APPLICATION OF 4DS OF CURRICULUM MODEL AS PARADIGM FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS IN NIGERIA

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ABSTRACT

The Sustainable Development Goals (SDGs) were formulated to secure economic development and ensure social equity among others. To achieve the goals, universities have been assigned the responsibility to educate students for sustainable development through the transformation of the curricula to integrate Education for Sustainable Development (ESD). While several universities have transformed their curricula to accommodate ESD, extant literature however, has shown that the existing curricula are not adequate to achieve the SDGs. Previous studies largely focused on efforts made by governments to achieve the goals with little emphasis on the curriculum model to be adopted by Nigerian universities to integrate ESD into their curricula. This study, therefore, was carried out to apply 4Ds (develop, design, demonstration and dissemination) of curriculum model in designing curricula on ESD for undergraduates in Nigeria as a paradigm for achieving the SDGs by 2030.

Situation Analysis Curriculum Design Model provided the framework, while the mixed method design was adopted. The study was carried out in four stages. The development stage employed cluster sampling to group South-western states into three zones (Lagos/Ogun, Oyo/Osun and Ondo/Ekiti). From each zone, three universities were randomly selected, making a total of nine universities. From each university, 250 undergraduates were randomly selected; 1,852 undergraduates participated in the need assessment. The demonstration stage employed purposive sampling in selecting three experts who validated the curriculum. FOR the dissemination stage, a trial testing was carried out at the University of Ibadan in which two departments (Chemistry and Classics) were randomly selected. The intact classes of 200 and 300 levels of the two departments were involved. Instruments used were Curriculum on Education for Sustainable Development Needs Assessment Questionnaire with three subscales: Awareness (r=0.87), Practices (r=0.85) and Knowledge (r=0.96), Curriculum on Sustainable Development Implementation (r=0.89), Curriculum on Education for Sustainable Development Participants' Perception (r=0.95) scales and Key Informant Interview guide. Quantitative data were analysed using descriptive statistics and Pearson product moment correlation at 0.05 level of significance, while qualitative data were content analysed.

The development stage showed that undergraduates' awareness ($\bar{x}$=2.07; SD = 0.52), knowledge of sustainable development ($\bar{x}$= .92; SD = 0.02) and Nigerian universities sustainable practices ($\bar{x}$ = 2.10; SD = 0.07) were low (using the threshold of 2.50 as the criterion norm). Majority (64.7%) of the participants at the needs assessment stage were females, while 50.6% were from sciences. Demonstration results showed a measure of agreement amongst the validators on the objectives; (FOR 5,10)=3.65), the content (F (5,10)=7.44) and classroom utility (F(5,10)=6.61) of the curriculum in achieving sustainable development education. Dissemination results showed that participants perceived the curriculum as relevant in achieving the SDGs such as inclusive and equitable education for all, conservation of earth's resources, combating climate change, promotion of inclusive economic growth and partnership building, among others.

The 4Ds of curriculum model provided a paradigm for designing curricula on ESD for universities in Nigeria. Universities in Nigeria should adopt this model of curriculum design in order to achieve the SDGs.

Keywords: 4Ds of curriculum model, Sustainable Development Goals, and Curriculum on education for sustainable development.

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CERTIFICATION

I certify that this work was carried out by Mr. S. O. Babalola of the Curriculum and Instruction Unit in the Department of Arts and Social Sciences Education, University of Ibadan.

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DEDICATION

This work is dedicated to the Almighty God for His mercies. To Him alone be all the glory.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The Millennium Development Goals (MDGs) were adopted in September 2000 by United Nations Heads of States to confront the problem of poverty and promote sustainable development. The time-bound goals sought to get ridof severe poverty and hunger; achieve universal primary education; promote gender equality and women empowerment; lower child mortality; advance maternal health; prevent HIV/AIDS; maintain environmental sustainability; and foster a global collaborationfor development. These goals were to be attained by the year 2015. The United Nations Development Programme (UNDP) (2005) report noted that the MDGs being the most widely supported, detailed, and specific poverty reduction goals the world has ever launched, is too crucial to fail. The (MDGs), according to UNDP (2005) can be summarised thus:

> Forthe global political system, they are the pivot on which development strategy is centered. Forthe people living in abject poverty, they represent the means to a productive life. foreveryone on the globe they are a linch-pin to the quest for a more secure and peaceful world (p. 28)

Consequently, all member countries who were signatories to this millennium declaration went ahead to work by formulating policies and programmes in order to achieve these lofty goals.

However, these goals were not fully achieved in Nigeria due to several factors among which are: non-inclusion of education as a vehicle to drive its implementation; endemic corruption; lack of conceptualisation of the goals by implementers and the people; lateness in the implementation of the goals; inadequate and unreliable data system; absence of periodic appraisal and supervision of the execution of the goals; lack of human capacity in implementation and finance. (UNESCO, 2015; Ajiye, 2014; Ajulor, 2013)

While it can be said that Nigeria did not record a hundred percent success in achieving the eight goals of the Millennium Development, yet Nigeria has made significant improvement from where it used to be before the goals were set in year 2000. As observed by Ajiye (2014), Nigeria recorded significant improvement in the area of developing global partnership for development which led to the cancellation of Nigeria's foreign debt by the Paris Club and the London Club; increased war against polio, HIV/AIDS and relatedinfections; promotion of gender parity and women empowerment; introduction of the Universal Basic Education Scheme; and the introduction of poverty alleviating policies all of which contributed to the declining trend of these problems in Nigeria. Similarly, Abdulgafar, Ibrahim and Alasinrin (2013) stated that even though Nigeria is far-away from realizing the Millennium Development Goals, it recorded a good performance in taming maternal health; fighting HIV/AIDS; environmental sustainability and development of global cooperationfor development.

The United Nations Secretary General while assessing the impact of the Millennium Development Goals in the Millennium Development Goals Report (2015), observed that the world over, the MDGs recorded a great success in reducing the scourge of poverty amongpersons; empowering less privilege women and girls especially in rural areas; improving health and well-being; providing vast opportunities for better lives; improving gender parity; targeting investments in confronting diseases like HIV/AIDS, malaria and reducing maternal mortality. According to him, the achievement of the MDGs shows that with goal setting and careful implementation a generation can be taken out of poverty when governments, business and civil societies work together.

Therefore, in an effort to consolidate the success of the MDGs, a new course has been charted for the world through the sustainable development agenda adopted in September 2015 by Heads of states in New York. The Sustainable Development Goals (SDGs) programme is represented in a seventeen (17) series time-bound fifteen year (2015 – 2030) goal, which aims primarily at providing economic development, fostering social equity and justice and maintaining environmental protection. Through the Sustainable Development Goals (SDGs) the United Nations hope to achieve the following lofty goals by the year 2030:

1. Put an end to all forms of poverty everywhere in the world.
2. Put an end to hunger by achieving food security and improving nutrition through promotionof sustainable agriculture.
3. Promote healthy lives and well-being for all at all ages.
4. Provision of inclusive, equitable and quality education with lifelong learning opportunities for all.
5. Ensure gender equality and empower all women and girls.
6. Ensure availability and sustainable management of water and sanitation for all.
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation.
10. Reduce inequality within and among countries.
11. Make cities and human settlements inclusive, safe, resilient and sustainable.
12. Ensure sustainable consumption and production.
13. Take urgent action to combat climate change and its impacts.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt reverse land degradation and halt biodiversity loss.

16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

17. Strengthen the means of implementation and revitalize the global partnership for sustainable development. (UNDP 2015)

Several of the new SDGs were previously included in the MDGs as targets or indicators. Forexample, the need for employment for all was a target under first MDG, whereas the need to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation was a target under MDG 8 While MDG 7 included an indicator to measure CO_2 emissions. This is why Osborn, Cutter and Ullah (2015) maintained that the SDGs being the offshoot of the MDGs sought to provide a comprehensive vision and structurefor the development of all member states in the years ahead.

Sustainable Development as observed by Centre for Environment Education (CEE) (2007) is economic advancement that promotes a nation's overall prosperity. Before the emergence of the sustainable development era, the only parameter used in measuring the economic growth of any country is the Gross Domestic Product (GDP) which has its limitations. FOR example, as pointed out by CEE (2007), the Gross Domestic Product (GDP) measures the amount of money being spent in a country and it is assumed that the more money being spent, the higher the GDP and the better the overall economic well-being of the people. This assumption disregards the effect of such developmental activities on the community's social and environmental health. In essence, the Gross Domestic Product (GDP) can go up even when the overall community health and social well-being goes down.

Hence, while Gross Domestic Product (GDP) may indicate economic growth, it failed toput in to perspective the standard of living of an individual and their social and environmental well-being. Sustainable development focuses on improving the quality of life for all of the earth's citizens without increasing the use of natural resources beyond the capacity of the environment to supply them indefinitely. This approach to

development that does not compromise the social well-being of the people and of the environment is what is referred to as sustainable development. Thus, it is not only necessary but important for a country like Nigeria that is not only in a hurry to develop but to develop on a sustainable basis.

In essence, emphasis has shifted from development that ensures only economic growth to development that has capacity to ensure growth together with equity where social justice, equal opportunity and access for all the people in the country's prosperity are the major concern.

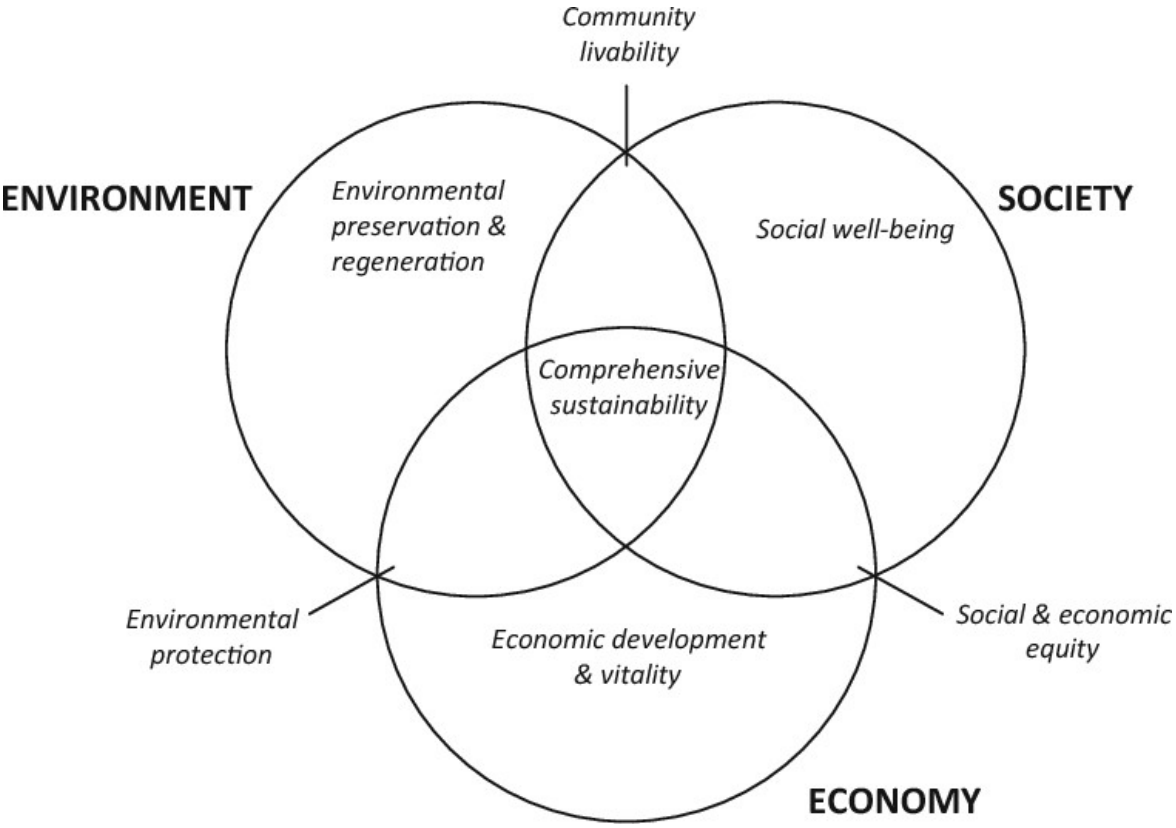


Fig. 1.1. Comprehensive Sustainable Development interactions of the society, economy and the environment

Source: Brodmann and Spillmann (2000 P.8)

Figure 1.1 showsclearly, the interactions that should exist among the components of sustainable development (environment, economy and the society) in a situation where the development is sustainable and not measured on the basis of gross domestic product

only. It explains the need to have a balanced development that takes into considerations several factors like;environmental protection, social and economic equity and other factors that promotes community livability. With this concept of development, two things are evident: development ensures continuous economic growth and development is concerned with human and environmental well-being. In a situation where this development is operational such a development can be confidently referred to as sustainable development.

As pointed out by the United Nations SDGs Implementation Framework (2015), the implementation and success of the SDGs relies on countries' sustainable development policies, plans and programmes, and individual countries is expected to lead their programmes and policies. This implies that each member country of the United Nations is expected to design policies, and programmes relevant to achieving the SDGs using their socio-cultural realities, and national peculiarities. In the same vein, governments are expected to develop national indicators to assist in monitoring the progress made on the goals and targets. The means of implementation of the SDGs is to be monitored using a set of indicators to be developed by Members States in March 2016 and reviewed in line with the Addis Ababa Action Agenda which is the document to ensure financial resources for the sustainable development agenda.

Furthermore, implementing the Sustainable Development Goals as outlined by UN SDG Implementation Framework (2015) is a multi-stakeholder process that should engage national and local governments, civil societies, multi-national corporations and representatives from the academia and the sciences. The national governments are the duty bearers of the SDGs. They are expected to embark upon a comprehensive programme of implementation, developing a national strategy and establishing multi-stakeholder advisory groups to support implementation. Governments are expected to show strong public commitment to implementing the SDGs and be accountable to the citizens through national formal and informal mechanisms. The civil society groups are expected to play the key role of ensuring that government strategies target all segments of the society and ensure accountability for SDG implementation.

More importantly, the academia is expected to play an active part in planning and implementation process. Through research and development, they can create and evolve new ideas and technologies that can help to implement and monitor the agenda through collection, analysis and interpretation of primary data. Specifically, universities are expected to educate new generation of sustainable development experts, and play a vital role in creating public awareness, embark on long term educational design and planning to support the implementation of the SDG plans.

In spite of the fact thatseveral frameworkshave been put in place to achieve the Sustainable Development Goals by the United Nations and Member States by 2030, several scholars, multinational agencies and civil organisationsshare a common opinion that one of the potent and long term instruments that should be carefully utilisedfor the ultimate realisation of the SDGs is education.In its publication, UNESCO (2012),maintained that Education for Sustainable Development (ESD) is much more than communicatingthe information, skills, values and competencies associatedwith sustainable development. Teaching and learning (Education) for Sustainable Development in its popular conception is teaching and learning for societalreorientation and reconstruction with the focus geared towards inventing new viable communities. Education for Sustainable Development affects all facets of human life and activities including; education, policy development, programme planning and execution, business, curriculum development, teaching and learning, assessment and administration. Education for Sustainable Development aims to offer an articualte interaction between education, unrestricted public consciousness, and training with the focus of re-inventing an excellent sustainable future for all.

Similarly, as pointed out by Bokova the Director General of UNESCO in UNESCO's publication tilted, 'Shaping the Future We Want' (2014:16); education is the most effectivetool to achieve sustainable development. Fiscalpolicies, technological inventions and interventions, political directives or monetary incentives are not enough. There is need for anessentialmodification in the manner of people's thinking and action.

The United Nations (UN) in recognising the relevance of education in achieving sustainable development in 2002 took a bold step when it launched a programme it

declared as Decade of Education for Sustainable Development (DESD, 2005-2014) and it named The United Nations Education, Scientific and Cultural Organisation (UNESCO) as the lead agency for the implementation of the programme. The focus of the programme was to promote sustainable development through global campaigns to transform educational systems so they can better equip learners with skills and knowledge to survive and thrive by the long term challenge of sustainability.

Teaching and learning (education)for sustainable development is a comprehensive goal towards transforming education to respond to the difficulties of sustainability by equipping learners at all levels with competencies and viewpoints required to respond to the challenges of sustainable development and to contribute to the achievement of SDGs. (UNESCO, 2014) Accordingly, higher education institutions (HEIs) due to their strategic nature have been assigned a crucial role in making positive input into the execution of sustainable development through education for sustainable development. This is because, universitystaff produceshuge numbers of graduate every year in all specialties and are in a convenient place to cultivate and promote the values, knowledge and skills of sustainable development in their respective institutions. (Leal, 2015)

In response to this assigned role, Leal (2015), pointed out that some universities in North America, Europe and Asia are examples of universities that have institutionalised sustainable development education into their operations. These universities include; Yale University, Columbia University as well as the University of British Columbia in Canada, University of Lüneburg, University Zittau-Görlitz or the Hamburg University of Applied Sciences (in Germany). Also, The University Saints Malaysia, University of Hong Kong and Tokyo University are examples of what is happening in Asia, whereas in Latin America and Africa the University of Sonora (Mexico) and University of Nairobi can be cited as other examples. (Leal, 2015; pg. 11)

While universities in different parts of the world are making effort at introducingEducation for Sustainable Development (ESD) into their curricula and university operations through teaching, research and sustainable campus practices as a means to achieving sustainable development goals by 2030, the concept remains largely an emerging interest among higher education institutions (HEIs) in Africa, especially Sub-Saharan Africa. (UNESCO, 2014) This is because the concept has not been fully

explored in Africa and only few universities in Egypt, Kenya and South Africa have an integrated campus approach to sustainable development. The situation is not any different in Nigeria as proactive efforts have not been taken by universities to actively incorporate Education for Sustainable Development into teaching, research, curricula and campus practices. This has created a wide gap on the concept of sustainable development among Nigerian undergraduates as many do not have a detailed knowledge of the concept of sustainability and the Sustainable Development Goals (SDGs) and its direct implications on their social, economic and environmental development.

Omisore, Babarinde Bakare and Asekun-Olarinmoye , (2017) identified one of the problems of the MDGs to be low level of awareness among actors as many of the stakeholdersare ignorant of their responsibilities in promoting the achievement of the goals.One of the platforms through which proper awareness of such goals could be effectively communicated is through an organised curriculum in a school system. However, this was not the case in Nigeria during the era of the MDGS. Consequently, it can be said that one of the factors that made the attainment of the Millennium Development Goals (MDGs) problematic in Nigeria could be attributed to the absence of anorganised curriculum throughwhich the goals could be communicated to the people at all levels of formal education.

Forinstance, many university graduates did not have the detail knowledge of what the MDGs was about until they got to the National Orientation Camps during their compulsory one year National Youth Service Scheme. It was through the effort of a Non-Governmental Agency known as the MDG Club at the Camp that some graduates camedirectlyincontact with the meaning of the Millennium Development Goals for the first time. It is imperative to say that the activities of this club and the training they provided for the graduates cannot be categorised as structured and formal. The absence of a structured and organised curriculum led to the situation where the Millennium Development Goals were not made ready to be taught in a formal school system. This created a hugeknowledge deficit which made it extremely difficult for people to understand the relevance and importance of the goals to their social, economic and environmental well-being. This widespread ignorance of the Millennium Development

Goals also made it difficult for government to adequately mobilise support for the goals among the citizens since many are uninformed of its purpose and importance.

It is imperative therefore, that for the Sustainable Development Goals (SDGs) not to end the same way, there has to be a structure put in place to develop a formal curriculum that will transfer the goals into education. Thus, it becomes necessary to re-orient university education in Nigeria to accommodate and promote the execution of the Sustainable Development Goals (SDGs). The need to reorient education to accommodate Sustainable Development has a direct implication on education and especially the curriculum process. This is because as observed by Huebner (1966) curriculum is the heart and soul of education and nothing can meaningfully take place in the school without being reflected by the curriculum. This implies that whenever there is need for an improvement and innovation in education so as to address the increasing and ever dynamicnecessities of the society, it becomes the duty of the curriculum development process to bring it into to effect.

Curriculum development process is a complex process that requires time and resources working together coordinately, especially if the objective is to develop a curriculum which extends beyond a local context. The Netherlands Institute for Curriculum Development (2009) observed that curriculum development is a process that incorporates educational aspirations together with values in a manner of constructing, applying and appraising to attainreal tangible outcomes. Furthermore, Lewy (1991) sees curriculum development as a process of not just writing instructional objectives, selecting contents, organising learning activities and stating evaluation procedures but as a dynamic process which involves various people and variables working together. As pointed out by Kolawole (2015), curriculum development is explained as the process by which choices are made in designing learning activities for students so that they reach their optimum.

The process of curriculum development is best understood througha model. A model, in curriculum development is a framework used in conceptualising the components of a curriculum that is to be designed. Mulenga (2014) explain curriculum development model as a framework for organising and planning what students are expected to specifically learn in a subject. According to him, what students are expected

to learn are based on selected and specific learning outcomes as well as learning experiences, instructional strategies and method of determining if the selected learning outcomes have really been learnt while, Mc Neil (1985) sees curriculum model as a means through which the components and structure of curriculum is being represented. Often time, the representation of a curriculum model is done through diagram and many of the models are named based on their graphic representation. Curriculum models serve the purpose of providing structure in delineating each of the components of the curriculum and it shows areas of interactions among the components of the curriculum.

