson (2001) and Shephardson et'al(2009) cited in Cimer et'al (2011), there are two important sources of the unempirical conceptions of the students, which usually affect their behaviour and practices: (i) daily lifestyle and (ii) formal learning events. Thus, the students' erroneous idea that ozone layer depletion is the main cause of climate change and global warming may be a result of misinformation through the television programmes or popular media that give more attention to ozone later 'hole' (Papadimitriou, 2004) as well as instruction in schools which integrates the concepts of climate change, global warming and ozone layer (Knapp, 2000; Anderson and Wallin, 2000).

However, an important point that should be borne in mind here is that the respondents of most of these studies were pupils; therefore, the amount of education given in the schools is required to be increased. Educating students at younger ages will give opportunities for the society to change positively and to acquirea positive attitude and behaviours in the long term for better practices (Amosun, 1999; Ajitoni, 2005; Ajiboye and Silo, 2008; Amosun and Oderinde, 2009; AmosunandAderinwale, 2012; Gbadamosi, 2012; Falaye and Okwilagwe, 2016).Because of that, it was determined that while teaching abstract concepts such as climate change, greenhouse effect, greenhouse gases, global warming and ozone layer depletion, the activities in-classroom and out-of-classroom should empasise group work, collaborative learning, project work and active- discovery learning that is problem- solving, which make the students pro-active and environmental friendly in practices to ensure sustainable environment.

2.3.6 Conventional Method and Students' Learning Outcomes.

Traditionally, the teaching in most countries is dominated by a teacher centred method (Wang and farmer, 2008). Several researchers have noted that most teacher tend to emphasise knowledge, content, teacher- centred classrooms and examination results. While concepts such as flexibility, problem- solving, critical- thinking and independent learning are not recognised (Adib- Hajbaghery, 2005).

As the teachers rely on lecture, most of the students see knowledge as something to be transmitted by the teacher, because students are often quiet, shy and uncommunicative in the classroom (Wang and Farmer, 2008). These claims are confirmed by Song (1995) that Asian students are reluctant to 'stand out' by expressing their views or raising questions, particularly if this might be perceived as expressing public disagreement. Studies have also shown that most teachers are not familiar with modern teaching methods (Stitt-Golides, 2001; Salsali and Alimadi, 2004), traditional lectures are still the popular instructional methods in school (Rahmani 2007 and Saville, 2009). Brown (2003) states that most of these teachers have been taught in learning environment that was instructor centred, therefore they teach the same way. Factors such as simplicity of lecture presenting its appropriateness for crowded classes, limitation of time and the massive amount of theoretical content which should

be present have made the instructors to use lectures as the most popular teaching method (Adib-Haybaghery, 2005 and Farhadian et'al, 2007).

Overly using lecture method will induce a hidden curriculum that teaches students to be obedient, compliant in expressiveness and will reduce their self-confidence (Esplanade and Shanta, 2001). Studies have shown that teacher centred teaching methods are not appropriate to teach students in school (Caudron, 2000). Some studies have also shown that students prefer teaching methods with more student involvement (Salsali, 2005, Adib- Haybaghery, 2005). Some conflicting results have been reported when researcher compared the effects of lecture and more active teaching methods (Barness and Blevins, 2003; Riggio, 2007 and Sanille, 2009) therefore, the need to use conventional method as one of the independent variables in this present study.

Educationists see learning as a process of actively exploring information and formation of learning by linking it to previous knowledge and experience, so teachers are encouraged not to teach the contents but to teach the students how to learn (Palmer, 2003). Students' participation in the learning process and substitution of conventional method gives learning opportunities for students' development. It is believed that such engagement will deepen their understanding of the course materials, encourage them to assume a major responsibility in the learning process, help improve their intellectual interpersonal and team work skills, improve their ability and skillss, obtain and organise information, improve their ability to identify and solve problems and will help them set the foundation for life- long learning (Debessay and Lerner, 2004; Joyce, Weil and Calhoun, 2005).

2.3.7 School Location and Students' Learning Outcomes

School location has been viewed as one factor that affects students' academic achievement (Akpan, 2001). Over the past two decades, research has indicated that the educational aspiration of students' who study in the rural areas lag behind those of their urban counterparts (Kampits, 1996). Related findings from other studies have further indicated that students from rural schools place less value on academics (Stern, 1994; Ley, Nelson and Beltyukova, 1996). In a study of 2,355 students from

21 rural high schools in 21 states, it was revealed that students placed more importance on personal qualities and less importance on academic achievement (Ley, Nelson and Beltyukova, 1996).Ojoawo (1989) stated that school location is one of the potent factors that influence the distribution of educational resources. Ezike (1997) conceptualised urban environment as those environment which have high population density containing a high variety, beauty and common place views, and rural environment as being characterised by low population density containing a low variety and isolated place view. Boylan (1998) reported that rural schools were inferior and lacking in the range of facilities with high staff turnover and suffered lack of continuity in their curriculum.

Axtel and Bowers (1972) found that students from the rural areas perform significantly better than their urban counterparts in verbal aptitude, English language and total score using the National Common Entrance as a base. Gana (1997), on the effect of using design visual teaching models on the learning of mathematics at junior secondary level of Niger state, found that there was no significant difference in mathematics achievement scores of students in urban and rural locations.

Alokan (2010) found out that students' problems are strongly associated with poor performance and that gender and locations do not affect the negative relationship between students' problems and academic performance. In another development, Considine and Zappala (2002) found out that geographical locations do not significantly predict outcomes in school performance. In view of these inconclusive findings, it became necessary to carry out further research to confirm or annul the otherwise protracted issue on school location and academic performance hence,this study: the effect of mentoring and field study instructional strategies on students' learning outcome in climate change concepts in social studies in Lagos State.

2.3.8 Gender and Students' Learning Outcomes

It is extremely vital to include gender, women in particular in the whole climate change issue; they bear most of the burden. Where the adverse effects of climate change is concerned,building their capacity and empowering them to be able to participate and make decisions affecting them is very important. According to

Gbadamosi (2012) and Salako (2014), some studies have shown that certain variables such as gender and school location are capable of influencing learning outcomes. Macdonald and Hara (2010), as well as Olatundun (2008) and Adekunle (2005) reported that female pupils had higher environmental knowledge and attitude means scores than their male counterparts. On the other hand, Wang and Cheng (2010) as well as Abiona (2008) found there was no significant difference between the environmental knowledge and attitude of male and female students', though there was a slight difference in their performance. This review reveals that the influence of gender on learning outcomes in environmental education is still a controversial issue. Further research is, therefore, needed to examine whether gender could influence environmental literacy of individuals. Wigfield, Battle, Keller and Eccles (2002) stated that most studies show that, on the average, girls do better in school than boys. Girls get higher grades and complete high school at a higher rate compared to boys (Jacobs, 2002).

Standardised achievement tests also show that females are better at spelling and perform better in tests of literacy, writing, and general knowledge (National Centre for Education Statistics, 2003). An international aptitude test administered to fourth graders in 35 countries, for example, showed that females outscored males in reading literacy n every country. Although there were no differences between boys and girls in fourth grade on mathematics, boys began to perform better than girls in science tests in fourth grade (International Association for the Evaluation of Education Achievement). Girls continue to exhibit higher verbal ability throughout high school, but they begin to lose ground to boys after fourth grade in tests of mathematical and science ability. These gender differences in mathematics and science achievement have implications for girls' future careers and have been a source of concern for educators everywhere.

During the past decade, there has been concerted effort to find out why there is a shortage of women in science, mathematics, engineering, and technical fields (AAUW, 1992). In 1995, 22% of America's scientists and engineers were women, compared to half of the social scientists. Women who pursue careers in science, engineering and mathematics most often choose fields in the biological sciences,

where they represent 40% of the workforce, with smaller percentages found in mathematics or computer science (33%), the physical sciences (22%), and engineering (9%) (National Science Board, 1998).

Part of the explanation can be traced to gender differences in the cognitive abilities of middle-school students'. In late elementary school, females outperform males in several verbal skills tasks: verbal reasoning, verbal fluency, comprehension and understanding logical relations (Hedges and Nowell, 1995). Males, on the other hand, outperform females in spatial skills tasks such as mental rotation, spatial exception, and spatial visualisation (Voyer, Voyer, andBryden, 1995). Males also perform better in mathematical achievement tests than females. However, gender differences do not apply to all aspects of mathematical skill. Males and females do equally well in basic mathematical knowledge and girls actually have better computational skills. Performance in mathematical reasoning and geometry shows the greatest difference (Fennema, Sowder, and Carpenter, 1999). Males also display greater confidence in their mathematical skills, which is a strong predictor ofmathematical performance (Casey, Nuttall, and Pezaris, 2001).

The poorer mathematical reasoning skills exhibited by many female adolescents have several educational implications. Beginning at age 12, girls begins to dislike mathematics and science and like language arts as well as social studies more than boys (Kahie and Lakes, 2003; Sadker and Sadker, 1994). They also do not expect to do as well in these subjects and attribute their failures to lack of ability (Eccles, Barber, Jozefowicz, Malenchuk, and Vida, 1999). By high school, girls self-select out of higher- level, "academic-track" mathematics and science courses, such as calculus and chemistry. One of the long-term consequences of these choices is that girls lack the prerequisite high school mathematics and science courses necessary to pursue certain majors in college (engineering, computer science). Consequently, the number of women who pursue advanced degrees in these fields is significantly reduced (Halpern, 2004).

Some researchers, on the one hand, argue that the gender gap in mathematics is biologically driven. Selected research shows that prenatal hormones circulating in the

brain encourage differential development in the hemispheres of male and female foetuses (Berenbaum, Korman, and Leveroni, 1995). Others believe intelligence has its roots in genetics. There is evidence, however, that socio-cultural factors may influence girls' attitudes toward mathematics and science. For example, parents tend to view mathematics as more important for sons, language arts and social studies as more important for daughters (Andre, Whigham, Hendrickson, and Chambers, 1999). Parents are more likely to encourage their sons to take advanced high school courses in chemistry, mathematics, and physics and have higher expectations for their success (Wigfield, Battle, Keller, and Eccles, 2002).

Teacher characteristics and the classroom environment also have been identified as contributors to this gender gap. Seventh and eighth graders attending mathematics and science camps identified a mathematics or science teacher as "a person who has made mathematics, science, or engineering interesting" for them (Gilbert, 1996, p. 491). Unfortunately, many females report being passed over in classroom discussions, not encouraged by the teacher, and made to feel stupid (Sadker and Sadker, 1994). Classroom environments can be made to feel more "girl-friendly" by incorporating:

- Low levels of competition, public drill and practice
- High levels of teacher attention
- Hands-on activities
- Female role models
- Same-sex cooperative learning communities
- Nonsexist books and materials (Evans, Whigham, and Wang, 1995)

Fortunately, sex differences in mathematical reasoning have begun to decline, and female enrollments are up in mathematics and science coursess. Programmes are designed to interest girls in mathematics and science which demonstrates how this knowledge will allow them help others (Campbell, Hombo and Mazzeo, 2000; Freeman, 2004).

2.4 Appraisal of Literature Review

Climate change awareness involves creating knowledge, understanding, values, attitude, skills and abilities among individuals and social groups towards the issues of climate change for attaining a better quality environment. Climate change specialists

have repeatedly pointed out that a solution to climate change problem will require its awareness and proper understanding. Therefore, the role of the facilitator in the social constructivist viewpoint is that the instructor and students' are equally involved in learning from each other. This means the learning experience is subjective and objective, and required that the instructor's culture, value and background become an essential part of the interplay between students and tasks in the shaping of meaningful learning as a transformation process. Hence, the importance of mentoring and field study instructional strategies in the process of learning climate change concepts cannot be overempasised, since these allows good collaborative, cooperative and supportive interactive activities among the students and teacher as a proactive teaching and learning process, to bring about friendly environmental behaviour.

Literature reviewed revealed that mentoring and field study instructional strategies enhance the creation of a powerful and meaningful learning situation, which allows the use of innate potentials in the learners. This makes them active – participants and environment-friendly citizens, as it relates to climate change concepts. The literaturereviewed, showed that some renowned scholars had already worked on strategies to teach some environmental concepts, which exclude climate change. Despiteworthwhile contributions made to teaching and learningfrom these researchers;Climate change is still a threat. These lapses arise from the way students were taught and what they learnt in schools, since teachers in schools commonly used conventional lecture method in teaching as against students – centred strategies, hence the shift from the teacher- centred method of teaching climate change concepts to embrace students – centred strategies. The extents to which the moderator variable will influence students learning outcomes in the learning process of climate change concepts in Social Studies is yet to be determined which necessitate the choice of these two variables (gender and school location) in this study.

Literature reviewed indicated that no study has been carried out on the effects of mentoring and field study instructional strategies on students' learning outcomes in climate change concepts in Social Studies using gender and school location as moderator variables.

CHAPTER THREE

METHODOLOGY

This chapter presents a discussion of the research design, the selection of subjects, the development of the research instrument, and procedure for the study and, finally, the method of data analysis.

3.1 Research Design

The study adopted a pre-test, post-test,control group, quasi experimental design.

The two treatments and control group are schematically illustrated below:

O_1	X_1	O_2 = Group 1	Experimental Group 1
O_3	X_2	O_4 = Group 2	Experimental Group 2
O_5	X_3	O_6 = Group 3	Control Group

Where:

O1, 3, 5 = Pre-test observation/measurement

O2, 4, 6 = Post-test observation/measurement

X1 = Treatment one (Mentoring Strategy)

X2 = Treatment two (Field Study Strategy).

X3 = Control Group (Conventional Strategy)

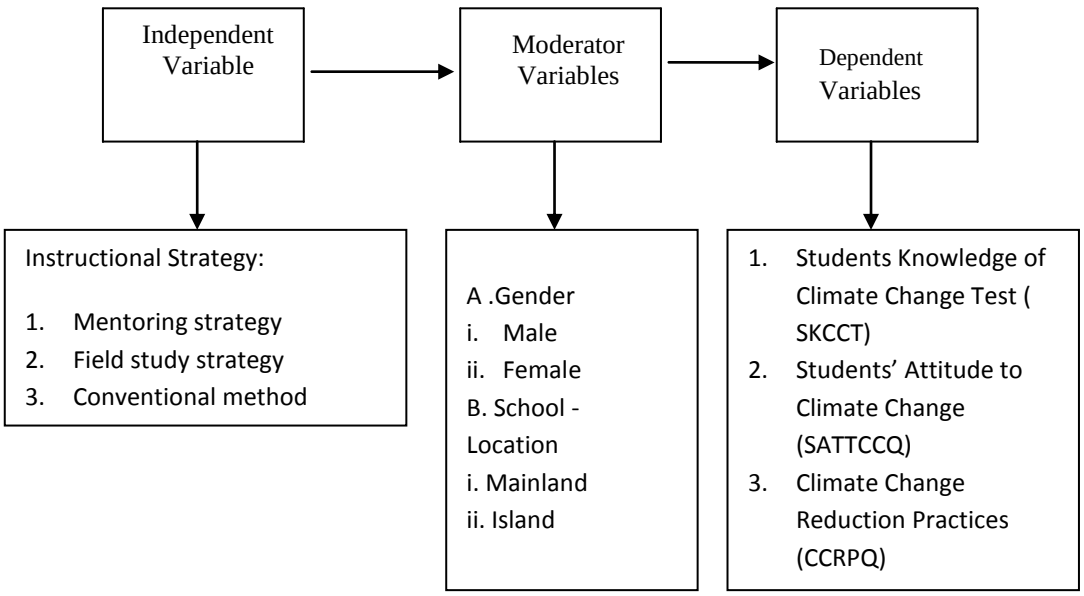

Fig 3:1 Representation of the research variables.

3.2 Variables of the Study

Three categories of variables were involved in this study.

(A). The Independent variable is the instructional strategy which varied at three levels.

(i) Mentoring Strategy (MS)

(ii) Field Study Strategy (FSS)

(iii) Control Group (CS)

(B). Two Moderator variables identified as important to this study were:

(i) Gender – Male

- Female

(ii)School location,this occurs at two levels:

- Mainland
- Island

(C). The Dependent variables were the learning outcomes specified as:

(a) Knowledge of climate change concepts

(b) Attitude to climate change

(c) Reduction practices towards climate change.

3.3 Factorial Matrix

For the purpose of data analysis, a 3x2x2 factorial design was adopted in the study. This is illustrated below:

Table 3. 1: 3x2x2 Factorial Matrix

Treatment	**Gender**	**School Location**	
		Island	Mainland
Mentoring strategy	M		
	F		
Field Study Strategy	M		
	F		
Control (Conventional)	M		
	F		

KEY: M = Male and F = Female

3.4 Selection of Participants

The population of this study comprised all secondary school students' in Lagos State, Nigeria. The participants of the study were made up of 284Junior Secondary School students from Education Districts III and V,consisting of 143 males and 141 females. The Multistage sampling procedure was used to select the sample for the study. First, Lagos State schools were stratified into six education districts (Education Districts I to VI) .Second, based on location, the researcher purposively selected education districts III and V to represent Lagos Island and Mainland schools, using the random sampling technique to identify the sample for this study through balloting. The Junior Secondary Two (JS2) Social Studies students'were sampled and selected, as intact classes for this study. The criteria for selection of participating schoolsinclude:

(a) Schools that have presented candidates for the Junior Secondary Schools (JSS) Certificate Examination in Social Studies for ten-years.

(b) Schools that have qualified Social Studies teachers with at least Bachelor's Degree in Social Studies Education (B.Ed).

(c) Schools in which all the topics to be covered in this study hadnot been taught.

The researcher personally discussed with the Social Studies teachers in these schools. The criteria for participating in the study were spelt-out to them in form of questions which the teachers answered.

3.5.0 Instruments for Data Collection

The following instruments were used in this study:

(i) Students Knowledge of Climate Change Test (SKCCT)

(ii) Students Attitude to Climate Change Questionnaires (SATTCCQ)

(iii) Climate Change Reduction PracticesQuestionnaire(CCRPQ)

(iv) Teachers Instructional Guide for Mentoring Strategy (TIGMS)

(v) Teachers Instructional Guide for Field Study Strategy (TIGFSS)

(vi) Teachers Instructional Guide for Conventional Method (TIGCM)

3.5.1 Students' Knowledge of Climate Change Test (SKCCT)

(i) The instrument consisted of two sections. The first was used to obtain background information from the respondents. The second consistedof 20 multiple- choice objective test itemtype (A-D) designed and used to assess the students' cognitive domain on climate change concepts and their application of knowledge attained in everyday life.The SKCCT was validated using the Kuder-Richardson formula (K_r 20) and a coefficient of 0.77 was obtained(see appendix i).

Table 3.2:Specification for StudentsKnowledge ofClimate Change Test (SKCCT)

Topic/Concept	Remembering	Understanding	Thinking	Total	Percentage %
Environment	1,2 (2)	9 (1)	10 (1)	(4)	20%
Climate Change	4 (1)	3,7,15 (3)	12,14 (2)	(6)	30%
Vegetation	5,20 (2)	11,19 (2)	13,18 (2)	(6)	30%
.Pollution	16,17 (2)	6 (1)	8 (1)	(4)	20%
Total	(7)35%	(7)35%	(6)30%	20	100%

3.5.2 Students' Attitude to Climate Change Questionnaires (SATTCCQ)

This questionnaire was designed to measure the affective domain of the students. The items on this questionnaire can be grouped under the following categories:

(i) Love for and interest in Social Studies and Climate change

(ii) Importance of Social Studies and Climate change

(iii) Attitude to the Social Studies teaching and learning process.

(i) Attitude towards the use of mentoring strategy in the teaching and learning of Social Studies.

The SATTCCQ is made up of 20-items to which students' responded on a four-point Likert scale StronglyAgreed, Agreed, Disagreed, and Strongly Disagreed [SA; A; D; and SD respectively]. Items which indicated a positive attitude was graded on points

ranging from 1 to 4, while the scoring mode was reversed for items which indicated negative perception.The result of the trial out was analysed based on 21 cases, using the Cronbach-alpha technique; thereliability coefficient of 0.96 was recorded for the SATTCCQ (see appendix ii).

3.5.3 ClimateChange Reduction Practices Questionnaire (CCRPQ)

The Climate Change-PracticesQuestionnaire was designed to measure the students'psycho-motor domain. The CCRPQ was validated using the Cronbach -alpha technique and a coefficient of 0.96 was obtained.Climate Change Practice Questionnaire includes:

(i) Observing, selecting, locating, understanding and interpreting

(ii) Ability to use available tools such as spade, rake, broom, cutlass and waste bin.

(iii) Ability to evacuate dirt from water channels and garbage spots (see appendix iii).

3.5.4 Teacher's Instructional Guide for Mentoring Strategy (TIGMS)

The teacher instructional guide was developed by the researcher as a teaching guide written for the participating research assistants in mentoring strategy to ensure uniformity. Each lesson involving mentoring strategy in teaching climate change concepts lasted40 minutes.

Steps in mentoring strategy

Step 1: Clarify the objective of the topic

Step 2: Group formation: The teacher helps in the selection of the mentee. The mentee are grouped based on their ability and pre-test scores.

Step 3: Analyse the issue: This involves identification of climate change concepts.

Step 4: Presentation of the problem: The mentor presents the problem to the mentee briefly and allows the group's contribution (think-pair-share).

Step 5: Reframe the problem: After a series of questions, the mentees often with the guidance of the mentor reached a consensus on the most critical and important problem they should work-on.

Step 6: Determine goal: Once the key issue has been identified, the mentee seeks consensus for the goal. The achievement of the goal would solve the restated problem for the longterm, with positive rather than negative consequences on individual and society(see appendix iv).

3.5.5 Teacher's Instructional Guide for Field Study Strategy(TIGFSS)

This instructional guide was developed by the researcher as a teaching guide for the participating research assistants for field study strategy to ensure uniformity. Each lesson involving field study strategylasted 40 minutes. The procedure is as follows;

Step 1: Introduction and discussion of the basic concepts as regards climate change.

Step 2: The learner clarifying issues. Five questions were asked to stimulate and direct the field study (inquiry).

Step 3: The facilitator directs the learner to identify sources of information

Step 4: The facilitator divides the students into groups;

a. The facilitator helped in the division of the studentsinto groups. Each group consistedof five students of mixed ability.

b. Each group selected their leader who presented the findings.

c. Each group was directed to develop plans on how to involve all the members in the group in collecting facts, arranging and assessing the findings.

d. Each group interacted and proceeded to information gathering.

Step 5: Each group leader spoke for the group;

a. Each group leader asked probing and analytical questions: what, when, why, who and how on each controversial point

b. The facilitator concluded the section based on tasks assigned.

Step 6: Students' draw conclusions and make decisions on climate change issues

a. The teacher directed the class to conclude in the light of available evidence from the field study.

b. The teacher further directed students' to re-examine their conclusions with a view to take rational decision, leading to sustainable future (see appendix v)

3.5.6 Teacher's Instructional Guide for Conventional Method (TIGCM)

This was developed from the course content outline of classroom activities in the school curriculum. The purpose is to ensure uniformity in the dissemination of climate change concepts through conventional method.

Step 1: The teacher specified the topic to teach.
Step 2: The teacher stated instructional objectives
Step 3: The teacher listed keywords.
Step 4: The teacher taught contents of the topic.
Step 5: The students' performed their activities.
Step 6: The teacher evaluated the lesson(see appendix vi).

3.6 Validity and Reliability of Instruments.

The measuring instruments, namely, the Student Knowledge of Climate Change Test (SKCCT), Climate Change Reduction PracticesQuestionnaire(CCRPQ) and Student Attitude to Climate Change Questionnaires (SATTCCQ); were made to undergo a two-phase validation test.

(i) The instruments were first presented to some eminent scholars in the Department of Teacher Education for face and content validity, and the table of specification was made available to these experts by the researcher. Valuable comments and contributions were made by thesefive experts.

(ii) Lastly, a field trial was carriedout. The errors detected were taken note of and amendments effected. For instance, theSKCCT is a questionnaire comprising 20 multiple objective questions, the SATTCCQ has 20 items too, while the CCRPQ) has15 items. The result of the trial out was analysed based on 21 cases, using the Cronbach-alpha technique; thereliability coefficient of 0.96 was recorded for the SATTCCQ. The SKCCT was validated using the Kuder-Richardson formula (K_r 20) and a coefficient of 0.77 was obtained, while the CCRPQ was validated using the Cronbach -alpha technique and a coefficient of 0.96 was obtained.

3.7 Procedure for the Study

The researcher got introductoryletter from the Head of Department, Teacher Education, University of Ibadan .Thereafter, permission was requested from the Tutor General / Permanent Secretary of Education; Districts III and V, representing Lagos Island and Lagos Mainland, to afford the researcher the opportunity to use participating Junior Secondary Schools (JSS), in their jurisdictions. A letter of authority was given to the researcher for Principals of the participating schools, to ensure their support in the interest of the study. Also, consent of the parents was obtained, through the use of a form titled 'parental consent form'which was endorsed by parentsto enable their wards/ children participate in the research, especially those in the field study instructional strategy experimental groups.A one-week sensitisation and training period was held with the teachers (research assistants) who participated in this study;they were adequately trained in an organized seminar on the purpose, principle and procedures governing this study, the use of Mentoring andField Study Strategies in teaching and learning of climate change concepts in SocialStudies.

In the course of the seminar, a brief induction/orientation by way of discussion, question and answer wasgiven to them, and they were asked to revisit their respective jotted-notes from time to time. Also, they were taught how to administer the instruments in the company of the researcher. The pre-test and post-test materials were given to them shortly after the induction/training.

The teacher's firsst appearance in the classroom is to introduce the strategy (treatment), prepare the students, and inform them of the purpose, principles and procedures governing the research. They were informed on the benefits and importance of their participation from the beginning of the programme to the end, this was stressed.

Table 3 .3: Summary of Procedure for the Study

Week	Activities
One	Training of research assistants
One	Pre-test administration
Seven	Treatment and follow up
One	Post-test administration
Ten weeks	

3.7.1 Procedure for Experimental Group 1 (The Use of Mentoring Strategy)

The mentoring instructional strategy model was adapted from Hudson(2010) - Mentoring Model:

Phase 1: Pre-Action

Step I: The mentor guides mentees to link the concept with climate change issues in the school community used.

Step II: The mentorguides the mentees to mention the areas experiencing climate change issues for the study.

Step III: Mentees' think –pair-shares(to identify) the causes of climate change problems such as pollution in the school compound.

Step IV: The mentor guides mentees to discover the importance of solving the identified climate change problems in the school community.

Step V: Mentees decide on what they would do to solve the problem (activities to perform).

Phase 2: In-Action

Step I: The mentorguides the mentees' to organise the project themselves and develop a work plan. The work plan will involve 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 mentor guides thementees to develop pre-reflection activities whereby students think about what to gain in solving the problem before they engaged in it.

Step III: The mentees' carriedout their activities such as making of sand bag as well as planting of trees to control erosion and as wind-brakers, washing of toilet, clearing of channels/gutter/drains and community sensitisation activities.

Phase 3: Post-Action

The mentor provides structured time for mentees' to think, talk and write about what they did and observed during the service activity.

Phase 4: Demonstration! Celebration

The mentees' organise presentations on what they have learnt and how the project positively affected them.

3.7.2 Procedure for Experimental Group 2: (Use of Field Study Strategy)

Phase 1: Pre- Field Study

Teacher's activities

Step I: The teacher takes attendance of the students.

Step II: The teacher discusses the topic with the students.

Step III: The teacher presents the purpose of the trip to the students.

Step IV: The teacher gives background information by describing specific features to be observed on the trip.

Step V: The teacher asks students to jot information received during the trip.

Phase 2: Field Study

Teacher's and Students' activities

Step I: The teacher and the students visit the study sites such as Nigerian Conservation Foundation, Lekki-Epe Expressway-Lagos, illegal dump sites in Lagos State (Ojota, Isheri Olofin), erosion site in the school compound, and flooded areas in Lagos (Ajegunle, Agege, Lekki-Ajah),Apex- Mill at Eric-moor, Flour-Mill at Apapa and Beautification garden at Abebe- village Surulere-Lagos.

Step II: The students observed and studied causes, effects and solutions to the climate changeproblems.

Step III: Each pupil writes what he/she observed.

Step IV: The students ask questions from the teacher and/ or community members

Phase 3: Post-Field Study

Follow up Evaluation

Teacher's /Students' activities

Step I: The students present and discuss their observations from the environmental problems sites visited.

Step II: The Teacher evaluates the students' by asking questions.

3.7.3 Control Group 3: (Conventional Method)

The conventional method was used here, and the researcher/teacher followed the following procedure:

Step I: Teacher specifies learning objectives and decided on content (see appendices).
Step II: Teacher identifiesstudents' ability level as low, average or high achievement.
Step III: Teacher teaches appropriate unit/content.
Step IV: Teacher writes the topic on the chalkboard (marker/magnetic board).
Step V: Teacher discusses the topic in detail, itemised the salient points.
Step VI: Teacher evaluates the lesson asking questions based on the topic/content.
Step VII: Teacher rewards students accordingly through motivational applause.
Step VIII: Teacher gives homework (reading assignment).

It should be noted that before the treatment, all students who participatedin the three groups (classes) were already seated during class section. Hence, at different periods, times and days: the research instruments were pre-tested which included SKCCT, CCRPQ, and SATTCCQ.Finally, after all the units had been taught and evaluated, the post-test of SKCCT, CCRPQ and SATTCCQ were applied on all students' (see appendices i - vi).

3.8 Method of Data Analysis

The data collected were analysed using analysis of covariance (ANCOVA). The seven hypotheses were tested at 0.05 alpha, while the pre-test scores were used as covariates. The multiple classification analysis (MCA) was used to determine the magnitude of performance across the groups, and where differences were observed in the ANCOVA results, the Scheffe post-hoc test was used to determine the source of variation and direction of significances among the groups.

CHAPTER FOUR

RESULTS

This chapter presents the results from the analysis of the data collected in this study.This section is based on the seven hypotheses earlier formulated and tested in the study.

4.1:Section A: Testing the Null Hypotheses

4.1.1: H_{01a}: There is no significant main effect of treatment on students' knowledge of climate change concepts.

Table 4.1: Summary of 3 X 2 X 2 Analysis of Covariance (ANCOVA) on Students' Knowledge of Climate Change Concepts

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	192.751[a]	12	16.063	3.036	.001	.118
Intercept	3130.308	1	3130.308	591.598	.000	.686
Preknow	15.559	1	15.559	2.940	.088	.011
Trtmt	125.452	2	62.726	11.855	.000	.080
Gender	1.977	1	1.977	.374	.542	.001
Schlloc	14.447	1	14.447	2.730	.100	.010
trtmt * Gender	10.445	2	5.222	.987	.374	.007
trtmt * Schlloc	36.523	2	18.262	3.451	.033	.025
Gender * Schlloc	.830	1	.830	.157	.692	.001
trtmt * Gender * Schlloc	6.397	2	3.198	.604	.547	.004
Error	1433.936	271	5.291			
Total	39995.000	284				
Corrected Total	1626.687	283				

a. R Squared=. 118 (Adjusted R Squared= .079)

Table 4.1 reveals there is a significant main effect of treatment on student knowledge on climate change ($F_{(2,\ 271)} = 11.86$; $p<0.05$; $\eta^2= 0.08$).Therefore, H_{01a} is rejected. Table 4.2 presents the estimated marginal means that reveal the magnitude of performance across the groups.

Table 4.2: Estimated Marginal Means on Student Knowledge of Climate Change

Variable	N	Mean	Std.Error
Intercept			
Pre score	284	8.651	-
Post score	284	11.631	.142
Treatment			
Control	88	10.665	.262
Experimental I (Mentoring)	96	12.354	.241
Experimental II (Field study)	100	11.875	.239
Gender			
Male	143	11.718	.198
Female	141	11.544	.203
School Location			
Mainland	123	11.867	.215
Island	161	11.395	.187

Table 4.2 shows that students exposed to mentoring had the highest knowledge mean score (12.35), followed by those exposed to field study strategy (11.88), while those in control group who were exposed to conventional strategy had the least knowledge mean score (10. 67). Table 4.3 presents the Scheffe's Pairwise post hoc test in order to detect the source of the significant difference.

Table 4.3: Scheffe's Pairwise Comparison on Student Knowledge of Climate Change

Treatment Group	Control	Experimental I	Experimental II
Control		*	*
Experimental I	*		
Experimental II	*		

Table 4.3 reveals that the significant effect revealed in Table 4.1 is due to the significant differences between:

i. Control group and experimental group I

ii. Control group and experimental group II

But there is no significant difference between those exposed to experimental groups I and II in their knowledge. This implies that those exposed to experimental groups I and II performed significantly better than those exposed to the conventional strategy.

4.1.2: H_{01b}: There is no significant main effect of treatment on students' attitude to climate change concepts.

Table 4.4: Summary of 3 X 2 X 2 Analysis of Covariance on Students'Attitude to Climate Change

Dependent Variable: post attitude

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	654.002[a]	12	54.500	3.981	.000	.150
Intercept	15397.673	1	15397.673	1124.870	.000	.806
Preatt	26.109	1	26.109	1.907	.168	.007
Trtmt	239.280	2	119.640	8.740	.000	.006
Gender	9.430	1	9.430	.689	.407	.003
Schlloc	15.030	1	15.030	1.098	.296	.004
trtmt * Gender	17.570	2	8.785	.642	.527	.005
trtmt * Schlloc	119.687	2	59.844	4.372	.014	.031
Gender * Schlloc	12.122	1	12.122	.886	.348	.003
trtmt*Gender* Schlloc	70.478	2	35.239	2.574	.078	.019
Error	3709.558	271	13.688			
Total	488763.000	284				
Corrected Total	4363.560	283				

a. R Squared = .150 (Adjusted R Squared = .112)

Table 4.4 reveals there is a significant main effect of treatment on students' attitude to climate change ($F_{(2, 271)} = 8.74$; $p<0.05$, $\eta^2= 0.06$).Therefore, H_{01b} is rejected. Table 4.5 presents the estimated marginal means that reveal the magnitude of attitude across the groups.

Table 4.5: Estimated Marginal Means on Student Attitude to Climate Change

Variable	N	Mean	Std.Error
Intercept			
Pre score	284	44.560	-
Post score	284	41.370	.228
Treatment			
Control	88	42.362	.425
Experimental I (Mentoring)	96	40.075	.384
Experimental II (Field study)	100	41.674	.387
Gender			
Male	143	41.179	.320
Female	141	41.561	.328
School Location			
Mainland	123	41.616	.348
Island	161	41.124	.305

Table 4.5 shows that the students exposed to conventional strategy had the highest attitude mean score (42.36), followed bythose exposed to field study strategy (41.67) while those exposed to mentoring strategy had the least attitude mean score (40.08).

Table 4.6: Schaffer's Pair Wise Comparison on Student Attitude to Climate Change

Treatment Group	Control	Experimental I	Experimental II
Control		*	
Experimental I	*		*
Experimental II		*	

Table 4.6 reveals that the significant effect shown in Table 4.4 is due to the significant differences between:

i. Control group and experimental group I

ii. Experimental groups I and II

Meanwhile, there is no significant difference between those exposed to conventional strategy and field study in their attitude. This implies that those students in control group had significantly better attitude towards climate change thanthose in experimental group I, and students in experimental groupI is significantly better than those in experimental group II.

4.1.3: H_{01c}: There is no significant main effect of treatment on students' climate change reduction practices.

Table 4.7: Summary of 3 X 2 X 2 Analysis of Covariance on Student Climate Change Reduction Practices

Dependent Variable: post practices

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1950.833[a]	12	162.569	3.809	.000	.144
Intercept	20648.784	1	20648.784	483.860	.000	.641
Prepract	.790	1	.790	.019	.892	.000
Trtmt	1085.924	2	542.962	12.723	.000	.086
Gender	1.404	1	1.404	.033	.856	.000
Schlloc	397.902	1	397.902	9.324	.002	.033
trtmt * Gender	44.175	2	22.087	.518	.597	.004
trtmt * Schlloc	246.617	2	123.308	2.889	.057	.021
Gender* Schlloc	2.577	1	2.577	.060	.806	.000
trtmt * Gender * Schlloc	59.782	2	29.891	.700	.497	.005
Error	11564.956	271	42.675			
Total	559650.000	284				
Corrected Total	13515.789	283				

a. R Squared = .144 (Adjusted R Squared = .106)

Table 4.7 reveals there is a significant main effect of treatment on student climate change reduction practices ($F_{(2, 271)} = 12.72$; $p<0.05$; $\eta^2= 0.09$). Therefore, H_{01c} is rejected. Table 4.8 presents the estimated marginal means that reveal the magnitude of practices across the groups.

Table 4.8: Estimated Marginal Means on Students' Climate Change Reduction Practices

Variable	N	Mean	Std.Error
Intercept			
Pre score	284	41.356	-
Post score	284	43.810	.403
Treatment			
Control	88	40.859	.743
Experimental I (Mentoring)	96	44.998	.680
Experimental II (Field study)	100	45.573	.676
Gender			
Male	143	43.736	.567
Female	141	43.883	.579
School Location			
Mainland	123	45.049	.608
Island	161	42.570	.534

Table 4.8 shows that students exposed to field study had the highest climate change reduction practices mean score (45.57), followed by those exposed to mentoring strategy (45.00), while those exposed to conventional strategy had the least practices mean score (40.86). Table 4.9 presents the Scheffe's Pairwise post hoc test in order to detect the source of the significant difference.

Table 4.9: Scheffe's Pairwise Comparison on Students Knowledge

Treatment Group	Control	Experimental I	Experimental II
Control		*	*
Experimental I	*		
Experimental II	*		

Table 4.9 reveals that the significant effect presented in Table 4.1 is as a result of the significant difference between:

i. Control group and experimental group I

ii. Control group and experimental group II

Meanwhile, there is no significant difference between those exposed to experimental groups I and II in their practices on climate change reduction. This implies that those exposed to experimental group I and II practices significantly performed better than those exposed to the conventional strategy.

4.1.4: H_{02a}: There is no significant main effect of gender on students' knowledge of climate change concepts.

Table 4.1 reveals there is no significant main effect of gender on student knowledge of climate change ($F_{(1, 271)} = 0.37$; $p>0.05$; $\eta^2= 0.00$).Therefore, H_{02a} is not rejected. This implies that student gender had no significant effect on their knowledge of climate change concepts.

4.1.5: H_{02b}: There is no significant main effect of gender on students' attitude to climate change concepts.

Table 4.4 reveals there is no significant main effect of gender on student attitude to climate change ($F_{(1, 271)} = 0.69$; $p>0.05$, $\eta^2= 0.00$).Therefore, H_{02b} is not rejected. This implies that students' gender had no significant effect on their attitude towards climate change concepts.

4.1.6:H_{o2c}: There is no significant main effect of gender on students'climate change reduction practices.

Table 4.7 reveals there is no significant main effect of gender on student climate change reduction practices ($F_{(1, 271)} = 0.33$; $p>0.05$; $\eta^2= 0.00$). Therefore, H_{02c} is not rejected. This implies that students' gender had no significant effect on their practices towards climate change reduction.

4.1.7: H_{o3a}: There is no significant main effect of school location on students' knowledge of climate change concepts.

Table 4.1 reveals there is no significant main effect of school location on student knowledge of climate change ($F_{(1, 271)} = 2.70$; $p>0.05$;$\eta^2= 0.01$), therefore, $H_{03a}$is not

rejected. This implies that school location had no significant effect on students' knowledge of climate change concepts.

4.1.8: H_{o3b}: There is no significant main effect of school location on students' attitude to climate change concepts.

Table 4.4 reveals there is no significant main effect of school location on student attitude to climate change ($F_{(1, 271)} = 1.10$; $p>0.05$, $\eta^2 = 0.00$), therefore, $H_{03b}$is not rejected. This implies that school location had no significant effect on student attitude towards climate change concepts.

4.1.9: H_{o3c}: There is no significant main effect ofschool location on students' climate change reduction practices.

Table 4.7 reveals there is a significant main effect of school location on student climate change reduction practices ($F_{(1, 271)} = 9.32$; $p<0.05$; $\eta^2= 0.03$). Therefore, H_{03c} is rejected. This implies that school location had a significant effect on student practice towards climate change reduction. This also reveals that the significant main effect of the treatment on climate change reduction practices earlier found was affected by the school location; hence the main effect of treatment no more holds.

4.1.10: H_{04a}: There is no significant interaction effect of treatment and gender on students' knowledge of climate change concepts.

Table 4.1 reveals there is no significant interaction effect of treatment and gender on student knowledge of climate change ($F_{(2, 271)} = 0.987$; $p>0.05$;$\eta^2= 0.01$).Therefore, H_{04a} is not rejected.

4.1.11: H_{04b}: There is no significant interaction effect of treatment and gender on students' attitude to climate change concepts.

Table 4.4 reveals there is no significant interaction effect of treatment and gender on student attitude to climate change ($F_{(2, 271)} = 0.64$; $p>0.05$,$\eta^2= 0.01$).Therefore, H_{04b} is not rejected.

4.1.12: H_{04c}: There is no significant interaction effect of treatment and gender on students' climate change reduction practices.

Table 4.7 reveals there is no significant interaction effect of treatment and gender on student climate change reduction practices ($F_{(2,\ 271)}$ = 0.52; p>0.05; η^2= 0.00).Therefore, H_{04c} is not rejected.

4.1.13: H_{05a}: There is no significant interaction effect of treatment and school location on students' knowledge of climate change concepts.

Table 4.1 reveals there is a significant interaction effect of treatment and school location on student knowledge of climate change ($F_{(2,\ 271)}$ = 3.45; p<0.05; η^2= 0.03).Therefore, H_{05a} is rejected. Figure 4.1 presents line graph that disentangles the interaction effect.

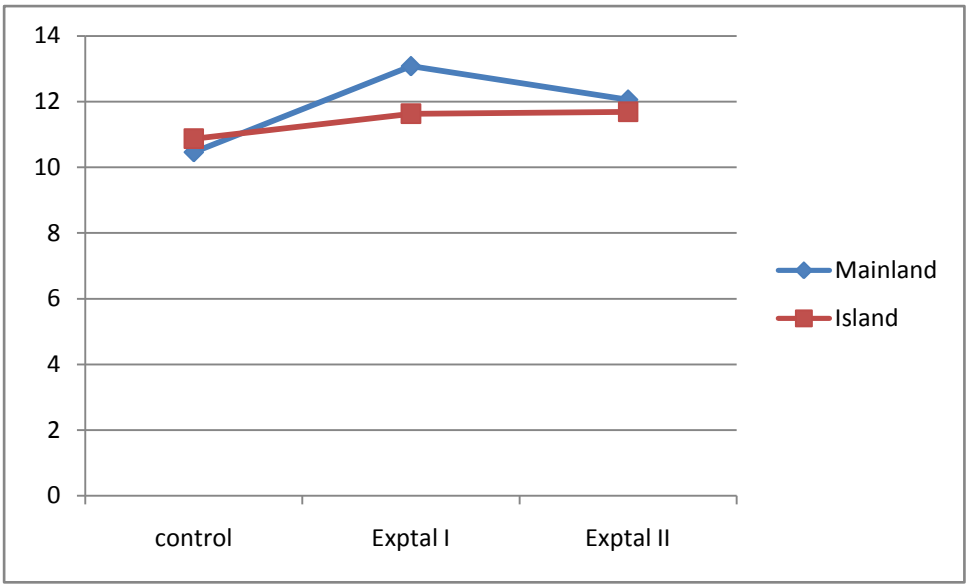

Fig. 4.1: Interaction Effect of Treatment and School Location on Knowledge

Figure 4.1 reveals that students in Island in the control group scored higher than those from the mainland but students in mainland scored higher in experimental groups I and II, herefore, the interaction effect of treatment and school location is disordinal.

4.1.14: H_{05b}: There is no significant interaction effect of treatment and school location on students' attitude to climate change concepts.

Table 4.4 reveals there is a significant interaction effect of treatment and school location on students' attitude to climate change ($F_{(2,\ 271)}$ = 4.37; p<0.05,η^2 =

0.03).Therefore, H_{05b} is rejected. Figure 4.2 presents the line graph that disentangles the interaction effect.

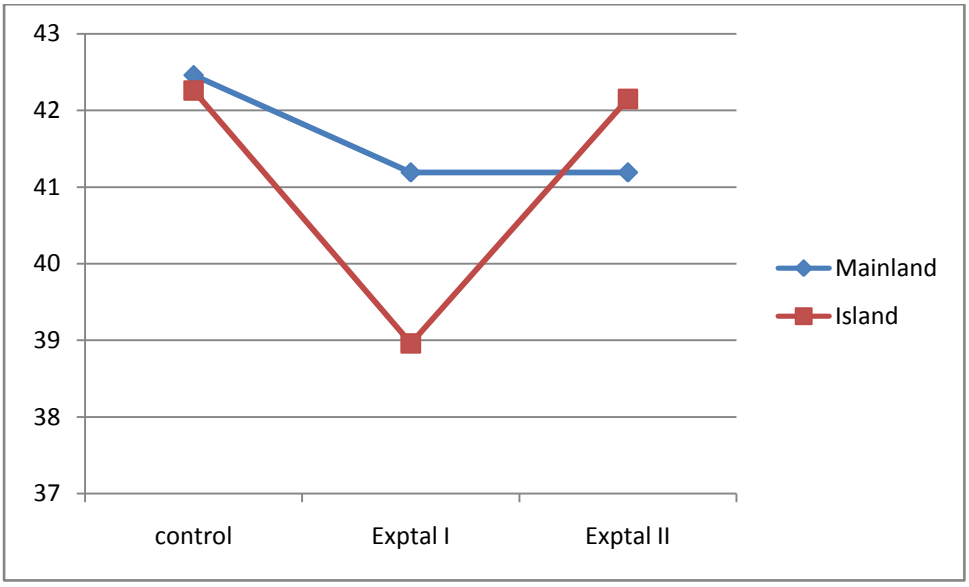

Fig. 4.2: Interaction Effect of Treatment and School Location on Attitude

Figure 4.2 reveals that students from mainland in control group and experimental group I did better than their counterparts from Island but students from Island did better than those from mainland in experimental group II, therefore, the interaction effect of treatment and school location on attitude is disordinal.

4.1.15: H_{05c}: There is no significant interaction effect of treatment and school location on students' climate change reduction practices.

Table 4.7 reveals there is no significant interaction effect of treatment and school location on student climate change reduction practices ($F_{(2, 271)} = 2.89$; $p>0.05$; $\eta^2= 0.02$).Therefore, $H_{05c}$is not rejected.

4.1.16: H_{06a}: There is no significant interaction effect of gender and school location on students' knowledge of climate change concepts.

Table 4.1 reveals there is no significant interaction effect of gender and school location on students' knowledge of climate change ($F_{(1, 271)} = 0.16$; $p>0.05$; $\eta^2= 0.00$).Therefore, H_{06a} is not rejected.

4.1.17: H_{06b}: There is no significant interaction effect of gender and school location on students' attitude to climate change concepts.

Table 4.4 reveals there is no significant interaction effect of gender and school location on students' attitude to climate change ($F_{(1,\ 271)}$ = 0.89; p>0.05, η^2= 0.00).Therefore, H_{06b} is not rejected.

4.1.18: H_{06c}: There is no significant interaction effect of gender and school location on students' climate change reduction practices.

Table 4.7 reveals there is no significant interaction effect of gender and school location on students' climate change reduction practices ($F_{(1,\ 271)}$ = 0.06; p>0.05; η^2 = 0.00).Therefore, H_{06c} is not rejected.

4.1.19: H_{07a}: There is no significant interaction effect of treatment, gender and school location on students' knowledge of climate change concepts.

Table 4.1 reveals there is no significant interaction effect of treatment, gender and school location on students' knowledge on climate change ($F_{(2,\ 271)}$ = 0.60; p>0.05;η^2 = 0.01).Therefore, H_{07a} is not rejected.

4.1.20: H_{07b}: There is no significant interaction effect of treatment, gender and school location on students' attitude to climate change concepts.

Table 4.4 reveals there is no significant interaction effect of treatment, gender and school location on student attitude to climate change ($F_{(2,\ 271)}$ = 2.57; p>0.05, η^2= 0.02).Therefore, H_{07b} is not rejected.

4.1.21: H_{07c}: There is no significant interaction effect of treatment, gender and school location on students' climate change reduction practices.

Table 4.7 reveals there is no significant interaction effect of treatment, gender and school location on student climate change reduction practices ($F_{(2,\ 271)}$ = 0.70; p>0.05;η^2 = 0.01).Therefore, H_{07c} is not rejected.

4.2: Section B: Summary of Findinsgs

Based on the analysis and the interpretation done on the data collected, the following are the findings of the study:

- There is a significant main effect of treatment on student knowledge of climate change. Those exposed to experimental groups I and II performed significantly better than those exposed to the conventional strategy.
- There is a significant main effect of treatment on student attitude to climate change. Those in the control group had significantly better attitude towards climate change than those in experimental group I and that of the students in experimental I is significantly better than those in experimental group II.
- There is a significant main effect of treatment on student climate change reduction. This implies that those exposed to experimental groups I and II practices performed significantly better than those exposed to the conventional strategy in their practices towards reduction of climate change.
- There is no significant main effect of gender on student knowledge of climate change
- There is no significant main effect of gender on student attitude to climate change
- There is no significant main effect of gender on student climate change reduction practices
- There is no significant main effect of school location on student knowledge of climate change.
- There is no significant main effect of school location on student attitude to climate change
- There is a significant main effect of school location on student climate change reduction practices. This implies that school location had a significant effect on students' practices towards climate change reduction. This also reveals that the significant main effect of the treatment on climate change reduction

practices earlier found was due to the school location; hence the main effect of treatment on practicesnot significant.

- There is no significant interaction effect of treatment and gender on students' knowledge of climate change.
- There is no significant interaction effect of treatment and gender on students' attitude to climate change.
- There is no significant interaction effect of treatment and gender on students' climate change reduction practices.
- There is a significant interaction effect of treatment and school location on students' knowledge of climate change. This interaction effect is disordinal.
- There is a significant interaction effect of treatment and school location on students' attitude to climate change. This interaction effect is disordinal.
- There is no significant interaction effect of treatment and school location on students' climate change reduction practices.
- There is no significant interaction effect of gender and school location on students' knowledge of climate change.
- There is no significant interaction effect of gender and school location on students' attitude to climate change.
- There is no significant interaction effect of gender and school location on students' climate change reduction practices.
- There is no significant interaction effect of treatment, gender and school location on students' knowledge on climate change.
- There is no significant interaction effect of treatment, gender and school location on students' attitude to climate change.
- There is no significant interaction effect of treatment, gender and school location on students' climate change reduction practices.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter presents the discussion of findings of the study, conclusion and the recommendations.

5.1. Discussion of Findings

5.1.1. Effects of Treatment on Students' Knowledge of Climate Change Concepts

The main focus of this study was to determine whether or not there would be any significant difference between the knowledge of students exposed to the use of mentoring instructional strategy, field-study instructional strategy and those in the conventional method. The result of the study shows significant difference among the three groups. (i.)Experimental group 1 (Mentoringinstructionalstrategy), (ii.) Experimental group 2 (Field-study instructional strategy), (iii.) Control group3 (Conventional method) in term of students' knowledge of climate change concepts.

In Tables 4.1and 4.2,the ANCOVA indicated that the Experimental group -1 recorded the highest post-test mean score (Mentoring instructional strategy) while the Experimental group-2 (Field-study instructional strategy) ranked second, and the Control group-3 (Conventional method) performed least. The result empirically supports other earlier findings on students' knowledge of environmental issue, especially climate change (Gbadamosi, 2012;Adelekan, 2009;Ajiboye 2008;Ajiboye and Silo, 2008;Adelekan and Gbadegesin, 2004; Okebukola, 2001).

The success of the Experimental groups 1 and 2 over their counterparts in the Control group may not be unconnected with the level of their participation in the learning process. It should be noted that while Mentoring and Field study instructional strategiesempasised participatory teaching and learning process based on positive forms of interdependence, interaction, individual and collaborative accountability as well as development of practices, the Conventional method of teaching and learning process did not favour nor allow the pattern of teaching and learning process called participatory learning or active learning rather the learners were usually passive.

Mentoring and Field study instrumental strategies directly contribute to teaching and learning and provide a good support function to learners of climate change concepts in social studies because of active learners participation, and interaction of learners that Conventional method which does not provide such experiences (Salako, 2014; Gbadamosi, 2012; Bradfield and Hudson, 2011; Hudson, 2010;Snowman, Dobozy, Scevak, Bryer, Barlett and Biehier, 2009;Ajiboye and Silo, 2008; Olatundun, 2008; Ajiboye, 2006; Adekunle, 2005; Ajitoni, 2005;Bruner, 1973).

Bronfenbrenner (1990) affirmedin ecological system theory renamed bio- ecological system theory that in a child's maturing biologically, his/her immediate family and community environment, and the societal landscape fuels and steers his/her development. Changes or conflict in any one layer will ripple throughout other layers, hence, to study a students development, one should look not only at the learner and his/her immediate environment, but also at the interactions of the larger environment as well.This study applauds Bamikole (2001) cited in Adenisoye (2006) that social studies has its particular mission, the tasks of helping young people develop competence that enable them deal with, and to some extent manage the physical and social forces of the world in which they live, if appropriate knowledge, attitude and environmentally sound reduction practices are instilled, they can provide good knowledge based solutions for the prevailing challenge of climate change through Mentoring and Field study instructional strategies..

A person's appraisal of a situation is likely to be influenced by personal characteristic and influences to which such a person is exposed, for example, his/her knowledge about the environment may affect his/her view of the seriousness of climate change and the norms of people with what he associates may influence his/her appraisal of his/her responsibility for helping solve such problems (Kolmuss and Agyeman, 2002).The lower knowledge score recorded in Conventional method group, reinforced the opinion of Olatundun (2008); Ajitoni (2005); and Kola- Olusanya (2006) as minimal student participation usually found in traditional classroom where teachers' dominate classroom interaction, where the learners are inactive or passive listeners in the study, which implied that the treatment has significant main effect: Ho1a is rejected.

5.1.2. Effects of Treatment on Students' Attitude to Climate Change Concepts

The findings of the study in respect of students' attitude to climate change concepts in social studies reveal there is a significant main effect of treatment on students' attitude to climate change across the three groups. In Tables 4.4 and 4.5, the ANCOVA result shows that students exposed to Conventional instructional strategy had the highest attitude mean score (42.36), followed by those exposed to Field study instructional strategy (41.67), while those exposed to Mentoringinstructional strategy had the least attitude mean score (40.08). Table 4.6, reveals that the significant effect as shown in Table 4.4 was a result of the significant difference between theControl group and Experimental group 1, and between Experimental group 1 and 2. There is no significant difference in attitude between those exposed to Conventional and Field studyinstructional strategies in their attitude. This implied that students' in Control, group had significantly better attitude towards climate change than those in Experimental group2, and those in Experimental group 2, were significantly better than those in Experimental group -1.

The results above reaffirmed Fazio and Roskes (1994); Raji and Ayoade (2004); and Amosun, Oyekanmi and Ige (2010) that attitudes are important to educational psychology because they strongly influence social thought, the way an individual think about and processes social information. Teachers and learners have opportunities to learn about instructional strategies and how these are used in different context since climate change has become a topic for public discussion in the last few decades, a considerable number of studies have examined the influences on peoples attitude and behaviour, which demand personal proactive environmental behaviour.

The findings of this study contradict Song (1995) that Asian students are reluctant to 'stand out' by expressing their views or raising questions particularly if this might be perceived as expressing public disagreement, but support Salsali and Alimadi (2004) that most teachers are not familiar with modern teaching methods, traditional lecturing methods are still the popular instructional approaches in schools (Rahmani, 2007 and Saville, 2009).Brown (2003) states that most of these teachers were taught in learning environment that were instructor-centred, therefore, they teach the same way too.