There are several models of curriculum development. Tyler (1949), proposed the 'Objective Model' where he explained that the elements of a curriculum are essentially four. According to Tyler (1949), curriculum process starts with objectives, contents, method and evaluation. He believes that listing curriculum objectives should be the first logical thing to be done in curriculum process and that it is after the objectives have been listed that other elements can be identified. Evaluation is considered as the last and final stage of curriculum process.While the Tyler's Objective curriculum model could be classified as one of the earliest curriculum model several scholars have also made attempt to propound other curriculum models with their distinctive features. For example, Wheeler (1967) proposed a cyclical model of curriculum development. He maintained that curriculum process is a continuous and a never ending activity and that in as much as the society continues to evolve, the curriculum process will continue to engage and confront issues of development in the society and this process of continuous engagement of these issues is what makes curriculum development process cyclical. He identified five stages of curriculum development and they are: Aims, goals and objectives, selection of learning experiences, selection of content, organization and integration of learning experiences and content and evaluation. He explained that these elements are interdependent and not independent like the ones identified by Tyler.

Skilbeck (1984) propounded situation analysis curriculum design model. In the model, he identified five stages or elements of curriculum development to include: situation analysis, goal formation, programme building, interpretation and implementation and monitoring, feedback, etc. In his submission, Skilbeck submitted thatbefore attempt is made to work on any of the elements which he described as

interactive, effort must be made to undertake a situation analysis. Situation analysis is required to take stock of existing factors that could hinder the process of curriculum development.It also helps curriculum experts to approach the process of development with informed and rational judgment. He sees the identified elements as a whole but he argued that their development can be done systematically.

Similarly, Netherlands Institute for Curriculum Development (2009) in propounding a model for curriculum development identified five elementsthat should be included in developing a curriculum to include: analysis, design, development, implementation and evaluation. Kerr (1968), in propoundinganother model of developing a curriculum identified four stages of curriculum development to include: aims and objectives, knowledge, school learning experience and evaluation while Kolawole (2015), identified eleven (11) stages of curriculum development.

Curriculum development is that larger whole that encapsulates design, demonstration dissemination and evaluation. Curriculum design as a stage in curriculum development process is concerned with identifying, determining and arranging of goals, subject matter, relevant instructional materials and means of evaluation. On the other hand, curriculum demonstration is a process that is concerned with authenticating and ascertaining the functionality and relevance of the designed curriculum by curriculum experts and professionals using criteria to test the veracity of the assumptions of the curriculum. Furthermore, curriculum dissemination is a crucial process concerned with bringing the designed and demonstrated curriculum in contact with the learners in the classroom situation with the guidance of a teacher. Evaluation, which often times comes last in the process of curriculum development, is the process of making informed curriculum decision on learners' performance and the curriculum using assessment techniques to evaluate both the long and short term planning of a curriculum. This however, occurs after the developed curriculum has been implemented over the period of certain number of years.

A critical examination of the curriculum models earlier discussed showed that opinion varies among the scholars on the number of stages that should be involved in curriculum development process. However, there are core and important stages that cannot be left out in any modelof curriculum development and these stages are central to

all models of curriculum development. These important stages are: aims, goals and objectives, selection of contents, design; implementation, validation and the stage of evaluation. For the purpose of this study, these important stages in curriculum developmenthave been summarised into four (4) distinct stages of development (conceptualizing, need assessment), design (organisation of curriculum frameworks), demonstration (validation) and dissemination(tryout) with each of the first acronym rendered with a letter D thereby providing the 4Ds model.

While several authors have agreed with the proposition of Skilbeck (1984) with regard to the need to initiate a need assessment analysis as the entry point to curriculum development, there is no unified approaches to the number of stages to be taken to conclude the process of curriculum development as it varies from one author to another.

Consequently, due to the significant role of education especially Education for Sustainable Development (ESD) as an important implementation framework to achieve Sustainable Development Goals and due to the fact that United Nations have specifically placed the responsibility of training new generation of leaders in sustainable development on universities, it is imperative for universities to respond by putting in place programmes that will drive the achievement of these goals. Therefore, this study applied 4Ds of curriculum model to design a workable curriculum on sustainable development as paradigm for achieving the Sustainable Development Goals (SDGs) in Nigeria.

2.1 Statement of the Problem

The Sustainable Development Goals (SDGs) which was designed to consolidate the gains of the Millennium Development Goals (MDGs) is a United Nations fifteen year development agenda, aimed at securing economic development, social equity and environmental protection. Education for Sustainable Development (ESD) is among several frameworks identified by the United Nations to facilitate the implementation of the Sustainable Development Goals because of its overarching importance in promoting education that empowers people of all ages to assume responsibility in creating a sustainable future. Reports however, have shown that not much attention has been paid to the use of education as a tool for promoting sustainable development in Nigeria. Previous studies focused largely on promoting basic literacy and explaining the meaning,

importance and benefits of adopting Education for Sustainable Development to Nigerian educational system with little attention given to developing an organised curriculum for sustainable development. This study therefore applied 4Ds (develop, design, demonstrate and disseminate) of curriculum model to design a curriculum on Education for Sustainable Development for university undergraduates in Nigeria as a paradigm for achieving Sustainable Development Goals in Nigeria by 2030 and beyond.

1.3 Research Questions

This study provided answers to the following research questions

1. Would undergraduates' level of awareness of Sustainable Development substantiate the need for curriculum in Education for Sustainable Development in Nigerian universities?
2. Would undergraduates' level of knowledge of Sustainable Development Goals authenticate the need for curriculum in Education for Sustainable Development in Nigerian universities?
3. To what extent would the level of Sustainable Development practices of Nigerian universities substantiate the need for curriculum in Education for Sustainable Development in Nigerian universities?
4. To what extent do the objectives of the developed curriculum on Education for Sustainable Development promote the acquisition of Sustainable Development competencies among students in Nigerian universities?
5. To what extent does the content of the curriculum on Education for Sustainable Development deal with local sustainable challenges in Nigeria?
6. To what extent do learners during pilot testing perceive the content of the curriculum on Education for Sustainable Development in acquiring competencies needed to deal with sustainable development challenges in Nigeria?
7. What are the observers' assessments of the classroom utility of the curriculum on Education for Sustainable Development?
8. What are the learner's perceptions of their learning outcomes in the curriculum on Education for Sustainable Development during trial testing?

1.4 Scope of the Study

This study applied 4D's of curriculum model to design sustainable development curriculum for undergraduates in universities in South-West Nigeria. The sustainable development curriculum was validated by curriculum experts, instructional technology environmental experts, and environmental/sustainable development experts. The validated curriculum on education for sustainable development was trial tested in a selected public university in South-West Nigeria using trained facilitators and research assistants. The trial testing was done to determine the validity and classroom utility of the curriculum on education for sustainable development in promoting sustainable development competencies among undergraduates in Nigerian universities with the focus of achieving Sustainable Development Goals in Nigeria.

1.5 Significance of the Study

The study adhere to the principles of curriculum development to produce a curriculum on education for sustainable development which was tried out with university undergraduates to expose them to the principles, skills and competencies in sustainable development to facilitate changes in behaviour as a basis for promoting the achievement of the Sustainable Development Goals. The study would sensitize universities in Nigeria to their responsibility in greening their curricular to accommodate Education for Sustainable Development and also to improve their campus sustainable practices. It is anticipated that the study would sensitise policy makers to the need to give sufficient attention to Education for Sustainable Development as an instrument to mobilize support for the implementation of Sustainable Development Goals as prescribed by The United Nations. It is also believed that the awareness this study created would inform the government to come up with an action plan on how to effectively engage and harness the newly designed curriculum on education for sustainable Development as aninstrument to promote the attainment of the Sustainable Development Goals in its educational system.

Similarly, it is anticipated that the Curriculum on Education for Sustainable development would become a framework aimed at extensive execution of teaching and learning (education)for Sustainable Development programme in Nigerian universities while it is hoped that the findings in this study would stimulate the interest of researchers to carry out studies in Education for Sustainable Development. Lastly, it is expected that

the study would be an addition to the field of curriculum development and design that researchers and students in the field of Curriculum and Instruction would find useful.

1.6 **Definition of Terms**

Application: The utilisation of curriculum development variables inproducing a newly developed curriculum on education for sustainable development to be usedin a practical teaching and learning situation.

Curriculum Model: This refers to a framework that guides the selection of objectives, contents, learning activities and assessment of curriculum design and promotes the design of a workable curriculum.

4Ds: In this study, 4Ds refer to curriculum Development, Design, Demonstration and Dissemination.

Paradigm: This refers to an established pattern or a theoretical framework for implementingsustainable development.

Sustainable Development: This refers topresent economic, environmental and social growth of the individual and the larger society without compromising the economic, environmental and social growth of the future generations.

Curriculum in Education for Sustainable Development: This refers to an organised body of knowledge to promote the acquisition of ideals, principles and competencies that underlie sustainability.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Related literature for this study was appraisedusing the under-listedsub-topics and sub-headings.

2.1 Theoretical framework

2.1.1 Situational Analysis Curriculum Design Model (SACDM)

2.2 Conceptual Review

2.2.1 The Concept of Sustainable Development

2.2.2 The Paradigm of Sustainable Development

2.2.3 Sustainable Development Goals

2.2.4 Sustainable Development Goals Implementation Framework

2.3 Empirical Review

2.3.1 Education for Sustainable Development (ESD)

2.3.2 Evaluation of United Nations Decade of Education for Sustainable Development (DESD) (2005 – 2014)

2.3.3 The Nature and Scope of Education for Sustainable Development

2.3.4 Developing a Curriculum to Drive Sustainable Development

2.3.5 Competencies that should be fostered in Sustainable Development Curriculum in Universities

2.3.6 Methods of Evaluating Students' Learning in Education for Sustainable Development

2.3.7 The Role of Higher Education in Achieving the Sustainable Development Goals

2.3.8 Activities of Universities in Promoting Education for Sustainable Development

2.1 Theoretical Framework

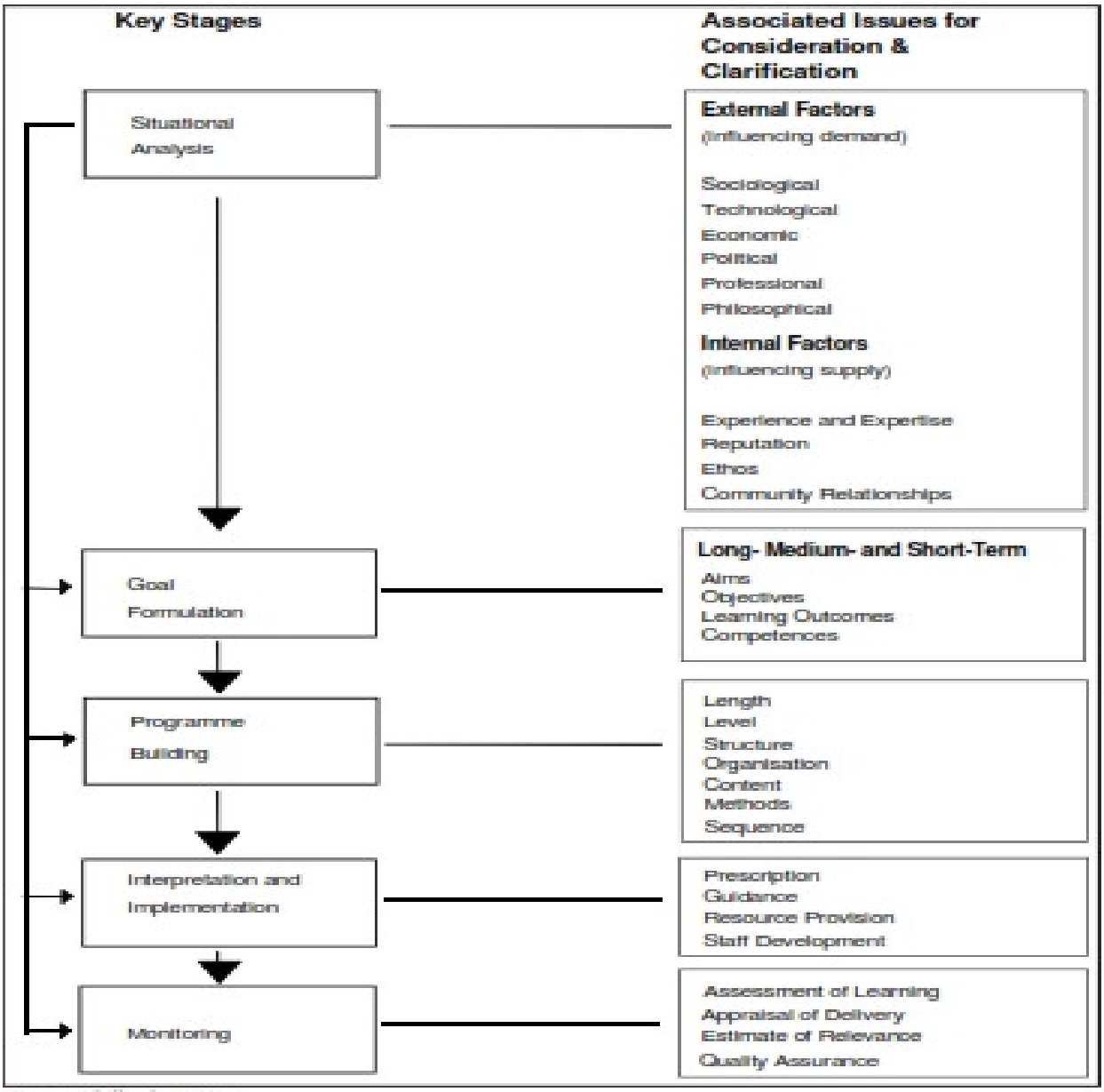
The theoretical framework of this study is based on the Situational analysis curriculum model of Malcolm Skilbeck (1984).

2.1.1 Situational Analysis Curriculum Design Model (SACDM)

Situational analysis curriculum design model (SACDM) is a model that has gained credence among experts in the field of curriculum development. The situational analysis curriculum model was popularised by Malcolm Skilbeck in 1984 through his publication titled "School-Based Curriculum Development". This curriculum model is unique in that it proposes that before any attempt is made to develop any curriculum, a situational analysis must be carried out. Situational analysis according to skilbeck is a process of a detailed analysis of several factors relating to the context and the application of the analysis into planning the objectives, the content, the learning activities and the method of evaluation. What this curriculum theory holds is that if a curriculum will be effective, the process of development must be conducted starting with situational analysis which involves gathering data from stakeholders at different levels such as the schools, group of schools, regions or even at the national level depending on the spread of the curriculum to be developed. This situational analysis is influenced by several factors. Nicholls and Nicholls (1978) refer to the factors in situational analysis as students, their homes and backgrounds, the school including its climate, staff, facilities and equipment. Analysis of these factors and the study of their implications on curriculum development constitute a rational approach of situational analysis upon which SACDM is based.

Conducting a situational analysis starts with asking important questions about what is known about the context, the learners, the teachers, the school and its environment. Furthermore, questions are asked about why the curriculum is needed and

what do learners need? Situational analysis curriculum design model does not leave the curriculum developer to intuitively assume what the learners need and assumptions on other factors critical to successful curriculum development. Indeed, during situational analysis, attempt is made to collect and analyse useful data on the critical factors which become a springboard from which the elements of the curriculum are derived. This process as observed by Mulenga (2014) becomes a basis on which curriculum developers can suitably devise appropriate curriculum aims, goals and objectives and better able to source for appropriate content, learning activities and relevant evaluation methods. The curriculum being proposed is based on the paradigm given below:



Source: Skilbeck (1984)

Figure 2.1 –Skilbeck's (1984) Situational Analysis Curriculum Design Model

In the five stages model of curriculum development proposed by Skilbeck, situational analysis is the starting point for curriculum development and it affords the curriculum developers an advantage to take into consideration portent factors that may hinder curriculum development. It also helps the developers to approach curriculum development with firsthand information which enables the builder to make informed and rational

judgement on the factors that influence curriculum development. Mulenga (2014) states that the justification for undertaking a situational analysis can be summarised as:

a. Identifying needs of the students and other stakeholders such as; the parents,the teachers and the immediate community.
b. A vivid understanding of the indigenoussetting of the curriculum
c. Facilitating planning and subsequent curriculum development
d. Provision of anorganized database for formulating curriculum goals and objectives.

One of the critical techniques employed in determining a situational analysis is need assessment. Need assessment is used to collect information and for carrying outreviews of relevant aspects of the intended curricula. It is used to make valid assumptions relevant to determining and prioritizing educational aspirations of the society. Also, itcould be used in determining the bedrockof anappropriateand suitable set of curriculum objectives, goals and aims.

To carry out a useful situational analysis, Skilbeck (1984), identified a set of issues that are of serious importance to the school when situations are to be analysed. These he classified as external and internalfactors. The important external factors to the school include:

i. **Cultural, societal changes and anticipations**: This involvessuch changes that occur as a result of changes in societal values, economic expansion, technological advancements, scarce economic opportunities and unemployment. It also involves changes in family relationships such as women active participation in economic activities, increased expectations of the role of the school in producing high level manpower for the economy, etc.

ii. **Educational system requirements and challenges:** This entails organisational considerations such as policy documents, reports of enquiry, reports from external examinations, major curriculum projects and output of significant educational research.

iii. **Changing nature of content:** The changing nature of subject matter being taught in schools necessitatescontinuousreviewfor the purpose of updating in line with global conformity.This is necessitated by knowledge expansion, technological advancement and increase of new published literature.

iv. **Teacher support systems:**teaching/learning techniques, updates in subject matter, assessmentmethods, educational research institutes, peer review throughcommunity teacher centres, curriculum experts, in-service trainings and teacher professional associations are examples of external relatedfactors that can support the teachers.

v. **Resources:** Curriculum experts need to be conscious of the provisions and flow of material/instructional resources into the school. These may come from state educationministries and agencies, the community and private organizations.

Internal factors to the school acceding to:

i. Pupils: Significant data that may be gathered on students include abilities, physical and psychological development, aptitudes, emotional and social development and educational needs. An accurate understanding of the nature of students allows for effective curriculum planning.

ii.Teachers: What are the skills, experience, teaching style, values and special strengths and weaknesses of a school teaching staff? Special strengths may broaden curriculum offerings and allow for curriculum enrichment and extension.

iii.School ethos: The school climate/environment is a significant factors influencing curriculum and includes principal involvement, power distribution, social cohesiveness, operational procedures and professional cohesiveness.

iv.Material resources: What exactly does the school possess in terms of buildings, equipment, resources (books, curriculum materials), land and vehicles as well as financial resources for future purchases?

v. Perceived problems: Major stimulus for curriculum change emanates from a perception of needs (problems. Curriculum planners ascertain these problems from

parents, teachers, students, the community and other stakeholders. Needs-assessment techniques areused to determine these.

Mulenga (2014) identified four approaches to conducting a situational analysis. It includes:

a.Contextualisation of the Problem: The educational issues that require situational analysis could be specific, fundamental(elementary. Contextualising the problem is a crucial step taken to guideagainst vital difficulties the curriculum would encounter by analysing the felt needs of the learners and the society and some of these problems include pupils' abilities and background; teachers' competence and the numbers of teachers; school atmosphere and climate; Instructional materials/resources and stakeholders opinion of the curriculum to be developed. This enquiry is important to deal with identified difficulties and to keep the curriculum relevant to the learners and the society at large.

b. Identifysuitable factors: When the difficulties to be addressed through the curriculum must have been identified, the curriculum planner categorises them into factors that are internal to the school environment and external to the school environment.

c. Data gathering and interpretation: this involvesthe use of interviews, careful observation of the school records, opinion survey through questionnaires, staff profile and details, inventory checklist etc. to gather information. Data gathered are then analysed to determine their relevance in the context of the situation. Interpretation of the results from the data collected guides the curriculum developer to make recommendations for specific actions.

d.Make recommendations: the analysed data guides the curriculum developer to make informed decision. The value of engaging in a situational analysis is to translate results into plans of action. Ultimately, the results guide the curriculum developer to formulate relevant curriculum goals and objectives, select contents that are appropriate and suitable strategies that can stimulate gainful teaching-learning activities and means of evaluation.

2.2 Conceptual Framework

2.2.1 The Concept of Sustainable Development

The term sustainable development is a fluid concept and various definitions have emerged over the past years. The concept of sustainable development was not well defined and remained unpopular until the Brundtland Report which gave a definition for the first time was published in 1987.Earlier, particularly due to the challenges of indiscriminate exploitation of natural resources that greeted economic and demographic growth, the think tank group referred to as the Club of Rome, which was founded in 1968, advocated zero growth. This club united scientists, economists, national and international civil servants, and industrialists from 53 countries with the goal of confronting the complex problems that bedeviled all societies, be it developedor developing. In 1971, this private but global association voiced aserious alarm through their publication 'The Limits to Growth'. In broad terms the publication presentedthe current economic growth as being irreconcilable with the long-term preservation of the earth.Also, a conference on human environment was held in 1972 by the United Nations where a new understanding of the concept of sustainable development emerged with the inclusion of such concept as social fairness and an economic advancement that protects the environment from over-exploitation and degradation. This conference also led to the establishment of United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP).