Factors such as simplicity of lecture presenting, its appropriateness for crowded classes, limitations of time and the massive amount of theoretical content which should be presented have made the instructor use lecturing method as most popular teaching approach (Adib-Haybaghery, 2005). Table 4.5. shows that students exposed to Conventional instructional strategy had the highest attitude mean score (42.36), followed by students exposed to Field study instructional strategy (41.67) and students exposed to Mentoring instructional strategy had the least attitude means score (40.08); a plus to the study carried out by Esplanade and Shanta (2001) that overly using lecture method will induce a hidden curriculum that teaches students to be obedient,compliant in expressiveness and will reduce their self confidence. Conflicting studies show that teacher-centreed teaching methods are not appropriate to teach students in schools or other fields, that training involves context which gives it meaning (Caudron, 2000).

Studies had also shown that students prefer teaching methods with more students-activity involvement (Salsali, 2005 and Adib- Haybaghery, 2005). Conflicting results had been reported when researchers compared the effects of conventional method and more active instructional methods (Barness and Blevins, 2003; Riggio, 2007 and Sanille, 2009).In the opinion of Hennessy (1993), discussion, negotiation and collaboration in classroom situation will provoke a more meaningful engagement with problem- solving process that the social studies teachers aimed to encourage through the use of Mentoring and Field study Instructional strategies as against the Conventional method in classroom situation where the teacher dominate and little interaction takes place. Bruner (1973) states that most constructivist call for instructional intervention especially the use of active participatory learning designed not only to match learning but to accelerate movement through developmental stages and emotional display of values and attitudes since social studies teachers' encourage active learners' participation in the teaching and learning process.

Traditionally, it was believed that behaviour could be changed by making people more knowledgeable about the environment and its associated issues such as climate change. The underlying assumption is that the more people know, the more aware they are, they will become motivated to act towards the environment in more

responsible ways (Evans, 1998; Bronfenbrenner, 1990).Given thatthe concept of attitudes is helpful in understanding how individuals interpret and respond differently to the same informing because preexisting beliefs and values resulting in bias perceptions and guide behaviour, people are more attentive to, and accepting of, attitude consistent information, and tend to ignore or reject dissonant information.

Further, as declared in Agenda 21 signed in Rio,a comprehensive programmeof action for global response in all areas of sustainable development, schools are directly challenged to increase their responsibility in developing an environmental literate citizen. In particular, universities were asked to play prominent roles in preparing citizens to analyse and resolve environmental issues. Therefore, there is need to address knowledge, attitudes and practices (KAP) of students and staff in Lagos State towards climate change. This is an important task because Lagos State and the students as well as staff it accommodates have a significant impact on the environment, which related to their high consumption levels of water, paper and electricity coupled with their high output of waste and greenhouse gases (GHGS). Ultimately, their actions play a role in contributing to climate change.

It ispertinent to understand what levels of knowledge and attitudes as well as reduction practices students ascribed to, in order to gauge their impact on global climate change. In this study, connection was found between a person's level of knowledge of climate change and his/her more proactive behaviour, similar to Bandura's self efficacy construct within the framework of social constructivists theory of self regulation (1991, but dating back to 1977), since the descriptive statistics for the attitude post-test score showssthat the treatment has significant main effect, $H_0$1b is rejected.

5.1.3. Effects of Treatment on Students' Reduction Practices towards Climate Change

The study focused on whether or not there would be any significant difference in the climate change reduction practices of students exposed to the use of Mentoring and Field study instructional strategies as well as those in the Conventional method. The

result of this study as revealed in Tables4.7 and 4.8. Show a significant main effect of treatment on students' climate change reduction practices across the three groups.

The estimated marginal means reveal the magnitude of practices across the groups, that students exposed to Field study instructional strategy had the highest climate change reduction practices mean score(45.57), followed by the students exposed to Mentoring instructional strategy with mean score of (45.00), while those exposed to Conventional instructional strategy had the least practice mean score (40.86) . Table 4.9shows the Scheffe's Pairwise post hoc test in order to detect the source of the significant difference.

The significant difference is as a result of the difference between Experimental group-1 and Control group as well as Experimental group-2 and Control group. There is no significant difference between those exposed to Experimental group 1 (Mentoring instructional strategy) and those in Experimental group-2 (Field study instructional strategy) in their climate change reduction practices. This implied that students exposed to Experimental groups-1 and 2 climate change reduction practices were significantly been better than those exposed to the Conventional instructional strategy.

The result presented above duly justified previous studies on the effectiveness of Field study instructional strategy over other instructional strategies. Field study instructional strategy has been found more beneficial to students who find classroom learning more challenging (Ajitoni, 2005;Gbadamosi, 2012and Salako, 2014), while Maynard, Watersand and Clement (2013) contend that, the teachers in their study reported that when engaged in child initiated activity in the field study environment over half of the children who in the classroom were perceived to be under achieving, appeared to behave differently. This present study supports the notion that the more natural field study spaces in which child-initiated activities take place directly and indirectly diminished the perception of under-achievement (Monroe, 2004; Loynes, 2002 and Sax, 2001).

This study also indicates that there appeared to be ongoing positive effects. The largest empirical study of the effects of field study education programme (mostly outward bound programme) found small, moderate, short-term positive impacts on a

diverse range of generic life skills, with the strongest outcomes for longer and less expedition-based programme with motivated young adults, and partial long term retention of these gains (Neill, 2008).

Mentoring instructional strategy in Experimental group- 1 came second with the climate change reduction practices mean score (45.00) which reiterates the benefits of mentoring instructional strategy as observed in previous studies (Astin and Sax, 1998; Ajiboye, 2008; Ajiboye and Silo, 2008). Students were involved in mitigating activities such as planting of trees, conservation of water and energy, reduction in the burning of waste papers, burning of firewood and conservation of natural resources in the environment, a long-lifestyle changing exercise for which most students were most willing to get involved, as observed in thisstudy. Students' engaged in this form of activities feel more motivated and eager to help their community. In the long run, this approach will allow students to actually see the impact of their reduction practices towards climate change, they will be able to step back and see the flints of their labour.

Outside climate change issues, a large literature dealing with human decision making and action suggests that motivation and perceived abilities are important determinants of human action (Grothmann and Patt, 2005). New arrivals in schools will be introduced to a culture and practices where all studentspick up rubbish, recycle, use and reuse as well as renew materials causing climate change, to positively impact the environment and thus, feel frowned upon if they do not conform to the social norm. Once a particular way of doing things becomes established as a rule, it continued being in force because people prefer to conform to a rule given the expectation that others are going to willingly conform (Lewis, 2002). Although, the students exposed to the Conventional instructional strategy had the least climate change reduction practices mean score (40.86), educationist view learning as a process of actively exploring information and formation of learning by linking it to previous knowledge and experience, so teachers are encouraged not to teach the contents but to teach the students how to learn the content (Palmer, 2003).

Students' participation in the learning process and substitution of conventional method gives learning opportunities for the students' development. It is believed that such an engagement will deepen the students' understanding of the course materials and concepts,it will encourage them to assume a major responsibility in the learning process , it will help them improve their intellectual interpersonal and team work skill, it will improve their ability, practice and search to obtain and organise information, it will improve their ability to identify and solve problems and it will help them set the foundation for lifelong learning (Debessay and Lerner, 2004; Joyce et'al, 2005 and Hudson, 2010).

5.1.4. Effects of Gender on Students' Knowledge, Attitude and Reduction Practices towards Climate Change

The result of this study shows there was no significant main effect of gender on students' knowledge of, attitude and reduction practices towards climate change. Apparently, there were differences in the students' knowledge score on climate change,students' attitude score on climate change and students' climate change reduction practices score. It's obvious therefore, thatH02a-c is not rejected.This implied that students' gender had no significant main effect on their knowledge, attitude and reduction practices towards climate change concept in social studies', as vividly revealed in Table 4.1.,4.4 and 4.7, because the treatment had almost equal effect on male and female students in the study, which could be attributed to the fact that the treatment provided equal learning opportunities for both gender.The findings of This study is in line with Falaye and Okwilagwe (2016); Gbadamosi (2012) and Salako (2014) that certain variables such as gender does not capable of influence learning outcomes but in conflict with MacDonald and Hara (2010); Olatundun (2008) and Adekunle (2005) who affirm that femaleshad higher environmental knowledge and attitude mean score compare to their male counterparts.Wang and Cheng (2010) as well as Abiona (2008) find there was no significant difference between the environmental knowledge and attitude of male and female students' though there was a slight difference in their performance. Unfortunately, knowledge of climate change did not translate to positive attitude and favourable practices in this case, that further confirmed the generally held view that attitude and behaviour are not easily changed (Falaye and Okwilagwe, 2016; Anable, Lane and Kelay, 2006).Eccles

(2002) opinesthat on the average, girls do better in school than boys. Girls get higher grades and complete high school at a higher rate compared to boys (Jacobs, 2002).

From the non- rejection ofH_{o2} ($_{a\ -\ c}$) above, it means gender has no significant influence on students knowledge, attitude and practices towards climate change irrespective of instructional strategy adopted. These findings were also similar to that of Okebukola (1984) that gender of the students was not significant for achievement, scientific attitude and practical skills in Biology. Ajayi (2002) also reports that there is no difference between the academic performance of male and female students in the mastery and enhanced mastery learning groups. The findings from this study are therefore consistent with earlier research findings in this area.

The above findings suggest that Mentoring,Field study instructional strategy and Conventional instructional strategiescan still be used as medium of instruction to enhance students' learning outcomes on climate change concepts in social studies regardless of gender differences.

5.1.5 Effects of School Location on Students' Knowledge, Attitude and Reduction Practices towards Climate Change

The main focus of this study is to determine whether or not there is any significant main effect of school location on students' knowledge, Attitude and Reduction Practices towards climate change across the treatment groups as stated in $H_{o3a\ -\ c}$of this study. Table 4.1, reveals there is no significant main effect of school location on students' knowledge of climate change;therefore, $H_{o3a}$is not rejected. Table 4.4 reveals there is no significant main effect of school location on students' attitude to climate change, So, H_{o3b} is not rejected. Table 4.7 reveals there is a significant main effect of school location on students' climate change reduction practices, therefore, Ho3c is rejected.

The non- rejection of $H_{o3a}$and H_{o3b}impliesthat school location had no significant main effects on students' knowledge and attitude to climate change. Schools in Lagos Mainland area of this study had post knowledge mean score (11.86) and schools in Lagos Island area of this study had post knowledge mean score (11.40).The results

might be attributed to the fact that Lagos Mainland students' might have been confronted with more of climate change issues and problems in their areas than their Lagos Island counterparts. Also, it is probable that the mastery of the climate change concepts were better understood by Lagos Mainland studentsthan Lagos Island students. Students' living within Lagos Mainland area had higher climate change knowledge and positive attitude than students within Lagos Island area, these differences are not significant. This finding might be as a result of individual differences in behaviour of students, tropological variability of learning environment,students level of understanding coupled with the monthly sanitation programme' in Lagos State, constantly monitored by the Lagos State Ministry of Environment (MoE) to ensure environmental friendly culture among her citizens.

There are jingles on radio and television for proper environmental and atmospheric management such as the one in Lagos State Television Corporation (LTV-8) and RadioLagos as well as Nigerian Television Authority (NTA) and Bound FM Radio which warn the citizens to desist from bush burning, deforestation, burning of refuse, dumping of refuse indiscriminately and burning of fossil fuel coupled with the unruly emission of carbon –dioxide and carbon-monoxide. People were usually been encouraged to clean and clear gutters/drainage, and encouraged to use more of energy saving bulbs especially incandescent bulbs, encouraged to reduce and possibly stop emission of carbon-dioxide, and increase the planting of trees (promote greening environmental culture) and so on.

The studentswere also exposed to the same topics in social studies on climate change education that gave them the opportunity for almost equal access to information about climate change problems and challenges. This must have actually bridged the gap between them on climate change issues. This finding supports indeed the results of Gbadamosi (2012); Olatundun (2008); Adekunle (2005) and Akpan (2001); that there was no statistically significant effect of school location on learning outcomes (Alokan, 2010). On the other hand, the report negates the views of Axtell and Bowers (1972); Kampits (1996) and Ajayi (2002) who contend that school location could predict school achievement in science, and influence learning outcomes. Hypothesis, $H_0$3c is rejected in this study because Table 4.7 reveals there is a significant main

effect of school location on students' climate change reduction practices. Lagos Mainland students had higher mean scores on climate change reduction practices than the Lagos Island students probably because they were able to acquire more knowledge and positive attitude to climate change concepts which resulted to action practices that they exhibited.

Based on the findings of this study, it is revealed that students from Lagos Mainland areas were aware of the alarming rate by which pollutants are being discharged into the atmosphere and environment (land, air and water) from both direct and indirect activities of household, industries and other related urbanisation activities on daily basis and their implication on human health. They also noted persistent challenge of poor waste generation and disposal by families, schools and sellers of various items in the marketplaces that increase greenhouse gases (GHGS) and effect generation. They also noted the ineffective and discouraging refuse management system and legislation by the governments as well as implications of these climate change threats to individual, society and nation in general. The experiences enable them decide whether to retain or change behaviours that are dangerous or inimical to a sustainable environment, and become actively involved in the activities that improved, maintained and restored viable and friendly atmospheric conditionsustainable for all. The findings corroborate Oladipo (2012);Adelekan (2009); Ajiboye (2008); Ajiboye and Silo (2008);Adefolalu (2007);Nwafor (2006); Adelekan and Gbadegesin (2004)that education leads to informed and reformed actions. Therefore, students' awareness of climate change resulted in right action practices across the study areas.

5.1.6. Two-way Interaction Effects of Treatment and Gender on Students Climate Change Knowledge, Attitude and Reduction Practices

The findings of this study reveal that the two-way interaction effects of treatment and gender on students' climate change knowledge attitude and reduction practices werenot significant. This means that gender of the students had little or no effect on their learning outcomes (i.e. climate change literacy), what actually determined students' performance was the instructional strategy adopted by the teachers. When male and female students were exposed to actions-based strategies that involved activities, they equally had good performance. This implies that gender differences of being male or female are not relevant to performance in climate change concepts. Irrespective of students gender, Mentoring and Field study instructional strategies, were the most effective in enhancing climate change knowledge and reduction practices of students as against conventional instructional strategy. Although, there is a significant main effect of treatment onstudents' attitude to climate change because students in control group had significantly better attitude towards climate change than those in experimental group -1, and that of students in experimental grouop-1, is significantly better than those in experimental group-2. Unfortunately, knowledge of climate change did not translate to positive attitude and environmental-friendlypractices, that further affirmed the general belief that attitude and behaviour are not easily changed (Falaye and Okwilagwe, 2016; Anable, Lane and Kelay, 2006).

This result is in consonance with Okebukola (1984) that gender of students was not significant for achievement, scientific attitude and practical skills in Biology. Ajayi (2002) also reported that there was no difference in the academic performance of male and female in the mastery and enhanced mastery learning groups. Abiona (2008); Wang and Cheng (2010) and Gbadamosi (2012) stated that there was no significant difference between the environmental knowledge, attitude and practices of male and female students, though there was a slight difference in their performance but not significant.

The result in this study contradicts the findings of Macdonald and Hara (2010); Olatundun (2008); Adekunle (2005); Eccles (2002) and Jacobs (2002) that female students had higher environmental knowledge and attitude mean score than their male

counterparts. Those studies had shown that girls on the average do better in school than boys and get higher grades to complete high school at a higher rate compared to boys, due to gender stereotype, duties, roles and responsibilities, since females were generally believed to be more environmentally conscious, caring, caution and friendly than males, but participatory learning is the demand for sustainable development.

5.1.7. Two-way Interaction Effects of Treatment and School Location on Students Climate Change Knowledge, Attitude and Reduction Practices

The result of this study in Table 4.1 reveals that there is a significant interaction effect of treatment and school location on students' knowledge of climate change, therefore, $H_0$5a was rejected. Figure 4.1 reveals that students in Lagos Island in the control group scored higher than those from Lagos Mainland, but students in Lagos Mainland scored higher in experimental group 1 and 2. So, the interaction effect of treatment and school location on knowledge is disordinal. Table 4.4 reveals there is a significant interaction effect of treatment and school location on students' attitude to climate change, therefore, $H_0$5b was rejected. Figure 4.2 reveals that students' from Lagos Mainland in the control group and experimental group-1 did better than their counterparts from Lagos Island, but students from Lagos Island did better than those from Lagos Mainland in experimental group-2. Hence, the interaction effect of treatment and school location on attitude is disordinal.

Given, that the interaction effect of treatment and school location on students knowledge and attitude is disordinal reaffirms the view of Ojoawo (1989) that school location is one of the potent factors that influenced the distribution of educational resources, while Akpan (2001) states that school location has been viewed as one factor that affects students academic achievement. Considine and Zappala (2002) find that geographical locations do not significantly predict outcomes in school work. There has been much debate over whether or not the knowledge of a subject automatically results in better practices. Most sociologists' argument onthis is too simplistic a relationship to generalize, giventhat a person's attitudes and practices are the outcomes of a huge range of factors such as culture and experiences (Steel, 1995).

In this study, it can be stated that a connection was found between a people's level of knowledge on climate change and their more proactive behaviour (attitude and

practices), which corroborates Bandura's (1991)self – efficacy construct. Bandura (1991) states that altering our standards and goal setting is essential for self- directed change. Once a particular way of doing things becomes established as a rule,it becomes and continues in force because people prefer to conform to rules given the expectation that others are going to conform as well (Lewis, 2002).

Table 4.7 reveals that there is no significant interaction effect of treatment and school location on student's climate change reduction practices, therefore, Ho5c is not rejected. The result of this study had shed new light on previous perceptions of individuals KAP towards climate change. Previous KAP studies have found that a person's educational level does not imply greater understanding of global warming (Bostrum,1994). It has been found that there is the tendency for the general public to mistrust climate change findings in the light of many uncertainties present,since neither of these generalisations can be applied to students. Based on this study, students were found to be more willing to get involved in mitigating activities with greater and good understanding of the subject and for the most part trusted that enough evidence abound which separates the effects of mentoring and field study instructional strategies coupled with conventional instructional strategy as a justification for paradigm shift from teacher- centred- approach to child –centred-approach, of teaching and learning processes which encourage action –learning and active-participatory-discovery learning.

5.1.8 Two-way Interaction Effects of Gender and School Location on Students' Climate Change Knowledge, Attitude and Reduction Practices

The study reveals that there is no significant effect of gender and school location onstudents' climate change knowledge, attitude and reduction practices. This implies that gender and school location had little or nothing to do with climate change KAP of the students. The results buttress Okebukola (1984); Ajayi (2002); Abiona, (2008); Wang and Cheng (2010), and Gbadamosi (2012). In summary, irrespective of students' gender and school location, learning outcomes were determined by the methods of instruction adopted by the teacher who serves as facilitator or guidance in the modern day classroom situation, with empasises on child- centred teaching and learning process.

5.1.9 Three-way Interaction Effects of Treatment, Gender and School Location on Students'Climate Change Knowledge, Attitude and Reduction Practices

The findings of thisstudy reveal that the three-way interaction effect of treatment, gender and school location was not significant on student climate change knowledge, attitude and reduction practices. Thismeans that if the same treatment was given to the male and female students' from Lagos Island and Lagos Mainland, similar results would be realised in climate change KAP of the students as found in this study. The results support Okebukola, (1984); Ajayi, (2002); Wang and Cheng, (2010) and Gbadamosi, (2012), but contradict Adekunle,(2005); Olatundun,(2008); Macdonald and Hara,(2010), who reported that female students had higher environmental knowledge and attitude means score than their male counterparts.

5.2 Implications of Findings

The findings of this study had shown that Social Studies as a school subject is better taught using mentoring and field study instructional strategies than the conventional instructional strategy in Junior Secondary Schools. The higher learning outcomes of students exposed to mentoring and field study instructional strategies have implications for teaching of climate change concepts which suggests a paradigm shift from teacher-centred-teaching and learning process to child-centred-teaching and learning process. The teaching and learning strategies that allow critical thinking, problem-solving skills acquisition, enhance contextual learning skill, promote good communication skill, ensure information and media literacy skill, inculcate creative and innovative skill, as well as collaborative skill coupled with sense of responsibility in learners should be encouraged.

Field study instructional strategy was found most effective instructional strategy in enhancing climate change KAP of students. It allows for hands-on-real world experiences, positive attitude towards the environment, improvement of social interaction between students and development of rapport between students and teachers, as well as transforming teaching and lesson periods into creative, interesting, innovative and exciting sessions, which in all will enhance the improvement of

climate change KAP of students. The implication is that teachers should always relate field study to the curriculum for better improved teaching and learning processes.

Field study instructional strategy was found to be most effective in improving the climate change reduction practices of students. It is important for curriculum developers and teachers to adopt teaching strategies and students' activities that are problem–based-learning strategy, which could afford students' the opportunity to gain a better understanding of what they learn , retain it longer and take charge of their own learning (inferring meaning from experience) as problem-solvers. The implication of this is that teachers should possess adequate desirable KAP before these can be passed on to the students. This demands that teachers training programme in colleges and universities should incorporate modern methods, techniques, approaches, models, and strategies to enhance learning process in and outside the classrooms to ensure enduring and sustainable friendly environment.

This study also reveals that gender and school location had no significant effects on climate change literacy KAP. This implies that learning outcomes of the students were determined by methods of teaching employed by the teachers, the need therefore for a total reinvigoration, and revitalisation of teachers on the use of participatory-activity-based strategies in teaching and learning of climate change concepts in Social Studies. These modern strategies had been found more effective in enhancing students climate change KAP as against the use of Conventional instructional strategy.

5.3 Conclusion

The study reveals that mentoring and field study instructional strategies begin with students' immediate environment. It exposed students to personal experience of their immediate natural environment coupled with collaborative effort among students (think –pair- share) of learning experiences. These strategies generally enable the students' to benefit from experiences of adults who are specialists and experts in Social Studies, who encourage them to develop their own creative and innovative skills focused on problem –solving, for a better-friendly and sustainable environment. Also,gender and school location had no significant effect on students climate change KAP in Social Studies, therefore, mentoring and field study instructional strategies

are effective for teaching and learning of climate change concepts in Social Studies in schools in Lagos State.

5.4 Recommendations

In course of the findings of this study, the following recommendations are made:

1. Educators should adopt mentoring and field study instructional strategies in the teaching and learning of climate change concepts in Social Studies as against only conventional instructional strategy. The students' should be exposed to basic climate change concepts through outdoor activities to ensure better learning outcomes. Unnecessary risk of accidents should be avoided by taking precaution and approval from the appropriate authorities to avoid litigation.

2. Social Studies curriculum should be updated to incorporate issues on attitude change and practices, to ensure that the affective and psychomotor domains of learning are achieved, in order to improve ecological literacy about global warming issues facing humankind.

3. All students should be exposed to issues of climate change with a view to increasing awareness and positive practices given that adverse climate change will affect everybody in the society. The impact of climate change stirs the world in the face now than ever before and the current global awareness being created by the world leaders at several fora make it imperative to galvanise all efforts to protect the earth and make it sustainable.

4. Mentoring instructional strategy should be encouraged for acquisition of practical skills that is problem–solving oriented, in the interest of the individual and society at large.

5. Mentoring and field study instructional strategies are good for Mainland and Island areas; therefore teachers should use these strategies to link the school with the society.Based on the effectiveness of the strategies, there should be special provision for its inclusion in the school curriculum and timetable.

6. Mentor-Mentee committee should be constituted in schools to help teachers engage in special training, monitor the progress of work, provide support services during project execution and help document students' activities. Also, field study coordinators should be in Junior Secondary Schools, to plan and offer suggestions on what teachers, parents, and students should know before embarking on fieldwork.

7. Government at all levels should take a cue from countries like Japan, Canada, Asia and Australia to create better awareness of climate change and management of disasters, to mitigate negative impacts of such changes on the population. For instance, responses to climate change include: Eco-schools in Japan, Institution of solar schools in Australia, Provincial policies formulation in Canada and disaster reduction risk management inclusion into school curriculum in Asia and Madagascar (UNESCO, 2012).

8. Government should organise training and retraining programme for Junior Secondary School teachers for effective usage of action or activities-based instructional strategies through workshops, seminars and conferences, to enhance effective teaching and learning of climate change concepts in Social Studies.

9. Teachers training, Colleges of Education andFaculty of Education in Universities should not only include mentoring and field study instructional strategies in teaching manual, but should provide practical experiences for pre-service teachers to acquire prerequisite technicality on the use of modern -day teachingstrategies.

10. An essential factor in the success record of mentoring and field study instructional strategies is to ensure that it is sociologically, psychologically, and philosophically appropriate. Teachers must ensure adequate knowledge of studentss level of intellectual development and skills, for meaningful learning outcomes through the use of mentoring and field study instructional strategies.

5.5 Limitations of the Study

Gender and School Location are the only moderator variables considered among others in thisstudy that could have affected the outcome of this research. Also, the period of study (10 weeks) was quite short forgeneralisation. The study was limited to some selected climate change concepts in Social Studies. This makes the result obtained not generalisable beyond the selected climate change concepts examined in the study. The study was conducted in Education District- III and Education District – V, representing Lagos Island and Lagos Mainland, consistimg of seven zones and six schools. Students were assigned to experimental and control groups, hence the number of schools and students may pose some limitations to the study.

It took some time to get parents consent for their ward /children to participate in the study. Some school authorities refused to grant the request to use their schools, based on State government policy statement of zero tolerance for video coverage, press-interview and data collections in schools.Regardless of all these inadequacies, the findings of this study could serve as a baseline source of data for future studies on climate change in Nigeria.

5.6 Contributions to Knowledge

The study has contributed to knowledge especially its findings that:

1. Mentoring instructional strategy boost students' learning outcomes in climate change concepts in social studies.
2. Field study instructional strategy enhanced students' attitude and reduction practices towards climate change better than the mentoring and conventional instructional strategies
3. Gender has no effect on students' learning outcomes in climate change concepts in Social Studies.
4. School location has a significant effect on students' climate change reduction practices but not on students' attitude to climate change concepts in Social Studies.
5. Activity–based strategies have great potentials at enhancing students' learning outcomes in climate change concepts in Social Studies.

6. Campaign and advocacy are needed to improve students' attitude towards greener behaviour.
7. Students should take advantage of the greener environment to enhance entrepreneurial skills for job creation.s

5.7 Suggestions for Further Studies

The study should be replicated in the Senior Secondary Schools, Private Secondary Schools and all the six geo-political zones of Nigeria, to enable more generalisations.

Further research should examine other moderator variables such as teacher factor, personal traits and socio-economic status. Also, impact assessment of climate change should be carried out in Lagos State.

REFERENCES

Abiona, O.F.2008.The impact of three life-skill strategies on students' learning outcomes in environmental concepts of sewage disposal and water treatment in Biology. Unpublished Ph.D Thesis, University of Ibadan, Ibadan.

Adebayo, A. A, and Umar, A. S. 2005. "Climate", in The land and people of the Mambilla Plateau, Tukur A. L, Adebayo A.A and Galtima M. (Eds), the land and people of the Mambilla Plateau, Heinemann, lbadan. pp. 25-32.

Adebayo, S. I. 1998. Climate change and global warming and high frequency of storm surges along the Atlantic coast of Nigeria. Proceedings of Sustain Africa, 4: 6-8.

Adefolalu, D. O, 2007. "Climate change and economic sustainability in Nigeria". Paper presented at the International Conference on Climate Change and Economic Sustainability held at Nnamdi Azikiwe University,Enugu, Nigeria.12-14 June 2007.

Adefolalu, D. O, Pam, J L, and Habbi, H. M 2007. "Climate change and safety of air transportation -A Nigerian perspective". Proceedings of the International Conference on the Impacts of extreme weather and climate on socio-economic development in Africa held at the Federal University of Technology,Akure, Nigeria.11-15 Nov.,2007.p1-15.

Adegoke, M.O. 2012.A Comprehensive text on physical, human and regional geography for senior secondary schools and colleges. Osogbo:Aquifer Publishers.

Adekunle,M.O. 2005.Problem-solving and concept mapping strategies as determinants of students' achievement and attitudes in some environmental concepts in social studies. Unpublished Ph.D Thesis,University of Ibadan,Ibadan.

Adelekan, 1.O and Gbadegesin, A.S, 2004. Analysis of the public perception of climate change issues in an indigenous African city. International Journal of Environmental studies Vol.62, No 1,1 15- 124.

Adelekan,I.O 2009.The Nigerian press and environmental information for sustainable development. Local Environment 14(4)297-312.

Adenisoye, E. 2006.Teacher's perceptions of the place of values in the teaching and learning of social studies. M.ED Dissertation of the department of teacher education, University of Ibadan

Adger ,W.N., Arnell, N.A., and Tompkins, E.L. 2005. Adaptation to climate change: perspectives across scales. Global Environmental Change 15(2): 77-86.

Adger, W.N., Brown, K., Fairbrass, J., Jordan, A., Paavola, J., Rosendo, S and Seyfang, G. 2003. Governance for sustainability: towards a 'thick' analysis of environmental decision-making. Environ. Plann. A, 35, 1095-1110

Adib-Hajbaghery, M. 2005. Factors affecting and barriers to evidence based nursing in Kashans' hospitals in 2005: a grounded theory study. Research project, Kashan University of Medical Sciences, PP. 83-95.

Adib-Hajbaghery,M., Salsali M., and Ahmadi F. 2004. The factors facilitating and inhibiting effective clinical decision-making in nursing: a qualitative study. BMC Nursing 3:2.

Afiesimama, E A., Ojo, S O., and Gbuyiuro, S .O 1999. "The diagnosis of climatic trends over Nigeria in the last half century of this millennium",

Afiesimama,E.A.,Ati,O.F.,Olokor,J.O.,Ijioma,M.A.,Chendo,M,A and Ayansina,A. 2010. National climate change scenarios development.Draft technical report for Nigerians second national communication.

Ahmad, O. K., and Ahmed, A.U. 2000. "Social sustainability, indicators and climate change", in Munasingh, M. and Swart, R. (Eds), "Climate change in Nigeria.

Ajayi,G.O. 2002. African response to the information communicaton technology revolution.ATPS Special paper No.8(online)http://www.atpsnet.org/docs /ajayi.polf

Ajayi, I. A. 1999. Unit cost of secondary education and students' academic achievement in Ondo State, Nigeria (1991-1995) .Unpublished Ph.D thesis, University of Ibadan.

Ajayi, K and Ogunyemi, B.1990.The relationship between instructional resources and socio-economic status in selected population of high school. Dissertation Abstract International,25(2)22-23.

Ajiboye, J. O. and Silo, N. 2006. An Impact assessment of EE graduate teachers in Botswana primary schools: Implications for teacher preparation programme. Paper presented at Environmental Education Association for Southern Africa (EEASA) conference, Harare, Zimbabwe.

Ajiboye, J.O. 2008. Promoting Civic Training among Primary School Pupils through the School Civics Clubs: the Botswana experience. European Journal of Social Sciences,5(4),81-91.

Ajiboye,J.O and Silo, N, 2008. Enhancing Botswana Children's Environmental Knowledge, Attitudes and Practices through the School Civic Clubs. International Journal of Environmental and Science Education.3. (3),105-114.

Ajitoni, S.O. 2005. Effects of Full and Quasi-Participatory Learning Strategies on Senior Secondary Students' Environmental Knowledge in Kwara State, Nigeria.Unpublished Ph.D Thesis,University of Ibadan, Ibadan.

Ajzen, I and Fishbein, M. 1985. Understanding attitudes and predicting scial behaviour. Englewood Cliffs, NJ: Prentice- Hall.

Akeusola, O. 1994. Images of Lagos in African Oral Literature. In R.O. Ajetunmobi (Ed), Evolution and Development of Lagos State. Lagos: A-Triad Associate Publishers.

Akikibofori, J.S. 2014. Incorporating sustainable development into teaching in schools in Nigeria. Research on Humanities and social science. Vol. 4 (2), 2222-2286.

Akinkuotu, Y. A. 2001. Modern approaches to philosophical foundations of education.(New Edition). Lagos: Babs Olatunji publishers.

Akinlaye, F.A., Mansaray, M. and Ajiboye, J.O. 1996. Fundamentals of social studies teaching. Lagos: Pumak Nigeria publisher Ltd.

Akpan, E.U.U. 2001. Government and science and technology education in Nigeria. Journal of Educational Issues. 1(1), 101-113.

Aldernan, M.K.1999; Motivation for at-risk students'. Educational Leadership,48, 27-29

Aldilu, D. 2006. Natural resource degradation and famine: Assessment of students' awareness and views. Flensburg, Germany.

Allen,T.D.,Eby,L.T and Lentz,E. 2006. Mentorship behaviour and mentorship quality associated with formal mentoring programme; closing the gap between research and practice. Journal of Applied Psychology.91(3)567.

Allen,T.D and Eby, L.T. 2007. Definition and Evolution of Mentoring . In The Blackwell Handbook of Mentoring. A Multiple Perspective Approach. Sussex ,U.K: John Wiley and Sons.

Alliance for Excellent Education 2005.Tapping the potential: retaining and developing high-quality new teachers. Washington DC: Alliance for Excellent Education.

Alokan. F.B. 2010. Influence of sex and location on relationship between student problems .the academic performance. *The Social Sciences (TSS),* 5(4). 340 - 345.

Amosun, P.A. 1999. An assessment of teacher preparation to teach environmental eduction in Ibadan, Oyo State. African J ournal of Education Research, 5 (2).

Amosun, P.A. and Oderinde, F.O. 2009. Climate change and the environment: the need for environmental education. Proceedings paper in Nigerian Meteorological Society International Conference on climate change and sustainable development, Osogbo, Nigeria.

Amosun, P.A., Oyekanmi, O.O. and Ige, O.A. 2010. ICT and effective learning: information and communication technology versus other instructional materials and conventional methods in teaching social studies. In Kasanvu Geoffrey et'al(Ed) Journal of Sociology and Education in Africa.Vol 9 No.2.

Amosun, P.A . and Aderinwale, A.O. 2012. Secondary school students'knowledge of and attitude to climate change issues in Ibadan. Proceedings paper in Nigerian Meteorological Society International Conference on climate change and variability, Osogbo, Nigeria.

Anable, J., Lane, B.and Kelay, T. 2006. An evidence base review of public attitudes to climate change and transport behaviour (Final Report) for the development of transportation.

Anderson, J. E .1988. Public policy-making.London: Nelson.

Andersson, B. and Wallin, A. 2000. Students' understanding of the greenhouse effect, the societal consequences of reducing Co_2emissions and the problem of ozone layer depletion. Journal of Research in Science Teaching. 37 (10),1096-1111.

Angel, A.V. 1999. Democratic climate in elementary classrooms: a review of theory and research. Theory and Research in Education, 19 (3), 241-266.

Anyadike, R. N. C. 1992a, "Seasonal and annual rainfall variations over Nigeria" nt. J. Climatol. 13(5):567-568.

Anyadike, R. N. C. 1992a "Regional variations in fluctuations of seasonal rainfall over Nigeria", Theory. App. Climatol. 45(4):285-292.

Ariyo, A.O.2006.School and students' factors as determinants of secondary students' achievement in Physics in Oyo state .An unpublished Ph.D thesis,University of Ibadan,Ibadan.

Astin, A.W. and Sax, L.J. 1998. How undergraduates are affected by service participation. Service Participation 39(3): 25 1-263.

Atasoy, E. and Erturk, H. 2008. A field study about environmental knowledge and attitude of elementary school students. Erzincan Journal of Education Faculty. 10 (1),105-122.

Atchinson, C. L and Feig,A.D. 2011.Theoretical perspective on constructing experience through alternative field- based learning environments for students' with mobility impairments . In A.D Feig and A .Stokes (Eds),Qualitative Inquiry in Geoscience Education Research (Special Paper 474).Boulder, CO: The Geological Society of America Inc.

Avery, P; Bird, K; Johnstone, S.; Sullivan, J.L.; and Thalmmer, K. 1992.Exploring political tolerance with adolescents. Theory and Research in Social Education, 20(4), 386-420.

Axtell, B. and Bowers J. *1912. Rural- Urban Effects on the Common Entrance Examination.* TEDRO R P. 104 .

Ayenigbara, G.0. 1998. Knowledge and attitude of adolescent schools in Ondo state: implication for curriculum design, Ph.D Thesis, University of Ibadan

Ayoade J.O. 2003. Climate change, Vantage Publishers, Ibadan, pp.

Ayuba HK, Maryah UM, Gwary DM 2007."Climate change impact on plant species composition in six semi-arid rangelands of Northern Nigeria", Nig. Geogry. J., 5(1):35-42.

Babarinde, S. A. 2006. The Link between everyday reasoning, scientific reasoning, scientific research and theory.In Olayinka, A. I; Taiwo, V. O; Raji-Oyelade, A and Farai, I. p(Eds) Methodology of Basic and Applied Research (2nd Edition). Ibadan: Dabfol Printers.

Badran, I. 1995. Knowledge, Attitude and Practice, the three pillars of excellence and wisdom: a place in the medical profession, Eastern Mediterranean Health Journal, Vol. 1, Issue1, 1995, PP. 8-16, retrieved on April 8, 2009 from: http://wvvw.eniro.who.int/publicationlemhi/0 101/01 .htm.

Bamisaye, O. A. 2005. Philosophy of education: External studies programme. University of Ibadan.

Bandura,A. 1977.Social Learning Theory. New York :General Learning Press.

----------.1997.Self-efficacy: The exercise of control. New York: W.H Freeman.

----------.2006. Toward a psychology of human agency. Perspectives on Psychological Science. 1 (2), 164-180.

Barnes, D., and Blevins, D. 2003. An anecdotal comparison of three teaching methods used in the presentation of microeconomics. Educational Research Quarterly 27(4): 41-60.

Baron, C .2010.Encouraging his/hertorical thinking athis/hertorical sites. Unpublished Doctoral Dissertation , Boston University.

Barr, R. and Parrett, W., 1995. Hope at Last for At-Risk Youth. Toronto, ON: A1I3n and Bacon.

Barratt Hacking, E., Barratt, R and Scott, W. 2007. Engaging children: research issues around participation and environmental learning. Environmental Education Research, 13(4), 529-544.

Barraza L. and Walford, R. A. 2002. Environmental education: comparison between English and Mexican school children. Environ. Educ. Res., 8(2): 171-186.

Bergman, L and Henrekson, M. 2003. CGE Modelling of environment policy and resources. htt://user.ictp.it/eee/workshops/smr1533.

Berk, L.E. 2000. Child Development. London: Allyn and Bacon.

Berkes, F. and Jolly, D. 2001.Adapting to climate change: social-ecological resilience in a Canadian western Arctic community. Conservation Ecology 5(2): 18.

Beaufort, A. 2000. Learning the trade: A social apprenticeship model for gaining writing expertise. Written Communication, 17(2), 185-223.

Berman, S. 1990. Educating for social responsibility. Educational Leadership, 48 (3), 75-80.

Bibby, T. 2009. How do children understand themselves as students'? Towards a learner- centreed understanding of pedagogy, Pedagogy, Culture and Society, 17(1), 41-55.

Big Brothers, Big Sisters of Canada, 1996. Exemplary efforts, advocacy through community leadership, BBBS of America Philadelphia, PA, 19-107.

Billet, S. 1994. Situated learning in the workplace: Having another look at apprenticeship. Industial and Commercial Training, 26 (11), 9-16.

Billet, S. 2000. Guided learning at work, Journal of Workplace Learning, 12(7), 272-285.

Blechman, E.A. 1992. Mentors for high risk minority youth; from effective communication to bicultural competence. Journal of Clinical Child Psychology, 21(2) 160-169.

Blennow, K. and Persson J. 2009. Climate change: motivation for taking measure to adapt. Global Environmental Change 19(1): 100-104.

Bloom, B.S., Krathwohl, D.R. & Masia, B.B. 1956. Taxonomy of educational objectives: The classification of education goals. University of Michigan (Longman 1984) Publication.

Blum, D., and Jones, A., 1993, Academic growth group mentoring programme for potential dropouts, The School Counsellor (January 1993) (40) 207-2 17.

Bogdan, R., and Bikien, S., 1992. Qualitative research for education —An introduction to theory and methods. Boston: Allyn and Bacon.

Bohner , G .and Wanke , M . 2002. Attitudes and attitude change. Psychology Press.

Bonk, C.J., and Dennen, V.P. 1999.Getting by with a little help from my pedagogical friends.Journal of Computing in Higher Education, 11(1), 3-28.

Bonk, C.J., and Kim, K.A. 1998. Extending sociocultural theory to adult learning. In M. C. Smith and T. Poutchor (Eds.), Adult learning and development:Perspectives from educational psychology. Mahwah, NJ: Lawrence Erlbaum. Pp 67-88.

Boostrom, R., 1994. Learning to pay attention. Qualitative Studies in ,7(1), 51-64. Brandt, R. 1993. Overview: Yes, children are still at risk. Educational Leadership, 50(4), 3.

Bord Ri., Fisher A., O'Connor R.E. 1998. Public perceptions of global warming: United States and international perspectives. Climate Research 11: 75-84.

Boreen, J., Johnson,M.K.,Niday,D and Potts, J 2000. Mentoring beginning teachers: Guiding reflecting, coaching. York-Maine:Stenhouse Publishers.

Bostrom, A., Morgan, M.G., Fischhoff, B. and Read, D. 1994. What do people know about global climate change? Risk Analysis 14(6): 959-970.

Bottery, M and Wright N. 2000. Teachers and the State: Towards a Directed Profession. London: Routledge.

Boyer, E.L. 1990.Civic education for responsible citizens. Educational Leadership, 48 (3), 4-7.

Boyes E and Stanisstreet M. 1993. The 'Greenhouse Effect': children's perceptions of causes, consequences and cures. International Journal of Science Education, 15, pp 53 1-552.

Boyes, E., Stanisstreet, M and Daniel B. 2004. High school students' beliefs about the extent to which actions might reduce global warming: Paper to be given at the 15th Global Warming International Conference and Expo, San Francisco, April 2004.

Boylan, C and Meswan,D .1978. Long staying rural teachers who are to blame? Australian Journal of Education,42 (!),213-223.

Boyle, B., While,D. and Boyle, T. 2004. A longitudinal study of teacher change: What makes a professional development effective? The Curriculum Journal (15) 1, 45-68.

Bozdogan, A. E. 2009. The development of a scale of attitude toward global warming. Erzincan University. Journal of Education Faculty. 2 (1),35-50.

----------. 2009. An Investigation on Turkish prospective primary school teachers' perceptions about Global warming. World Applied Sciences Journal. 7(1), 43-48.

Bozeman,B. and Feeney,M.K 2007. Toward a useful theory of mentoring:A conceptual analysis and critique. Administration and society 39(6)719-739.

Bozkurt, O. and Aydogdu, M. 2004. Sixth, seventh and eighth year students' knowledge levels about greenhouse effect, ozone layer and acid rain. Mediterranean Journal of Educational Studies, 10 (2), 81-95.

Bozkurt, O. and Cansungu, O. 2002. Primary school students' misconceptions about greenhouse effect in environment education. Hacettepe University Journal of Education, 23, 67-73.

Bradfield, K. and Hudson, P. 2011. Pre-service teachers' observations of their mentors' teaching strategies for differentiated learning

Bradley,R.J.2005. The effect of expository trade book usage on reading attitude in the inquiry – based science classroom. Unpublished action research paper, Kennesaw State University.

Brawer, F. 1996. Retention-attrition in the nineties.Los Angeles, CA. (ERIC Document Reproduction Service No.ED 393 510.

Bredo, E. 1994. Reconstructing educational psychology: situated cognition and Deweyian pragmatism. Educational Psychologist,29 (1), 23-25.

Brendtro, L. and Long, N., 1995.Breaking the cycle of conflict. Educational Leadership, 52(5), 52-56.

Brendtro, L., Brokenleg, M., and Van Bockem, S., 1990. Reclaiming youth at risk: our hope for the future. Bloomongtoti, IN: National Education Service,

Breuig, G., and Belim, D., 1996. Early child mentoring programme: A survey of community initiatives. National Centre for the Early Childhood Work Force,

Britton , E., Raizen, S., Paine, L. and Huntley, M. 2000. More swimming, less sinking: Perspectives from Abroad on U.S Teacher Induction. Paper Presented at the National Commission on Mathematics and Science Teaching in the 21st Century, San Francisco.

Brock, R., and Grady, P. 1997. The Relationship of Mentoring to Teacher Retention as Perceived by Current Practitioners in South Mississippi Public Schools. Pro-Quest Publishers.

Brodkin, A., and Coleman M., 1996. He's trouble with a capital T. Instructor, 105(7), 18-21.

Brokerileg, M. 1998.Native wisdom on belonging. Journal of Emotional and Behavioural problems, (Fall 1998) 7(3) 130-132

Bronfenbrenner, U .1990. Discovering what families do. In rebuilding the nest: A ne commitment to the American family.

Bronfenbrenner, U. 1986. Alienation and the four worlds of childhood. Phi Delta Kappan, 67 (6) 430-436.

Bronson, M., 1991.Longitudinal evaluation of a collaborative public school and day care intervention programme in preschool and kindergarten. Paper presented to the American Educational Research Association in Chicago, Elinois; April, 1991.

Brooks, R., 1991. The self-esteem teacher: seeds of self-esteem. Loveland OH: Treehaus Communications, Inc.

Brown, A. L., and Palincsar, A.S. 1989. Guided, cooperative learning and individual knowledge acquisition. In L. B. Resnick (Ed.), Knowing, learning and instruction: Essays in honour of Robert Glaser. Hillsdale, NJ: Lawrence Erlbaum Associates. Pp 393-451.

Brown, J.S., Collins, A., and Duguid, P. 1989. Situated cognition and the culture of learning. Educational Researcher, 18(1), 32-42.

Brown, R., 1995. Mentoring at-risk Students: challenges and potential, No. 217. Toronto ON: Toronto Board of Education. (ERIC Document Reproduction Service No. ED 391 138)

Brown, R. S. 1996. Challenges and potential of mentoring at-risk students': literature review. ERS Spectrum, 14(2),17-28.

Brown, S., 1999. Seams of learning: children create curriculum. Unpublished Dissertation, University of Alberta, Canada.

Bruner, J. 1968. The process of education. Massachusetts: Harvard University Press.

----------.1973. The relevance of education New York: w. w. Norton and Company.

Buba A D 2004. "Climate change and water problems in Chad Republic", J. Arid Environ., 3(2): 42— 50.

Budak D.B., Budak F., Zaimoglu Z., Kekec S.and Sucu M.Y. 2005. Behaviour and attitudes of students' towards environmental issues at faculty of Agriculture, Turkey, Journal of Applied Science 5(7): 1224-1227.

Buell, C. 2004. Model of mentoring in communication. Communication Review 53(1)56-73.

Bullis, C and Bach, W.B. 1989, 2012."Are mentor relationships helping organisation? : An exploration of developing mentee-mentor organisational identification using turning point analysis" Communication Quarterly 37(3), 199-213.

Burmeister, M. and Eilks, I. 2013. Using participatory action research to develop a course moduleon education for sustainable development in pre–servicechemistry teachereducation. C.E .P. S. Journal, v l.3(1).

Burton, L., Weston, D. and Kowaiski, R. 2009. Psychology (2nd Ed.). Milton, QLD: Wiley and Sons.California: SAGE Publications.

Burton, L., Brown, D. and Fischer, R. 1999. Sking as a model of Instruction. In B. Rogoff and J. Lave (Eds). Everyday Cognition development in Social Context.Cambridge, M.A: Harvard University Press.s

Campus Compact. 1994. Resource manual for campus –based youth mentoring programme. Available from campus Compact , P.O. Box 1975, Brown University, Providence, Rhode Island 02912, (401) 863-1119.

Capdevila I., Bruno J., Jofre L. 2002. Curriculum greening and environmental research co-ordination at the Technical University of Catalonia, Barcelona. Journal of Cleaner Production 10: 25-31.

Caudron S., 2000. Learners speak out. What actual learners actually think of actual training? Train Dev 54(4): 52-7.

Cazden, C., 1996. The "Mentor Paper" Writing Assignment in One Community

Centre for Civic Education 1994.National standards for civics and government. Calabasas,CA:

Chalmers, R., 1999.. Roots of violence tangled. The Emotion Journal. A14. (1999, May 21).

Chaner, C., Weissberg, R. Cowan and Guare, 1984. Long term effects of a school based secondary prevention programme for young mal-adapting children. Journal of Consulting and Clinical Psychology, 52(2)165-170. Change science. http/www.sciencemag.org.

Chang, K. E., Sung, Y.T., and Chen, S.F. 2001. Learning through computer-based concept mapping with scaffolding aid. Journal of Computer Assisted Learning, 17, 21-33.

Change and Economic Sustainability held at Nnamdi Azikiwe University, Enugu, Nigeria. 12-14 June 2007.

Change and its linkages with development equity and sustainability". Proceedings of the IPCC Expert Meeting held in Colombo, Sri Lanka, 27-29, Apr, 1999.

Chindu A, Nyelong PN. 2005."Lake Chad: From Megalake to Minilake", Arid Wetland Bull. No. 6: 24— 27.

Cimer, k.,Gratzer, E and Leeb, C.W.C. 2011.Von der Schule im stall. Bio Austria (4)12- 13.

Clarke L., K. Jiang, K. Akimoto, M. Babiker, G. Blanford, K. Fisher-Vanden, J.-C. Hourcade, V. Krey, E. Kriegler, A. Löschel, D. McCollum, S. Paltsev, S. Rose, P. R. Shukla, M. Tavoni, B. C. C. van der Zwaan, and D.P. van Vuuren, 2014: Assessing Transformation Pathways. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group IIIto the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Clerk, C. R. 2002. "Climate change or climate fluctuation?" J. Arid Environ., 1(1): 18-33.

Cobb, P. 1995. Continuing the conversation: A response to Smith. Educational research. 24(6),25-27

Cobb, P., Wood, B and Yackel, E. 1994. Constructing Mathematics Knowledge: Creating an Environment for Learning Mathematics, Social Interaction Perspective. Journal for Research in Mathematics Education. Monograph Vol. 6. Rethinking Elementary School Mathematics: Insight and Issues.

Coffey, M., and Gibbs, G. 2002.Measuring teachers' repertoire of teaching methods. Assessment and Evaluation in Higher Education, 2 7(4), 383-390.

Cognitive perspectives on peer learning. Mahwah, New Jersey: Lawrence Erlbaum Associates. Pp 197-211.

Collins, A, Brown,J.S and Newman,S.E. 1989.Apprenticeship: teaching the crafts of reading,writing, and mathematics.In L.B. Resnick(Ed),Knowing,learning and instruction.Essay in honour of Robert Glaser.NJ: Lawrence Erlbaum Associates.

Coltman, P., Petyaeva, D., and Anghileri, J. 2002. Scaffolding learning through meaningful tasks and adult interaction. Early Year, 22(1), 39-49.

Considine. G. and Zappala. G. 2002. The influence of social economic disadvantage in the .academic performance of school students in Australia. *Journal sociology, 38, 127- 148*

CoP 3 1997. Kyoto Protocol to the United Nations Framework Convention on Climate Change [on-line]. Available Internet: http://www.unfccc.deL

Coppock, M.L 1995. Mentoring at risk His/herpanic students' in self –esteem, academic growth and citizenship awareness. Equity and Excellence in Education 28, 36-43

Costa, A., and Garmston, R., 1994. Cognitive coaching: foundation for renaissance schools, Massachusetts, U.S., (ERIC Document Reproduction Service No. ED: 394 168).

Coulter D., 1999. Federal grant promotes safety in Alberta's schools, In Edmonton Journal. B3 (1999, May 20).

Crockett, L., and Smink, J. 1991. The mentoring guidebook: practical manual for designing and managing a mentoring programme. U.S. South Carolina.(ERIC Document Reproduction Service No.ED: 341 924).

Crotty, M. 1998. The foundation of social research: Meaning and perspectives in the research process. London: Sage Publication.

Daman 1984. The Goa, Daman and Diu Preservation of Tree Act, 1984. Manual of Goa Laws. Vol. 3.

Darcin, E. S., Bozkurt, O, Hamalosmanoglu, M and Kose, S. 2006. Determination of elementary students'level of knowledge and misconceptions about greenhouse effect. International Journal of Environmental and Science Education, 1 (2), 104-115.

Davis, J. 1998.Young children, environmental education and the future.In Graves, Norman (ed.) Education and Environment. World Education Fellowship, London.

Debessay, A. and Lerner A. 2004. Creating a deeper learning environment using group based active interactive collaborative learning 2004. Available from: URL: http//www.udel.edu/pbl/PBL2004fiIes/debessa)-paper.pdf.

De, U. S., 2008. Coping up with climate change, IMSP workshop on climate change for teachers, July 12, 2008 J. md. Geophys. Union (January 2009)

Dennison, S. 2000. A Win-Win peer mentoring and tutoring programme: A collaborative model. The Journal of Primary Prevention, 20(3), 161-174.

Deny, S.J. 1999. A Fish called peer learning: searching for common themes. In A.M. O'Donnell and A. King(Eds).

DeWeerdt, S. 2007. Climate change coming home: Global warming effect on populations. World Watch, 2(3) 6-13.

Dewey, J. 1933. How we think. A restatement of the relation of reflective thinking to the educative process. Boston, USA: D. C. Heath.

De Young, R. 1985. Satisfaction from environmental conservation in North America Environmental Conservatioon. Vol.12(3Pp258-261.

Dika, L.C. 2001. Lagos and its Environs. Lagos (Nigeria) - Civilization. Lagos: First Academic Publishers.

Driver, R. 1989. Constructivist approaches. In P. Adey (Ed), Adolescent development and school science. London,UK:Falmer Press, 79-103.

Driver, R. and Easley, J. 1978. Pupils and paradigms:A review of literature related to concept development in adolescent science students.Studies in science Education 5, 61- 84.

DuBois, D. L; and Neville, H.A 1997. Youth mentoring: investigation of relationship characteristics and perceived benefits. Journal of Community Psychology, 25,227-234.

DuBois, David L; Michael J. and Karcher, D . 2005.Handbook of Youth Mentoring. Thousand Oaks, California: SAGE Publication Ltd.

Dufour, R. 2004. What is a professional learning community? Educational Leadership, (61)8, 6-11.

Duit, R. 1991. Students' conceptual frameworks: consequences for learning science. In S.M. Glynn, R.H.Yeany and B.K.Brittn (Eds). The psychology of learning science. Hillsdale; Lawrence Erlbaum, 65-85.

Duit, R. 1993. The Constructivistic view, a both fashionable and fruitful paradigm for science education research and practice. In L. Steffe (Ed),Constructivism in Education.Hillsdale: Lawrence Erlbaum.

Dung- Gwon, J. 1999. Partnerships in planning and environmental management in Nigeria: Some case studies. Journal of Environmental science. 3 (1) 36-45.

Edwards, D and Mercer, N. 1987. Common knowledge. The development of understanding in the classroom. London, UK: Methuen.

Ehrampoush, H. 2005. Survey of Knowledge, attitude and practice of yard college Puento class: Preliminary report from a participant observer.

Ekpoh I.J and Ekpoh U.I .2010. Assessing the level of climate change awareness among secondary school teachers in Calabar municipality, Nigeria: Implication for Management Effectiveness.

Elias, N. 2004. The rhetoric-reality gap of environmental education: challenge to curriculum development, Journal of Ethiopian Educational Research Association, volume 1, no. 2, Nov. 2004, PP. 39, Addis Ababa.

Ellis, B., 1996. Children and place: stories we have, stories we need. Paper presented at SSHRC workshop: Spencer Hall, London (April 26, 1996).

Ellis, J., 1997. What a seriously at-risk 12-year-old would really like to say to teachers about classroom management. Education Canada. (June/July 1997), 37(2), 17-21.

Ellis, J. 1998. Teaching from understanding: teacher as interpretive inquirer. New York: Garland.

Ellis, J., Hart, S., and Small-McGinley, L. 1998. The perspectives of "difficult" students' on belonging and inclusion in the classroom.Journal of Emotional and Behavioural problems, (Fall 1998) 7(3)142-146.