Still, the concept of sustainable development remained largely unpopular in the 1980s, except for civil societies who were sensitizing the public canvassing for the need to maintain equilibrium between human activities and the environment. When the media began to draw the attention of the public to the reality of acid rainfall, the damage in the ozone layer and the greenhouse effect, the topic began to gain recognition among the public. In 1980, the International Union for the Conservation of Nature (IUCN) published its globalpreservation strategy which was at that time a document of first importance to express concern for a rounded economic growth known as sustainable development. The report established that the questfor human development and the environmental risks require immediate need to safeguard the environment. (IISD, 2013)

However, the term ‘sustainable development’ became popularised by the Gro Harlem Brundtland report 'Our common future', published in 1987. As the Prime Minister of Norway and the chairperson of the World Commission on Environment and Development (WCED) she helped to define sustainable development as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. This definition of sustainable development popularised by the Brundtland report became anoperationalexplanation through which sustainable development is understood. This definition by Brundtland, became the lens through which sustainable development concept has been viewed everyoneall over the globe.

Even though, the Bruntland definition has served as a window through which many have viewed the concept of sustainable development. The definition espouses the idea that today’s development and economic prosperity must not hamper the existence of the next generations of people who will live on the planet earth. Pearse and Atkins (1998) explained that the definition is anticipated to embrace the view of safeguarding that upcoming generations receive an ‘earth’ which will sustain their means of livelihoods in such a way that the upcoming generations are not poorer than the present day generations. They went further to say the requirementsfor sustainable development, consequently, sums up to ensuring that every generation leaves the future generation with a standard productive capacity, in the form of resources, financial assets and technological innovation that is sufficient to sustain the valueor well-being per capita of individuals than what is being currently enjoyed by the present generation. This view of sustainability that increasingly talks about the future generations and conservation of resources have been termed an economic perspective of sustainable development, however, as maintained by Harris (2003), there has been a growing recognition of three essential phases of sustainable development which are economic; environmental and social. According to him an economically sustainable society must of a necessity have capacity to provide goods and services on anongoing basis, to sustain manageable levels of government and external debt, and to guide againstdangeroussectorialinequalities which damage industrial production. He went further to say that environmentally sustainable society have toretain a steady resource background, with efforts targeted at guiding against over-harvesting of renewable resource structuresor environmental sink functions, and exhausting non-

renewable materials to the extent that investment is made in adequate substitutes. This includes the maintenance of biodiversity, atmospheric stability and other ecosystem functions not ordinarily classed as economic resources. Further, he maintained that social sustainability shouldimportantly achieve impartiality in allocation of resources, crafting opportunities for everyone, delivery of sufficientcommunalamenities including education and health, political participation gender equity, and responsible governance and many others.

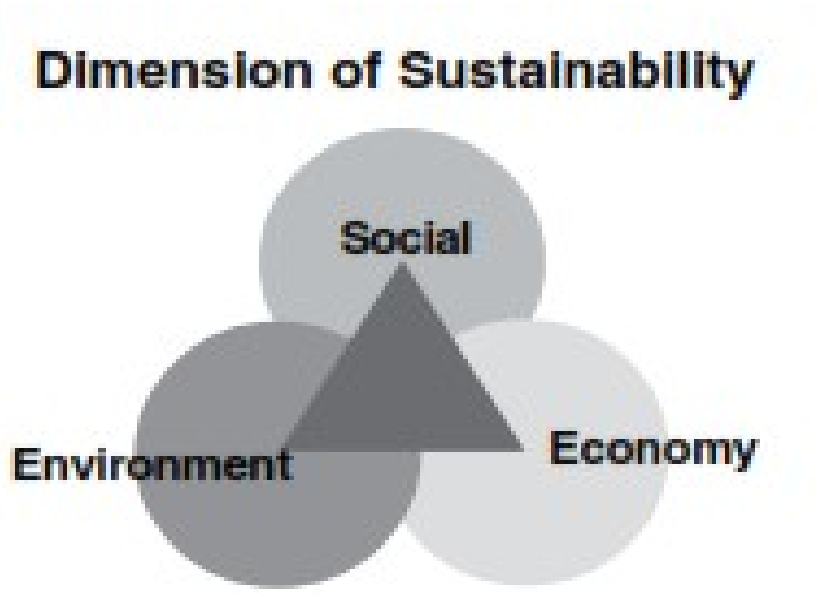
Furthermore, Centre for Environmental Education (2007) explained sustainable growthto meanan organised economic advancementthat puts into perspective the protection of the environment, with each supporting the other. Sustainable development, then, is strikingequilibriumamong the needs of humans to advancetheir way of life,theirwelfare and conserving natural resources and bio-systems, on which their present and future generations depend. Also, Monet, (2001) defines sustainable development as an avenueof putting in place dignified life styles with great reference to human rights by evolving and preserving the broadest probableseries of choiceswith which life spans can be defined. The standard of fairness among the present and generations of the future oughtto be carefully taken into consideration in the usage of economic, environmental, and social assets. Putting these needs into practice entails strict all-inclusivesafeguard of bio-diversity in terms of ecosystem, species and genetic diversity, all of which are the vital foundations and sustenance of life. Thus, sustainable development primarily does not focus principally on environmental issues but in broad terms,incorporates three general policy areas namely economy, environment and society.

2.2.2 The Paradigm of Sustainable Development

Sustainable development is intended to encompass three pillars, even though it has been misconstrued over the years as an environmental issue. The United Nations Conference on Sustainable Development in June 2012 popularly referred to as Rio + 20, made its commitment to sustainable development to cut across the economic, social and environmental aspects. As pointed out by the United Nations (2010) there exists complex interconnection between economy, society and the environment. Hence, effort must be made not to play one issue off against the other, but recognising the interdependent nature

of these three pillars. As put forward by UNESCO (2012)sustainable development is a frameworkfor approaching a properly adjusted future in whichecological, economic and social issuesare balanced in the questfor better-qualityof lifefor all people and an economic growth. Since, society, environment and the economy are interconnected the focus of sustainable development is to maintain strict balance among economic forces, environmental forces and social forces, with the intention of creating prosperity for the presentgenerations and the future generations. Sustainable development is a long-term and unifiedmethod ofadvancing and realising healthy communities by cooperativelytackling and solving economic issues, environmental issues, and social issues, with the goal of avoiding the over reliance on and consumption of key natural resources.

The figure below shows that the principle of sustainable development is based on the three interlocking dimensions of environment, economic and the society. The model is put together to show the need for environmental conservation, economic growth, social equity and justice for sustainability.



2.2 – Three Figure Pillar Basic Model

Source: Centre for Environmental Education, 2007

The model in figure 2.2 further shows that each of the three dimensions of environment, economy and the society are interconnected and interdependent,meaning that development must shift focus from just economic growth only to an economic development that ensures equity of all living in the society whereby social justice, equality of opportunity and access for all people in the country's prosperity are the concern of everyone. Further, attention must be shifted to an economic advancement that protects the environment from degradation and exploitation. In essence, development involves continuous growth and it is concerned with human and environmental well-being. CEE (2007)

While explaining further, UNESCO (2012) observed that the sustainable development framework is a major departure from the previous economic arrangementwhich has negative effects on the welfare of the people and their environments. Until the present times when sensitisation became rife, the old order economic activities with its risk to the lives of human beings and its environmental degradation and exploitation have been viewed by many as unavoidable and inevitable. However, the sustainable development principle has clearly shown that economic advancement that poses serious risk to human lives and the environment does not have a place in the sustainable development framework. Further, UNESCO (2012) established that every sustainable development programmes should consider the three core areas of sustainable development such as the ecology, the human societies, the economy, as well as the fundamental aspects of human social traditions. In as much sustainable development addresses the native milieu of these spheres of sustainable development, it is expected that its implementation will take several shapes around the globe. The principles, ideologies and values that formthe basis for sustainable development include such concepts as generational equity, gender balance, enduring peace, tolerance, reduction of poverty and unemployment, preservation of the environment,conservation of natural resources, social inclusion and justice. The Rio Declaration consists of 27 principles that should direct the effort of governmental institutions, cities and communitiesand civil society organisations to define sustainable development goals and craft programmes to help achieve the goals. Theyinclude:

1. People should have accessto a healthy lifestyle in a natural environment for productivity;
2. The right to self-determine must be met so as to achieveeconomic development and ecological needs of the generation of the present and the future generations in a way that is fair and equitable;
3. Eliminating poverty and loweringinequalities in living standards in every parts of the globe are crucial to sustainable development;
4. Protection of the environment is an essentialaspect of the process of development and cannot be isolated from sustainable development;
5. Actions of international agencies and institutions in the fields of development and environmentoughtto tackle the challenges and interest of everycountry;
6. Towards achieving sustainable development and an improved standard of life for everyone, nations should lower and exterminate unsustainable models of manufacturing and consumption and also encouragesuitable demographic guiding principles;
7. Totalcontributionand involvement of women is indispensable to realising and achieving sustainability since they play a crucial role in managing the environment and in economic development;
8. Violence, conflict and warfundamentallyimpedethe progress towards sustainabledevelopment. Therefore, peaceful co-existence, development and ecologicalprotection are symbiotic and inseparable.

Furthermore, accompanying The Rio Declaration principles are viewpoints that have become integral part of the world sustainable development discourse and approach. They include:

a. System thinking framework, instead of amethod that views problems in isolation should be employed. Sustainable developmentproblems are interconnected and part of a complete set.
b. A good perception ofindigenoussubjects in aninternationalperspective and identifyingthat solution to local challenges could have global significance.

c. An Understanding that personal consumer decisions have implication and could escalate and growunsustainable extractionof natural resources and production aroundfarawayregions and places.
d. Ensuring that dissenting and differing views are well-thought-outbefore taking a vital decision or judgement is taken on a matter.
e. Identifying that economic choices, religious beliefs, and communal ethicscontendfor prominence as people groups fromdiversebackground and interests interrelate.
f. An understanding that human beings havecharacteristicsand attributes that is universal.
g. Recognising that technological advancement and science onlyis not sufficient toproffer solution to every problem of human beings and their societies.
h. Stressing the significance and importance of the need of governmental institutions to involve different social groups in their decision making process, especially, those groups or people who are likely to be affected by such government decisions. It is expected that they participate in the build-up leading to such decisions.
i. A strong callfor high level ofopenness, transparency and probityin the decision-making process of the government and its institutions.
j. Engagingpreventive standard by engagingrelevant actions to guide against the likelihood of severeor irreparableecologicalor social damages even in the face of inadequate or unconvincing scientific findings.(UNESCO, 2012)

Sustainable development contains quite a number of issues which the United Nationsassociatecountries have agreed solve and tackle. Such issues include lowering the scourge of poverty, replacing consumption models, international population increase, and preservingthe health of humans, totallyall ofthese issues pose a great challengetoeconomic and social institutions. Furthermore, these topics comprisetaking care of the land, the water systems, the air, and other natural resources including keypresent-day problems of change in climateand biodiversity loss.

2.2.3 Sustainable Development Goals

The Sustainable Development Goals (SDGs) was adopted by the United Nations General Assembly in September 2015 by the gathering of Head of States and Government in a bid to sustain the progress made by the Millennium Development Goals (MDGs). The data fromthe Millennium Development Goals (MDGS) 2015 Report shows that:

a. The Millennium Development Goals (MDGs) realised the decrease of personsexisting in horrible poverty in the developing countriesparticularly those existing on less than one dollar daily. Internationally, the number of people living in abject poverty has reduced by more than half, falling from 1.9 billion in 1990 to 836 million in 2015.
b. The elementary school net registrationpercentage in the unindustrializednations reached 91 percent in 2015, an increase from recorded 83 percent in year 2000, while the over-all figure of out-of-school children of elementary school age globally has decreased by almost 50 percent, to an estimated 57 million in 2015, down from 100 million in 2000. Further, Sub-Saharan Africa has had the best record of improvement in primary education of any region since the MDGs were established. The region achieved a 20 percentage point increase in the net enrolment rate from 2000 to 2015, compared to a gain of 8 percentage points between 1990 and 2000. The literacy rate among youth aged 15 to 24 has increased internationally from 83 percent to 91 per cent between 1990 and 2015. The widening gap existing between men and women has closed.
c. A good number of girls are duly registered in schools when compared to fifteen (15) years ago. The unindustrialisedcountrieshavejointly achieved the objective to eradicate gender inequality in elementary, secondary and post-secondary (tertiary) education. In Southern Asia, only seventy-four (74) girls were registered in elementary school for every hundred (100) boys in 1990. Now, 103 girls of school going age are registeredfor every 100 boys. Women now make up 41 percent of salariedstaff outside the agricultural sector, which is anincrease from 35 per cent in 1990. Fromthe year 1991 to 2015, the ratio of women in exposedoccupation as

asegment of over-all female employment has reducedby thirteen 13 percentage. In contrast, exposedoccupationfor men crashed by 9 percentage points. Furthermore, women hadan increased number in legislative representation in almost 90 per centof the 174 nations with records over the past 20 years. The typicalpercentage ofwomen in parliament has approximatelydoubledall through the same period. So far, only onein five membersof the parliament are women.

d. Worldwide under-five deathlevel has decreased by much more than fifty (50) percent, falling from ninety (90) to forty-three (43) deaths per 1,000 successfuldeliveries between 1990 and 2015. Despite increase in population in the unindustrialisedcountries, the amount of mortality of children under the ages of five has falling from 12.7 million in 1990 to almost 6 million in 2015 internationally. From the early years in 1990s, the degree of decreasein the mortality of children under the ages of five has more than tripled globally. In sub-Saharan Africa, the annual rate of reduction of under-five mortality was over five times faster during 2005–2013 than it was during 1990–1995. Measles vaccination helped prevent nearly 15.6 million deaths between 2000 and 2013. The number of globally reported measles cases declined by 67 per cent for the same period. About 84 per cent of children worldwide received at least one dose of measles containing vaccine in 2013, up from 73percent in 2000.

e. The death resulting from pregnancy and child delivery declined by forty-five percent globally and the decline has been steady since the year 2000.Death resulting from pregnancy and child delivery in southern Asia also reduced by sixty-four percent since the year 1990 and the year 2013. In Africa, particularly sub-Saharan Africa the death resulting from pregnancy and child delivery reduced by around forty-nine percent and around seventy-one child delivery were prosecuted by trained health professionals and experts worldwide in the year 2014 which is a steady growth from fifty-nine percent in the year 1990. The ratio of pregnant mothers who got four and above pre-natal care in Northern part of Africa, rose from fifty percent to eighty-nine percent between the year 1990 and the year 2014. There was also an increase in the number of women using contraceptives to prevent diseases among the age of fifteen to forty-nine.

f. In combating HIV/AIDS and other diseases the reported indicated that new HIV infections fell by approximately 40 per cent between 2000 and 2013, from an estimated 3.5 million cases to 2.1 million. By June 2014, 13.6 million people living with HIV were receiving antiretroviral therapy (ART) globally, an immense increase from just 800,000 in 2003. ART averted 7.6 million deaths from AIDS between 1995 and 2013. Over 6.2 million malaria deaths have been averted between 2000 and 2015, primarily of children under five years of age in sub-Saharan Africa. The globalmalaria incidence rate has fallen by an estimated 37 per cent and the mortality rateby 58 per cent.More than 900 million insecticide-treated mosquito nets were delivered tomalaria-endemic countries in sub-Saharan Africa between 2004 and 2014.Between 2000 and 2013, tuberculosis prevention, diagnosis and treatmentinterventions saved an estimated 37 million lives. The tuberculosis mortality ratefell by 45 per cent and the prevalence rate by 41 per cent between 1990 and 2013.

g. In the area of ensuring environmental sustainability the report pointed out that ozone-depleting substances have been virtually eliminated since 1990, and theozone layer is expected to recover by the middle of this century.Terrestrial and marine protected areas in many regions have increased substantiallysince 1990. In Latin America and the Caribbean, coverage of terrestrial protectedareas rose from 8.8 per cent to 23.4 per cent between 1990 and 2014. In 2015, 91 per cent of the global population is using an improved drinking watersource, compared to 76 per cent in 1990.Of the 2.6 billion people who have gained access to improved drinking water since1990, 1.9 billion gained access to piped drinking water on premises. Over half of the global population (58 per cent) now enjoys this higher level of service. Globally, 147 countries have met the drinking water target, 95 countries have metthe sanitation target and 77 countries have met both.Worldwide, 2.1 billion people have gained access to improved sanitation. Theproportion of people practicing open defecation has fallen almost by half since1990.The proportion of urban population living in slums in the developing regions fellfrom approximately 39.4 per cent in 2000 to 29.7 per cent in 2014.

h. In developing global partnership for development, the report shows that official development assistance from developed countries increased by 66 per centin real terms between 2000 and 2014, reaching $135.2 billion.In 2014, Denmark, Luxembourg, Norway, Sweden and the United Kingdomcontinued to exceed the United Nations official development assistance target of0.7 per cent of gross national income.In 2014, 79 per cent of imports from developing to developed countries wereadmitted duty free, up from 65 per cent in 2000.The proportion of external debt service to export revenue in developing countriesfell from 12 per cent in 2000 to 3 per cent in 2013.As of 2015, 95 per cent of the world's population is covered by a mobile-cellularsignal.The number of mobile-cellular subscriptions has grown almost tenfold in the last 15years, from 738 million in 2000 to over 7 billion in 2015.Internet penetration has grown from just over 6 per cent of the world's population in 2000 to 43 per cent in 2015. As a result, 3.2 billion people are linked to a global network of content and applications. (MDGs, 2015)

While speaking on the success of the MDGs, the Secretary-General of the United Nations in the 2015 report of the Millennium Development Goals maintained that:

> *The MDGs have rescued the lives of several people who are surviving in excruciating lack and enriched the situations for many more people who are living in pitiable conditions. The breakdown of statistics presentedin the report showed that, with carefully organised development interventions, well-crafted policies, mobilization of needed funds and governmental determination, even countries living in abject poverty can dramatically change toward the path of progress that is unprecedented. However, The MDGs report of 2015 did not fail to indicate that the gains and achievement recorded during this period being uneven in many countries is the basis for continuation or the beginning of a new era of development.*
>
> Millennium Development Goals 2015 Report Pg. 4

The uneven accomplishment of the Millennium Development Goals (MDGs),its non-completion and the need aimed at continuity in development is the basis for the envisioning of a post 2015 development agenda referred to as the Sustainable Development Goals (SDGs). The United Nations General Assembly while justifying the introduction of the SDGs explained that the 17 Sustainable Development Goals and 169

targets demonstrates the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what it did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

2.2.4 Sustainable Development Implementation Framework

Several means of implementing the Sustainable Development Goals have been highlighted by the United Nations to achieve the vision by year 2030. The implementation and success of the SDGs will be spearheaded by individual member countries through formulation of sustainable strategies, guidelines and government policies. The SDGs is expected to be a compass for aligning countries' plans with their global commitments.The UN SDG Implementation Framework (2015) clearly stated that the implementation of the SDGs will be a multi-stakeholder process to be spearheaded by national governments. The Addis Ababa Action Agenda (2015) have listed some of the areas that are crucial to the implementation of the Sustainable Development Goals. These include: the mobilization and effective use of domestic public resources; investment from domestic and international private business and finance in areas critical to sustainable development; effective international public finance to complement the efforts of countries to mobilize resources domestically from other sources; using international trade as an engine for development to contribute to achieving SDGs; employing new financial instruments such as debt-to-health swapsfor debt sustainability; UN leadership role in promoting development; increased investment in science, technology, innovation and country-driven capacity building; a focus on increasing the use of high-quality disaggregated data as essential input for decision making in support of the SDGs.

In the area of finance the national government through its agencies is expected to formulate developmentpolicies, plans and programmes that will aid the realisation of the Sustainable Development Goals. Further, the government is expected to mobilise and effectively use domestic resources by perfectingsocialequality, openness in governance, proficiency and efficiency of their respective tax systems, same aswidening the tariffsupport and solidifying administration of tax. National governments are also

expected to make effort to fixnationwidewell-definednationalobjectives and time frameworkfor raisenationalincomeand as well develop global partnership to seek international cooperation and assistance.

Furthermore, international private bodies are to apply originality and inventionin the direction oftackling sustainable development tasks and to involve as allies in the development process. They are expected to support a centralcommercialframework that accounts for the ecological, social and governance effects of their actions, with painstakingunifiedreportage.In the face of global development the executionof action agenda calls for collaboration to enhance the efficiency of advancement cooperation and to disseminate knowledge about their distinctiveendeavours. Nations are supposed to hold open, all-encompassing and openconversations on the anticipateddegree of over-allformal support requiredfor sustainable development. Individual countries essentially have to put into perspective the three focal point of sustainable development and to intensify efforts to boost the capacity of countries to adequately respond to devastation such as natural disasters like earthquake, famine and drought.