Ellis, J., Small-McGiniey, L., and Hart, S., 1998. Mentor-supported literacy programme for elementary schools. Alberta Journal of Educational Research, 44(2), 149- 162.

Emerson, E. 2001. Challenging Behaviours Analysis and Intervention in People with severe Intellectual Disabilities. Cambridge University Press.

Emotions and beliefs are what it is needed. Environ. Behaviour, 32(5): 711-723.

Enkenberg, J. 2001. Instructional design and emerging teaching models in higher education. Computers in Human Behaviour,17,495-506.

Ernest, P. 1999. Social Constructivism as a Philosophy of Mathematics:Radical Constructivism.

Erol, G. H. 2005. Prospective of elementary school teachers' attitudes toward environment and environmental problems.International Journal of Environmental and Science Education,1(1) 65-77.

Espeland, K. and Shanta L. 200I. Empowering versus enabling in academia. J Nurs Educ Thorofare 40 (8): 342-6.

Ethics at UNESCO — http://www.unesco.org/shs/ethics, www.uneprg/enJ climatechange, www.uneesco.org/enlesd, www.unesco .on/enlsids

Evans, M. 1998. Using a problem solving action. Quarterly Journal (Current Notices), retrieved on April 8, 2009 from p/Lwww.newhorizons.org/strategies/environmental/evans.htm.

Ezeasor , M.N.2005.Teacher effectiveness and teacher gender as determinants of students' achievement in senior secondary school Biology in Ogun state .In A,E Emeke and C.V Abe (Ed.) Evaluate in theory and practice.

Ezike B.U. 1997. The effect of resource distribution and Utilisation on the performance of students' in chemistry. M.Ed Dissertation University of Ibadan.

Fadeiye, J.O. 2005. A social studies textbook for colleges and universities (Part one) Akin Johnson Puss and Publishers Ibadan.

Fageyinbo, M.O. 2004. Topics in tertiary social studies. Ogun State: Lucky (NY) Enterprises Ijebu- Ode

Fairbanks, C., Freedman,D and Kahn,C .2000. The role of effective mentors in learning to teach. Journal of Teacher Education 51,(2),102-112.

Falaye, F.V. 2006. Numerical ability, course of study and gender differences in students achievement in practical geography. Research in Education, 76, 33-42, Manchester,Manchester University Press.

Falaye, F.V. 2009. Age and gender differences in students' attitudes towards social studies. Ife Journal of Theory and Research in Education, (1), 37-47.

Falaye, F.V and Okwilagwe, E A. 2016. Assessing the senior school students'knowledge, attitude and practices related to climate change: implication for curriculum review and teacher preparation. Journal of the International Society for Teacher Education.

Falk, B and Balling, 1980. The school Field study: Where you go makes a difference, Science and Children, 6-8.

Fankhanser, S and Burton, I. 2011.Spending adaptation money wisely: Climate Policy, 11:1037-1049

Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Farhadian F., Tootoonchi, M. Changiz, T. Haghani, F. and Oveis Gharan S. 2007. Faculty members' skills and educational needs concerning clinical teaching methods in Isfahan University of Medical Sciences. Iranian Journal of Medical Education 7 (I): 109-18

Federal Ministry of Health. 1985. A Handbook of Continuous Assessment.

Federal Government of Nigeria, 2013. Nigeria Post-Disaster Needs Assessment(PDNA) 2012 Floods.

Feiman–Nemser S. 2000, Helping novices learn to teach: lessons from an exemplary support teacher. Journal of Teacher Education, (52), 1,17-30.

Ferguson, L., Angell, T. and Tudor, M. 2001.Better test scores through Environmental Education.

Fewster, G., 1991. The paradoxical journey: some thoughts on relating to children. Journal of Child and Youth Care, 6(4), 85-9 1.

FGN/UNICEF, 2001.Children and women's right in Nigeria; a wake-up call. Abuja:Government Printer.

Fien, J. 2000. Education, sustainability and civil society: Australian Journal of Environmental Education, vol.15/16, 129-132.

Filho, W. L. 1998. Environmental education and distance education, Filho,W.L and Tahir,F (Eds):Distance Education and environmental Education. Germany: Peter Lang GmbH, 9-19.

Fischer C., and R. G. Newell 2008**.** Environmental and technology policies for climate mitigation. Journal of Environmental Economics and Management**55**, 142 – 162. Available at: http: / / www.sciencedirect.com/ science / article / pii /S0095069607001064.

Flaxman, B., 1988. Youth mentoring: programme and reduction practices. Urban diversity series, No. 97. Columbia University, New York, N.Y. Teachers College (ERIC Document Reproduction Service No: ED 308 257).

Flaxman, B.and Riehi, C., 1987. Issues in improving urban schools: dropout prevention, hispanic secondary education and urban teaching careers, (ERJC Document Reproduction Service No. ED: 281 914).

Flaxman, E., 1993. Standards for mentoring in career development.Columbia, New York, N.Y. Inst. on Education and the Economy.(ERIC Document Reproduction Service No.ED: 366 820).

Flaxman, E. and Ascher, C., 1992. Mentoring action: the effects of programme in New York City. New York: Institute for Urban and Minority for Urban and Minority Education. Columbia, University. (ERIC Document Reproduction Service No: ED 354 291).

Flaxman, E., Ascher, C. and Harrington, C. 1988. Mentoring programme and reduction practices: an analysis of the literature. New York: Teachers College Institute for Urban and Minority Education.

Fletcher, S. 2000. Mentoring in schools: a handbook of good practice. London: Kogan Page.

Fletcher, S. 2012, Editorial of the inaugural issue of the International Journal of Mentoring and Coaching in Education. International Journal f Mentoring and Coaching in Education, (1)1, 4-11

Fleurbaey M., S. Kartha, S. Bolwig, Y. L. Chee, Y. Chen, E. Corbera, F. Lecocq, W. Lutz, M. S. Muylaert, R. B. Norgaard, C. Okereke, and A. D. Sagar, 2014: Sustainable Development and Equity. In: Climate Change 2014: Mitigation of

Climate Change.Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change[Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Freedman, M., 1992. The kindness of strangers, reflections on the mentoring movement. Public Private Ventures.

Freedman, M., 1993.The kindness of strangers, adult mentors, urban youth, and the new voluntarism. San Francisco: Jossey-Bass.

Freedman, M., 1996.Making Sense of Mentoring.Corporation for National Service.

Frornm, E., 1956. The art of loving. New York: Harper and Row.

Gana, E.S.1997. Effect of using visual designed training model on the learning of Mathematics at J S S. Unpublished Ph.D thesis, University of Ibadan,Ibadan.

Garbarino, J., 1993. Childhood: what do we need to know? childhood, 1(3) 3-10.

Gardner, H. 1991. The unschooled mind: How children think and how schools Should teach. New York: Basic Books.

Gardner, H. 1999. The disciplined mind: what all students should understand. New York: Simon and Schuster.

Gariepy, R. 1999. Are Alberta's schools safe? The ATATews, 1999, May 11, Spring

Gay, G. 1988. Designing relevant curricula for diverse students'. Education and Urban Society, 4(20) 327-340.

Gbadamosi, T.V. 2012.Effects of service learning and educational-trip in social studies on primary school pupils environmental literacy in Oyo township, Nigeria. Unpublished Ph.D thesis,University of Ibadan,Ibadan, Nigeria.

Gehrke, N. 1989.Toward a definition of mentoring. Theory and Practice (Spring 1988 — 1989) 27-28.

Glaserfeld, E. Von. 1989. Cognition, Construction of knowledge and teaching synthese 80,121-140.

Goodlad, J.I. 1986. The students' at the world's centre. Social Education, 50(6), 5-6.

Government of Botswana 1994.The Revised National Policy on Education. Gaborone: Government Printers.

Government of Botswana 2002.Environmental Guidelines for Primary, Secondary and Tertiary Institutions (National Goals, Principles, Objectives, and Environmental Education Content Objectives) Curriculum Development & Evaluation Department: Ministry of Education. Gaborone:

Government of Botswana; Vision 2016.Long term vision for Botswana-towards prosperity for all. Gaborone: Government Printers..

Graham, G., Whelan, J. and Fitzgerald, R. 2006. Progressing participation: taming the space between rhetoric and reality. Children, Youth and Environments, 16(2), 23 1-247.

Gredler, M. E. 1997. Learning and instruction: Theory into practice (3rd Ed). Upper Saddle River, NJ: Prentice-Hall.

Grothmann, T. and Patt, A. 2005. Adaptive capacity and human cognition: the pieces of individual adaptation to climate change. Global Environmental Change Part 4. 15(3): 199-213.

Haas,T. 1992. What can I become? : educational aspirations of students in rural America ERIC Digest, (No ED 345931)

Hairon S, and Dimmock, C. 2012, Singapore schools and professional learning communities: Teacher professional development and school leadership in an Asian hierarchical system. Educational Review, 64(4), 405-424.

Hallam, S., and Hazel, F. 1998. Is my understanding yours? A study of higher education students' reading for understanding and the effects of different texts. Learning and Instruction, 8(1), 83-95.

Halpern, D.F and LaMay, M.L.2000.The smarter sex: a critical review of sex differences in intelligence (electronic version). Educational Psychology Review, 12 (2),229-246.

Hammerman, W. 1980. Fifty years of resident field study education, 1930-1980, Martinsville: American Camping Association.

Hammerman, D., Hammerman, E.and Hammerman, W. 2000. Teaching in the field studys, (4th ed), Danville, IL: Interstate Publishers.

Hart, R. A. 1992. Children's participation: from tokenism to citizenship. UNICEF Innocenti Essays No. 4. UNICEF International Child Development Centre, Florence Italy.

Harris, P. 2006. Environmental perspectives and behaviour in china. Environment and Behaviour. Vol. 38 (1) 5-22.

Hattie,J.A.,Marsh,H.W.,Neill,J.T. and Richards,G.E.1997. Adventure education and outward bound;Out- of- class experiences that have a lasting effect.Review of Educational Research,67,43-87.

Hendricks, C. C . 2001. Teaching causal reasoning through cognitive apprenticeship: What are the results from situated learning. Journal of Educational Research, 94(5), 302-311.

Hengeveld, H., Whitewood, B. and Fergusson A. 2005. An introduction to climate change: A Canadian perspective. Environment Canada, Canada, pp. 7;27.

Hewitt, M., 1998. Helping students' feel like they belong. Journal of Emotional and Behavioural Problems, (Fall 1998) 7(3)155-159.

Herrera,C., Sipe, C.L and McClanahan, W.S .2000. Mentoring school-age children: relationship development in community-based and school-based programme. Philadelphia, P.A:Public and Private Ventures.

Hobson, A.J., Ashby, P., Malderez, A. and Tomlinson , P.D. 2007. Mentoring beginning teachers: What we know and we don't. Teaching and Teacher Education, 25(1),207-216

Hoge, J, D. 1998. Civic education in schools. ERIC Digest .Bloomington, In: ERIC Clearing House for Social Studies/ Science Education, December (ED 301-531).

Holmberg, B. 1995. Zheoy and Practice of Distance Education, Routledge.

Hudson, P. 2007. Examining mentors' practices for enhancing pre-service teachers' pedagogical development in mathematics and science. Mentoring and Tutoring: Partnership in Learning,15(2),201-217.

Hudson, P. 2010. Mentors report on their own mentoring practices. Australian Journal of Teacher Education, 35(7), 30-42.

Hudson, P., Skamp, K., and Brooks, L. 2005. Development of an instrument: Mentoring for effective primary science teaching. Science Education, 89(4), 657-674.

Hyde,J.S and Linn ,M.C. 1988 . Gender differences in verbal ability: a meta-analysis.Psychological Bulletin, 104, 53-69.

htt://www.un.org/esaldsd/dsd_aofw_cc/cc_index.shtml

http://wwwb1urtit.comJci 1 86072.html

http://ec.europa.eulclimalsites/campaignlindex_en.htm

http://www.nigeriaclimatechange.org/proiectinformation.php

http://www.gdrc.org/sustdev/defmitions.html,http://www.iisd.org/sd/

http://ww.un:org/esa1dsd/dsdaofw_cc/cc_indexshtml

http://beginningtoteach.qct.edu.au/TeachingandleaminWClassrooniManagement.html

http://www.un.org/esalsustdev/documents/WSSD_POI_PD/EnglishJWSSD_ PlanlmpLpdf

International Council for Science(ICSU), 2002. ICSU Series on Science for Sustainable Development No 9: Science and Technology for Sustainable Development, 30 PP.

Institute for Global Environmental Strategies(IGES), 2005. Sustainable Asia 2005 and beyond: in the pursuit of innovative policies. IGES White Paper, Institute for Global Environmental Strategies, Kanagawa, Japan, 174 pp.

Iierriam, S. 1998. Qualitative research and case study applications in education. San Francisco: Jossey-Bass.

IkhiIe, C. I. 2007. "Impact of climate variability and change on the hydrology and water resources of the Benin-Owena River Basin", Ph D thesis submitted to the Department of Geography and Regional Planning, University of Benin, Benin City, Nigeria.

Intergovernmental Panel on Climate Change (IPCC) 2001.The report of working Group 1 of the Intergovernmental Panel on climate change, survey for policymakers.

Intergovernmental Panel on Climate Change (IPCC), 2007, "Climate change 2007: Synthesis report. Summary for policy makers", available at: http:f/www.ipcc-wgl -ucar.edu/wgl/wgl - report.htm, (accessed 26 October 2009).

Intergovernmental Panel on Climate Change. 2007. The Physical Science Basis: International Journal of Environmental and Science Education Vol. 6, No. 1, January2011, 79-98.

Iingersoll, R,M and Smith, T.M. 2003. Do teacher induction and mentoring matter? NASSP Bulletin, 88(638), 28-40

IPCC Fourth Assessment Report, Climate Change 2007.synthesis report at http://www,ipcc .ch/pdflassessment-retott

IPCC, 1996. Climate Change 1995: Impact, Adaptation and Vulnerability. Contribution of Working Group II to the Second Assessment Report of the Intergovernmental Panel on Climate Change, R.T. Watson, M.C.

IPCC, 2001. Climate change: impact, adaptation and vulnerability, summary for policymakers, WHO.

IPCC 2007a. Climate Change 2007: Mitigation of Climate Change: Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O. R. Davidson, P. R. Bosch, R. Dave, L. A.Meyer (eds.)]. Cambridge University Press, Cambridge, UK and New York, NYUSA, 862pp. ISBN: 978 0521 70598 1.

IPCC 2007b.Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J. vanDer Linden and C. E. Hanson (eds.)]. Cambridge University Press, Cambridge, UKand New York, NY USA, 976 pp. ISBN: 978 0521 70597 4.

IPCC 2007c. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis,K. B. Averyt, M. Tignor and H. L. Miller (eds.)]. Cambridge University Press,Cambridge, UK and New York, NY USA, 1009pp. ISBN: 978 0521 70596 7.

IPCC 2009.Meeting Report of the Expert Meeting on the Science of Alternative Metrics. In: Plattner G-K, Stocker T, Midgley P, Tignor M (eds). IPCC Working Group I Technical Support Unit, University of Bern, Bern, Switzerland. 75 pp.

IPCC 2011.IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation. Prepared by Working Group III of the IntergovernmentalPanel on Climate Change [O. Edenhofer, R. Pichs-Madruga, Y. Sokona,K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S.Schlömer, C. von Stechow (eds.)]. Cambridge University Press, Cambridge,United Kingdom and New York, NY, USA, 1075 pp.

IPCC 2012.Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Geoengineering [O. Edenhofer, R. Pichs-Madruga, Y. Sokona,C. Field, V. Barros, T. F. Stocker, Q. Dahe, J. Minx, K. Mach, G.-K. Plattner, S.Schlömer, G. Hansen, and M. Mastrandrea (eds.)]. IPCC Working Group III TechnicalSupport Unit, Potsdam Institute for Climate Impact Research, Potsdam,Germany. 99 pp.

IPCC 2013a.Climate Change 2013: The Physical Science Basis: Working Group I Contribution to the IPCC Fifth Assessment Report of the Intergovernmental Panel on Climate Change [T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K.Allen, J. Boschung, A. Nauels, Y. 40 Xia, V. Bex, P. M. Midgley, (eds.)]. CambridgeUniversity Press, Cambridge, UK and New York, NY USA. 1535pp.

IPCC 2013b.Summary for Policy Makers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [T. F. Stocker, D. Qin, G.-K.Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. 40 Xia, V. Bex, P. M. Midgley,(eds.)]. Cambridge University Press, Cambridge, UK and New York, NY USA.

IPCC 2014.Climate Change 2014: Impacts, Adaptation, and Vulnerability: Working Group II Contribution to the Fifth Assessment Report. Cambridge UniversityPress, Cambridge, UK and New York, NY USA

Jacobson, W. (Ed) 1986. Module for in-service training of science teachers and supervisors for secondary schools. EE Series 8 Paris: UNESCO, 103-104.

Jagtap, S . 2007. “Managing vulnerability to extreme weather and climate events: implications for agriculture and food security in Africa”, paper presented at the International Conference on the’ impact of extreme weather and climate on

socio-economic development in Africa held at Federal University of Technology, Akure, Nigeria. 11-15 Nov. 2007. pp 1-15.

Jarvela, S. 1995. The cognitive apprenticeship model in a technologically rich learning environment: Interpreting the learning interaction. Learning and Instuction,5, 237-259.

Jeffries, P. R., Woolf, S and Linde, B. 2003. Technology-based vs. traditional instruction. A comparison of two methods for teaching the skill of performing a 12-lead sECG. Nurs. Educ. Perspect. 24(2):70-4.

Jekielek, S. M., Moore, K.A., Hair, E.C and Scarupa, H.J. 2002. Mentoring: A promising strategy for youth development (Research Brief). Washington, DC: Child Trends.

John, D and Deborah, M. 2010. Sustainable from Brudtland to Rio 2012. Background Paper Prepared for Consideration by the High level panel on global Sustainability at its first meeting September19th, 2010. New York: United Nations Headquarters.

Jonassen, D.H. 1999. Designing constuctivist learning environments. In C.M. Reigeluth (Ed), Instructional-design theories and models: A new paradissgm of instruction theory. Mahwah NJ: Lawrence Erlbaum.Pp. 215-239.

Joyce, B.R., Weil, M., and Calhoun, E. 2005. Models of teaching. 7th ed. Allyn and Bacon, 2003.

Kafai, Y and Resnick, M. 1996. Constructionism in practice: Designing, thinking and learning in a digital world. Mahwah, NJ: Lawrence Erlbaum Associates.

Kampits, E.I. 1996. Rural partnerships in New England learning from kids. Journal of Research in Rural Education, 12(3), 171-177.

Karcher , M. J . 2005 .The effects of developmental mentoring and high school mentors attendance on their younger mentees self esteembehaviour and connectedness. Psychology in the schools, 42, 65-77.

Kardos, S. M., and Johnson, S. M. 2010. New teachers' experiences of mentoring: the good, the bad, and the inequality. Journal of Educational Change, 11(1), 23-44.

Karpudewan, M., Zurida, I. and Norita, M. 2012. Pre-service teachers' understanding and awareness of sustainable development concepts and traditional environmental concepts. Asia Pacific Journal of educators and education, vol.28, 117-130

Kates, R.W., Panis,T. M. and Leiserowitz,A.A. 2005. What is sustainable development? Goals, indicators, values, and practice. Environment: Science and Policy for Sustainable Development, 47, 8—21.

Kelly,A .1986. The development of girls and boys attitude to science education longitudinal study. European Journal of Science Education ,8 ,399-412 .

Kennedy, I D., 1989. Developing self-esteem in young children, 4-C's caregiver training, Paper presented at workshop, December 13, 1989, Marquette, Mi.

Kennel, J., Taylor, N and Jenkins, K. 2008. Listening to teachers: teacher and student roles in the New South Wales sustainable school programme. Environmental Education Research, 14(1), 53-64.

Kern, E. and Carpenter, B. 1984. Enhancement of student values, interests, and attitudes in earth science through a field-oriented approach, Journal of Geological Education, 32, 299-305.

Kern, E. and Carpenter, B. 1986.Effects of field activities on student learning, Journal of Geological Education 34, 180-182.

Khalid T. 2001 Pre-service teachers' misconceptions regarding three environmental issues. Canadian Journal of Environmental Education, 6, pp 77-101

Kickbusch, K.W. 1987. Civic education and pre service educators: the boundaries of discourse. Theory and Research in Social Education, 25 (3), 173-188.

Kilinc, A., Stanisstreet, M. and Boyes, E. 2008. Turkish students' ideas about global warming. International Journal of Environmental and Science Education, 3(2), 89-98.

King, A. 1994. Guiding knowledge construction in the classroom: Effects of teaching children how to question and how to explain. American Educational Research Journal, 31 (2), 338-368.

Knapp, D. 2000 Memorable experiences of a science field study, School Science and Mathematics 11(2), 65-71.

Kokakos, A . 1999 Adult education, Vol. D, Patra: Hellenic Open University 55-57.

Kokakos, A. 1989. Instruction techniques in contact sessions/tutorials, relationships between tutors and students'. Open and Distance Education. A. Kokkos and A. Lionarakis (Eds.) Patra: Hellenic Open University, Vol. B, 125-149.

Kola-Olusanya, A. 2006. Environmental education in Nigeria: A Look beyond the infusionproblem.Retrieved,20th October,2006fromhtt//www.naee.org/conference/ 2006.

Kollmuss, A and Agyeman, J. 2002. Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour. Environmental Education Research. 8 (3) 239-260.

Krain, K., and Isabella, L.1985. Mentoring alternatives: the role of peer relationships in career development.Acatlemy of Management Journal, 20 (1)110-32.

Krupp, J., 1987. Mentor and protege perceptions of mentoring relationships in an elementary school.The Journal of Mentoring, 1(1) 35-3 8.

Kuhlemeier, H., Bergh, H. and Van Den Lagerweij, N. 1999.Environmental knowledge, attitudes, and behaviour in Dutch secondary education. J. Environ. Educ., 30, Issue 2.

Kukla, A. 2000. Social Constructivism and the Philosophy of science. NY: Routledge

Kunreuther H., S. Gupta, V. Bosetti, R. Cooke, V. Dutt, M. Ha-Duong, H. Held, J. Llanes-Regueiro, A. Patt, E. Shittu, and E.Weber, 2014: Integrated Risk and Uncertainty Assessment of Climate Change Response Policies. In: Climate Change 2014:Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the IntergovernmentalPanel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

Langer, A. M. 2001. Confronting theory: the practice of mentoring non-traditional students at Empire State College. Mentoring and Tutoring, 9(1), 49-62.

Lave, J., and Wenger, E. 1991. Situatedlearning: legitimate peripheral participation. Cambridge,UK: Cambridge University Press.

Law, W.W 2009. Culture and school leadership in China: exploring school leaders' views of relationship and rule-based governance. In A.W Wiseman (ed), Educational Leadership: Global Contexts and International Comparisons (International perspectives on Education and Society (11), 303-341.

Lawal, B. O. 2004.Comparative education. Ibadan: Swift Publishers Nigeria Ltd.

Lee, B. and Cramond, B., 1999. The positive effects of mentoring economically disadvantaged students' Professional School Counselling 2(3), 172-178.

Legters, N., and McDill, E., 1995. Rising to the challenge: emerging strategies for educating youth at-risk.Urban Monograph Series. North Central Regional Educational Laboratory: Oak Brook, IL. (ERIC Document Reproduction Service No: ED 397 202).

Lester,J.H 2003. Planning effective secondary professional development programme .American Secondary Education , 32 (1) 49-61.

Lewis, D. 2002. Convention: A philosophical study. Blackwell Publishing, Oxford, UK.

Ley, J., Nelson, S.and Beltyukova, S. 1996. Congruence of aspirations of rural youth with expectations held by parents and school staff. Journal of Research in Rural Education, 12(3), 133-141.

Lieberman, G.A. and Hoody, L.L.1998.Closingthe achievement gap http://www.seer.org/extras/execsum.pdf.State Education Round Table.

Little, J. W. 1990. The mentor phenomenon and the social organization of teaching. Review of Research in Education, 16,297-351.

Long, L.,1996. Exemplary efforts, in Brothers Big Sisters of America. 230 North 13th Street. Philadelphia, P.A.

Loynes,C.2002.The generative paradigm.http:www.thresholdconsulting.co.uk/.

Lucas, K. F. 2001. The social construction of mentoring roles. Mentoring and Tutoring, 9(1), 23-47.

Lynn ,R. 1994. Sex differences in intelligence and brain size: a paradox resolved. Personality and Individual Differences,17 ,257-271 .

Mabo, C. B. 2006. "Temperature variation in northern Nigeria between 1970 and 2000", J. Energy Environ., 19(1): 80-88.

Macdonald, W.I and Hara,N .2010. Gender differences in environmental concern among College students' .Journal of Park and recreation administration, Vol.31.No.5-6,369-379.

Maio, G .,Maio,G.R. and Haddock,G .2010. The psychology of attitude and attitude change. SAGE Publications Ltd.

Manne , A.and Richels, R. 2004. US rejection of the Kyoto protocol: the impact on compliance costs and CO_2 emissions. Energy Policy 32: 447-454.

Mansaray, A. 1991. Social studies method 1. Ibadan: Department of Adult Education External Degree Services, University of Ibadan

Mansaray, A. and Ajiboye, J.O. 1997. Environmental education and Nigerian students' knowledge, attitudes and reduction practices (KAP): implications for curriculum development. International Journal of Environmental Education and Information, 16(3), 317-324.

Mason, S.L. 1980. Fieldwork in earth science classes, School Science and Mathematics 80, 317-322.

Mbaekwe, F.E.1986. Location and resources factors in the development of the Nigerian Army School 1980 -1984. Unpublished Ph.D thesis , University of Ibadan, Ibadan.

McCarthy, H. I. Schelinhuber, B. Bolin, N. M. Dickenson, S. Faucheux, G. C. Gallopin, A. Grübler, B.Huntley, J. Jger,N.S Jodha,McColough, D. and Ketlhoilwe, M.J. 2000. Environmental education: learning together for sustainable development. Paper presented at the First National Environmental Education Conference. Gaborone: Botswana.

McCrone, A; Usher, E andb Moslener, U. 2013. Global trends in renewable energy investments in 2013: Key findings. http://www.eldis.org/cf/rdr/?doc=65320, accessed on 19 July, 2013.

McDonald,, L .2001. Successful associate teachers' beliefs, attitudes and practices within a New Zealand Context. Massey University: Unpublished M.Ed Project .

McLean, K .T. 1998. Mentoring makes a difference findings from the Commonwealth fund 1998 survey of adults mentoring young people .The Commonwealth Fund Retrieved January 24, 2011 from http//www.commonwealthfund .org.

McLoughlin, C. 2002. Learner support in distance and networked learning environments: Ten dimensions for successful design. Distnce Education 23 (2), 150-163.

McMahon, M. 1997. Social Constructivism and the world wideweb- A paradigm for Learning. Paper presented at the ASCILITE conferencePerth, Australia.

McPartl and, J., 1985. The myth of the mentor, Campus Voice, (1) 8-11.

McPartland, B., and Nettles, S., 1991. Using community adults as advocates or mentors for at-risk middle school students': A two year evaluation of project Raise American Journal of Education, (99) 568-586.

McQuire, B. ,Macon, I and Kilburn, C. 2002. Natural hazards and environmental change, Arnold, London, 13— 61.

McRae, K. 1990. Introduction to the purposes and reduction practices of field study education, K. McRae (Ed), field study and environmental education, South Melbourne, Australia: Macmillan

Melaku Girma 1994. An investigation into the integration of environmental education into social studies course in some selected teachers training institutes. Unpublished, M.A. Thesis, Addis Ababa University

Mel-i-jam, S., 1983. Mentors and proteges: a critical review of the literature. Adult Education Quarterly, (33) 16 1-173.

MENTOR. 2009. Mentoring immigrant and refugee youth: a toolkit for programme coordinators. Alexandria, V.A.

Merriam, S., 1988. Case study research in education: a qualitative approach. San Francisco: Jossey-Bass.

Mills, R., Dunham, R., and Alpert G., 1988. Working with high risk youth in prevention and early intervention programme: toward a comprehensive wellness model. Adolescence, 23 (91) 643-660.