While the United Nations General Assembly has put in place economic and financial measures to ensure the successful implementation of the 2030 agenda, it has also reiterated the importance of using education as a tool achieve these goals.In essence, one uniqueand important framework to realize the Sustainable Development Goals (SDGs) is education. United Nations General Assembly categorically stated that:

> *there is need to perfect the capability of education structure to get people readyto actively work at development that is viableand toincorporateteaching and learning for sustainability keenly intoschool curriculumfurther than the Decade of Education for Sustainable Development*
>
> (UN General Assembly 2012:45)

Emphasis has shifted from technological and financial solutions to SDGs but on solutions that have education at their core even especially education with sustainable development focus. As observed by the Technical Support Team (TST) education is a cross-cutting issue for all development goals. TST also stated that:

> *education must place in order the gaining of understanding, expertise, and proficiencies that are connected to 21st century means of livelihoods and employment, and contribute to modelingperceptions and actions that encourage social bonding, inclusion and ecological sustainability (pg.4)*

Similarly, Bokova (2014), the Director General of UNESCO in UNESCO's publication tilted; Shaping the Future We Want (2014) explained that:

> *Education is the most potent tool to achievesustainability. Economc policies, technological inventions and interventions, political directives or fiscal incentives are not enough. There is need for a fundamental change in the manner of people's thinking and action(pg. 16)*

Moreover, the open working group on the SDGs repeated that learning and gaining knowledge through education and schooling is a vehicle to accomplishing a huge worldwide advancement schedule. This policy presents a concise, authenticating outline of the numerous methods wherein teaching and studying (training) ought to enhance the projected post-2015 Sustainable development programme. It emphasises the idea that sustainable development for each country is actually achievable with the aid of an all-inclusive attempts that starts with teaching and gaining knowledge of (schooling). In the same vein, Nevin (2008) explained that good and qualitative education is an importantinstrumentfor realising a more sustainable world. In the views of Maclean (2008) he noted that even though there are several alternativesolutions to development, such as better infrastructure pipe borne water, telecommunication amenities, good roads, telecommunication facilities, energy expansion, etc. education remains and is regarded as the maininstrument for economic and social growth or development. Further, he highlighted that wherevereducation is properly delivered, it hasbeen seen to engender: extreme poverty reduction; social equity and justice;social inclusionand orientation of the marginalised groups in the society and sustainable development. He further argued that effective education helps to guarantee a safer, improved, more flourishing, and ecologically secure world, while at the same timepromoting socio-economic, cultural advancement, tolerance and international partnerships and co-operation. In the same way, education is an instrument to raise people's income levels and improvetheir standards of living.

Moreover, UNESCO (2014) in the Education for All Global Monitoring Report (EFAGMR) titled 'Sustainable Development Begins with Education' indicated that teaching and learning (education) can helpin realising sustainable development in severalareas which include reduction of poverty; improvement of nutrition; health benefits; equitable and inclusive education; gender balance and female empowerment and confidence-building; clean water and sustainable electricity; economic advancement; reduction in social inequality; development of rural areas; protection and preservation of the ecology; peaceable, impartial and an inclusive communities. The document in addition submitted that teaching and learning (education) can hasten advancement in the route of achieving each of the stated sustainable development goals for 2015 and past in a ramification of methods. The report maintained that not only is teacvhing and learning (education) a fundamental human right but a critical instrument for social development and reconstruction. It maintained in addition that teaching and getting to know (education) empowers people, mainly women, to stay and seek for healthy, essential, innovative and irrepressible lives. It strengthens their voices within the society, countrywide and international topics. It unlocks varied and new employment chances which arethe bases of social up-scale movement. In essence, the final results of teaching and learning (education) are massive through many development areas. Education deserves to be a prominent cornerstone in the post-2015 development framework. The governmental and monetary obligations to teaching and getting to know (schooling) by means of nations and individuals should be safeguarded and transformed. There is therefore, a chronic necessity for closer partnership throughout areas to permit those collaborations to take form and take root.

Lastly, Sterling (2014) carefully pointed out that:

> *Whilst the SDGs are extremelythought-provoking, the devicesintended to implement them are presented as: economic policy and assistance, supervision, financeand motivations and lawmaking and guideline. These are important, butnot sufficient, exceptparticipants, technocrats, lawmakers, companies,government establishments, civil societyorganizations (CSOs), media outfits and the general public are includedin the learning processes, the anticipated 2030 agenda will not be achieved.This is because there cannot be positive changewithout learning. Positive change in the direction of sustainability needs on itsown has to be sustainable. Essentially, teaching and learning (education) is central to this process."(Pg.92)*

The education that promotes this type of development has been identified as Education for Sustainable Development.

2.3 **Empirical Review**

2.3.1 **Education for Sustainable Development**

Teaching and learning (education) is imperative to development that is sustainable. As explained by UNESCO (2005) education and sustainable development are inseparablyconnected.In the submissions of Sterling (2014) the value of the human lives and their environmental future is largely dependent on the cooperativecapability to learn new things and facilitate change. In a situation where such learning is lacking the people with their environment will get the future they deserve. Sustainable development is not on its ownrealisticexcepturgent, appropriateand adequate knowledge acquisition takes place among relevant stakeholders.However, this knowledge acquisition (education for sustainable development) cannot be made possible exceptsufficient attention is given to the process of curriculum modeling to design a new a curriculum for sustainable development education. While sustainable development can be sponsored through formulation of policies, legal frameworks, economic and businessinducements and disincentives, information and crusades. These can only be operativefor only as they are applied. According to him:

> *Education can improve the efficacy of each and every of these instruments through developing informed engagement, agency and empowerment among all affected stakeholders. Furthermore, education canput togetherlong-term change that is, changes that are sustainable, because it is owned bythe learner and gets to hearts and minds. (*Pg. 90)

Sterling (2014) further observed that Education for Sustainable Development connotes and implies much more than people working outside of the ESD area frequently recognise it to mean, Education for Sustainable Development presents an enhanced direction for educational plan and implementation completely in line with the requirements, subjects and competencies of this present century.Teaching and learning (education) for Sustainable Development cannot be narrowly described as elementary literacy or be limited to education for all (EFA) action plan. The crucial task of teaching and learning (education) for Sustainable Development unswervingly seeks the methods the sustainable development values, skills and competencies can be ingrained at the focal point of teaching and learning, in such a way that there is mutual benefit and hastened positive result, sufficient to improve innovation and commitment towards an ecologically safe, economically steady, and socially equitable and just societies.

Education for Sustainable Development (ESD) is an all-inclusivemethod to teaching and learning (education). It accentuates a lifetime learning process that leads to an enlightened and concerned citizen basecoupled with inventive problem-solving expertise, scientific and social literacy, and determination to engage in reliablepersons and mobilise joint actions thatcould help to safeguard an ecologically sound and economically thriving future. Education for Sustainable Development is a new educational directionwith the goal of empoweringindividuals of all times to undertakeconstructive actionfor crafting a future that is sustainable. As observed by UNESCO (2010) the existingparadigm of development is unsustainable and that the existing educationalorganisationmirrors and supports this paradigm to a great extent. Education remains an indispensablerequirementfor enabling the society to make the needed shift to a sustainable lifestyle. It states that Education for sustainable development (ESD) is criticalfor good

governance, knowledgeableopen decision-making and the advancement of democracy. It plays animportant role in overcoming social, economic and ecologicalproblems. Education for Sustainable Developmentdelivers with it the inherentnature ofimplementing programmes that are locally important and sociallyappropriate.

Education for Sustainable Development (ESD) is built on values and principles that are fundamental to sustainable development, such as social equity, gender balance, social inclusion and tolerance, poverty reduction, ecologicalconservation and restoration, natural resources management, and fair and peaceful communities. As rightly pointed out by UNESCO (2009b) Education for Sustainable Development is established on the tenets of impartiality, fairness, tolerance, abundance and responsibility. It promotes gender balance, socialcohesion and poverty relief. It emphasises care, integrity and honesty, as conveyed in the Earth Charter. Education for Sustainable Development is strengthened by ideasand valuesthat promote sustainable living, communalfairness and human well-being. Environmentalconservation and renewal, natural resource conservation and sustainable practice, addressing unsustainable building and exhaustionforms, and the formation of fair and peaceablecommunities are also essentialideologiessupporting Education for Sustainable Development.

Education for Sustainable Development (ESD) is targeted at inspiring the reorientation of teaching and learning (education) so that it is capable of contributingefficiently to the reorientation of communitiesin the direction of sustainable development. This it attempts through a reorientation of existing education systems and structures, as well as reframing of teaching and learning. Education for Sustainable Development concerns with the core of teaching and learning and should not be considered as an add-on to existing curriculum or educational practices. (UNESCO 2014) Education for Sustainable Development applies to all levels of education and occurs in a wide range of settings whether in a formal, non-formal or informal schooling context to vocational education and workplace training, higher education, adult learning and public awareness education.

Education for Sustainable Development is concerned with integration of sustainable development issues into teaching and learning. These include: themes such as:

climate change, disaster risk reduction, sustainable livelihoods, sustainable consumption and production, biodiversity and poverty reduction because this issues are characterized by uncertainty, complexity and a high degree of systemic interconnection.UNESCO (2014) explains that Education for Sustainable Development requires participatory teaching and learning methods like critical thinking, imagining future scenarios and making decisions in a collaborative way in order to empower learners to take action for sustainable development. Educations for Sustainable Development also help learners to be able to:

a. Learning to ask critical questions;
b. Learning to clarify one's own values;
c. Learning to envision more positive and sustainable futures;
d. Learning to think systemically;
e. Learning to respond through applied learning; and,
f. Learning to explore the dialectic between tradition and innovation (UNESCO, 2011a, p. 8).

2.3.2 Evaluation of United Nations Decade of Education for Sustainable Development (DESD) (2005 – 2014)

The past account of teaching and learning (education)for Sustainable Development is directly associatedwith the Environment and Development Conference held by the United Nations in 1992 popularly referred to as (UNCED), where member countries decided on an agendafor action (Agenda 21 chapter 36) In it, it wasadmitted that teaching and learning (education), public awareness creation and training are vitalinstrumentto transit towards development that is sustainable.With this decision, it became necessary to reorient the process of teaching and learning towards the development that is sustainable. The overarching significance of teaching and learning(education) in attaining development that is sustainable were stated in separatepiece of writings like the Rio Conventions, the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (UNCBD) and the United Nations Convention to Combat Desertification (UNCCD). Since then, some of this article have

influenced and guided intellectual thinking and planning for teaching and learning for development that is sustainable. (UNESCO 2014: 17)

In the year 2005, the General Assembly of the United Nations inaugurated the Decade of Education for Sustainable Development through its decision. This inauguration started a ten year era of an unequivocal worldwide campaign to improve and reorient the systems of teaching and learning (education) towards development that is sustainable. (UNESCO, 2014) The decision to launch the Decade of Education for Sustainable Development stated that the Decade would run from 2005 to 2014 and that UNESCO would be the agency to coordinate the activities leading to its implementation. The Decade mobilised national governments to embrace teaching and learning for development that is sustainable by including measures to execute the objectives of the Decade in their separate educational policies and plans. Several participating countries agreed to this arrangement by supporting and backing the agenda with extra financial provisions to UNESCO, such countries included; Germany, Denmark, Japan, Sweden among many others (UNESCO, 2013a, p.5).

The United Nations Educational, Scientific and Cultural Organization (UNESCO) being the coordinating agency for the Decade of Education for Sustainable Development a role designated to her by the United Nations plays a double function. Primarily, it acts as the international coordinator for all participating countries in the decade, secondly, its acts as the specialized agency of the United Nations dealing with education. The UNESCO as the chief implementer of the teaching and learning (education) for sustainable development has developed several programmes and packages to implement Education for Sustainable Development. The vision of UNESCO is that of teaching and learning (education) that promotes social equity, and fairness, inter and multi-disciplinary thinking, problem solving and innovation. As expressed in the UNESCO (2014) report, the present educational paradigm promotes intellectual thinking and actions on the basis of discipline, age long practices and established beliefs. However, the current trend of education or education for sustainable development) as articulated by UNESCO is an educational paradigm that is aimed at inducing and redirecting global educational efforts towards teaching and learning that works with new methods and contents that will encourage the

recipients of such education (learners) to intellectually interrogate and query development patterns and approaches that is not sustainable.. In addition, it is aimed at empowering learners to look for creative and sustainable alternatives to evolving issues which will enable them to adjust to the new realities of sustainable development, and to evolve an education organisation where the values, principles and sustainable actions will find their placement in elementary education of learners, higher education institutions, community related training activities and office training activities. The duty of educators in this case is to serve as agents of change by promoting learning that is participatory, reflective practices, problem solving activities and critical thinking.

The Decade of Education for Sustainable Development is designed to inculcate the ideals, philosophies and actions rooted in sustainable development into every sorts and forms of education across all educational levels to inspire attitudinal changes and activities that are sustainable with the goal of creating solid societies that is founded on the principles of fairness and justice for everyone. Here, teaching and learning for sustainable communities becomes an instrument of advocacy and a tool of mobilisation with which civil society organisations, government institutions, multi-national organisations, private institutions and native communities globally can exhibit their commitment in a practical way to learn sustainable lifestyle. The decade is a global effort targeted at reorienting education system around environmental, economic and the society which is the pillar of sustainable development. (UNESCO, 2014:19) As observed by Richmond in UNESCO (2010), UNESCO believes that Education for Sustainable Development is not limited to formal educational system but is applicable at all system of education be it formal, semi-formal of non-formal. Teaching and learning for sustainable development is a vibrant concept that engages a wide range of public awareness creation and training to educate and mobilise the general public to grasp and understand the sustainable development concept with regard to the ability to think in between systems and stimulate positive actions. It goals is to develop the values, skills, knowledge, and competencies that will equip learners to take direct action for evolving a future that is sustainable future.

UNESCO in promoting teaching and learning (education) for sustainable development developed an implementation scheme referred to as (International Implementation Scheme) (UNESCO 2005a) to enablejoint ownership of the Decade and to linkseveralinternationalactivities to stimulateaction for teaching and learning for sustainable development. UNESCO in pursuant of this acknowledged that two corresponding advocacy effortsarenecessary in pushing forth the Decade of Education for Sustainable Development. The firstis to back the existing educational system in its bidto transit to development that is sustainable, the second, is to assistsustainable development stakeholders working on integratingteaching and learning for sustainable development into their activities. To implement the two corresponding efforts, UNESCO focused its efforts in four distinctive areas:

a. Supporting member states of UNESCO across the United Nations education system as a critical executioninstrumentfor development that is sustainable, spreading out to educational institutions and sustainable development societies.
b. Make available policy backing and guidance to participating countries, with the using the focus of teaching and learning for development that is sustainable to reorganise their educationalstructures and to make appreciableadvancement in the direction of achieving the global goals like MDGs and the EFA goals.
c. Sustaining aninternational discussion on teaching and learning for sustainable developmentby facilitatingcollaboration and interaction among participating countriesin order to advanceconversationamongsustainable development workers and specialistsglobally.
d. Design frameworks with which the progress of teaching and learning for sustainable development could be assessed by participating countries.

To its work on the right path, UNESCO came up with specialists and stakeholders whose advise would guide the execution of the Decade of Education for Sustainable Development implementation. These includes; High Level Panel on Decade of Education for Sustainable Development, Monitoring and Evaluation Expert Group (MEEG) for monitoring, and an international steering committee who was saddled with the

responsibility of preparing for the world conferences in the year 2009 and 2014. (UNESCO, 2009a).

The Decade of Education for Sustainable Development implementation was classified into two separate parts. The first being from years from 2005 to 2008 was devoted to explaining and campaigning for teaching and learning for sustainable development, finding people and promoting actions that had been earmarked, increasing collaborative partnerships, and devising mechanisms for effective assessment and monitoring. The second phase of the Decade commenced by employing the World Conference on Education for Sustainable Development held in the year 2009 to shift the conversation in the direction of a renewed effort in advancing teaching and learning for sustainable development, the discussion stressed the importance of teaching, content mastery and the significance of teaching and learning to sustainable lifestyle and work. As a result of the outcome reports of the world education conference in the year 2009, the Bonn Declaration and a newly expounded plan for the second phase of the Decade, UNESCO has focused its activities on teaching and learning for sustainable development on three important sustainability related aspects and it includes; biodiversity, disaster threat reduction and climate change these are to be solved through educational intervention. This framework has informed the activities of UNESCO in implementing the United Nations Decade of Education for Sustainable Development from 2009 to 2014 (UNESCO, 2010a).

2.3.3 The Nature and Scope of Education for Sustainable Development

Teaching and learning (education) for sustainable development is not the same with environmental education while an aspectof teaching and learning (education) for sustainable development concerns itself with espousing ideals which include preserving and conserving earth's resources, its scope is not limited to conservation of earth resources but includes other pressing human issues such as; fair distribution of natural resources; equality; human rights etc.Leal (2015)explained that althoughecological(environmental) education had a recognisedinterestin the eco-system and the methodsthrough whichresources that are gotten from the environment are expended.Teaching and learning (education) for sustainable developmentplaces direct importance on the ways, methods, instruments and proceduresthat allowsindividuals to

progressby acquiring the ideals, values, skills, knowledge , attitude and competencies required to contributively participate in the activities leading to a sustainable compliant community.

Furthermore, as explained by UNESCO (2009) Teaching and learning (education) for sustainability is a process of acquiring knowledge or method ofeducation) situated on the values, ideals and practices that a germane to development that is sustainable and it bothers itself with every categories and kinds of education. Teaching and learning (education) for sustainability actively promotes five major types of knowledge to delivervalueladen schooling and to raiseindividuals that are sustainable development compliant which includes; learning torecognize, learning to live, learning to co-exist, learning toact and learning to transform one's community. Teaching and learning (education)for sustainable development should be viewedas a wide-rangingprogrammefor value ladenteachingand learning through which importantproblems such as, sustainable environment, climate change, poverty alleviation, gender balance, corporate social responsibility and preservation of native cultures, amongst others. The all-inclusivecharateristics of teaching and learning (education) for sustainable developmentpermits it to be a useful tool for the attainment of the Sustainable Development Goals.

Teaching and learningfor sustainable development by its coverage is designed to deal with multifacetedmixture of topicspertinent to ecology, economy and the society. Itequipsindividuals to handle with and discoveranswers to difficulties that portend the sustainability of this present planet. The Decade of Education for Sustainable Development centers on four critical areas:

a. **Improving Access to Quality Basic Education**: The foremost importance of teaching and learning (education) for sustainable development is enhancing right of individuals to quality elementary education. The number of years and the package of elementary education differ internationally.Primary education is recognised as elementary education in many countries of the world, while in some, eight or twelve years is requiredfor completion.Gaining access toprimary education remains a problem for many, particularly, young women and adults who

have not had any form of formal education.It is estimated that more than 100 million elementary schoolyoungsters have never been present atany school and close to 800 million adults are uneducated (EFAGlobal Monitoring Report, 2004). The push for the teaching and learning (education) for sustainable development is not restricted to developing countries or nations with high level of uneducated or out of school children.Every country has its peculiarchallenges especially when it has to do with making quality education accessible and available to all citizens, irrespective of their economic cadre.Presently, several children of school going age, teenagers, middle aged and adults do not have open access to education and are as such denied even in the so nameddeveloped countries with reduced rate of illiteracy. FOR instance, the rate of students dropping out of school may be on the increase when access to adult education may be limited. Sadly, as it currently operates in most countries, merelyraising the rate of elementary education and literacy cannot place many countries on the path to development that is sustainable.

Certainly, if countries desire and strive to make appreciable advancement in the direction of achieving sustainable development goals, it is crucial that they aim at values, ideals, principles, knowledge and competencies that promote active involvement in public issues, governance and processes of public decision making.Communities and nations that plan to make progress towards sustainability goals, should of a necessity focus on facts, principles, skills, values, and perspectives that encourage and support public participation and community decision-making. To get this done, there is need to evolve a new dimension of teaching and learning (education) to address sustainability that is widened to include critical-thinking expertise, data organization and interpretation abilities, and critical questioning skills. Capacity to analyse critical social and community based issues should be included in the elementary education together with training to empower people to make consumption choices that does not deplete natural resource base or encourage social inequalities and injustice among people living together in the same system.

b. **Reorienting currentteaching and learning programmes**:Sustainable communities cannot be attained with present elementary (basic) education and the methods of its delivery. The riddlehowever, is that unsustainable impacts are being created by the so named developed nations with high number of educated citizens. Some of them use large quantity of energy, water and natural resource to maintain their way of life that is not sustainable. This implies that building a sustainable society will not automatically happen by increasing literacy rate, as a substitute, the content of education and its relevance to sustainable development must be emphasized. Repackaging, re-engaging, revising and rethinking the content (curricular) to include the values, principles, practices and knowledge of sustainable development from early childhood level of education to through to higher education institutions. The curriculum revision is expected to cover the three dimension of sustainable development, i.e. society, environment and the economy using a multi and inter-disciplinary approach and should be implemented by nations in a way that is culturally and locally acceptable.

c. **Creatingopen understanding and consciousness of sustainability:**Societies and communities need a crop of citizens who are properly sensitised about the goals of sustainable development and its knowledge and skill to make appreciable advancement in in the direction of sustainable development. A well-informedpopulation supports sustainable societies in many ways.In many ways, citizens at all times aid the policies of the policies of government through their attitudes in relation to management of resources and civic engagement. Citizens also, back informed actions that are in relation to sustainable development and government officials promoting informed legislation on sustainability.

In the same vein, citizens can purchase goods and services based on their knowledge of the impact of their consumption choices on their environment through buying of items with low environmental impacts and supporting companies with sustainable business and social practices.Citizens that are informed in sustainable developmentcould assist government institutions and their communitiesto come up with innovation and creative actions that would move communities towards sustainability. Evolving a population that is sustainability

compliant will involve a deliberate and intensive action to mobilise the citizenry with specific and practicable information that are consistent with the principles and practices of sustainable development to people of different age bracket.

Furthermore, messages could be delivered to the citizenry through social marketing to effect sustainable behavioural changes.An elaborate educational instrument with focus on the natureof the competencies that are germane to sustainable development such as system-thinking, rational decision making and critical thinking require to build a population with capacity to solve multi-faceted issues that confronts nations and societies.

d. **Providing training:**Businesses, companies, higher education institutions, non-governmental organisations and community based organisations governments, should be motivated to educate their leaders in the direction of sustainable development like issues of sustainable leadership, environmental conservation, social equity and justice etc. including training all workers sustainable practices. Teaching and learning (education) for sustainable development deals critically with the development of specific programmes of training to ensure every segments of the labour force possess the skills and knowledge required to do their work in a way that is sustainable. Presently, corporations especially large ones and manufacturing companies are harvesting great Currently the larger corporations, especially manufacturers, are reaping huge monetaryprofits from training activities introduced to solvewater, waste and energy related problems.

Presently, making attempts to solveecological, communal and human capitalsproblems are showing to be worthwhile, leading business schools now include knowledge and principles of sustainable development as abasicaspect of theircurriculum. Nonetheless, 99.7% businesses globally are small andmedium enterprises (SME), which hirenearly 75% of the workers in the world. In an effort to create teaching and learning (education) for sustainable development programmes that will address the fourabove listed aspects of ESD all segment of the education society have to work collaboratively. Formal education such as theelementary, secondary, and tertiary institutionshave to cooperate with associates from non-formal sector of education, these includes, agricultural

extension agents, community and public health staff, non-governmental agencies, etc. and with other media partners like television, radio, newspapers and magazines.

No universal models of teaching and learning (education) for sustainable development exist according to literature. While there is generalagreement on ideologies of sustainability and supporting concepts, there will be nuanced differences based onindigenous contexts, priorities, and methods. Every participatingnation has to outline its own sustainability and education concerns and actions. The emphasis of the goals and processes should of a necessity, be locally defined to meet the local ecological, social and economic situations in culturally suitable ways. Education for sustainable development is correspondinglypertinent and essentialfor industrialised and unindustrialised countries. Education for Sustainable Development has essential features that can be applied in many culturally suitable forms regardless of the industrialised and un-industrialised status of any particular country. The followings are the basic issues that the teaching and learning (education)for sustainable development should address and be based on:

1. is founded on the values and ideals that lie beneath sustainable development;
2. focuses on thereinforcement and subsistenceof all three aspects of sustainability – environment, society and economy;
3. stimulates life-long acquisition of knowledge; is locally applicable and culturally significant;
4. is grounded on indigenous needs, observations and structures, but recognizestheglobal impacts and significances of fulfilling such indigenous needs;
5. employs formal, non-formal and informal forms of education;
6. gives room for the growing nature of the concept of sustainable development;
7. pays attention to content, taking into cognizance context, universalconcerns and cogent native issues;
8. develops civil abilityfor society-related decision-making, communalforbearance, ecologicalleadership, flexible workforce and worth of life;

9. cuts across several disciplines. No particular discipline can lay claim on teaching and learning for sustainable development, all disciplines can contributeto it and benefit from it.
10. employ multiplicities of instructionalmethods that encouragescollaborativeteaching and learning and criticalstyle of thinking.

The important nature of teaching and learning for sustainable development can be executed in countless ways, so that the resulting teaching and learning for sustainable development programme will mirror the distinctive environmental, social and economic conditions of each locality. Moreover, teaching and learning for sustainability increases public capacity by improving and refining the workforce, social tolerance, environmental stewardship, active participation in community-based decision-making, and quality of life. To increase publicproficiency in these five areas, formal, non-formal and informal education should effectively collaborate.

2.3.4 Developing a Curriculum to Drive Sustainable Development

Ten key aspects that aidstandardteaching and learning in (education) for sustainable development has beenrecognised by UNESCO in relation to separatestudent and education systems some of which are centered on the student. It includes:

a. Searching the student out
b. Recognizing the experience and the knowledge of the learner
c. Ensuring that the content is relevant
d. Employing severalinstructional procedures and
e. Improving the environment where learning is taking place. (UNESCO, 2005)

Teaching and learning techniques in Education for Sustainable Development stimulates learners to deep enquiries and clarifications, examine and review, reason and reflectanalytically so as to make informed conclusions. These pedagogical approaches have moved from teacher-centered to learner-centered lessons and from rote memorisation to participatory learning.Teaching-learning in Education for Sustainable development many of the times are location based or centered on issues/problems which inspiresin depth reasoning, publicanalysis and examination of issues from local

perspective.This includes: discussion methods, application and critical examination of locally relevant ideals; constructing and sketching to arouseoriginality and envisionalternatethings to come in the future.

UNESCO (2012) observed that by using varying teaching techniques, the teacher attends to the diverse needs of the students. Not all students learn in the same way. Some prefer to listen, others to read, and still others to participate more actively. Traditional pedagogies mainly serve the students who are good at listening, reading, memorizing and sitting still; however, not all pupils have these abilities and can profit from maximally from such teaching learning process. As such, there is no equity in learning. However, for education to be sustainable such education must meet and consider the need of individual learners. This is why Education for Sustainable Development emphasise varying of teaching techniques so that teachers can attend to diverse need of the learners in the class.

Ensuring that students learning desires are met during classroom teaching and learning process promotes social equity which is one of the core values of sustainability. In the past, teaching techniques has not been seen by educational community as a way to promote social fairness and equity. Before, students who had excellent reading skills, who could recall and memorise what they were taught could excel academically while those students who were not good academically dropped out of school by means of that limiting their future career and economic prospects. Not finishing school has been a great Dropping out of school is a major societalproblem and an economic burden which has also become a sustainability concern. Nevertheless, employingvarieties of pedagogicand learning methodsequally meet students need can solve the problem of fairness and social justice right in the classroom.Pedagogical styles that promote equity and fairness are a good method to show to students the values that sustainability seeks to promote.

Like any other schoolactivities, instructional methods can promote ideologiesof sustainable development.Gender, is another form of equity that underlies sustainable development which can be promoted in the classroom. Since men and women in rural and native communities often times have separate roles as define by the culture, classroom teaching strategies that could promote gender balance should be employed. Also, instructional materials that promote gender equity should be deployed.

UNESCO in Education for Sustainable Development Sourcebook identified four teaching-learning techniques for Education for Sustainable. It includes: simulations, class discussions, issues analysis and storytelling. Each technique stimulates different learning techniques.

Simulations: Simulations are teaching/learning scenarios in which the teacher defines the context in which the pupils interact. Thepupils participate in the scenarios and gather meaning fromthem. Forexample, pupils imagine they live in a small fishingvillage and have to learn how to manage the fishing stocks sustainably (i.e. without depleting the fishing stocks or starving the people). Often, simulations are simplifications of complex abstract concepts. At the same time, because they are distillations of real-world situations, simulations give a sense of reality and thus engage and motivate learners of all ages. This is because concepts associated with sustainability are often abstract and complex. Simulations reduce complexity and highlight salient aspects. Simulations give concrete ways to teach abstract concepts. Providing concrete examples for abstract concepts is especially important learners. Simulations promote equity by occupyinglearnersthat learn throughseeing, hearing, and doing, it addresses tangible life relateddifficulties that confronts societies. Itenhances theimportanceof the curriculum and it encouragesadvancedskills of reasoning. (UNESCO, 2012)

Class Discussions: Class discussions allow for the transfer of information amongst students and from the students to the teacher, in addition to the traditional route from teacher to students. students come to the classroom with a wide variety of life experiences that can enrich the teaching of the mandated curriculum. Learners can therefore contribute a great deal to discussions of sustainability with observations from their neighbourhoods about what is sustainable and what is not. Teachers can then incorporate these experiences into their lessons through class discussions that provide learners with real life applications of concepts. Education for Sustainable Development emphasises this because one of the skills that Education for Sustainable Development seeks to develop is the ability to communicate orally and in writing. Discussions give learners opportunities to develop oral communication skills such as: developing focus and purpose before speaking, active listening, building on the ideas of others, summarizing, and questioning. Learners with

strong auditory learning modalities learn well from discussions, both from listening and expressing their own ideas. Class discussions stimulate learner's ability to analyse and think critically, and promote participatory learning.

Conversation in the classroom can be centered on discussions like set of questions, an activity to be done, a task to solve and a course of action to be embarked on. Verbal exchanges are expected among learners to get this accomplished. Discussions can take different ways and large class discussions can includeentire class while discussion in small group can involve two to five or six students. Classroom discussion can be facilitated by the teacher, the students or participatory. There is expected to be laid down rules that will guide the flow of classroom discussion and interaction. (e.g. only one person should talk at a particular time while others listen). Discussion method can be used by teachers to evaluate students' understanding and application of the concept of sustainable development with respect to the environment, economy and society. Many of the times the learner might demonstrate competence in one aspect of sustainability while the other aspects might not be immediately visible.FOR example, it is good to recycle products like aluminium and plastics because it good for energy conservation and environmental protection. The other aspects that might not be immediately obvious but that can become obvious through classroom discussion is that recycling is also good for the economy because it serves as a means of employment for some people and reduces the financial burden incurred by municipal authorities from waste management and disposal. This enables them to spend such money on other important areas of social need. (UNESCO, 2012)

Problem Analysis Techniques: Techniques of analysing problem is an organised method for exploring the tripartite dimension of sustainability challenges that confronts every society.It assist learners to recognise keyopinionsthat are connected to communities as well as important participants or stakeholders and their viewpoints aims and assumptions connected to any particular problem.Problem analysis is a critical method of considering financial costs to any identified solution as well as identifying who the sponsors are likely to be. Problem analysis is multi and interdisciplinary involving the social and the natural

sciences, it could also be done in an exhaustive or comprehensive manner and in a way that is considered brief.

This is because sustainable development is a multi-dimensional framework that incorporates environmental, economic, society, governance and other issues confronting human societiesglobally. Learners will have to deal with systemic and complicated issues that have no simple answers when they assume leadership positions. Schooling should empower them to build capacities for thinking in such a way that they will be able to solve and address complex life issues that confronts their societies. Also, it will help them to be able to create innovative and locally relevant solutions while not forgetting the global relevance of such solution, e.g. They should learn to solve problems of polluting the environment without exporting wastes that are toxic to other countries.

Problem analysis is relevant to all learners because it takes them through the process whereby they can apply the concept of problem analysis in solving any problem. Problem analysis is a broadmethod that can be useful to solving different problems like ecological, social and economic difficulties. It gives students a platform to view and come to terms with things that are specifically wrong in their societies and the larger global community, though they do not have the competencies to solve the problem.Many of the students that come to school are already exposed to the media and through the media they are in constant touch with persons outside of their immediate communities and the global community. Through the media, they have experienced glamour and wealth, through the media as well, they are exposed to people living in abject poverty and all forms of injustice and inequalities going on globally. Problem analysis helps them to identify problem and properly clarify concepts as a class, a group or as an individual. (UNESCO, 2012)

Story Telling Technique: Telling stories is an attractive method of teaching that is useful to drive home issues, concepts and ideas that are pertinent to sustainable development. Current issues, past history, day-to-day experiences, social-media and media events, literary works like poem and drama constitutes things that can be used to narrate stories. The native tradition, culture, folklores, practices and believes of native societies is the pool from which stories can be drawn. In the past years, storytelling is a means of

teaching the young ones about the cultural values of their community, a means of preserving cultural heritage, of entertainment especially in the evening after the day's work. It is also a means of ensuring that the young ones imbibe the acceptable moral values and practices in a community. Telling stories reflect age long traditional practices, which the elderly holds dear, it contains ancient wisdom of creation and how the environment came about and how it should be culturally protected. Telling stories is a useful instructional method in teaching and learning sustainable development because it draws from cultural practices and perspectives that are peculiar to community preservation. When stories are told, ideas, concepts, principles and theories learnt while interacting with instructional material like textbook or classroom teaching and learning ordinarily become meaningful and exciting, telling stories make seeming irrelevant information become relevant and properly contextualised

This assistsinstructors to effectively conveysustainability concepts, ideologies and ideals to students. Learners who are auditory learners learn effectively when storytelling strategyis used.It could prove difficult for students to remember concepts that are disjointed or unconnected to specifics, but students rarely find it difficult to recall stories that are associated and connected to topics that they have been taught. Stories ease students into the process of learning and make them feel relaxed during teaching and learning process.Story is a leveler, it engages individuals of different age group and capabilities. Moreover, it links and unites students to their native and traditional knowledge and practices thereby passing to them their elders wisdom for them to hand to the next generation. The fourth dimension of sustainable development is culture, telling stories, exposes learners to their culture making them become aware of their roots. As a leveler, it promotes fairness and equity in the classroom since every learner is carried along in the teaching-learning process. This is a unique feature of sustainable development.

Teachers, can tell stories by arranging story contents that reflects and mirror the principles of sustainable development in a lesson. FOR instance, predator-prey interactions can have a sustainability twist by narrating an event of the accidentalimplications of the bringing in of animalsthat are not indigenous to the

Australian eco-system. Instead of proceeding through the facts in the teaching kits or materials a narration can be made in an organised way to depict the topic to be taught. This will take the students through the moments of understanding the initial problem, the contradictions, the complications, the high point, solution and the conclusion. Constant practice, suspense can be introduced into the stories through breaks to draw the focus of students to pertinent issues the teacher wants them to grasp. Another means through which this can be done is allowing students to draw conclusions from stories told by telling them to imagine what the conclusion is like. This will stimulate critical thinking and imaginative problem solving skills in the learners. In the same way, asking students to imagine a follow up to the stories, and what they think would happen nextis a way of bringing back the lesson to the theme of sustainable development that being considered and promoting critical thinking. Teachers can ask, for instance, how the narration illustratesthe concepts and principles of sustainable development. Overtlyconnecting the story to the topic being taught in class is essential. Though the connection between the story and the subject matter might be so clear to the teacher, clearly showing how it connects is important since learners might not be so clear about it. (UNESCO, 2012)

Furthermore, as observed by UNESCO, (2012b) local communities are one of the main resources for teaching and learning in education for Sustainability. A focus on the community helps to draw on distinctivepast, atmosphere, individuals, way of life, financial management, collection of works of arts, like poetry, drama, music etc. of a specific place.Members of the society are seen as vital partners and resources in the process of teaching and learning.The communities provide an opportunity to link academic realities with goings on in the society, thereby creating active citizenry. In the same way, video documentaries and case studies provide multiple perspective and analysis skills for the students. Showing a documentary for students to view together in a classroom can be a method to promote societal perspective on a specific subject. The analysis of the documentary can be done in a group discussion to draw together the findings of each group. Through such discussion, it would becomevividlyclearthe information that is lacking and the ones that are available. The group can debate good opinions and prejudices in the documentary and to discoveromittedfactsor answers.

2.3.5 Competencies that should be fostered in Sustainable Development Curriculum in Universities

Universities are expected to actively participate in the process of implementing sustainable development. They have the responsibilities to impart the knowledge and skills to make their students advance successfully in a globalised world and to nourish in them the skills and positive attitudes towards environmental issues, cultural diversity and the richness of nature and how it contributes to their well-being and why it should be preserved for the coming generations.Rieckmann, (2011) explained that for universities to cope with these challenges, they need to create teaching and learning settings characterised by inter- and transdisciplinarity, participation, problem-orientation and linking of formal and informal learning to facilitate the development of competencies needed to deal with sustainable development.

Competencies describe the dispositions which individuals needs in his environment to take positive actions and to self-organise in various complex contexts and situations, this include cognitive, affective, volitional, motivation and psychomotor which are interplay of knowledge, capacities and skills.According to Rieckmann, (2011) several competencies required for sustainable development in universities have been developed and this includes: shaping competence, sustainability literacy and sustainability skills. Furthermore, UNESCO, (2005) in the International Implementation Framework for the ESD stated that:

> education must be reoriented to address sustainability and expanded toinclude critical-thinking skills, skills to organize and interpret data and information, and skills toformulate questions. (p. 29)

Similarly, in Germany, developing “Gestaltungskompetenz” (shaping competence) which meansthe precisecapability to take action and provide solutions to difficultieshas been discussed as the central educational objective of Education for Sustainable Development. Shaping competence encompasses a set of competencies which are expected to facilitate active, reflective and co-operative participation of an individual toward sustainable development. According to de Haan, (2012) shaping competence

comprises of the following competencies that are key to achieving sustainable development. They include:

a. **Competence in Foresighted Thinking**: The capability to solve uncertain issues of the present and future projections, expectations and plans typifies the sub-competence of being able to think beyond the present. It is necessary that the years yet to come be understood as open and something that can be molded.
b. **Competence in Interdisciplinary Work**: A single method and established procedure of action are not sufficient to solve the problems of today. Sustainable challenges require interdisciplinary and multi-disciplinary approach of many scientific fields, native traditions, cognitive and other approaches.
c. **Competence in Interdisciplinary Learning**: There exist two different but important kinds of interdisciplinary approach. First are subject areas that share similar theories, methods, conceptual approaches, terminologies etc. and the second one, is called problem oriented interdisciplinary. This type is the combination of specialized disciplines coming together to proffer solution to an identified problem that the knowledge of a single discipline might not be able to solve. Some problems could behydra complex and could be solvedwhen differentcontrolledand scientific approaches are used from the sciences, politics, sociology, economics, ethics, geography etc.FOR instance, the causes and effects of many established problem in sustainability cannot be adequately described and comprehendedif learners do not understand the interplay and relationships that exist between different fields.
d. **Competence in Cosmopolitan Perception:**It involves having a shared knowledge of more than a culture and the readiness to tolerate people from different cultural orientation. It also means theability to classify and localize occurrences withintheir local milieu while not losing the importance of their global relevance and effects. This skill is focused on expanding learner's horizon to perceive issues based on their contextual implications, since a local or regional perspective of matters can be narrow or limited for effective global

interaction and perception. This sub-competence aims at contextual and horizon-expanding perceptions. There is need to allow for global perception in developing our perception and judgments.

e. **Learning Participatory Skills**:Developing contributive and participatory abilities is essential and of a paramount concern for sustainable development and education for sustainable development. Sustainable development is focused on developing such characteristics because it is essentially on of its principles. It is premised on the fact that the Sustainable Development Goals require the contribution of everyone and not only state actions through policies and legislation or the building of new technologies or strong institutions and economies. Even though those are necessary, it requires the active support of the citizenry.

f. **Competence in Planning and Implementation Skills**: This means the ability to gain access tomaterials that are required to carry out certain programmes and how to make them available employing sustainable techniques.It also entails the ability to evolve genuine and creative partnerships and to determine possible challenges and surprises that may arise in the process of designing a plan to implement a programme. Animportantissue in evolving planning abilities is learning to consider the quickunpredictability and fleetingcharacteristics ofinformationpertinent to planning. Executioncapabilitiesextendoutsideintents and strategies tointegrateessential and real interests in acting. It consists of the capability to design specific goals to be instantly pursued and the ability tomakechoices that translate from wishful thinking to action.

g. **The Capacity for Empathy, Compassion and Solidarity**. One of the critical ingredients of sustainability is the promotion of justice and social equity and fairness. It seeks to promote equity between the rich and the poor, the privileged and the less privileged. It also seeks to minimize oppression and repression. To be able to do this, there is need to develop competencies in communicating using more than one language and developing competencies to cooperate with people from different background. There is need for

development of feeling of empathy and attitude that will promote unity and togetherness among peoples. Therefore, the goal of teaching and learning (education) for sustainable development is to equip individualswith capabilities toact, communicateand promote values of compassion and international solidarity. It is designed to motivate individuals and societies to cooperatein finding future-orientedanswers to shared difficulties and to design responsible means to attainsocial justice.

h. **Competence in Self-motivation and in Motivating Others**: Changing and motivating others to change is a concept in sustainability that must come alive to achieve a satisfying lifestyle. Teaching and learning for sustainable development seeks to develop the learner'smotivationdrive to lead a fulfilled life and to mobilise others to do so in the face of complexities of the world that is fast experiencing globalisation. Developing these competencies requires individuals to ponder on several models from cultural models to models of production social organization models, etc. objectively. It involves placing several of these models side by side with models that exist in the individual's society to gain new perspective even when such come in contact with foreign ones. Ability to do this has been the exclusive preserve of education.

In a study carried out by Rieckmann, (2012) it was found out that 12 sustainable development competencies are key, and they are; competency for systemic thinking and handling of complexity, competency for anticipatory thinking, competency for critical thinking, competency for acting fairly and ecologically, competency for cooperation in (heterogeneous) groups, competency for participation, competency for empathy and change of perspective, competency for interdisciplinary work, competency for communication and use of media, competency for planning and realising innovative projects, competency for evaluation, competency for ambiguity and frustration tolerance.