Mings, Lucia. 2008. Determination of knowledge, attitudes and reduction practices on climate change issue: Environment Tourism Consulting.

Mitroff, K.L. and Kilmann, R.H. 2002. The ethics of social research: Surveys and experiments. Evaluation and Programme Planning 7(1): 106-113.

Mobereola, D. 2010. Light rail system,the best alternative for effective transportion in Nigeria. Pasper Presentation to Environmental Studies Students Association at YabaCollege of Technology, Lagos.

Moery, K., 1995.Wecare: mentoring-the-mentor for effective family/professional collaboration and team building. University of illinois, Chicago IL (ERIC Document Reproduction Service No: ED 392 218.

Molega, A. U. 2006. Rainfall anomalies in Nigeria. J. Arid Environ. 5(1):

Moles, B. A. 1988. The classroom and the field: A Necessary Unity, Journal of Experiential Education. 11 (2), 14-20.

Monroe, E .2004. The effects of environment – based education on students' critical thinking skills and disposition toward critical thinking.Environmental Education Research 10(4)522. Retrieved 14 March, 2014.

Moser,S.C and Dilling,L (2006). Creating a climate for change: commmunicating climate change and facilitating social change, Cambridge University Press.

Mshelia, A . D. 2005. "Adaptation strategies to climate change", J. Energy Environ., 18(3): 74-81.

Munainghe, M., O. Canziani, O. Davidson, B. Metz, M. Parry and M. Harisson, 2003.Integrating sustainable development and climate change in the IPCC Fourth Assessment Report.Munasinghe Institute for Development, Cololnbo, 44-52.

Munasinghe, M. and R. Swart, 2000.Climate change and its linkages with development, equity and sustainability.Proc. IPCC Expert Meeting, Colombo, Sri Lanka, Intergovernmental Panel on Climate Change, 319 pp.

Murray, P.E. and Murray, S.A. 2007. Promoting sustainability values within career-oriented degree programs: A case study analysis. International Journal of Sustainability in Higher Education. 8(3), 285-300.

Naito M. and Nakayarna T. 2003. Ethics in questionnaire-based research. Eubios Journal of Asian and international Bioethies 13: 147-151.

Namunga, N. W and Otunga, R.N. 2012. Teachers'education as a Driver for Sustainable Development in Kenya. International Journal of Humanities and Social Science. Vl. 2(5),228-234.

Neill, J.T. 2008. Enhancing Life Effectiveness: the impact of outdoor education

programme. Ph.D thesis,University of Western Sydney,Sydney.

Nelson, A. 2003. Peer mentoring: a citizenship entitlement at Tanfield School.

Oxford: Blackwell Publishing.

Newmann, F.M. 1989 .Reflective civic participation. Social Education, 53(6), 357-366.

Nigerian Environmental study/action team (NEST), 2003. Climate change in Nigeria: a communication guide for reporters and educators, NEST, Ibadans.

Nkeiruka, E.N.and Apagu, B. 2005. "Rainfall analysis for environmental application in Maiduguri, Nigeria", Global J. Environ. Sci. 4(2): 155-

Nnodu, V. C., Onwuka, S.V.and Okoye, C.V. 2007. "Climatic variability and its impact on runoff in south-eastern Nigeria" Paper presented at the lnternational Conference on Climate Change and Economic Sustainability held at Nnamdi Azikiwe University, Enugu, Nigeria. 12- 14 June 2007.

NRC (National Research Council), 1999.Our common journey. Our Common Journey: a transition toward sustainability, Board on Sustainable Development, Eds., National Academy Press, Washington, District of Columbia, 21-58.

Nwafor, J .C .2006. Environmental impact assessment for sustainable development: the Nigerian perspective, Enugu, Environmental and development policy centre for Africa, pp. 372-385.

Nwafor, J. C. 2007. "Global climate change: the driver of multiple causes of flood intensity in sub-saharan Africa", Paper presented at the International Conference on Climate Change and Economic Sustainability held at Nnamdi Azikiwe University, Enugu, Nigeria, 12- 14 June 2007.

Nwaubani, O.O. 1996: Values clarification strategies and students' performance in some values concepts in social studies. An unpublished Ph.D Thesis, University of Ibadan.

Nyelong, P.N. 2004. "Global warming and global waters", J. Energy Environ., 17(l) pp. 79-90.

Nykodym, N., Freedman, L., Simonetti, B. Nielson, W. and Battles, K. (1995), mentoring: Using transactional analysis to help organize members to use their energy in more productive ways. Transactional Analysis Journal, 25(2)170-179.

O' Riordan, T. 2004.Environmental science, sustainability and politics. T. I Brit. Geogre., 29, 234-247.

O'Riordan and U. Svedlin, 2000: Sustainability science. Science, 292, 641-642.

Obadegesin, A. S. Olorunfemi F.B and Raheem,U.A. 2011. Urban Vu1nerability to Climate Change and Natural Hazards in Nigeria

Obe, E.O. 1984. Urban-rural and sex differences in scholarstic aptitude on primary school finalist in Lagos state. Education and Development,41(2):123-134.

Obol, C; Allen, I and Bach, H. S. 2003.Environmental education policy processes in southernAfrica.p//www.eeasa.org.za1static/publications/EEASAJournal/Volume 20/f1 .pdf Retrieved August 20, 2007.

Ocholi,E.F. 2002. The girl-child is vulnerable in access to quality education. Counselling intervention for gender equality. Paper presented at the 26 Annual conference of counseling association of Nigeria held at University of Benin, August.

Odinko, M. N. 1999. Socio-psychological factors as correlates of learning outcomes in English Language among senior secondary school students'. Ph.D thesis of Department of Teacher Education, University of Ibadan,

Odjugo, P. A. O. 2005. An analysis of rainfall pattern in Nigeria", Global J. Environ. Sd., 4(2): 139-145.

Odjugo, P. A. O. 2007. "The impact of climate change on water resources; global and regional analysis", Indonesian J. Geogre, 39(1): 23-41.

Odjugo,P.A.O. 2009. Quantifying the cost of climate change impact in Nigeria.Emphasis on wind and rainstorm. J. Human Ecol., 28(2): 93-

Odjugo, P. A. O. 2010. General overview of climate change impact in Nigeria. J. Human Ecol., 29(1): 47-55.

Odjugo, P. A. O and lkhuoria A .I. 2003. "The impact of climate change and anthropogenic factors on desertification in the semi-arid region of Nigeria" Global J. Environ. Sd. 2(2):1 18-126.

Odumosu, T. 1999. Lagos State in Maps. Ibadan: Rex Charles Publishers.

Ogunebi, A.C.2004."Socio-economic impact of flooding in Lagos State, Environ. Impact Anal. 12 (1): 16-30.

Ogunyemi, B. 2005. Mainstreaming sustainable development intoAfrican school curricular: Issues for Nigeria. Current issues on comparative education. Vol.7 (2), 4-103.

Ojo O 1999. "Overcoming hunger: The challenges in meteorological hazards Ekuwem E. E. (Eds), Meteorological hazards and development, Kola Okanlawom Press, Lagos, pp. 22-36.

Ojoawo A.O. 1990. An empirical study of factors responsible for poor academic performance in -secondary schools, in Oyo State AJEM, 4 (1 ans 2) 140-148

Okebukola, P. A. O. 2001.Advancing a pragmatic approach towards environment protection in Nigeria. Research studies on Environment, Vol.1 No.1. July 2001, LASU.

Okebukola, P A 2004.Module 8 instructional guide retrieved on 8 April,2004 from www.nucvihep.net.students'.access and equity issues.

Okpani, I.E.2003. Boosting girl-child education in the North. Daily Trust , September 4.

Oladipo,E.O 2012.An Overview of the socio-economic sustainability of livelihood in the lake chad basin. Paper presented at the Humboldth Kollegs International Conference, Abuja.

Olagunju, A. M. 2002. Environmental Education for sustainable development in Nigeria implication for biological education. Conference proceeding of STAN on difficult concept in STM Abeokuta

Olaniran, O. J 2002. "Rainfall anomalies in Nigeria: the contemporary understanding', paper presented at the 555 inaugural lecture, University of llorin, Nigeria, p. 55.

Olaoye, I. 2006. Students' knowledge and attitude to HIV/AIDS in Ibadan Municipality M.ED Dissertation

Olatundun, A.O. 2008.Impact of field study educational activities on pupils environmental knowledge and attitude in selected primary schools in Ibadan, Nigeria .Unpublished Ph.D Thesis, University of Ibadan, Ibadan.

Olorunfemi, F.B and Raheem, U.A. 2007. "Urban development and environmental Implications: The Challenge of Urban Sustainability in Nigeria". Ibadan Journal of the Social Sciences. Vol. 6 No 1 (March) pp. 69-78.

Olorunfemi, F.B and Raheem, U.A. 2010. Waste to wealth as a strategy for poverty reduction in Nigeria: Current practices and future prospects. Environmental issues. Vol. 3 (1), 11-20.

Olubella, R. A., Oyekanmi, O.O. and Abubakar, S. I. 2014. Teachers' awareness and responses to the causes, cases and caution for climate change in Nigeria: implications for social studies teachers. Paper presented at SOSAN 30th Annual Conference held at University of Ibadan, November, 24-27.

Oluk, S and Ozalp, I. 2007. The teaching of global environmental problems according to the Constructivist approach: as a focal point of the problem and the availability of concepts cartoons. Educational Science: Theory and Practice. 7(2), 881-896.

Omekwu.C. 2004. Advances in information technology: implication for the future of education in Nigeria: teachers' mandate on education and social development in Nigeria, Ibadan. Stirling — Hordem publishers (Nig Ltd)

Oniye, A O 1993. Study habit, achievement motivation and academic achievement of students' in Asa Local Government Area, Kwara State. Unpublished M.Ed. thesis.Department of Educational Guidance and Counselling, University of Ilorin, Ilorin.

Orion, N.and Holstein, A. 1994. Factors that influence learning during a scientific field in a natural environment, Journal of Research in Science Teaching, 31(10), 1097-1119.

Orion, N. 1993.A model for the development and implementation of field studys as an integral part of the science curriculum, School Science and Mathematics, 93 (6), 325-331.

Osokoya, I. O. 1987. 6-3-3-4. Education in Nigeria (History, Strategies, Issues and Problems) Ibadan: Laurel Educational Publishers Ltd.

Owoeye, J.S. 2000.The effect of interacstion of location, facilities and class size on academic achievement of secondary school students' in Ekiti State, Nigeria. Unpublished Ph.D thesis, University of Ibadan, Ibadan.

Oyekanmi, O. O. 1998. Computer application areas in social studies: opportunities and threats. Seminar paper in faculty of education, University of Uyo, Akwa-Ibom State.

---------- . 2007. Effect of ICT and other instructional materials on students' achievement in junior secondary social studies in Lagos State. Ibadan: Unpublished M.Ed Project.

Packer, M. and Addison, R., 1989. Entering the circle: hermeneutic investigation in psychology. Albany: Suny.

Palmer, J. 1998. Environmental education in the 21st century: theory, practice, progress and promise. London.

Palmer, J.A. and Birch, J.C. 2003. Education for Sustainablility: The Contribution and Potential of Non-Governmental Organization.Environmental Education Research, Vol. 9 pp447-460.

Palmer, W. 2003.Simple, surprising, useful? Three questions for judging teaching methods. Pedagogy 3(2): 285-87.

Papadimitriou, B. 2002. The use of environment in the educational process and the "practical theories" of the teachers, G. Bagakis (Ed.), the teacher as researcher, Athens: Metaixmio, 349-356.

Papadimitriou, V. 2004. Prospective primary teachers understanding of climate change, greenhouse effect and ozone layer depletion. Journal of Science Education and Technology, 13 (2) 299-307.

Patchen, M. 2006. Public attitudes and behaviour about climate change.Purdue climate change research center outreach publication. www.purdue.edu/climate

Parkay, F., 1989.Reflections of a protege. Theory and Practice, (Spring 1988- 1989) 27-28.

Patton, M. 1990.Qualitative evaluation and research methods. (2nd ed.) Newbury Park: SAGE.

Paul, G and Volk, T.L. 2002. Ten years of teacher workshops in environmental problem-solving model: Teacher Implementation and perceptions. The Journal of Environmental Education. 33(3), 10-20.

Pearson, J. 2010. Pushing at a half-open door.IDS Bulletin, 41(3): 118-127.

Pekel, F.O. 2005. High school students and trainee science teachers' perceptions of ozone layer depletion. Journal of Baltic Science Education, 1(7), 12-21.

Perkins, R., Paradowski, B., and Hirchert, S., 1994. The MEGA experience: mentoring programme that works. Journal of College Student Development, (3)152-

Person, R.W 1989 Mentor teacher handbook (8 sections). Available online: http://www.gse.uci.edu/doehome/edureosurce/mentorteacher/contents.html.

Peschkin, A., 1993. The goodness of qualitative research. Educational Researcher, 22(2), 23-29.

Peters, R. S. 1967. The concept of education. Routledge and Kegan Paul.Partnership in Learning, 15(2), 201—217.

Philip, K., and Hendry, L., 1996, Young people and mentoring-towards a typology? Journal of Adolescence, (19)189-201.

Polkinghorne, D. 1995. Narrative configuration in qualitative analysis.In J.A. Hatch andR. Wisniewski (Eds.), Life his/hertory and narrative (pp. 5-24). Washington, DC: Falmer Press.

Pooley, J.A, and O'Connor, M. 2000. Environmental education and attitudes:

Porbeni, C.V. 2004. "The impact of global warming on high latitudes and attitudes", J. Arid Environ., 3 (2), 75-88.

Prawait, R.S. 1995. Misleading Dewey: Reform, projects and the language game. Educational Research, 24 (7), 13-27.

Prawait, R.S. and Floden, R.E. 1994. Philosophical Perspectives on Constructivist Views of learning. Educational Psychologist, 29 (1), 37- 48.

Priest, S. 1993. Important components of field study leadership, Pathways: The Ontario Journal of Field study Education, 5(4), 13-16.

Qreskes N. 2004. Beyond the ivory tower: the scientific consensus on climate

Queensland College of Teachers.(n.d.). Beginning to teach: classroom management.Queensland College of Teachers. Retrieved from Partnership in Learning, 15(2), 201—217.

Raheem, K and Ogunyemi, B. 2004. Education for sustainable development: The roleof Environmental education in developing countries with focus on Nigeria. Braya, Portugal. May 19-22, 2004.

Rahmani, A., Mohajjel-Aghdarn, A., Fathi-Azar, E.and Abdullahzadeh, F. 2007. comparing the effects of concept mapping and integration method on nursing students' learning in nursing process course in Tabriz University of Medical Sciences. Iranian Journal of Medical Education 7(I): 41-59.

Rana, S.V.S .2007.Essentials of Ecology and Environmental Science, 3rd Ed. New Delhi: Jay Print Pack Private Limited.

Raji, M.O and Ayoade, O.B. 2004. Effect of the use of traditional teacher directed instruction (ITDI) and computer assisted instruction (CAI) on students' academic achievement in Computer Science.Nigeria Journal of Computer Literacy (NJCL)Vol.5 , (1),1-10.

Reid, H. and Alam, M.2005.'Millennium Development Goals' Tiempo. Issue 54, January 2005. Published by Third World Network Features and at http://www.twnside. ora. sg, www.endpoverty2015.org

Reynolds, E., 1996. Guiding young children: a child-centreed approach. Mountainview CA: Mayfield Publishing Company 2nd Ed.

Rhodes, B., 1994. Older and wiser; mentoring relationships in childhood and adolescence. Journal of Primary prevention, (14) 187-196.

Rhodes, J., Davis, A., 1996. Supportivities between non-parent adults and urban adolescent girls. In B.R. Leadbeater, N.W. Way (Eds.), Urban girls: Resisting stereotypes, creating identities (213-225). New York: University Press.

Rhode, J .E. 2000.Agents of change : pathways through which mentoring relationship influence adolescents academics adjustment. Child Development , 71 ,162-167.

Rhodes, J. E. 2002. Stand by me: the risks and rewards of mentoring today's youth. Cambridge, MA: Harvard University Press.

Rhodes, J.E and Grossman ,J .B. 2002. The test of time:s predictors and effects of duration in youth mentoring relationship. American Journal of Community Psychology , 30 ,199-219

Riggio, R.E. 2007. Reciprocal peer tutoring: learning through dyadic teaching. In B.K. Saville T.E. Zinn S.A. Meyers J.R. Stowell (Eds.), Essays from excellence in teaching, Retrieved from the Society for the Teaching of Psychology Web site: http://teachpsych.org/resources/e-books/eit2006/eit06 10.pdf.

Rivera, D., 1997. Teaching students' with learning and behaviour problems.3rd Ed. Boston; Allyn and Bacon.

Roberts, H and Roberts, I. 2000. Child : Care, Health and Development: Smacking. Vol. 26 (4), 259-262. USA: Blackwell Science Ltd.

Robinson, J.B. and Herbert D, 2001.Integrating climate change and sustainable development. International Journal of Global Environmental Issues, 1, 130-149.

Rogoff, B. 1990. Apprenticeship in thinking: cognitive development in social context. New York: Oxford University Press.

Roth, W.M. 2001. Situating cognition. Journal of the Learning Sciences, 10(12), 27.

Sachs, J.2003. The activist teaching profession. Philadelphia: Open University Press.

Said, M. 2003. Environmental concerns, knowledge and reduction practices gap among Malaysian teachers, International Journal of Sustainability in Higher Education, Vol. 4, No. 4, 2003, PP 305-313, retrieved on April 11, 2009 from http:/!www.emraldisnightcorn./insight/viewcontne sessiond.html

Salako, E.T.2014. Effects of cooperative learning and field- trip instructional strategies on secondary school students' knowledge and attitude to multicultural concepts in social studies.Unpublished Ph.D thesis University of Ibadan, Ibadan, Nigeria.

Salsali, M. 2005. Evaluating teaching effectiveness in nursing education: An Iranian perspective: BMC Medical Education 5:29.

Sato C. 1982. Ethnic styles in classroom discourse. In Mary, E.H. & William. R (Eds.). On TESOL '81. Washington, DC: Teachers of English to Speakers of Other Languages.

Satterthwaite, D. 2008. United Nations expert group meeting on population distribution, urbanization, internal migration and development: Population Division Department of Economic and Social Affairs United Nations Secretariat, New York.

Saville, B.K. 2009. Using evidence-based teaching methods to improve education.https:/*tle*.wisc.edu/solution/increasing-studentsuccess/using evidence-based - teaching -methods improve-education.

Sax,L.2001.Reclaiming-kindergarten: making kindergarten less harmful to boys.http//www.boysadrift.com/Sax APA 2001.pdf in Psychology of Men and Masculinity(2001)2.1 pp3-12.

Sbott, W., and Spencer, F. 2006.Professional development for inclusive differentiated teaching practice. Australian Journal of Learning Disabilities, 11(1), 35-44.

Schneider, S.H., Easterling, W.E. and Mearns, L.O. 2000. Adaptation: sensitivity to natural variability, agent assumptions and dynamic climate changes. Climatic Change 45(1): 203—221.

Schön, D. 1983. The reflective practitioner: how professionals think in action. New York .

Schunk, D.H. 2000. Motivation for achievement: Past, present and future. Issues in Education: Contributions from Educational Psychology 6, 161-165.

Schunk, D.H. 2000. Coming to terms with motivation constructions: Contemporary Educational Psychology 25, 116-119.

Schunk, D.H. 2003. Self- efficacy for reading and writing: Influence of modeling, goal setting and self- evaluation. Reading and Writing Quartrly. 19, 159-172.

Schunk, D.H. 2005. Self- regulated learning: The educational legacy of Paul, R. Pintrich. Educational Psychologist 40, 85-94.

Scollos, M. 2004. Science, Clture and Education for Sustainable Development.Sustainable Development Conference. Braya, Portugal. May 19-22, 2004.

Seidman, I., 1991. Interviewing as qualitative research. Teachers College Press NY: Teachers College Press.

Senge, P. 1999. The Dance of change: The challenges of sustaining momentum in learning organisations, New York: Doubleday.

Sipe, C.L. 1999. Mentoring adolescents: "What Have We Learned?"In J.B. Grossman (Ed) Contemporary Issues in Mentoring. Philadelphia,P.A: Public and Private Ventures.

Singer, S.F. and Avery, D.T. 2007. Unstoppable global warming: every 1000 years, Rowman and Uttlefield Publishers nc, New York, p. 114.

Slavin, R. 1994 . Preventing early school failure; the challenge and the opportunity. In R.E. Slavin, N.L. Karweit, and B.A. Wasik (Eds.) Preventing early school failure: Research, policy and Practice (p. 1-12). Toronto OT: Allyn and Bacon.

Slavin, R., Karweit, N. and Madden, N.1989. Effective programme for students' at-risk. Needham Heights, M.A: Allyn and Bacon.

Slavin, R., Karweit, N.L.and Wasik, B. 1993. Preventing early school failure: What Works ? Educational Leadership, 50(4)10-18,

Slicker, E., and Palmer, D., 1993.Mentoring at-risk high school students': evaluation of a school-based programme.The School Counsellor (40) 327- 334.

Smink, B., 1990. Mentoring programme for at-risk youth. Clemson S.C: National Dropout Prevention Centre. (ERIC Document Reproduction Service No.ED 318 931).

Smit, B., Burton, B., Klein, R. J. T. and Wandel, J. 2000. An anatomy of adaptation to climate change and variability. "Climate Change, 45:223-251

Snowman, J., Dobozy, E., Scevak, J., Bryer, F., Bartlett, B. and Biehier, R. 2009. Psychology applied to teaching. Milton, Australia: John Wiley and Sons Australia..

Song B.1995. What does reading mean for East Asian students'. College ESL 5(2): 35-48.

Spencer, R . 2007." It's not What I expected" a qualitative study of youth mentoring relationship failures. Journal of Adolescent Research ,22 ,331-354.

Spradley, J., 1990. Participant observaz'ioj. New York: Holt, Reinhart and Winston.

Stake, R., 1995.The art of case study research. SAGE Publications, Inc.

Stapp, W. B., Bennett, D., Bryan, W., Fulton,J., MacGregor, J., Nowak, P., Swan J., Wall, R. and Havlick, S. 1969. The concept of environmental education. J. Environ. Educ., 1(1): 30-31.

Staudt, D., 1995. A School-university partnership that is making a difference. College Station, TX: Paper presented at the Texas University/School Research Collaborative. (ERIC Document Reproduction Service No.ED 395 083.

Stein, M., Camine, D. and Dixon, R. 1998. Direct instruction: integrating curriculum design and effective teaching practice. Intervention in School and Clinic, 33(4), 227-233.

Stern, J.D (1994). The condition of education in rural schools, Washington Dc: U.S Department of education, office of educational Research and improvement, programme for the Improvement of practice.

Stevenson, R. B. 2007. Schooling and environmental education: contradictions in purpose and practice. Environmental Education Research, 13(2), 139-153.

Stiling, P.D. 1996. Ecology: Theories and Applications (Second Edition).New Jersey:Prentice-Hall, Inc.

Stitt-Gohdes W.L. 200I. Business education students. Preferred learning styles and their teachers. Preferred instructional styles: Do they match? Delta Pi Epsilon J. 43 (3): 137-51

Strahan, D., 1989. Disconnected and disruptive students'. Middle School Journal 21(1)1-5.

Sullivan, J. 1995. Exciting Ways to use Videodiscs.Media and methods 31(3), pp 8-10.

Summary for Policymakers.Contribution of Working Group I to the Fourth Assessment Report.http://portal.unesco, org/science/en/ev.phpurl id 7602 curldo =do topic&url_section =201. htm

Szerényi, Z .M, Zsóka A, Széchy A 2009. Environmental education and pro-environmental consumer behaviour- results of a University survey. Joint Actions on Climate Change, 8-10 June, Denmark.

Thompson, M., 1991. Understanding the essence of the relationship between big and little brothers and sisters: a phenomenological study. Unpublished Masters Thesis, University of Victoria, Canada.

Tully, F., andBrendtro, L., 1998.Reaching angry and unattached kids.Journal of Emotional and Behavioural Problems. 7(3) 155-159.

Umoh E 2007."Flooding problems in Rivers state", J. Environ. Sci. 4(2): 44-60.

UN 2012. The future we want. Outcome of Rio+20. United Nations Conference on sustainable Development. A/CONF.216/L.I. 19 June, 2012.

UNDP 2007. Human Development Reprt 2007/2008.Fighting climate change: Human Solidarity in a Divided World. New York: United Nations Development Programme.

UNDSD (United Nations Division for Sustainable Development), 2006:Agenda - 21. United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, June 1992. [Accessed 11.06.07: ://.un.orWes sustdev/documents/agenda2 1 /index.htm

UNEP 2011. Towards a green economy: Pathways to sustainable development and poverty eradiction. A Synthesis for policy makers. www.Unep. Org/greeneconmy, accessed in March, 2013.

UNEP 2011. Bridging the Emissions Gap. New York: United Nations Environment Programme (UNEP).

UNESCO 1977.The Tblisi Declaration.Intergovernmental Conference on Environmental Education, 14-26 October, 1977, Tblisi. UNESCO Director Generals opening speech p/unesdoçesçporg jgçs/0Ol8/00l833/l 83375epf

UNESCO 2003. United Nations Decade of Education for Sustainable Development 2005-2014) Framework for the International Implementation Scheme Wikipediahttp:/ www.demograhia.com/dbworlduapdf. `

United Nations (UN) 2000. Millennium Declaration.A/RES/55/2. 18 September. New York. [http://www.un.org/millenniuniIdeclaration/ares552e.pdfj.

United Nations 1992.United Nations Framework Convention on Climate Change. Rio de Janeiro, Brazil, 33 pp. Available online at http://www.unfccc.intltextJ resouree/docs/convkp/conven.pdf.

United Nations Educational, Scientific and cultural Organisation; Education for sustainable development united nations Decade 2005-20 14;DESD Quarterly highlights special COP 15 issue, Dec 2009.

University of Connecticut 2009. Climate change Planning at the University of Connecticut. [Online] Available: http: wu u .ecohusky.uconn.edw pee climate change.htmln [Accessed 26 9i09].

University of Medical Sciences Students' about Solid Waste Disposal and Recycling: Iranian Journal of Environmental Health Science and Engineering, Vol. 2, No. 2, 2005, PP. 26-30.

Van Bockem, S., 1998.Meeting the needs of our youth.Journal of Emotional and Behavioural Problems.7(3) 172-175 Vol.13, No.1, pp.43-48.

Victor D. G., D. Zhou, E. H. M. Ahmed, P. K. Dadhich, J. G. J. Olivier, H-H. Rogner, K. Sheikho, and M. Yamaguchi, 2014: Introductory Chapter. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the FifthAssessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E.

Vygotsky, L. S. 1977. The development of higher psychological functions. Soviet Psychology, 16, 60-73.

Vygotsky, L. S.1978. Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Vygotsky, L. 1986. Thought and language. London, UK: The MIT Press.

Walter, K., 1995. Excellent Beginnings: An Early Childhood Initiative. Kisco, NY; Plan for Social Excellence. ERIC Document Reproduction Service No. ED 394 641

Wang, C.2010. Boundaries of obligation in American Politics. Geographic, National and Racial Communities.New York:Cambridge University Press.

Wang V., Farmer L. 2008 .Adult Teaching Methods in China and Bloom's Taxonomy. International Journal for the scholarship of Teaching and learning 2.2.

Wang J. 2001, Contexts of mentoring and opportunities for learning to teach in a comparative study of mentoring practice. Teaching and Teacher Education, 17,51-73.

Washburn-Moses, L. 2010. Rethinking mentoring: Comparing policy and practice in special and general education. Education Policy Analysis Archives, 18 (32), 1-21

Wasik, B., and Slavin, R., 1993.Preventing early reading failure with one-on-one tutoring: A review of five programmes. Reading Research Quarterly, 28 (2) 178-200.

Weaver, A.A. 2002. Determinants of environmental attitudes: A five-country comparison. International Journal of Sociology, 32, (1) ,77-108.

Webb, N.M., Troper, J.D., and Fall, R. 1995. Constructive activity and learning in collaborative small groups. Journal of Educational Psychology, 87(3), 406-423.