2.3.6 Methods of Evaluating Students Learning inSustainable Development Curriculum

Teaching and learning (education)for Sustainable Development has a multi-viewpoint to teaching and learning. Assessment techniques have to be varied and multi-dimensional,

with benchmarksstarting with content-knowledge understanding and comprehension, effective use of strategies of communication together with appreciating multiple perspectives on issues. An assessment technique like this is not so simple. Learning related to sustainable development is so complex and cannot be assessed using very simple or conventional techniques.

Education for Sustainable Developmentappreciates the significance of knowledge, ideals, outlooks, competencies, abilitiesetc. in maintaining equilibriumamong cultural factors, social factors, economic factors, environmental factors, etc.To carry out an elaborate assessment each stated factors and areas has to be properly assessed. UNESCO (2012) explained that assessment techniques has to include the multidimensional competencies, values and principles taught through an approach that is multi perspective in nature.Mixture of written and activity based (performance) assessment techniques have been suggested. It includes the under listed:

a. Performance of process skills: Assess learners' capabilities to gatherinformation, sketch and provide needed meaning tocharts, graphs, diagram and tables and how learners can constructand make exact dimensions and demonstrate other essential competencies and process skills.
b. Structure (unstructured Interviews: Carryout instruct(and learner(learner and learner discussions concentrating on centralthemes.
c. Blogging: Encourage learnersto promptly reply to other learner's messages and writings in a focused manner.
d. Communication: A close observation and monitoring of learners ability to effectively communicate the new knowledge, values, ideas and principles they have newly acquired as a result of their introduction to a new concept and subject matter.The communication could be through expository writing such as personal letters, short essays, posters, diagram representation oral presentations etc. and imaginative or creative writing such as songs, cartoons, stories, poem, drawings etc.

e. Teacher observations: Keenly document and pay attention to the way students learn and how they respond to new knowledge and information and how they apply such knowledge in their communities and how they interact with other learners in and out of the classroom.
f. Periodical Journal records: Encouragelearners to write down their new knowledge and understandings about new concepts, happenings, activities and challenges from time to time.
g. Written tests: An assessment of learners' level of knowledgeover a newly introduced subject matter or concepts or events using a structured test to be answered by the learners.

(UNESCO, 2012:26)

A multidimensional method to classroom instruction introduces complexities to the assessment and evaluation stylesto determine students learning. Although, knowledge is very essential and critical, it becomes meaningless and less effective if it is not presented in an organised and integrated way.Real life competencies and skillswhen completedin solving day to day problems in the societies are considered relevant and meaningful. In the same way, expression of values, ideals and perspectives becomes more significant and useful when such can be linked positive actions. However, assessing the interrelationships of meaningful actions and values could be more difficult than when single disciplinary knowledge is being assessed. Rubrics are more useful in this case since it has the pontential of showing and conveying the interrelationship that exist among knowledge, attitude and competencies.

2.3.7 Role of Higher Education Institutions in Achieving the Sustainable Development Goals (SDGs)

Teaching and learning (education)for Sustainable Development views instructional delivery from a multi-perspective approach ranging from local, regional and global level and this necessitates the involvement of severalstakeholders such as researchers, policy makers,public and private administrators, technocrats, etc. across local, provincial and international in everyregions of the United Nations regions such as the Africa, Asia,

Europe, Latin America, North America, and the Pacific.(Leal, 2015).Moreover, UNESCO (2012) emphasised that educational institutions can enhance their capabilities by engaging in the multi-perspective methodology of teaching and learning which has the capacity to facilitate interdisciplinary competencies and promote intercultural orientation since it addresses wide range of issues that could be considered as local, environmental or planet related. Interdisciplinary approach, wheresubjects, knowledge, theories and principles from separate academic disciplinesare employed to provide answers and solutions to problems empower and equip learners to creatively use newly acquired.

Higher education institutions globallywithin the last fifteen years have been emboldened to take active role locally, nationally and globally towards actions that promotes sustainable development and especially in mobilising and educating students towards these processes. (Jucker, 2002), explained that a lot have changed greatly from when there was a general confusion of the meanings of sustainable development.In the present time as outlined by Brundiers, Wiek and Redman (2010), there are severaladvantages and possibilities to learn about the concept of sustainable development, and there several advantages this affords.Leal (2015) explained that higher education is among the educational sectors that has been influenced by the rush for teaching and learning for sustainable development, because they have been saddled with the responsibility of educating for sustainability. The expectation of higher education institution to contribute strongly to the execution of sustainable development and to front the teaching and learning (education) for sustainable development is due to their nature that is very strategic and their unique positioning. The United Nations Conference on Sustainable Development (UNCSD) in Rio de Janeiro 2012 specifically stated the significance of higher education in successfully realizing sustainable development.The outcome document of the conference encompasses an elaborate outline of paradigms, methods and paraphernaliapresently being employed to incorporate sustainable development in greening of campuses, research and design, and in curriculum design and development.

As explained by Leal (2015), the higher education have been identified as a sector crucial to the implementation of sustainable development because; firstly, it is the

publications of researchers in the university more than any that exposes dangers of international consequence such as high rate of toxic waste, exhaustion of biodiversity, global heating upor the harm to the ozone layer,etc.Moreover, several graduates are trained every year by university lecturers in all fields, this places them on a pedestal to nurture, develop and foster the awareness, knowledge and meaning of sustainable development among students. Similarly, as a result of the knowledge and expertise base of universities, they are in a convenient position to assist the society in developing and implementing social and practical solutions to issues that threaten environmental stability which presents the interconnected method to sustainability.

Leal (2015) explained that there are three main approaches available to higher institutions to implement sustainability. They are; individual, sectorial and institutional which share a partial level of intersection, are interconnected and at the same time each being quite distinct. This is as shown in figure 2.3.

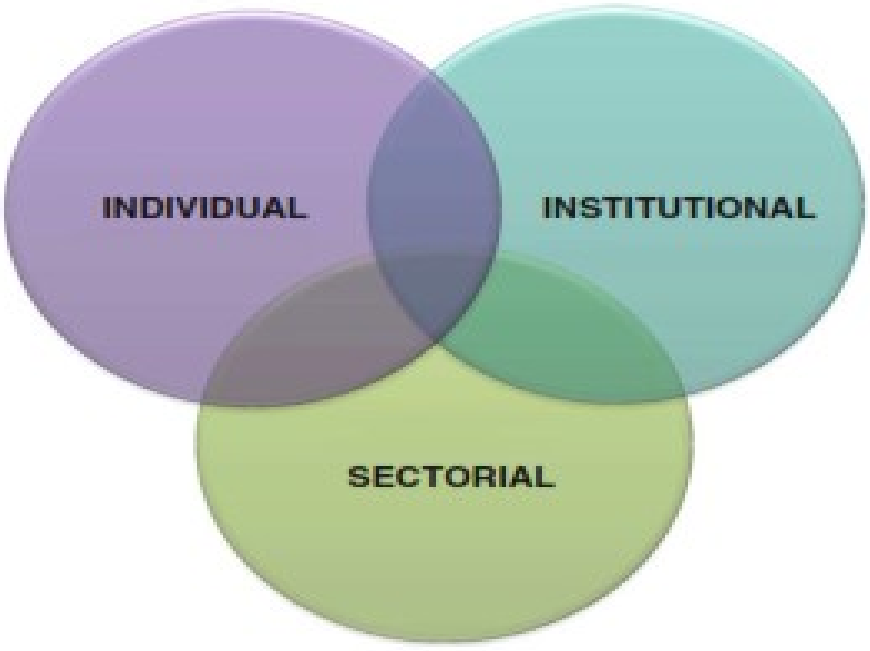


Figure 2.3 Main approaches towards Sustainability in Higher Institution

Source: W. Leal Filho (2015)

Individual: This is the first approach and in involves the individual identifying and tackling sustainable development issues on individual basis, such as taking personal initiativethrough writing, public discourse and enlightenment.

Sectorial: This is the second approach and it involves a faculty (e.g. faculty of natural sciences) taking proactive steps toward achieving sustainable goals while other faculties in the same institution (e.g. Education, Social Sciences etc.) do not take any steps to adhere to sustainability.

Institutional: The third approach is the institutional approach whereby the entire institution makes a commitment towards achieving sustainable development in the campus through policies, administration, teaching and learning, research and development.

According to Leal (2015), only a small percentage of universities adopt institutional approach, which shows that much still needs to be done. This state of affairs of sustainable development pointed by Leal clearly suggests that if Education for Sustainable Development is to be appropriatelyincorporated and entrenched in higher education institutions, There is need for a change of awareness.

The perception of actor's role in realizingsustainability has changed from how it was perceived when the Brundtland report was issued in 1987 and now. Leal (2012) explained the conceptual evolution of sustainability that it has gone through three (3) main phases between 1987 and now. According to him the phases are:

Phase 1 (1987 – 1997): this phase, being the early phase, was in care of the World Commission on Environment and Development (WCED), during this period sustainable development was typicallyseen as something nations should be concerned with, in line with the advocacy of Agenda 21 (UN 1992) and as approved Heads of States who were in attendance at the conference in Rio de Janeiro, June, 1992.

The second phase which was from1998 to 2002recorded a conspicuousmodification in the way sustainable development is being perceived. It has

emerged as something nations have to get involved with to something individuals and institutions should be engaged in. It was observed after the phase two World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 (also called Rio+10), that just little progress had beenmade since the first conference was held ten years beforeand that more of the pledges made by several governments who signed the first agreement were not realised.

The third phase which is the current phase started from the year 2002 till date. The third phase has witnessed a growing and changing aspects of what sustainable is and the general perception of people about the concept has improved since people's perception are now characterised by the dynamics of sustainable development with an increase awareness that individuals just like governments and institutions such as multi-national corporations and civil society organisations share equal responsibility and commitment to ensuring that sustainable development is achieved. The UN declaration of the decade for learning and teaching sustainable development has brought about a great improvement to achieving sustainability, even though this is not to the extent of initial projection. (Leal, 2012)

In its bid to foster the ideal of sustainability in all areas of education, the UN Decade of Education for Sustainable Development (UNDESD) has drawn the focus to the pressing requirements of educational provision for people of every age, gender and regions so as to equip them with skills, values, competencies, sustainable behavioural patterns and the need to make choices to guarantee a future that is livable.It is expected to achieve this through educational establishments, particularly, the tertiary educational institutions.The tertiary educational sector has always and to a considerable extent supported international development programmes, particularly in the field of sustainable development.Several institutions, especially universities and colleges in different part of the globe have critically examine and have to a great extentlower the ecological effect of their activities while several have embarked on innovativeteaching and learningmodels and frameworks, employing systems thinking (Habron, Goralink and Thorp, 2012).

FOR example, Leal (2015) observed that in the United Kingdom, the Higher Education Funding Council for England (HEFCE) document "Strategic statement and

action plan on sustainable development" has reiterated that individual higher education institutions should play a key role in their positions as centres of teaching and research (as well as managers of sometimes large campuses) both within the institution itself, but also in their local communities. The document outlines the elements which need to be considered by universities, in including sustainable development as part of their institutional plans. He stated that further that the institution is among the very few numbers of institutions globally that is financially supportingteaching and research for sustainability, partnering with its associate universities and promoting the distribution of standard practice.

Nonetheless, inspite of the effort being made at involving the higher education institutions in achieving sustainable development, many higher education institutions are not responsive and many are lagging behind. As pointed out by Leal (2015),several reasons could be attributed to the falling back of many tertiary institutions in executing teaching and learning for sustainability. FOR example, some universities lack manpower who could work or research into the theme and also represent the university in important decision-making committees internally and externally. Furthermore, the absence of defined goals and implementing framework which could serve as a guide and provide justification for engaging in an action and the lack of drive to confront the realities of institutional changes that do occur in pursuing investments in sustainable development so as to properly integrate sustainable development into institutional programmes and practices are among the reasons why many still lags behind in implementing teaching and learning for sustainability in their institutions. Figure 2.4 presents hierarchy of actions available to higher education institutions through which they can promote sustainable development actions in their institutions.

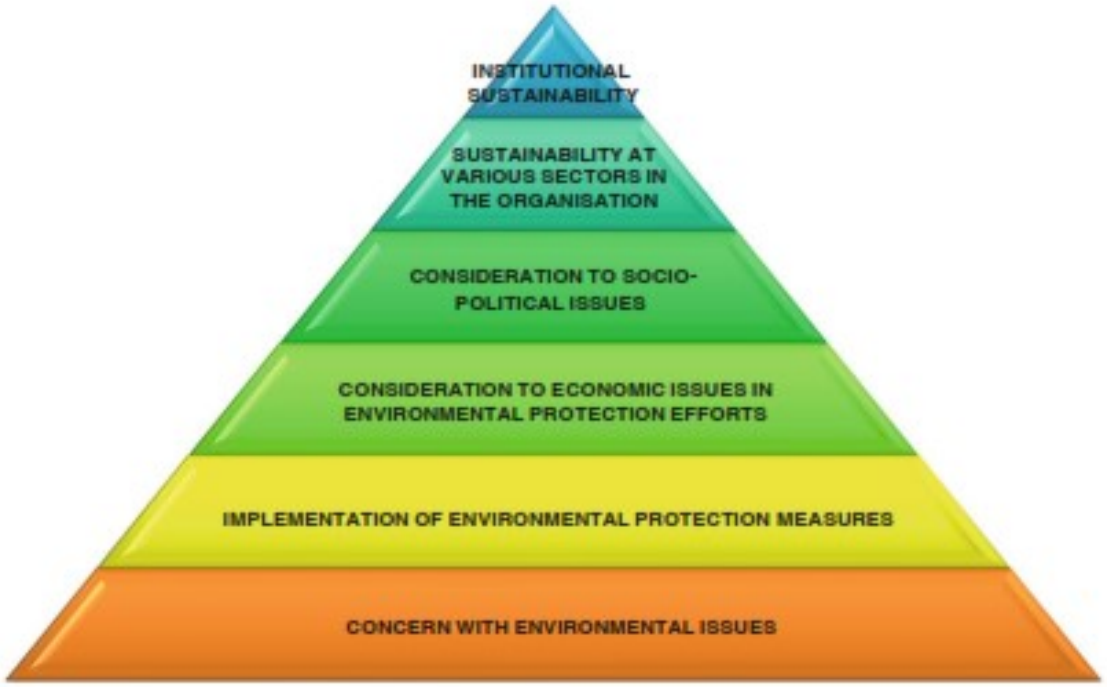


Fig. 2.4 Sustainability Hierarchy Reflecting Higher Education Institutions (HEIs) Involvement in Implementing Sustainable Development

Source: W. Leal Filho (2015)

Figure 2.4 shows how higher educational institutions perceive Education for Sustainable Development and the different levels of consideration to sustainability components as part of their activities, which indicates that many of the higher education institutions need to climb the sustainability hierarchy by intensifying their effort in addressing sustainable development challenges. The figure shows how this may take place. It explains that higher education institutions needs to move away from having basic concern for environmental issues (which is the lowest level in the sustainability hierarchy) to the execution of sustainable developmentmechanisms as inclusive of their activities in the entire university which is the highest level in the sustainability hierarchy. This, they can achieve by organising and undertaking a robust processes, deliberate and concise action plansto assist them in meeting and achieving set institutional objectives and in

teaching and mobilising a crop of new graduates who are exposed to the dynamics of sustainability and who would help in promoting sustainable practices in the larger society. (Leal, 2015)

2.3.8 The Role of Universities in Promoting Education for Sustainable Development

Rapid variations at every strata and persistentindigenous and worldwidesustainable development challenges calls for reconsidering how information, facts and knowledge is produced, communicated and used and how upcoming decision-makers and specialists are educated to solve the complexdifficulties of sustainability. As cerebralfrontrunners and keyprovidersof the capabilityenlargementneededfor worldwidechangeover to sustainability, tertiary institutions are expected to reactpositively, powerfully and all-inclusively to challenges in the society. In an effort to get this accomplished, it behooves on them toengage in the daunting mission of changing themselves to bring about needed change in their communities. The United Nations University (UNU) has responded to the UN Decade of Education for Sustainable Development (DESD) by initiatingglobalpartnershipsintended to reinforce the responsibilities of tertiary institutions in sustainability and teaching and learningfor sustainable development, as well as evolvinggraduate programmes in these themes and other interrelateddiscipline.

As explained by Abubakar, Al-Shihri and Ahmed (2016),the distinctiveresponsibilities of universities in advancing sustainabilty have been emphasised in numerousimportant pronouncements such as the Talloires Declaration in 1990, Agenda 21 in 1992, the Kyoto Declaration in 1993, Global Higher Education for Sustainability Partnership in 2000, the Luneburg Declaration in 2001, the Sapporo declaration in 2002, Graz Declaration in 2005, Abuja Declaration on Sustainable Development in Africa in 2009, the Rio+20 Higher Education Sustainability Initiative, as well as the UN Decade for Education for Sustainable Development. Teaching and learning for (education)for Sustainable Developmentnurtures a method of learning how to make choices that think through the continuing future of the economy, environment, fairnessand justice of all societies. As such, universities globally are becoming more practical in becoming sustainable and in encouraging sustainability through instruction,enquiry,

publiccampaign, and in campus activities. Through this pronouncements the United Nations, through the United Nations Universities (UNU) seeks to promote the participation of academia internationally in practicalenquiry, teaching and constanteducation to solve the persistentworldwidecomplications that are the pressing concern of the UN and its members.

Cole and Wright (2003),indicating a university that operates on a sustainable basis as a society that takes actionson its indigenous and internationalduties, to safeguard and improve the well-being and safety of persons and ecologies and develop some methods of confronting the current and upcomingenvironmental and societaldifficulties.Equally, a university is possiblyviablewhen it has healthysurroundings with an efficient ecologicaladministration and thrivingfiscal policy based on reduction of waste, power and conservation of resources, waste reduction, and promoting fairness and societal justice in its dealings and transferring these values at municipal, countrywide, and internationalstages. (Alshuwaikhat and Abubakar, 2008). This describes that a university is viable when it incorporatesstrategic sustainable development philosophiesand principles in the curricular, enquiry and municipalamenities, and as pointed out by Abubakar, Al-Shihri and Ahmed (2016), campus sustainability is also unattainable without integrating such ideologies as water conservation, energy efficiency in buildings and operations, sustainable transportation, efficient waste disposal system, resource management, fairness, and reducingecologicalcontamination into campus processes. It also containssharedinstruction and learning approaches that stimulate and equiplearners and the society to change their conduct and take action for sustainable development.

To achieve development that is sustainable, universities must be committed to undertaking several sustainable initiatives. Cole and Wright (2003), Lozano, Ceulemans, Alonso-Almeida, Huisingh, Lozano, Waas, Lambrechts, Lukman and Huge (2015), and Abubakar, Al-Shihri and Ahmed (2016),highlighted the sustainable initiatives that universities must of a necessity undertake to include:

a. Framing and executingstrategies and action plans (policies) to make certain that ecologicalproblems are handledsteadily and scientificallyall through the campus in an effort to lessenecologicaleffects and intensify operationseffectiveness;

b. Research restructuring and greening the curricula in a way that the emphasisisplacedon major sustainabilityframework likeecological preservation, poverty reduction, pollution control, biodiversity, reduction of poverty, sustainable resource consumption, climate change, global heating, promotion of equity and fairness, educating the every member of the society towards sustainable development competencies, values, ideals and knowledge required to evolve a future that is sustainable;
c. Building partnership and collaboration with stakeholders such as the students, staff, other institutions, non-governmental organisations public and private sectors etc. for community impacts, empowerment and mobilisation towards cultivation of sustainable actions for ecological sustainability; and
d. Sustainable developmentevaluation and reporting

Similarly, Leal (2015) explained thatthe execution of teaching and learning (education) for sustainable development at institution of higher education(universities) can take diverseforms and designs. According to him, university campuses should be perfect examples of how an institution can beviable and resources efficient. FOR instance, low energy consumption can lead to reduced energy charges which is an instant fiscaladvantage and also to reduceddepletion and consumption of petroleum products. In the area of waste control and administration, when effort is geared at lessening waste generation, it will require less pressure disposing such waste. He went further to state that some of the issues and challenges to be tackled for a university to be referred to as sustainable include:

a. the demandfor institutional strategies to advancesustainability within the institution
b. the demandfor additionalcommitmentfromacademic staff, to widentheir backingfor sustainable developmentschemes and advancecapabilitydevelopment
c. the demandfor curriculum designand reconstruction or in manycircumstances curriculum innovation to providefor the integration of sustainable developmentacademic programmes at universities

d. the demand to ensure that universitiestrajectoryis (i.e. ecologicalburden caused by the activities) furtherviable, from power consumption to carbon (CO_2)discharges fromtransportation
e. the demandfor native and provincialcollaborations on sustainability, so as toproduceoutcomes in the neighbouring societiesof the universities
f. thedemand to place sustainabledevelopment research paradigms, at the centre of institutional structuralpractices.

Furthermore, as stated by Mehlmann, McLaren and Pometun (2010),teaching and learning (education) for sustainable development at the university level oughtto be directed towards: the evolvement of unified/interdisciplinary approach; nurturingexpertise in unified planning; evolving a widerappreciation of difficulties and understanding the function of decision-making process.

Lastly, Leal (2015), while explaining the means to execute teaching and learning (education) for sustainable developmentresolved that theprocedure to be employedinexecutingteaching and learning (education)for sustainable development at universities differand couldcontainenhancedorganisational curricular incorporation, enhancedorganisational and decision-making machineries, which could at the same timeprovidefor sustainable development ideologies. Efforts to activate the prerequisitecomplete positive changes in anorganisationrequireassessment based on fixedprinciples, including; social equity and justice, practicalprecision and moral standard acceptance. The nonexistence of appropriateprovisionsfor one or additional of these fundamentalscouldendanger the projectionsfor complete positive change which is precisely what severaltertiary institutions require. Effortsin the direction of building a future that is sustainable involveindividuals to completelyrecognise the difficultiesin the world we presently live, and recognise the necessityfor evolving new sustainable ways of living. Teaching and learning (education) for sustainable development can assist in promotingthe understanding and expeditefull consciousness of the issues in sustainability. Universities are in a strategicand proper standpoint to make available their supportin this manner.(Leal, 2015:9)

2.3.9 The Need to Introduce Education for Sustainable Development into Nigerian Universities Curricula

As a follow up to the importance and responsibility placed on tertiary institutions in advancing sustainable development, several universitiesglobally especially in the twenty years have been executing policies and actions to make them viable. Universities have startedreorganising their educational programmes (curriculum), their research focus and plans and communaland societal initiativesin the direction of sustainability and are integrating sustainable development paradigms into their campus management and everydayprocesses. (Abubakar et al, 2016). This is based on the realisation of the need to adhere to international best practices in providing 21st century sustainable university education and sustainable university administration and management that reduces the impact of campus day-to-day activities and processes on the environment and enhances students' sustainability literacy and behaviour without neglecting teaching-learning and research activities that conforms to sustainable development.

Many universities in the developed world have mainstreamed education for sustainability into day to day running of their university.FOR example, in the United States over three hundred (300) higher education institutions have carried out campus sustainable developmentevaluationin last five years and several hundreds more are making plans to do likewise (Elder, 2008). Further, as pointed out by United States Teacher Education for Sustainable Development Network (USTESD) (2013) many institutions in the United States are incorporating sustainability into their undergraduate and graduate curriculum and changed the operation of campus facilities to be more sustainable and this involves the incorporation of Education for Sustainable Development into the teacher education programmes. Furthermore, in Canada Education for Sustainable Development feature prominently at all level of their educational programmes, from pre-school to higher education institutions including adult education and non-formal education (IISD, 2009) while in the United Kingdom strong effort have been made through the Higher Education Funding Council for England (HEFCE) to provide guidance and direction, funds and targets for total organisationaladjustmentin the direction ofsustainable developmentever since the Decade of Education for Sustainable

Development began. The action plan and strategy provided by HEFCE for Education for Sustainable Development includes; anoutlinefor sustainabilitypertinent carbon management, educational programme (curriculum) re-orientation and restructuring, student involvement and community extension. These have brought about far-reaching progress among institutions in England, Wales and Scotland. (UNESCO, 2014)

Leal (2015) identified some universities which he termed perfect examples of universities that are doingexcellently well in all-inclusive incorporation of sustainable development into their academic programmes. According to him, Columbia University, Yale University, and University of British Columbia, the University of Lüneburg, Polytechnic of Barcelona, University Zittau-Görlitz or the Hamburg University of Applied Sciences, and the Royal Institute of Technology are examples of universities that have integrated sustainable development fully into their academic programmes and campus operation in North American and Europe. University of Hong Kong, Tokyo University, University Saints Malaysia,University of Nairobi and University of Sonora are examples of universities that have achieved the same feat in Asia, Latin America and Africa. (Leal, 2015; pg. 11)

Apparently, it is evident that many universities in different regions of the globe have properly utilised the UN Decade of teaching and learning (education)for sustainable development to scale up effortto integrate Education for sustainable development into their curricula and campus operation and administration. As observed by UNESCO (2014), several indication of advancement on teaching and learning for sustainability in tertiary institutionsoriginates from the Europe and North America, the same withinitial dedication by tertiary institutions management, the institutionalisation of sustainable developmentstrategies, and the fastincreasingacceptance of sustainable developmentassessment instruments, like the sustainable development tracking, assessment and rating system of the association for the advancement of sustainable development in tertiary education. (UNESCO, 2014; pg. 116)

Surprisingly, while comparing the progress made by each continent in its final report on thedecade of teaching and learning (education) for sustainable development, UNESCO maintained that teaching and learning (education) for sustainable development

is nonetheless an evolvingconcern among tertiary institutions in Africa. Even though some universities from countries such as; Uganda, Kenya, and South Africa are adjudged to be making effort in confrontingcertainfacets of sustainability in diversedimensions, through teaching and instruction, research or campus processes.However, the same reports confirmed that Latin America and the Caribbean universities have reported progress in their effort at integrating sustainability into their curriculum and campus operation.

Nigeria is wealthy in human and natural resources and is characterised by diversity of cultures, knowledge and development opportunities. Like many African countries, Nigeria is blessed with plants, mammal and several animal species, including different weather conditions. (Conway, 2010) In spite the existence of development opportunities available to Nigeria, the country is faced with several sustainable development challenges which are threatening the natural habitat and eco-system and the social and economic welfare of several Nigerians. As explained by Global University Network for Innovation (GUNi), the International Association of Universtites (IAU) and the Association of African Universities (AAU) joint publication in 2011, Africa including Nigeria is susceptible to the effects of frighteningecological conditions like change in climate, forest encroachment, depletion of resources, worseningaquatic and shorelineecologies and problem of pure and portable water. (Paden, 2007; UNEP, 2008) In addition, scourging challenges of poverty, food insecurity, violence, crises and war, problems of HIV/AIDS, ecologicallymotivatedillnesses, famine, rainwater and hygiene are issues Nigeria is still grappling with.

In recent times, Nigeria has had to battle with growing insecurity and terrorism such as the Boko-haram terrorist group, Niger Delta militia group, Movement for the Actualisation of the Sovereign State of Biafra (MASSOB), high profile kidnapping and worse still, a dwindling economy as a result of the free fall of crude oil which serves as the major foreign earnings of Nigeria at the international market. Therefore, the challenge before Nigeria as a nation is to surmountthese problems that posea great threatto its advancementby sustainablymanaging its natural wealthand resources for the welfare of its citizenboth now and for future generations.. Nigeria has the urgent need to grow itshuman

resource baseby equipping them with competencies to advanceand expand development prospects, and to react and adjust to these risks.

The new path to all round development of the people living in the present times that will not jeopardise the advancement of the upcoming generation is through Sustainable Development. Sustainable Development have been emphasised by the United Nations and its commitment established through its report on Conference on Sustainable Development (UNCSD). Education, especially Education for Sustainable Development has been identified as an instrument critical to achieve thepost 2015 SustainableDevelopment agenda and it has been assigned a critical role at the global level through the Decade of Education for Sustainable Development (DESD) and Global Action Planon ESD coordinated by UNESCOto reorient education and learning ESD so that everyone has the opportunity to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development and to strengthen education and learning in all agendas, programmes and activities that promote sustainable development.

In the same vein, universities are expected to be part of teaching and learning (education) for sustainable development and have been mobilised to employ their focal duties of instruction, trainingand investigation to promote teaching and learning for sustainability. Via instruction, universities are supposed to communicate sustainable development principles to their students with the focus of creating awareness among the students to make sustainability compliant decisions (Clugston and Calder, 2002). Viapublicand societal outreaches and engagement, universities are expected to go outsideof their university campuses to involveand create awareness about sustainable development, sensitising them on the benefits of adhering to sustainable practices. The duty of universities in teaching and learning (education) for sustainable developmenthas become highly significantdue to the reality that the students they train today are the ones to make critical economic, social and environmental decisions in the nearest future. These students are the prospectivebuilders and directors of future societalorganisations. Similarly, universities have profound influence on commerce, industries, policies of government and governmental decisions. To address sustainable development challenges

bedeviling Nigeria, there is need for huge investment in tertiary education to produce professional required to confront the Nigerian sustainable development difficulties.

Therefore, for universities in Nigeria to join their counterpart in other parts of the world in employing university education through sustainable teaching-learning, research and sustainable institutional administration in achieving Sustainable Development Goals by 2030, there is the need to re-orient the universities curricular to accommodate knowledge, skills, values and attitudes that propagate sustainable development.

2.4 Application of 4Ds of Curriculum Model to Achieve Education for Sustainable Development in Nigeria

Literature has shown that one of the critical steps to be taken by universities in order to progressin the direction of sustainable practices is through re-orienting their curricula to expose students to the skills and competencies of sustainable development.The need for Nigerian universities to move towards re-orienting their curricula to deliver on sustainable development goals poses a great challenge for curriculum making in Nigeria.

As a unique field of study, the curriculum theorist/experts employ the blending of the skills of arts, science, philosophy, psychology etc. to arrive at developing a relevant and useful curriculum which must have far-reaching effects on the learners and the society. This is why Skilbeck (1982) stated that:

> *curriculum developers are sometimes criticised for taking on too much, over- reaching themselves. Granted,this is a feature of both people and institutions engaged in this work. It arises, however, not from pride or self-aggrandisement, but from a healthy recognition of thecomplexity of the task of modifying the curriculum for our schools.*(pg. 7)

In connection with the submission of Skilbeck, the application of 4Ds of curriculum model in this study is a reflection of the artistic dimension of curriculum making and creativity expected of curriculum developers in performing the task of making relevant and innovative curriculum in solving societal problems. In this study, four stages of curriculum making have been identified and fused and each stage of the

process has been represented with a ‘D’ which stands for Development, Design, Demonstration and Dissemination.

Curriculum development is carried out in stages this is because it involves the inputs of different people, organisations and stakeholders. Kolawole (2015), Netherlands Institute for Curriculum Development (2009), Skilbeck (1984), Stenhouse (1975) and Nichols and Nichols (1974) share the opinion that curriculum development is in stages which starts with an analysis of the existing setting and the formulation of intentions for the proposed change or innovation. This involves a problem analysis, a context analysis, a need analysis and an analysis of the existing activities. According to them, the data gathered gives the information needed to draw up a usable curriculum product which has relevance, consistency and practical usability to the needs and aspirations of the people.

While several authors have agreed with the need to initiate a need assessment analysis as the entry point to curriculum development, there is no unified approaches to the number of stages to be taken to conclude the process of curriculum development. Kolawole (2015) identified eleven stages of curriculum development; Netherlands Institute for Curriculum Development (2009) identified five stages of curriculum development; Skilbeck (1984) identified five stages of curriculum development; Kerr (1968) identified four stages of curriculum development; Wheeler (1967) identified five stages of curriculum development; Taba (1962) identified seven stages of curriculum development and Tyler (1949) identified four stages of curriculum development. In spite of the varying opinion of scholars on the required number of stages in curriculum development process, certain stages are core to curriculum development process. They include; setting of goals and formulating objectives; selection of contents; programme building or design; implementation and evaluation.

This study has identified four stages of curriculum development and they are:

Development: Curriculum Development which sometimes can be referred to as curriculum planning is a holistic and all-embracing process of all the stages that can be identified for the purpose of curriculum development, innovation or change.As explained by Netherlands Institute for Curriculum Development (2009) curriculum development is a

process focused on the improvement and innovation of education which may take many years. It maintained that during the process of curriculum development, desires and ideals are incorporated in a process of design, implementation and evaluation to achieve concrete results in practice. This implies that curriculum development always has a focus, a direction and a sense of purpose. This is reflected in the aims, goals and objectives, subject matter, method of instruction and means of evaluation. The goals, aims and objectives of a curriculum is a reflection of the collective aspirations of the society (Kolawole, 2015) and sometimes a reflection of their needs and challenges.

Netherlands Institute for Curriculum Development (2009) observed that often times than not, Curriculum development often starts with an analysis of the existing setting and the formulation of intentions for the proposed change or innovation. Important activities in this phase include a problem analysis, a context analysis, a needs analysis, and an analysis of the knowledge base. Based on these activities, first design guidelines are drawn up. The design requirements are carefully developed, tested and refined into arelevant and usable product. Evaluation plays an important role in the curriculum development process, as it casts light on the users' wishes and possibilities in their practical context and reveals the best way to attune the product to the practical setting. When the product has sufficient relevance, consistency and practical usability, the impact of the product can be investigated. Whereas the primary emphasis lies on generating suggestions for product improvement (formative evaluation), during later phases, this emphasis is shifted towards the evaluation of effectiveness which is summative evaluation.

Design: Curriculum design is a complex process and an important stage of curriculum development process. The design stage of curriculum deals with planning and sequencing of learning activities.In designing an effective curriculum, certain consideration must be given to the aims, intended learning outcomes, content/subject matter, teaching methods and materials and lastly the assessment techniques. According to Kolawole, (2015) to design an effective curriculum a good attention must be paid to the following;

a. Determine the Needs for the Design; this implies that the curriculum to be design must be relevant to meeting the needs of the society and also the needs of the

learner. In essence, a new curriculum is necessary only when its need have been determined to be relevant to the common good and aspirations of the society and the transformation of the learner into a useful member of the society.

b. State/Review the Aims of the Curriculum; the curriculum to be designed must state the aims of what the designer intends to achieve through the curriculum. The aim of the curriculum serves as guide to content selection, activities, material and methods of assessment. The aims should be constantly reviewed to reflect current realities in the society.

c. StateContent/Subject Matter; stating the content or the subject matter of the curriculum is crucial in curriculum design. The subject matter is the body of knowledge, skills, and competencies that will be transferred to the learner in the teaching-learning process to bring about change in behaviour. Therefore, the subject matter should be relevant to the outcomes of the curriculum, should be appropriate to the level of the students so as to sustain learners' motivation and should be up to date reflecting current facts and principles.

d. Identify Learning materials/Teaching Methods; learning materials are relevant means through which the learners learn and teaching methods is the means through which learners are engage with the subject matter. Therefore, in curriculum design materials that could help learners to do, touch, see and understand should be engaged. Such as laboratory classes, field trips, projects, online learning and group work and projects should be encouraged.

e. Identify Means of Evaluation: Learning occurs most effectively when a student receives feedback, i.e. when they receive information on what they have (and have not) already learned. The process by which this information is generated is assessment. Curriculum designers must identify means of evaluating learners' achievement and means of giving feedback regularly to students. Formative assessment such as self-assessment, peer assessment, tutor assessment should be properly utilised so as to prepare students for final (summative)assessment. This is Students usually learn more by understanding the strengths and weaknesses of their work than by knowing the mark or grade given to it. Summative assessment usually involves the allocation of marks or grades. These help staff to make

decisions about the progression of students through a programme and the award of degrees but they have limited educational value when there is no feedback to the students.

Demonstration:Curriculum demonstration/validation is one of the many processes of the curriculum process. Demonstration is an aspect of curriculum process which is embarked upon after curriculum design to ascertain the worth and validity of the newly designed curriculum. Even though this process is carried out more than once in the process of curriculum development, the one carried out immediately after design is referred to as demonstration.(Wall, 1972). Demonstration as suggested by Cronbach (1970) implies 'demonstrating the worth of; to validate and to investigate". Demonstration as explained by Wall, (1972) is the mortar that holds together the bricks of curriculum development. It is the check-and-balance dimension of any instructional system. Hence, it is important to both job/task analysis and to deriving behavioural-performance objectives.Curriculum demonstrationis taken during design and tryout of materials, during the conduct of training after implementation and at the end of a training action. In its broadest sense, according to Wall (1972) demonstration is almost synonymous with evaluation. (Wall, 1972:pg. 1) However, while evaluation is used to determine the efficiency of a curriculum in achieving the educational objectives it was designed to achieve, demonstration on the other hand makes informed judgement on the processes taken to put the curriculum in place. In essence, while demonstration ensures quality assurance during the process of design, (input) evaluation determines the effectiveness of the curriculum output after it has been implemented over a period of time.

Even though Wall (1972) classified demonstration in its broadest sense as evaluation, He went further to classify demonstration as a form of formative evaluation carried out during curriculum development process. He explained that formative evaluation is conducted during the experimental period and provides feedback for improvement of the instructional package. It is the collection of appropriate evidence during the construction of a new curriculum in such a way that revisions of the curriculum can be made on evidence. This process is on-going and is carried out concurrently with the instruction. According to Wall, curriculum demonstration is formative evaluation.

Formative test performs two purposes; to find out how much students have learnt in a restricted area of content and to assess whether instruction has been properly designed (i.e. appropriate content, sequence and method of instruction) and conducted.

The primary purpose behind conducting demonstration in the curriculum development process is to determine if the planned curriculum will achieve the responses for which it was designed. Demonstration searches for evidence to indicate that the curriculum can cause individuals to achieve its predetermined behavioural objectives and often times demonstration shows for the most part that when objectives are not achieved, the fault lies with the instructional system, and not with the student. Therefore, without curriculum demonstration being applied in the development process curriculum design will be greatly handicapped. (Wall, 1972)

Dissemination:curriculum dissemination/implementation isa crucial stage in curriculum process. It is at the stage of dissemination that all the efforts put into the developing and design of a curriculum is put into actual test. (Kolawole, 2015) Curriculum dissemination occurs when the curriculum is brought in contact with the learner in a classroom (laboratory situation with the guidance of the learner. Curriculum dissemination is an important stage in the curriculum process, this is because a sound and effectively developed curriculum can fail to achieve its goals if it is poorly implemented.Curriculum implementation is a collaborative process involving various participants who must work together to achieve the aims and goals of the curriculum. The teacher is a crucial factor at this stage and the success of the curriculum is dependent on what the teacher does or fails to do. Teachers provide the day to day guide to implementing the curriculum at the classroom level by breaking down the curriculum into manageable units for the purpose of instruction in the classroom, laboratory, workshops, etc. They are the ones that translate the curriculum and make it come alive in the classrooms. However, there must be learners for the teacher to do these. The learner is at the center of curriculum delivery. This is because all that is being done is for the learner to learn. The materials the teachers need for successful curriculum implementation have to be provided at this stage, the absence which makes curriculum implementation difficult.

2.5 Appraisal of Literature Reviewed

The reviewed literature shows that Sustainable development which is the development that considers the forces of economics, ecology, and social development of the present without compromising the ability of the future generation to meet their own need is the new path to development that is sustainable.Evidence has also shown that the United Nations through various conferences on sustainable development since 1992 to 2012 have taken a stance on the need for every member states to adopt sustainable development.Evidences from literature also show that in order to give direction to member states effort towards sustainability, the United Nations General Assembly in September 2015 has adopted 17 Sustainable Development Goals (SDGs) popularly referred to as agenda 2030. The implementation which startedin January 2016 will last through December 2030.

In line with the literature reviewed, Education for Sustainable Development (ESD) has been adopted by the United Nations through UNESCO as an instrument to educate the people towards sustainability and higher education institutions (HEIs) have also been designated as a viable agent of promoting sustainable development through re-orientation of taught courses and greening of their curricular to reflect sustainable principles and practices, research and development, sustainable administration and institutionalisation of sustainability in the campus operation. Evidence from literature showed that many universities in North America, Europe especially United Kingdom, Asia and few Universities in Africa have succeeded in institutionalising sustainability in their campus operations. However, Nigerian universities have lagged behind in developing and using sustainable curriculum to educate their students and drive their campus administration.

Since universities in Nigeria cannot be left behind, it has become imperative that they need a curriculum on education for sustainable development with which they can drive sustainable development in a much stronger direction. This is the gap this study is out to fill.

CHAPTER THREE

METHODOLOGY

This chapter provided a vivid description of the method used in conducting this study.

3.1 Research Design

Design and development research designof mixed methods of data gathering was adopted for the study. Design and development research is employed when the intent of the study is to develop a product and evaluate the product with the aim of establishing empirical basis for the creation of the instructional product.This study designed a curriculum, validates, pilot test and communicatedits findings using empirical method.

Though the study adapted the 6-stagedesign and development research approachof Hevner, March, Park, and Ram, (2004) and Peffers, Tuunamen, Rothenberger, and Chatterjee (2007), it was adapted into a 4-stage of development, design, demonstration and dissemination.

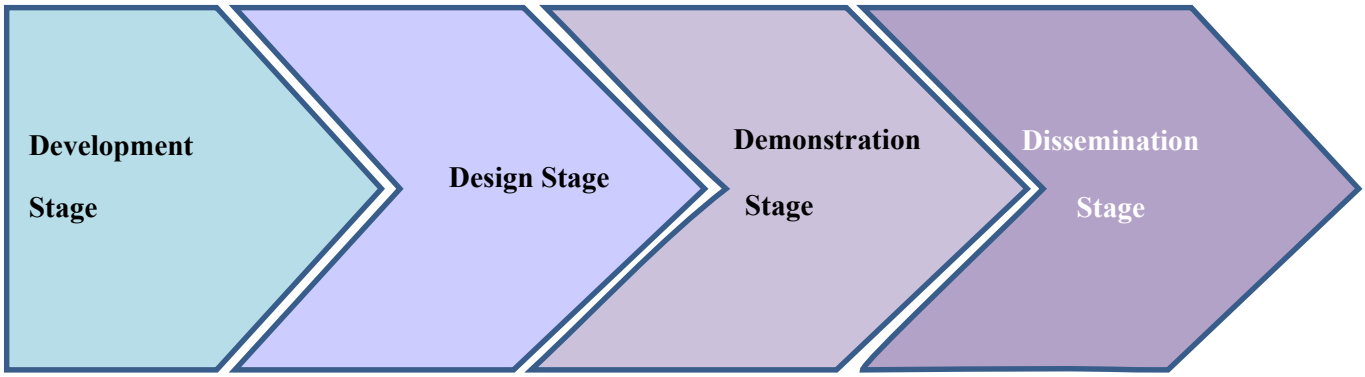


Figure 3.1: The adapted 4-Stage Design and Development Research Approach

3.2 Variables in the Study

The variables in the study were categorised on the basis of input, process and output.