Wenger, E.,Trayner, B and De Laat, M. 2011.Promoting and assessing value creation in Communities. Netherlands: Ruud de moor Centrum, Open University.

Werner E., and Smith, S., 1982. Vulnerable but invincible: A study of resilient children. New York: McGraw-HilL

Wertsch, D and Toma, I . 1994. Creating an Environment for Learning Mathematics, Social Interaction Perspective. Journal for Research in Mathematics Education. Monograph Vol. 6. Rethinking Elementary School Mathematics: Insight and Issues.

Wheatley, G.H. 1991. Constructivist perspecttves on Science and Mathematics Learning. Science Education, Vol. 75, 9 -21.

Wilson, K.M. 2003.Communicating climate change through media. In Environmental Risks and the Media, Allan, S., Adam B., Carter C. (ed) pp 201-2 14. London: Routledge.

Winsley P. Desired outcome of the sustainable development framework. [Online] Available: www.maf. govt.nz/. . ./page-3 .jpg [Accessed 13/9/09].

Woolfolk, A., andMargetts, K. 2010.Education psychology. French's Forest, NSW: Pearson.

World Bank 2010. World Development Report 2010: Development and Climate change. Washington, D.C: World Bank.

WSSD, 2002: Plan of implementation of the World Summit on Sustainable Development, 62 pp. [Accessed 11.06.07:

WWF-UK, 1988. A common purpose: Environmental education and the school. Module 2: A Whole School Approach to Environmental Education. httu:Y/www.ens.u.edu.aw"ciree/LSEiMOD2.HTM

WWW.Nairaland.Com/2894112/What-Lagos-Environ-Looked-Like.

Yamamoto, Kaoru 1989. To see life grow:The meaning of mentorship. Theory and Practice, 27

Yankauer A. 1983. The Ethics of social research, field work, regulation and publication. Social Science and Medicine 7(18): 1405-1406.

Yin, R. K. 2009. Case study research: Design and methods. (4th ed.), Thousand Oaks.

Yohe, G.W., R.D. Lasco, Q.K. Ahmad, N.W. Arnell, S.J. Cohen, C. Hope, A.C. Janetos and R.T. Perez, 2007: Perspectives on climate change and sustainability. Climate Change 2007: Impact, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M. L. Parry,0 , F. Canziani, J. P. Palutikof, P. J. Van Der Linden and C.E. Hanson; Eds., Cambridge University Press, Cambridge, UK, 811-841.

Young, A. M., and Perrewe, P. L. 2000. What did you expect? An examination of career-related support and social support among mentors and protégés. Journal of Management, 26(4), 611-632.

Young, J. 2006. Black water rising: The growing global threat of rising seas and bigger hurricanes. World Watch, 19(5), 26-31.

Young, H.P. 2009.'Social norms'.Paigrave Macmillan, London, UK.

Young, M. 2008. From Constructivism to Realism in the Sociology of the Curriculum. Review of Research in Education, 32(1),1-28.

Yusuf, M.A and Adigun, J.T. 2010. The Influence of School Sex and Location and Type of Students' Academic Performance in Ekiti State Secondary Schools. Amoye Grammar School, Ikere – Ekiti, Nigeria.

Zanier, M., 1992.An evaluation of the one-on-one match. The Social Worker, 60 (4)181-184.

Zey, G. 1985. Mentor Programme: Making the right moves. Personal Journal, 64 (20) 53-57.

Zinyowera,S. and R.H. Moss, Eds., Cambridge University Press, Cambridge, 880 pp

APPENDIX I

UNIVERSITY ON IBADAN
DEPARTMENT OF TEACHER EDUCATION
CLIMATE CHANGE KNOWLEDGE TEST (CCKT)

Dear Teacher,

A study is being carried out into what Nigerian students' know about climate change and what their attitudes to this new area of knowledge are. We would be very grateful if you could respond to this questionnaire. Your responses will be kept in strict confidence and will be used only for the purpose of this research. To assure this confidentiality, you are not requirsed to write you name on the questionnaire.

We thank you very much for your cooperation.

SECTION A: Personal Data

Instruction: Please tick ( ) appropriate response

1. Name of school:
2. Level:
3. Age:
4. Sex: Male ( ) Female ( )
5. Subject: Social Studies
6. Are you aware of climate change and global warming?
   Yes ( ) No ( )
7. What are the sources of your awareness?
   Classroom ( ) Internet ( ) Mass media ( ) others specified ( )

SECTION B: Students' knowledge of Climate Change Test (SKCCT)

Below are some items on global warming and climate change. Please choose the options that correspond with your choice by marking X boldly on the options considered the best. Please, tick on option only for each item

1. The average condition of the atmosphere over a long period of time is
   (a) weather (b) climate (c) geography (d) temperature
2. The instantaneous condition of a place within a short time is called
   (a) Climate (b) weather (c) glaciation (d) weathering
3. The increase in the average temperature of the earth's atmosphere is called
   (a) climate change (b) weather change (c) global warming (d) climate warming
4. Which of the following is the most identifiable evidence of climate change?
   (a) Globalization (b) rainfall (c) global warming (d) greenhouse effect
5. One of the following can cause global warming
   (a) Deforestation (b) Afforestation (c) fishing (d) weathering
6. The following gases make up green house *gases*
   (a) Methane, Oxygen, Niton (b) Carbondioxide, Mathene, Nitrox oxides (c) Water Vapour, Ammonia, Nitroge (d) Oxygen, Nitrogen, Argon
7. Global-warming and climate change induced by human activities may be termed
   (a) natural climate change (b) natural global warming (c) anthropogenic global warming (d)Climatic Variation
8. Carbon emissions and burning of fossil fuel can cause
   (a) Noise pollution (b) global warming (c) accelerated erosion (d) desertification
9. The progressive warming of the earth's surface due to blanketing effect of green house gases is called
   (a) Blanketing effect (b) blue house effect (c) climate change (d) green house effect
10. The following activities contributes majorly to global warming and climatic change except
    (a) Mining (b) deforestation (c) gas flaring (d) telecommunication

11. The reduction in carbon dioxide concentration in the atmosphere can be done through

    (a) Urbanization (b) bush burning (c) Afforestation (d) fossil fuel burning

12. The rise in sea level is a consequence of

    (a) Climate variation (b) global warming (c) global cooling (d) glaciations

13 Extinction of wildlife and aquatic life are consequences of (a) climate change and global warming (b) urbanization (c) afforestation (d) transportation

14 Government measure to mitigate global warming includes

    (a) carbon taxation (b) carbon use subsidy (c) legislation to encourage fossil fuel burning (d) encouraging industrial pollution

I5. According to Tang (2011),Nigeria and other countries of the world looses how much yearly to climate change?

    (a) $350 billion dollars (b) $ *250* billion dollars (c) $ 450 billion dollars (d) 350 million naira

l6. Climate is changing clue to human activities across the globe

    True( ) False ( )

17. The use of fossil fuel induces global warming and climate change.

    True ( ) False ( )

18. Global warming affects human health and economy

    True ( ) False ( )

19. Wild life's and aquatic lives are seriously being reduced by global warming and climate change. True ( ) False ( )

20. Environmental degradation has serious implication on climate change and global warming. True ( ) False ( )

APPENDIX II

UNIVERSITY ON IBADAN
DEPARTMENT OF TEACHER EDUCATION
STUDENTS' ATTITUDE TO CLIMATE CHANGE QUESTIONNAIRE (SATTCCQ)

Dear Teacher,

A study is being carried out into what Nigerian students' know about climate change and what their attitudes to this new area of knowledge are. We would be very grateful if you could respond to this questionnaire. Your responses will be kept in strict confidence and will be used only for the purpose of this research. To assure this confidentiality, you are not required to write you name on the questionnaire.

We thank you very much for your cooperation.

SECTION A: Personal Data

Instruction: Please tick ( ) appropriate response

1. Name of school:
2. Level:
3. Age:
4. Sex: Male ( ) Female ( )
5. Subject: Social Studies
6. Are you aware of climate change and global warming?
   Yes ( ) No ( )
7. What are the sources of your awareness?
   Classroom ( ) Internet ( ) Mass media ( ) others specified ( )

SECTION C: Students'Attitude to Climate Change Questionnaires (SATTCCQ)

Below are the statements on attitude of individuals towards climate change. Please indicate your extent of agreement or otherwise in the box provided.

The letters stand for the followings:

SA - Strongly Agree, A — Agree, D— Disagree, SD — Strongly Disagree

Students' Attitude to Climate Change Questionnaire (SATTCCQ)

S/N	STATEMENTS	SA	A	D	SD
1	There is nothing like climate change				
2	Nature is behind climate change				
3	High depletion of forest without replacement is bad				
4	Afforestation of our environment is desirable				
5	The use of fossil fuel should be discouraged				
6	Bush burning should be encouraged				
7.	Importation of electronics that uses sulphur and chiorofluorocarbon should be discouraged				
8.	Public enlightenment and awareness about global warming is highly needed				
9.	Reduction of carbon emission need to be seriously encouraged.				
10.	Every households is guilty of climate change problem				
11.	Climate change education is urgently needed now				
12.	Pollution is a problem associated with industrial countries as a price of progress.				
13.	Climate change phenomenon is a white man invention				
14.	Every citizen must be involved in curbing the problem of climate change and global warming				
15.	The use of fossil fuels should be reduced/ eradicated				
16.	Climate change is real				
17.	Climate change is a measure of punishment from God				
18.	There is nothing we can do stop climate change and global warming				
19.	Climate change is caused by industrial pollution of the world.				
20.	It is useless teaching climate change concepts				

APPENDIX III

UNIVERSITY ON IBADAN
DEPARTMENT OF TEACHER EDUCATION
CLIMATE CHANGE REDUCTION PRACTICESQUESTIONNAIRE (CCRPQ)

Dear Teacher,

A study is being carried out into what Nigerian students' know about climate change and what their attitudes to this new area of knowledge are. We would be very grateful if you could respond to this questionnaire. Your responses will be kept in strict confidence and will be used only for the purpose of this research. To assure this confidentiality, you are not required to write you name on the questionnaire.

We thank you very much for your cooperation.

SECTION A: Personal Data

Instruction: Please tick ( ) appropriate response

1. Name of school:
2. Level:
3. Age:
4. Sex: Male ( ) Female ( )
5. Subject: Social Studies
6. Are you aware of climate change and global warming?
   Yes ( ) No ( )
7. What are the sources of your awareness?

   Classroom ( ) Internet ( ) Mass media ( ) others specified ( )

SECTION D: Climate change reduction practices

Please rate how often you do the following things by ticking (V) the column that matches your answer.
The letters in the columns stand for the

VO: Very often
O: Often
S: Seldom
N: Never

Climate Change Reduction Practices Questionnaire (CCRPQ)

1.	Use the compact fluorescent lamps instead of incandescent bulbs?				
2.	Ride bicycle instead of going in a car?				
3.	Leave the Television-set on when nobody is around to view it?				
4.	Use electric- stove for cooking your food?				
5.	Put on the lights in the bedrooms through-out the night?				
6.	Leave the fan on working when no one is around to use it?				
7.	Cook with firewood in your home?				
8.	Leave the tap running while brushing your teeth?				
9.	Put on the bulb at day time ?				
10.	Remind children in your school or neighborhoods' not to liter?				
11.	Use mosquitoes spray (insecticide) at home?				
12.	Burn the bush in your compound?				
13.	Plug electrical appliances when not in use?				
14.	Cut down trees?				
15.	Leave your computer at standby when not in use?				

LESSON PLAN/INSTRUCTIONAL GUIDE

Lesson: Climate change concepts
Duration: 80 minutes
Content

1. Explain basic earth \sun relationship
2. How they influence climate
3. Identify major climate region or vegetation belt in Nigeria.

Behavioural objectives:

After learning about global warming students' will perform self – authored plays that answer the question.What if we do not do anything to stop global warming, with 100 per cent participation..
Assessment: This project will be done during the course of 80minutes periods. Much of the skit will be improvised. They will not receive a letter grade. The teacher will watch closely to see if the students' play demonstrated an understanding of what the potential dangers of ignoring global warming might be.

Advanced Preparation by Teacher:

Procedure:

Introduction/ Motivation: Say to the class we have been learning a lot about what global warming is and what is happening to our earth at the very minute. It's a very serious problem. Today l wants you to think about this question. I have written on the magic board,what might happen if we do not do anything to stop global warming? Turn to your neighbour and talk about this question.

Presentation

Step1: Explain that today we are going to make mini plays that answer the question you just discussed with your neighbour. I have assigned you to group of 20. You will have 20minutes to talk with your group and plan your play. You will then present your play to the rest of the class.

Step 2: Before I tell you your groups. Let's brainstorm how this could work. Who might be some characters in your slat?(take answers and write them on the board). Some answers might include animals who are loosing habitat due to global warming, everyday people, politicians who chose to not make laws against global warming, big factory owners who pollute ,aliens who see earth from space.

Step3: Remind the class of the question they are supposed to be answering with their skit .Tell the class who will be in their group.

Step4: Remind the class of the expected behaviour when doing group work (listen to every ones ideas; share the work, work as a team)

Step5 : Assign the groups to separate areas of the room to work on their skit.

Step6: Set the students' free to create a play .

APPENDIX IV

TEACHER'S INSTRUCTIONAL GUIDE FOR MENTORING STRATEGY (TIGMS)

Class: JS 1

Topic: This is for each of the topics

Duration: 80 Minutes

Objectives: (for all the lessons) at the end of the lesson students' should be able to

i. Define the concept

ii. Enumerate climate change issues

iii. Observe, gather and records data on climate change issues observed

iv. Interprete and analyze data on climate change concepts being discussed

v. State the need for Climate change education as related to the concept being taught

Entering Behaviour: The students' acquired general knowledge/ meaning of Concept during classroom.

Instructional Resources and Material: Map of Nigeria and Globe of the world.

References:1. Anikpo etal (2007): Basic Social Studies for Junior Secondary schools (UBE Edition)

2. Omotuyole, S.O(2010): Social Studies for Universal Basic Education.

Presentation

Step 1: Introduction. The teacher should

1. State the topic

2. Explain the purpose of the study

3. Link the topic with previous knowledge or experience using related questions

4. Introduce and give a brief highlight of the new topic

Step II. Strategy Implementation

Step III. The students'studies the case study which empasises Knowledge construction and not transmission of information.

Let there be a discussion on the problems and issues observed

Step IV: Allow students' to suggest or proffer solutions to the problem

Step V: Students' Activities

1. Ask relevant questions on the concept.

2. Allow students' discussion in groups to evaluate their level of comprehension and assimilation.

3. Engage the students' in drawing earth's crust and sun radiation to reflect climate change

STEP VI: Summary

Bring all the points together to provide an overview

Evaluation: The teacher ask the students' specific questions that

1. Relate to definition of the concept

2. Require an application of problem solving reduction practices

Assignment: Teacher would give class assignment and homework based on the next topic or

Concept

APPENDIX V

TEACHER'S INSTRUCTIONAL GUIDE FOR FIELD STUDYSTRATEGY (TIGFS)

Topic: This is for each of the topics

Duration:80 minutes

Objectives: (For all the lessons) At the end of the lesson students'

Should be able to:

i. Define the concept

ii. Enumerate climate change issues problems observed

iii. Observe, gather and record data on climate change issue observed

iv. Inteprete and analyzes data on climate change concepts being discussed

v. State the need for climate change education as related to the concept

Entering Behaviour: The students' have acquired general knowledge/ meaning of each Concept during classroom teaching.

The use of resource person(s) to present information on the field that will serve as the lnstructional tool.

Presentation

Step 1: Introduction

The teacher should state the topic

Explain the purpose of the study

Link the topic with previous knowledge or experience using related questions.

Introduce and give a brief highlight of the new topic

Step II: Presentation of theoretical content

State information on topic in form of discussions, description of concepts, benefits and value inherent and associated problems as earlier discussed in class.

Step III: Strategy Implementation

1. The teacher anchors the subject matter in a power point representation and shows the slides to the students'
2. Provide students' with a story about a problem riddled leaving clue. The teacher encourage student groups to extract key issues, facts, data
3. Students' are encouraged to play back or re explore story to retrieve necessary develop solution to the problem
4. Students' develop solutions to the problem
5. Use relevant questions to direct students' in the process and notice their attitude towards what is being observed

Step IV: Students' Activities

Allow students' discussion to evaluate their level of comprehension and Assimilation

Step V: Summary

Bring all the points together to provide an overview

Evaluation. The teacher ask the students' specific questions that relate to

Definition of the concept

Require an application of problem solving skills

Assignment. Teacher would give class assignment and homework based on the next topic or concept

APPENDIX VI

TEACHER'S INSTRUCTIONAL GUIDE FOR CONVENTIONAL METHOD (TIGCM)

Topic: This is for each of the topics

Duration: 80 minutes

Objectives: (For all the lessons). At the end of the lesson student should

be able to

i. Define the concept

ii. Enumerate climate change problems

iii. State the need for climate change education as related to the concept being taught

Entering Behaviour: The students' have acquired some level of general knowledge/ meaning of each concept in their previous class

Instructional Resources and Materials: Some charts and pictures showing some Climate change challenges.

Presentation

Step 1: Introduction. The teacher should

1. State the topic
2. Explain the purpose of the study
3. Link the topic with previous knowledge or experience using related questions
4. Introduce and give a brief highlight of the new topic

Assignment. Teacher would give class assignment and homework based on the next topic or concept

EVALUATION SHEET FOR MENTORING STRATEGY (ESMS)

Name of School

Local Government Area

School Location: Urban ( ) Rural ( )

S/NO	ACTIVITIES	V.G 4	G 3	AV 2	P 1
1	Introduction ability to link new topic to previous knowledge				
2	Clearly stated instructional objectives				
3	Presentation/description of concept				
4.	Mastery of subject-matter by the teacher				
5.	Variety and effectiveness of procedures/strategies				
6	Effective use of instructional guide given to the group				
7	Use of relevant questions on the climate change concept				
8	Reflection of real life challenges on climate change concept through the mentoring strategy				
9	Provision of relevant instructional materials				
10	Suitability and utility of instructional materials				
11.	Skills and language of communication of the climate change concept and issues.				
12.	Involvement of students' in classroom discussion				
13.	Initiating ideas of concepts amongstudents'by teacher				
14	Motivating students' to suggest or proffer solutions to problems where necessary				
15.	Identification of new climate change knowledge, attitude and reduction practicesgained in the evaluation				
16	Potentiality of the lesson in developing good climate change attitude in students'				
17.	Attainment of lesson objectives				

EVALUATION SHEET FOR FIELD STUDY STRATEGY (ESFSS)

Name of School

Local Government

School Location Urban [ ] Rural [ ]

S/NO	ACTIVITIES	V.G 4	G 3	AV 2	P 1
1	Introduction ability to link new topic to previous knowledge				
2	Clearly stated instructional objectives				
3	Presentation/description of concept				
4.	Mastery of subject-matter by the teacher				
5.	Variety and effectiveness of procedures/strategies				
6	Effective use of instructional guide given to the group				
7	Use of relevant questions on the climate change concept				
8	Reflection of real life challenge on climate change concept through the field study strategy				
9	Provision of relevant instructional materials				
10	Suitability and utility of instructional materials				
11.	Skills and language of communication of the climate change issues				
12.	Involvement of students' in field study discussion				
13.	Initiating ideas of concepts bystudents'while on the field				
14	Motivating students' to suggest or proffer solutions to problems where necessary				
15.	Identification of new climate change knowledge, attitude and reduction practicesgained in the evaluation				
16	Potentiality of the lesson in developing good climate change attitude in students'				
17.	Attainment of lesson objectives				
18	Relevant assignments or activities based on climatchange concept taughton the field.				

EVALUATION SHEET FOR CONVENTIONAL METHOD (ESCM)

Name of School

Local Government

School Location **Urban [ ]** **Rural [ ]**

S/NO	ACTIVITIES	V.G 4	G 3	AV 2	P 1
1	Introduction ability to link new topic to previous knowledge				
2	Clearly stated instructional objectives				
3	Presentation/description of concept				
4.	Mastery of subject-matter by the teacher				
5.	Variety and effectiveness of procedures/strategies				
6	Effective use of instructional guide given to the group				
7	Questioning skills. Use of relevant questions on the concept				
8	Reflection of real life climate problems through the cognitive mentoring strategy				
9	Provision operation or relevant instructional materials				
10	Suitability and utility of instructional materials				
11.	Skills and language of communication of the climate change issues				
12.	Involvement of students' in classroom discussion				
13.	Initiating ideas of concepts in students'				
14	Motivating students' to suggest or proffer solutions to problems where necessary				
15.	Identification of new climate change knowledge, attitude and problem solving skills gained in the evaluation				
16	Potentiality of the lesson in developing good climate change attitude in students'				
17.	Attainment of lesson objectives				
18	Relevant assignments or activities based on the environmental concept taught				

LESSON NOTE FOR MENTORING INSTRUCTIONAL STRATEGY

LESSON ONE

Subject: Social Studies

Topic: Physical Environment

Sub–Topic: Meaning, Types, and Features of Physical Environment.

Class: J.S. One (Basic 7)

Duration: 80 minutes

Period: 1 and 2

SpecificObjectives: At the end of the lesson, students' should be able to:

1. Define Physical Environment
2. Identify types of physical environment
3. Mention components of the identified types of physical environment.

ReferenceBooks:

1. **Odedele, M.O.A and Egotanwa, M.C (**2010**):**

Basic Facts in General Social Studies for Junior Secondary Schools.

Onitsha: Elites Commercial Agency

2. **Omotuyole**, **S**.**O** (2011) Social Studies for Universal Basic Education 9

Lagos: Omotuyole and Association Ltd.

Instructional Materia Charts showing different types of environment

KeyWords: (1) Environment (2) Surrounding

EntryBehaviour: The students' already know importance of Social Studies, and they are familiar with streams, oceans and rivers

Introduction: Teacher – Ask 'Ngozi' what is Environment?

Content:

Meaning of Environment

Environment means our surrounding; it is the condition that affects the behaviour and growth of somebody or something (s). Environment is the Sum total of all natural, man made and non – materials in our society.

Types of Environment

There are two types of Environment namely; Physical Environment and Social Environment.

1. **PhysicalEnvironment**: This is man's immediate environment and the physical things that surround man such as: Hills, rivers, lakes, mountain, vegetation and oceans. It is also the relief of an area.

Physical environment consists of the natural features and man – made features which we can see or feel in man's environment.

(a) **Naturalfeatures**: Theses can be regarded as the free gifts of nature. They are those things man makes use of in order to influence his/her environment such as: Valley, soil, tin, ore, rivers, crude – oil and diamond.

(b) **Man – madefeatures**: These are those things that have been changed or built by man in order to adapt the natural environment to suit his/her needs. They include: Roads, houses, towns, villages, factories, dams, canals, bridges, and so on. The manmade features are also known as: Artificial Physical Features:

Presentation:

StepI: Teacher – splits the class into groups for team work.

StepII: Teacher – guides the groups to identify the physical things that made – up environment.

StepIII: Teacher – allows the group representative to speak for their groups respectively.

StepIV: Teacher – guides the clears to make a pictorial description of the physical Environment.

StepV: Teacher – empasises the cogent point of discussion

Evaluation: The students' are to perform their required activities

1.What is Environment?

2. Differentiate between Physical and Social Environment.

3. Explain briefly the components of Physical Environment.

Conclusion: Teacher write note on the magic board for the class to copy.

Assignment: Draw a stream or river to represent Physical Environment

LESSON TWO

Topic: Physical Environment

Sub–Topic: Features of Physical Environment

Class: J.S. One (Basic 7)

Duration: 80 minutes

Period: 1 and 2

SpecificObjectives: At the end of the lesson, students' should be able to:

1. Define climate
2. Explain the meaning of weather
3. Differentiate between Climate and Weather
4. Mention the elements of Weather

Reference Books:

1. Odedele M.O.A and Egotanwa M.C (2010) basic facts in general social-studies for junior sec. school Onitsha commercial Agency
2. Omotuyole S.O (2011) social studies for universal basic education 9 Lagos: Omotuyole and Associate

Instructional material:

Key words:

EntryBehaviour: The students' are already familiar with the man-made physical environment

Introduction: Teacher ask 'the free site of nature to mankind is called what?

Content

Feature of Bio-Physical Environment

The features of the physical environment are known as the climate condition and weather elements. Climate condition plays a very important role in our lives.

Climate is defined as the average weather condition in a place over a long period of time, usually about 35 years. While **Weather** is define as the sum total condition of a place atmosphere at a given time .That is, the day may be sunny and bright sometime differently, it may be cloudy and dull at another time, or it may be dry and hot rainy and cool –all these help to describe weather condition.

Element of weather

Element of weather include the following:

1. Sunshine
2. Cloud
3. Temperature
4. Air-pressure
5. Wing
6. Rain fall
7. Humidity

Sunshine

All energy in the atmosphere comes from the sun. it is called Solar Energy . The amount of energy received from the sun at a particular time in a particular place is known as Insulation.

Sunshine can be measure by the use of a Campbell– Stokes - Recorder. While shadow stick is used to know the direction of Sunrise in the morning ,direction and length of the shadow at Mid=day and direction of Sunset.

Temperature

Temperature is the degree of heat or coldness of a place or thing. The Instrument used to measure temperature is called Thermometer. It is marked in either degree centigrade. Freezing point is O (zero degree) and boiling point is 100 (Hundred Centigrade). While in Centigrade, freezing point is 32F and boiling point is 212F. Normal temperature for any human being is 7.5

Wind

Wind is a moving air or Air in motion. It can be felt but not seen. Wind has both direction and speed. Wind occurs as a result of differences in pressure that is as a result of air pressure that wind blows from an area of high pressure to low pressure. Wind –Vane is used to know the direction of wind.

Cloud

Cloud is made up of tiny drops of water and dust. Whenever there is evaporation of water into the air from the soil, plain, river and seas. When the tiny drops of water get into the sky, it joins other particles like dust which may be present in the sky, and then a cloud is formed (Oktas).When a cloud grows quite large, it becomes heavy and dark .If it comes into contact with a cold wind, it condenses into tiny water. The drops of water may be big enough to fall as rain.

Rainfall

The term rainfall refers to rain and hail .We can also call it precipitation, which includes rain, hail,snow, dew, and fog. The Instrument used to measure the amount of rainfall is called Rainguage.

Types of Rainfall

1. Conventional Rainfall: This rainfall occurs when moisture- laden winds rises as a result of heat that is convection currents. This may also lead to the formation of ice in the sky, and pieces of this ice may fall with the rain as hail.

2. Relief or Orographic Rainfall: This occurs when wind rises over highland or mountain. This type of rain is common around the Jos Plateau.

3. Frontal or Cyclonic Rainfall: Thisoccurs whenever the hot and cold air which extend over arid areas meet, usually the hot air rises over the cold air and frontal rain occurs.

Presentation:

Step 1: Teacher –allow the class to express themselves in their group(s) in response to the question raised.

Step 2 : Teacher-guide the class to demonstrate the differences between weather and climate.

Step 3: Teacher-mobilize the class to identify elements of weather in their respective groups.

Step 4: Teacher-guide the respective group(s) to make their group presentation.

Step 5 : Teacher –stress cogent points of discussion.

Evaluation: Thestudents' are to perform their required activities:

1. Whatis Climate?

2. Explain Weather.

3. Draw the instrument used for measuring temperature and rainfall.

LESSON THREE

TOPIC: Physical Environment

Sub-Topic: Features of Bio-Physical Environment.

Class: J.S. One (Basic7)

Duration : 80 minutes

Period: 1 and 11

SpecificObjectives: At the end of the lesson, students' should be able to:

1. Itemize features of Physical Environment.

2. State three importance of rivers.

3. Differentiate between Highlands and Lowlands.

Reference Books:

1. Odedele M.O.A and Egotanwa M.C (2010) basic facts in general social-studies for junior sec. school Onitsha commercial Agency
2. Omotuyole S.O (2011) social studies for universal basic education 9 Lagos: Omotuyole and Associate

Instructional material:

Key words:

Entry Behaviour :

Introduction:

Content

Features of Bio-Physical Environment

Plains

Plains are lowlands that are below 12ometres, above sea level. They may be undulating or level in nature of sokoto plains, coastal plains

Mountains

Mountains are highlands which are over 6oo metres above sea level and have steep slopes eg Mandara and Gotee maintain

Plateaux

Plateaux are highland areas which have a table top. They are hills with flat tops. A plateau has a gentle sloping surface eg Jos Plateau

Valley

Valley refers to land lying between two hills or mountains often with a river running through. Simply put, a valley can also be described as lowland between two hills.

Delta

A delta is an area of land at a rivers mouth, like a triangle, crossed by branches of the river going into the sea .A delta can also be described as a place where a river enters into an ocean or sea with many mouths eg.-Niger-delta.

Ocean

Ocean is great masses of salt water that cover most of the earth's surface. Ocean form ¾ of the earth's surface. While land covers the rest e.g AtlanticOcean.

Lakes

Lakes are large water bodies that is surrounded by land eg Agulu lakes, Oguta lake, Lake chad, kainji lake and shiroro lake.

Highlands

Highlands refer to area over 300m above the sea level . Areas of highland in Nigeria are grouped into four as follows:

1. **North- CentalHighlands**: This can be formed in kano, Kaduna, Bauchi, Jigawa and plateau states. Jos plateau (2001/2 – 500m) is found in This highlandand serves as a great hydrological centre or water shed with radial pattern of drainage system which rivers like Hadaji at Kaduna and Sokoto took their sour
2. **WesternHighlands**s Western highlands: the western highly or upland is formed in western part of Nigeria around Ondo, Oyo, kwara and Osun states. (Yoruba or kukuruku hills). Importants hill in This area include:

a. Idanre Hill
b. Apata Hill (400-700m)
c. Epeme Hill (350-600m)

Three important rivers that had their sources from This highland are river Ogun, Osun, and Osse

3. **EasternHighlands**: These are found in the border between Nigeria and Cameroon. These include

a) Mandara mountain (1,200-1,500m)
b) Adamawa mountain (1,800-2,400m)
c) Bamenda highland (1,500-2000m)
d) Bin plateau (800m-1000m)
e) Alantika and Shebshi hills(1600m-2000m)
f) Obudu abd Oban hills(1200m)

Rivers Gana, Ngbeda and Yodseram took their sources from these highland/mountain and flow into Lake chad.

4. **EasternScarp Land**:This is found within the eastern region of Nigeria especially around Enugu and Nsukka. The majorm highland in This area is the Udi-Nsukka plateau (300m-600m). Rivers Anambra, Imo and Cross River had their sourced from the scarpland.

Lowland

Lowlands refers to areas below 300m above the sea level. Areas of lowland in Nigeria include;

a. Sokoto Plainsin the North-West (200-300m).
b. Niger Benue trough valley (100-300m).
c. Chad Basin/Borno Plainsn (100-300m).
d. Niger Delta (0-100m).
e. Cross River Basin (120-180m).
f. Interior Coastal Lowland (100-300m).
g. Coastal Plains (0-100m).

Rivers

Rivers are wide natural streams of water flowing between banks into lakes or other wider streams or sea e.g. River Niger, River Benue, River Sokoto, Cross River, Ogun River, Osun River, Imo River, Anambra River, Owena River, Osse River, Kaduna River and Hadeija River.

Importance of River

1. Domestic and industrial uses
2. Irrigation and farming purposes
3. Navigation (water transport)
4. Generation of Hydro-electric power
5. Fishing (Fish Farming)
6. Aiding construction of Dams, e.g. Kainji Dam
7. Exploration of mineral resources e.g. salt and crude oil
8. Research and recreational purposes
9. Employment opportunities
10. Tourist Centre e.g. warm spring.

LESSON FOUR

TOPIC : Physical Environment

Sub-Topic: Vegetation

Class: J.S. One (Basic7)

Duration : 80 minutes

Period: 1 and 11

SpecificObjectives: At the end of the lesson, students' should be able to:

1. Explain the meaning of Vegetation.

2. State importance of Vegetation to Nigerian economy.

3 List three Vegetation belt in Nigeria..

4. Draw the Map of Nigeria showing the Vegetation belts.

Reference Books:

1. Odedele M.O.A and Egotanwa M.C (2010) basic facts in general social-studies for junior sec. school Onitsha commercial Agency

2. Omotuyole S.O (2011) social studies for universal basic education 9 Lagos: Omotuyole and Associate

Instructional material:
Key words:
Entry Behaviour :
Introduction:

Content

Vegetation

Vegetation is part of physical environment and it refers to various plants growing on the earth including trees, shrubs, grassland, deserts, forest, and savannah.

The vegetation of an area will depend on the type of farming activities in such areas. The climate of an area also depends on where and when plants grow.

These invariably determine the sort of food people eat in the particular area. Grassland have dry wind and small quantity of precipitation unevenly distributed throughout the year.

Grassland comprises of grasses, herbs, and shrubs. A desert is a very dry (arid) area. The plants that develop in This area are dispersed. While most of the desert do not have vegetation.

Types of Vegetation

1. Swamp forest
2. Rain forest

3. Guinea Savannah
4. Sudan Savannah
5. Sahel Savannah

Swamp Forest

This type of forest usually has mangrove plants of various species and dense thickest lianas and palm trees. Swamp forest is of two types; fresh water and salt water.

Rain Forest

The rain forest cut across the South Western parts of the country to the Niger and to the Oban Hill in South Eastern Nigeria. It has high annual rainfall and high humidity. The rain forest consists of very tall trees like Obeche tree, tropical cedar tree, and mahogany tree.

Guinea Savannah

In This area, the trees and shrubs form a fairly close canopy. In other areas where Guinea Savannah can be located, trees and shrubs are scattered, trees may also be absent or both trees and shrubs may be absent.

Sudan Savannah

This is found in further north of guinea savannah occupying plains and chad basin. It covers area like Borno, Sokoto and major parts of Kano and Kaduna states respectively. This vegetation zones usually have a mean annual rainfall with short grasses. Trees that can be found in Sudan Savannah include Silk cotton, Baobab, and Acasia.

Sahel Savannah

This zone has a long dry season of about nine (9) months. Vegetation cover in This area is very small with short grasses. The area which Sahel savanna can be found is a very small part of Borno state near Lake chad.

Importance of Vegetation

1. It prevent erosion
2. It provide employment
3. It provide foreign exchange
4. It provide Raw – Materials for production of goods and services
5. It provide cash crops
6. It serves as tourist centres
7. It provides shelter for animals

8. It provides fire – wood for domestic cooking
9. It provides food for sustenance
10. It provides for Economic Trees which enhances construction work.

LESSON FIVE

TOPIC : Environmental Problems

Sub-Topic: Climate Change

Class: J.S. One (Basic7)

Duration : 80 minutes

Period: 1 and 11

Specific Objectives: At the end of the lesson, students' should be able to:

1. Explain the meaning of Environment Problems
2. State causes of Climate Change
3 List three effects of Climate Change as Environmental problems on the Society.
4. Explain solution to the identified Environmental problems.

Reference Books:

1. Odedele M.O.A and Egotanwa M.C (2010) basic facts in general social-studies for junior sec. school Onitsha commercial Agency

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Instructional material:

Key words:

Entry Behaviour :

Introduction:

Content

Environmental Problem

Environment is the land, water and airs that people,animals and plants live in. Environmental problems are the series of difficulties, damages, hazards and harmful effects to the environment.

There are environmental problem in all human societies which can be man-made or natural. Man-made environmental problems are created by man directly or indirectly as he goes about to influence environmental for survival.

Therefore, the goodness of environment depends on its usage. Natural challenge or environmental problems are not caused by man. These include volcanic eruption, earthquakes, tornadoes, hurricanes and cyclones.

The example of world environmental problems is as follows

1. Flooding 2. Erosion 3. Air pollution 4. Land pollution 5. Water pollution. 6. Drought 7. Hurricane 8. Tornado 9. Acid rain 10. Volcanic eruption 11. Deforestation 12. Cyclone 13. Earthquake 14. Desert encroachment 15. Greenhouse effect 16. Global warming e.t.c.

Climate Change

Climate change is defined as measurable increase in the average temperature of earth's atmosphere ocean and land masses. This is as a result of heat trapping gases, known as greenhouse gases in theatmosphere.These greenhouse gases occur naturally, and without them the planet would be too cold to sustain life as we know it.

Climate change is due to massive volcanic eruption, which increased carbon-dioxide in the atmosphere changes in the intensity of energy emitted by the sun, both in its orbit and in the inclination of its spin axis.

Human activities now are factors influencing earth's dynamics climate change has led to melting of mountain glaciers, rising in sea level ,more intense and longer drought , more intense storms, me frequent heat waves and change in the life cycle of manyplants and animals

Causes of Climate Change

Sunlight brings energy to the earth. This light turns to heat when it hits the ground. The heat in turn seeps away from the earth, but the atmosphere slow the heat's escape. The atmosphere is a layer of air around the planet. It holds in some of the warmth.

The atmosphere is a mixture of many gases. In the last 250 years This mixture has been changing. The amount of gases such as Methane and carbon-dioxide has been rising. These gases trap heat more effectively than other gases. They make the earth's atmosphere act like the glass in a greenhouse. It lets sunlight in, but it doesn't let heat out, as a result, heat is building up close to the surface.

Why is the Atmosphere Changing ?

1. People are changing the atmosphere
2. The changes started hundreds of years ago when people began cutting down forests and burning the wood.
3. The invention of cars and other machines greatly increased the amount 0of greenhouse gases released in to the atmosphere.
4. Such machines burn fuels like wood, coal, oil and natural gas
5. When these fuels burn, they add carbon-dioxide to the atmosphere
6. Methane comes from producing coal.
7. Today, the air contains almost one third more carbon-dioxide thn it did in 1750
8. The amount of methane has doubled.

Types of Greenhouse Gases

These include:

1. Carbon-dioxide
2. Methane
3. Nitrous-oxide
4. 4 ozone
5. Synthetic chemicals
6. Aerosols

Is Global Warning Dangerous?

1. Global warming could melt the ice at the poles resulting to flooding.
2. This would raise the level of e oceans
3. Water would then cover all the flat coastal lands.
4. People would have less land on which to live and grow food.
5. Plants and animals are adapted to their climate
6. If the climate changes rapidly, many may not be able to adapt.
7. Some species will simply die out.
8. Others may spread to cooler climate.
9. There, they will be struggling with species already in place.

Can Global Warming be Stopped?

1. Burning less word,coal, oil, and natural gas(e.g) will help stop global warning
2. Scientific recommend that people get more energy from sunlight wild, tides, nuclear energy and other sources that don't burn fuel.
3. Energy sources like these put little or no greenhouse gases into the air
4. Scientist say trees can help to prevent global warning
5. All growing plant takes carbon-dioxide out of the air
6. Trees do This especially well.
7. They turn the carbon part of the carbon-dioxide in wood.
8. They release the oxygen for human respiration
9. In recent years, people have be cutting down all over world.
10. Scientific say vast new forest must be planted

Major Effects of Climate Change

These include

1. Flood
2. Storm (thunder and lightning)
3. Drought & water scarcity
4. Erosion
5. Pollution
6. Shortage of food supply
7. Health Challenges

Solutions to Climate Change

1. Industries should control the release of carbon-dioxide into the atmosphere
2. Industries should reduce the use of fossil-fuel
3. Individuals at home should switch off electrical appliances when not in use (such as bulb, fan, television, air conditioner and refrigerator, e.t.c)
4. Turn of the water tap and reduce your use of water when brushing your teeth, washing platesand clothes, and when taking your bath
5. Ensure going to school and or work in public transport as against personal car.
6. Ensure cycling and promote the use of bicycle as against carbon-dioxide generating vehicles.
7. Reduce your waste generating culture
8. Government should enact law for preservation and conservation of the environment
9. We should develop proper ways of disposing waste and harmful materials that are not environmental friendly
10. We should all ensure environmental friendly behaviour, habit, and practices.

LESSON SIX

TOPIC : Physical Environment

Sub-Topic: Natural Resources.

Class: J.S. One (Basic7)

Duration : 80 minutes

Period: 1 and 11

Specific Objectives: At the end of the lesson, students' should be able to:

1. Explain the meaning of Natural Resources in our Environment.
2. Differentiate between Renewable and Non –Renewable Resources
3 List three ways of conserving resources in the Society.
4. Explain solution to Environmental problems.

Reference Books:

1. Odedele M.O.A and Egotanwa M.C (2010) basic facts in general social-studies for junior sec. school Onitsha commercial Agency

2. Omotuyole S.O (2011) social studies for universal basic education 9 Lagos: Omotuyole and Associate

Instructional material:

Key words:

Entry Behaviour :

Introduction:

Content

What are Natural Resources?

1. Natural resources are all the things on earth that support life, plants, animal, air, and water are natural resources.

2. Natural resources are also things that people use to make life easier,

3. Your life is easier because you can ride in a bus powered by gasoline

4. You can cook your dinner in a microwave oven powered by electricity.

5. People use natural resources to make gasoline and electricity

6. There are different kind, of natural resources which are renewable and Non- renewable.

Renewable Resources

1. Renewable resources can be replaced
2. Plants are renewable resources
3. Plants might set cut-down, butthey can grow back
4. Animals are renewable resources they can reproduce
5. Solar energy is a renewable resource from the sun.
6. No matter how much solar energy you use, there will always be men
7. Wind, Water and soil are also renewable resources.

Non- Renewable Resources

1. Non- renewable resources can be replaced easily
2. fossil fuel are non- renewable resources
3. Coal, oil and natural gas are fossil fuels.
4. Fossil fuels come from plants are animals that died millions of years ago.
5. We are using up fossil fuels and faster than earth can replace it
6. Ores comes from rocks that for millions of years ago
7. We use ores to make metals.
8. Ores cannot be replaced.

Conserving Renewable Resources

1. We need to use renewable resources insely its important to plant a tree- for every tree cut down
2. Conservationists look for ways to protect wilderness areas
3. Governments set up national parics to preserve unusual areas.
4. Logging, Mining, hunting and other activities' that use up natural resources are usually not allowed in national parks
5. Even our endless supply of air and water must be protected.
6. Factories, power plants cars and frocks give off smoke that pollutes air
7. Families on vacation can then enjoy the parks and plants and animals that live in them
8. Some factories dump chemicals on to lakes and rivers.

9. Polluted air can make us sick
10. We cannot drink polluted water
11. Fish die in polluted lake and river
12. It is important to keep air and water clean
13. Some – maces on earth have pleating of water, but deserts and other place.
14. It is necessary to conserve so that everyone has enough to drink and use for watering

Conserving Fossil-Fuels and Oil

1. One way to save fossil fuels to use less of them
2. Engineers are building cars useless gasoline
3. New furnaces burn less oil or no gas to heat buildings
4. Energy – efficient refrigerators air conditioners useless electric power
5. Scientists are experimenting in plants and animals are adapted to their climates.
6. Scientists are looking for ways to use solar power and the energy in the blowing wind.
7. They are looking for safe way to se the power that comes from tiny bits of matter called atoms.
8. Recycling is a popular way to conserve natural resources.
9. Recycling means collecting things so that they can be re-used rather than thrown away.
10. We can recycle papers and gift wrappers.
11. We can recycle glass and plastic bottles.
12. We can recycle coke cans.
13. Everybody can do something to conserve natural resources.

Conventional Strategy (Pre-test) Activities

Conventional Strategy (Pre-test) Activities

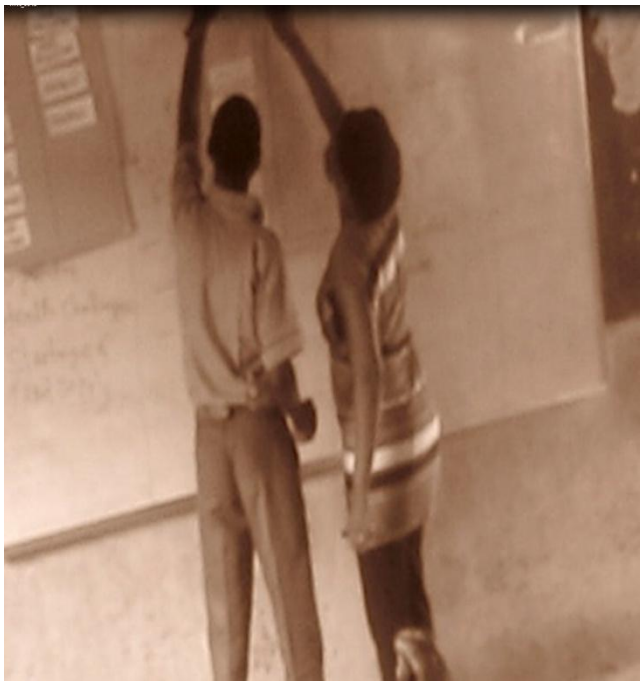
Conventional Strategy (Treatment) Activities

Conventional Strategy (Treatment) Activities

Mentoring Strategy (Treatment) Activities

Mentoring Strategy (Treatment) Activities

Mentoring Strategy (Treatment) Activities



Mentoring Strategy (Treatment) Activities

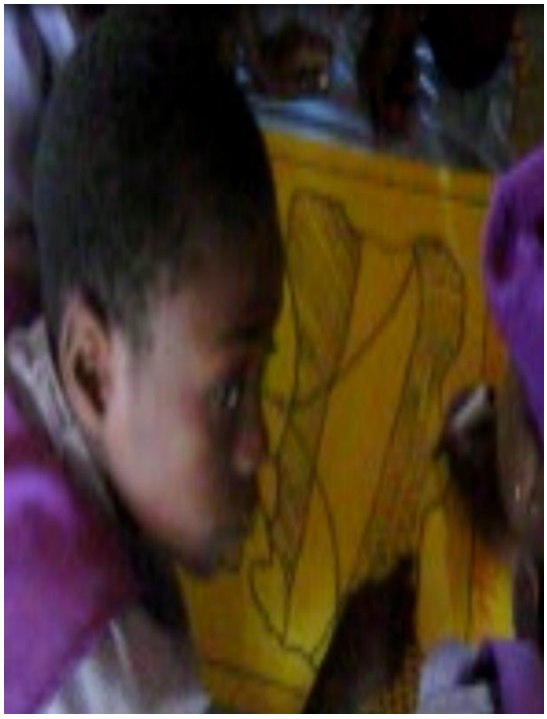
Field Study Strategy (Treatment) Activities

Field Study Strategy (Treatment) Activities

Field Study Strategy (Pre-Test) Activities

Field Study Strategy (Pre-Test) Activities

Mentoring Strategy (Treatment) Activities



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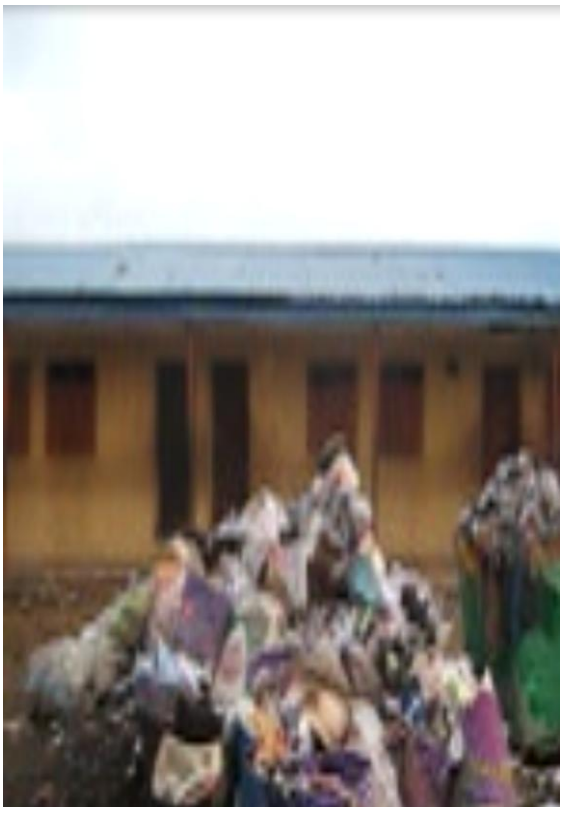

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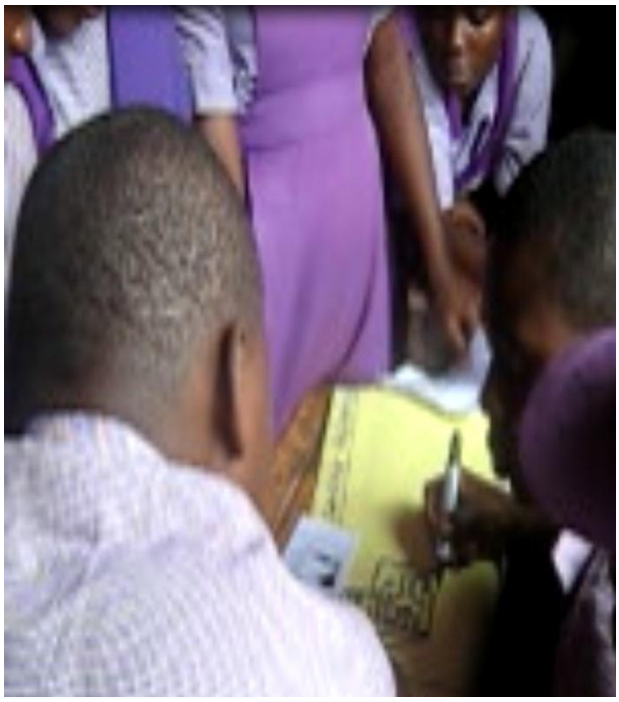

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Field Study Strategy (Treatment) Activities

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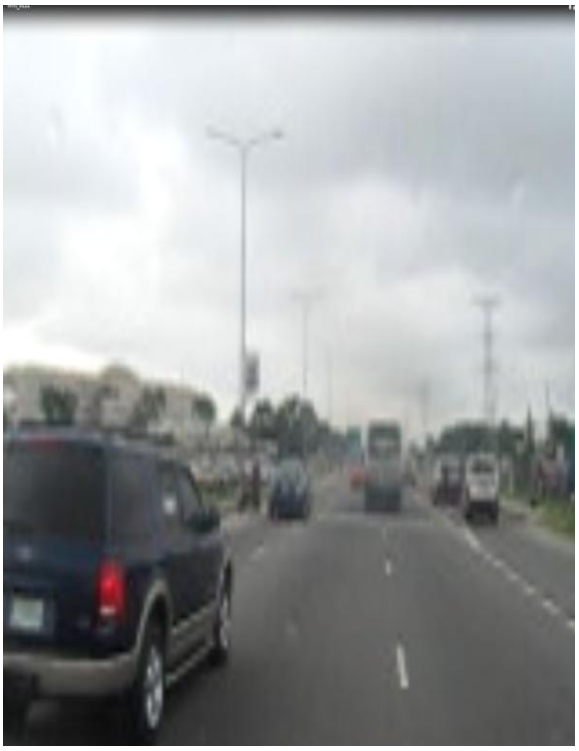

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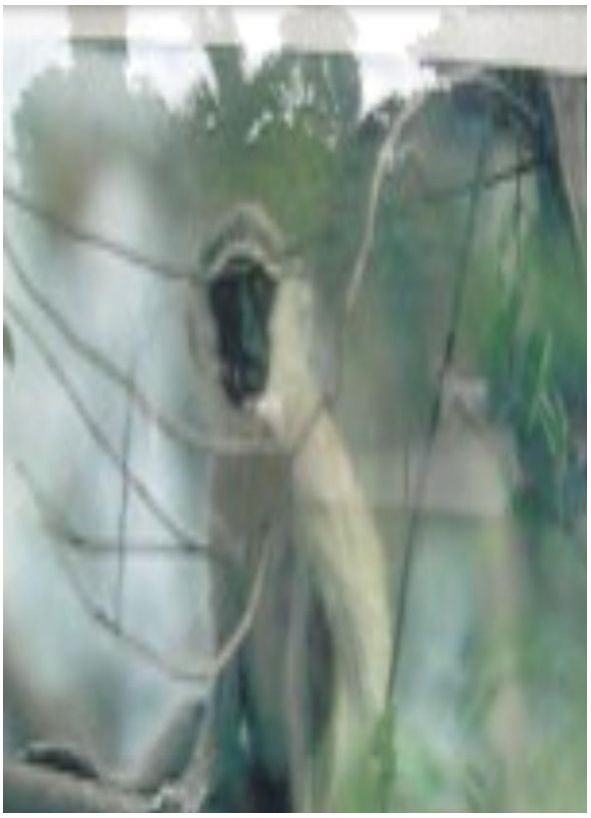

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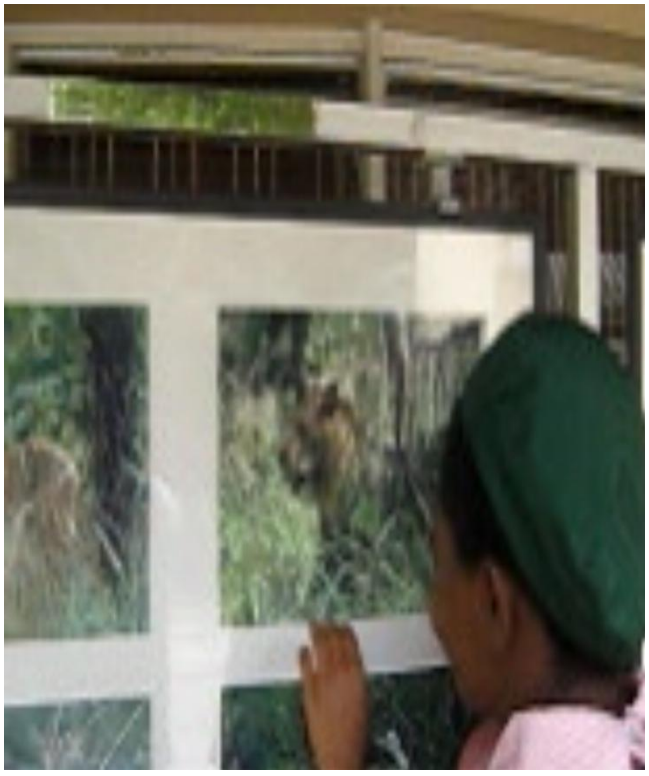

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Conventional Strategy (Treatment) Activities

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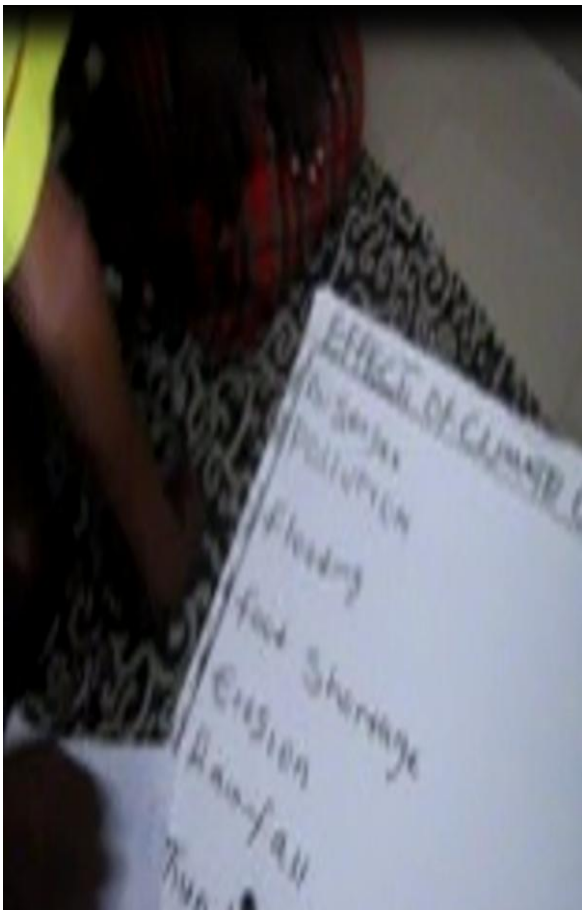
Air Pollution

Global Warming

Mentoring Strategy (Treatment) Activities

Mentoring Strategy (Treatment) Activities

Mentoring Strategy (Treatment) Activities



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