1. Input Variable: This is the concept of sustainable development and the Sustainable Development Goals (SDGs) capturing the three dimensions of economy, ecology and Society all of which forms the basis from which the Sustainable Development Goals are derived.

2. Process Variables: This is 4D's of Curriculum model representing curriculum process of development, design, demonstration and dissemination.

3. Output Variable: This is Curriculum on Education for Sustainable Development (CESD) which becomes the product/artifact derived through the 4Ds of curriculum model in the process variable. The curriculum is the product variable in the study.

The variables have been schematically presented in figure 3.2

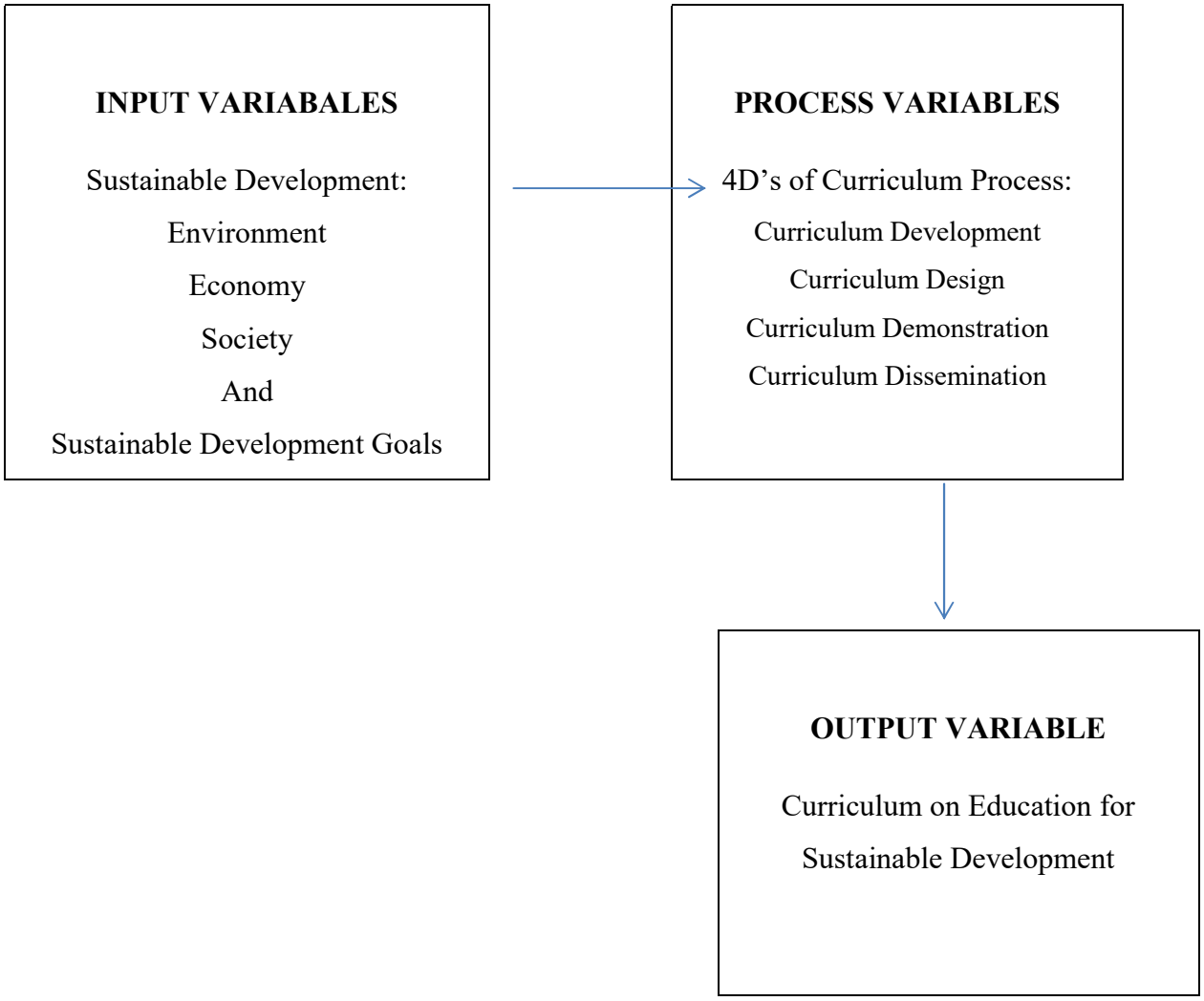


Figure 3.2Schematic Representation of Variables of the study

3.3 Population of the Study

The population for the study comprisesundergraduate students in public and private universities in South West Nigeria. Theseuniversities are owned by federal, state and privateindividuals or organisations.

3.4 Sample and Sampling Techniques

Multistage sampling procedure was adopted for the study.

The first stage(need assessment) employed cluster sampling technique in which South- West wassplitinto three zones: Lagos/Ogun, Oyo/Osun and Ondo/Ekiti states due to their nearness to each other.A random sampling technique wasused to selectthree (3) universities(1 federal, 1 state and 1 private university) from each of the zones and simple random sampling was used to select 250 undergraduates in each of the selected universitiesfrom whom data were collected on their awareness and knowledge of sustainable development and their universities sustainability practices. A total of 2,250 undergraduates were sampled in this stage of the study.

Purposive sampling technique was used at the demonstration (third) stage of the study to select 3 (three) expertswho validated the designed curriculum. The educational relevance and qualifications of the validators to the curriculum that was developed was considered in their selection.

Furthermore, purposive sampling techniquewas used at the dissemination (fourth) stage to selectthe University of Ibadan where the tryout of the designed curriculum was carried out. This is because University of Ibadan was among the universities sampled during the need assessment and a low level of undergraduates' awareness and knowledge of sustainable development had earlier been established.Still, purposive sampling technique was used toselect intact classes of 200 (CHE 277) level studentsfrom the Department of Chemistry, Faculty of Science and 300 (CLC 310) level students from the Department of Classics, Faculty of Artsto participate in the tryout (dissemination) of the curriculum.This was because the course lecturers of CHE 277 and CLC 310 showed willingness together with their students to participate in the study and also because CHE 277 and CLC 310 had students from other departments and faculties within the university. This enriched the spread of the participants during thetryout (dissemination) of the curriculum. A total of 241 undergraduates participated in the tryout (dissemination) of the curriculum.

3.5 Research Instruments

Fourself- constructed instruments were used in the study, namely:

(i) Curriculum on Education for Sustainable DevelopmentNeed Assessment Questionnaire(CESDNAQ)

(ii) Curriculum onEducation for Sustainable Development Validation and ImplementationRating Guide (CESDIRG)

(iii) Curriculum onEducation for Sustainable Development Participants' Perception Scale (CESDPPS)

(iv) Curriculum on Education for Sustainable Development Learning Outcome Interview Guide (CESDLOIG)

3.5.1 Curriculum on Education for Sustainable Development Need Assessment Questionnaire(CESDNAQ)

The Curriculum on Education for Sustainable Development Need Assessment Questionnaire was a self-designed structured instrument made up of four sections. Section A elicited demographic data, section B elicited information on students' awareness of sustainable development, section C elicited information on sustainable development practices of Nigerian universities while section D was an unstructured test to determine student's knowledge of sustainable development. The face and content validity of the instrument were determined by the project supervisors and experts who are Ph.D. holders in the Department of Arts Social Sciences Education, University of Ibadan. The reliability of the instrument was determined by administering it to 50 undergraduates, a sample not included in the study. Section B, C and D of the data was subjected to Cronbach reliability analysis and it yielded the Cronbach Alpha Coefficient of .876, .850 and .965 respectively.

3.5.2 Curriculum onEducation for Sustainable DevelopmentValidation and Implementation Rating Guide (CESDIRG)

This guide was a self-designed instrument to observe the pilot testing disseminationprocess of the designed curriculum in a classroom teaching-learning situation. It was designed to observe the relevance, suitability and adequacy of the objectives, content and utility of the curriculum.It was also intended to observe the pattern of teacher-student classroom interaction and methods employed by teachers in delivering instruction and assessmentof students' participation in the Curriculum on Education for Sustainable Development pilot testing dissemination. The face and content validity of the instrument was determined by experts. To determine the reliability three (3) raters used the (CESDIRG) to rate the pattern of teacher-student classroom interaction and methods employed by teachers in delivering instruction and assessment of students' participation in the Curriculum. Cohen kappa inter-rater agreement analysis was used to analyse the results collected, and it yielded .895 coefficients.

3.5.3 Curriculum onEducation for Sustainable Development Participants' Perception Scale (CESDPPS)

The questionnaire was a self-constructed questionnaire.It elicitedinformation on participants' perception of the objectives, contents, methods of instructional delivery, teacher-students classroom interaction and assessment/evaluation techniques of the curriculum. The face and content validity of the instrument were ascertained by presenting the instruments to experts in Teacher Education Department. The reliability yielded .952 coefficients after it was subjected to Chrobach alpha analysis.

3.5.4 Curriculum on Education for Sustainable Development Learning Outcome Interview Guide (CESDLOIG)

The interview guide was self-constructed and was intended to elicit information from participants who participated in the trial testing to verbally describe their knowledge of sustainable development before and after the training and to describe such areas they have benefitted in participating in the pilot testing of the Curriculum on Education for Sustainable Development. The face and content validity of the instrument was determined by presenting it to experts.

3.6 Procedure for Data Collection

Data collection was carried out in two phases. The first phase which includes stages 1 and 2 is the development and design stage while the second phase, stages 3 and 4 is the demonstration and dissemination stage.

Phase 1

Stage 1: This stage carried out need assessment using the self-designed Curriculum on Education for Sustainable Development Need Assessment Questionnaire (CESDNAQ) to gather data on undergraduate students' awareness and knowledge of sustainable development and universities' sustainable development practices from the selected universities. Data collection lasted for 8 weeks.

Stage 2: This stage identified curriculum objectives, appropriate contents, suitable learning materials, relevant methods of instructional delivery and assessment techniques using relevant literature and the results of the data collected through the need assessmentsurvey to design and organize the frameworks of the Curriculum on Education for Sustainable Development. This stage lasted for 12 weeks.

Phase 2: This phase which entail stages 3 and 4 ran concurrently and qualitative and quantitative data were collected.

Stage 3: This is the demonstrating stage of the curriculum. At this stage, the curriculum objectives, contents and classroom utility which entails gathering data on the classroom implementation process of the curriculum in such areas as; students' interaction with the subject matter and the learning materials; students' level of involvement/participation in the classroom; teacher-student classroom interaction; deployment of appropriate instructional materials to facilitate learning of sustainability concepts etc., were validated by experts in curriculum studies, instructional technology and development studies using the implementation rating guide called CESDIRG. This process enabled the validators to practically use the CESDIRG to ascertain the veracity of the curriculum that is being tried out. Data gathered from the validation process were analysed to determine if the designed curriculum objectives, contents and classroom utility are rational, practicable

and realistic for sustainable education. Training of validators which lasted for 1 week was done by the researcher and validation was done over the period of 4 weeks.

Stage 4: This stage which ran concurrently with stage three presented the newly developed curriculum for a pilot dissemination among undergraduate students in a classroom teaching-learning situation. This stage subjected the newly designed curriculum to a classroom implementation using trained facilitators. This stage explained to the participants the details about sustainable development, the goals and the importance of individual and collective efforts in achieving the Sustainable Development Goals. The study at the end of this stage collected data on the students' overall perception of the curriculum and their learning outcome through the Curriculum on Education for Sustainable Development Participant's Perception Scale (CESDPPS) and the Curriculum on Education for Sustainable Development Learning Outcome Interview Guide (CESDLOIG) to determine participant's learning outcome in the curriculum on issues not captured in the perception scale. Facilitators were trained for 1 week by the researcher and the dissemination (tryout) lasted for 4 weeks.

3.6.1 Validation of Curriculum for Sustainable Development

Experts in the field of Curriculum Design, Educational Technology and Environmental/Sustainable Development who were trained the researcher validated the curriculum. The validators through the Curriculum on Education for Sustainable Development Implementation Rating Guide (CESDIRG) collected data on teacher-student classroom interaction, method of instructional delivery, utilization of learning materials and students' involvement in the implementation process of the curriculum. The information gathered through the CESDIRG were analysed and the result served as feedback to strengthen and improve on the elements of the designed curriculum. The process lasted for 5 weeks.

3.6.2 Pilot-Testing of the Curriculum of Education for Sustainable Development

The pilot testing was done over the period of 5 weeks. The first week was for the training of research assistants by the researcher. The pilot testing was from the second week to the fifth week. During this period, facilitators took participants through the rudiments of

sustainable development, Education for Sustainable Development, Sustainable Development Goals, Campus Sustainability, etc. On the last day of the 5th week, data were collected from the participants by administering the Curriculum on Education for Sustainable Development Participants' Perception Questionnaire (CESDPPQ) and the Curriculum on Education for Sustainable Development Learning Outcome Interview Guide (CESDLOIG) was used to elicit information on their perception of the curriculum, the teaching learning process during pilot testing and their learning outcomes.

3.7 Method of Data Analysis

Data collected were analysed using descriptive statistics of frequency counts, percentage scores, mean (the threshold of 2.50 was considered as criterion norm/decision rule)and standard deviation. Furthermore, analyses were presented using inter rater scale and intraclass correlation coefficient at 0.05 level of significance to determine inter rater reliability. Qualitative data collected through Key Informant interview were content analysed.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter presents the results of the data collected in the study and the discussion of findings

4.1 Demographic Information of Participants

This section presents the demographic information of all participants in every stage of the study.

4.1.1 Needs Assessment Participants

Table 4.1 **Summary of Information on Needs Assessment Participants**

S/N	Gender	Frequency	Percentage (%)
1	Male	652	35.3
	Female	1199	64.7
	Total	1852	100%
PARTICIPANTS LEVEL			
2	100L	721	38.9
	200L	574	31.0
	300L	200	10.8
	400L	340	18.4
	500L and above	16	.9
	Total	1852	100%
PARTICIPANTS DEPARTMENTS			
3	Sciences	938	50.6%
	Arts/Humanities	914	50.4
	Total	1852	100%
PARTICIPANTS INSTITUTION			
4	UI	233	12.6
	UNILAG	228	12.3
	FUOYE	236	12.7
	EKSU	224	12.1
	UNIOSUN	235	12.7
	TASUED	228	12.3
	ACHIEVERS	235	12.7
	BOWEN	233	12.6
	Total	1852	100%

Table 4.1 presents the demographic information of all the participants during the need assessment of the study. It shows that 652 (35.3%) are males while 1199 (64.7%) are females. It also shows that 721 (38.9%) of the students are in 100 level, 574 (31%) are in

200 level, 200 (10.8%) are in 300 level, 340 (18.4%) are in 400 level while 16 (.9%) are in 500 level and above. It further shows that, 938 (50.6%) of the participants are from sciences while 914 (50.4%0 are in Arts and Humanities. Lastly, 233 of the participants (12.6%) are from the University of Ibadan, 228 (12.3%) are from the University of Lagos, 236 (12.7%) are from the Federal University, Oye-Ekiti, 224 (12.1%) are from Ekiti State University, 235 (12.7%) are from the Osun State University, 228 (12.3%) are from the Tai-Solarin University of Education, 235 (12.7%) are from Achievers University while 233 (12.6%) are from Bowen University.

4.1.2 Demographic Information of Validators

Table 4.1.2 Summary of Information on Validators

S/N	Gender	Frequency	Percentage (%)
1	Male Female	2 1	66.6% 33.3%
	Total	3	100%
HIGHEST QUALIFICATION			
2	Master's Degree	3	100%
	Total	3	100%
AREAS OF SPECIALISATION			
3	Curriculum and Instruction Educational Technology Sustainable Development	1 1 1	33.3% 33.3% 33.3%
	Total	3	100%
PARTICIPANTS INSTITUTION			
4	UI	3	100%
	Total	3	100%

Table 4.1.2 shows that 2 (66.6%) of the validators are male while 1 (33.3%) is a female. It also shows that all 3 validators (100%) have a master's degree. It further shows that each of the validators are from the discipline of curriculum and instruction, educational technology and sustainable development respectively. Lastly, it shows that all 3 validators (100%) are from the University of Ibadan.

4.1.3 Demographic Information of Participants during the Tryout Stage (Dissemination)

Table 4.1.3 Summary of Information of Participants during the Tryout Stage (Dissemination)

S/N	Gender	Frequency	Percentage (%)
1	Male	105	43.6%
	Female	136	56.4
	Total	241	100%
PARTICIPANTS LEVEL			
2	200L	166	68.9%
	300L	75	31.1%
	Total	241	100%
PARTICIPANTS DEPARTMENTS			
3	Chemistry	54	22.4%
	Law	41	17.0%
	English	14	5.8%
	Classics	10	4.1%
	Biochemistry	36	14.9%
	Education	44	18.3%
	Industrial Chemistry	15	6.2%
	Microbiology	17	7.1%
	Political Science	1	.4%
	Religious Studies	8	3.3%
	Music	1	.4%
	Total	241	100%
PARTICIPANTS FACULTY			
4	Sciences	98	39.1
	Arts	29	12.0
	Social Science	1	.4
	Law	45	18.7
	Education	44	19.8
	Basic medical sciences	24	10.0
	Total	241	100%

Table 4.1.3 presents demographic information of participants in the tryout of the curriculum. It shows that 105 (43.6%) are male while 136 (56.4%) are females. It also shows that 166 (68.9%) are in 200 level while 75 (31.1%) are in 300 level. It further shows that, 54 (22.4%) are from Chemistry Department, 41 (17%) are from Law, 14 (5.8%) are from English, 10 (4.1%) are from Classics, 36 (14.9%) are from Biochemistry, 44 (18.3%) are from Education, 15 (6.2%) are from Industrial Chemistry, 17 (7.1%) are from Microbiology, 1(.4%) is from Political Science, 8 (3.3%) are from Religious Studies while 1 (.4%) is from the Department of Music. Lastly, it shows that 98 (39.1%) are from the faculty of Science, 29 (12%) are from Arts, 1 (.4%) is from Social Sciences, 45 (18.7%) are from Law, 44 (19.8%) are from Education while 24 (10%) are from the faculty of Basic Medical Sciences.

4.2 Analysis of Research Questions

4.2.1 **Research Question 1**: Would undergraduates' level of awareness of Sustainable Development substantiate the need for curriculum on Education for Sustainable Development in Nigerian universities?

Table 4.2: **Summary of the Descriptive Analysis of Nigerian University Undergraduates' Level of Awareness of Sustainable Development**

S/N	ITEM	Very Much Aware F (%)	Aware F (%)	Less Aware F (%)	Not Aware F (%)	Mean	STD.
1	Are you aware of Sustainable Development (SD)?	237 (12.8)	348 (18.8)	326 (17.6)	937 (50.7)	1.94	1.098
2	Are you aware of Sustainable Development Goals (SDGs)?	202 (10.9)	326 (17.7)	384 (20.8	934 (50.6)	1.89	1.053
3	Are you aware of Education for Sustainable Development (ESD)?	172 (9.5)	309 (17.0)	393 (21.7)	941 (51.8)	1.84	1.021
4	How will you rate your knowledge of Sustainable Development?	163 (8.9)	335 (18.3)	573 (31.3)	761 (41.5)	1.96	1.072
5	Are you aware sustainable development has three focal point?	101 (5.5)	240 (13.1)	453 (24.8)	1031 (56.4)	1.70	1.182
6	Are you aware of your university's strategy/approach on how to achieve Sustainable Development in your university?	149 (8.1)	284 (15.5)	499 (27.2)	901 (49.2)	1.83	.970
7	Are you aware if your university has any centrefor research in education and policy development on Sustainable Development?	139 (7.6)	316 (17.2)	481 (26.2)	898 (49.0)	1.83	.969
8	Are you aware if any initiative is being taken by your university to create Sustainable Development awareness in your university?	132 (7.2)	299 (16.3)	482 (26.2)	924 (50.3)	1.80	.957
9	Are you aware of any programme undertaken by your university to orientate students towards sustainable development?	197 (10.7)	327 (17.8)	476 (26.0)	834 (45.5)	1.94	1.029
10	Are you aware of any student group directly promoting initiative on sustainable development in your university?	191 (10.5)	327 (17.9)	453 (24.8)	856 (46.9)	1.92	1.029
11	Are you aware of any workshop, seminar, symposium (a conference organised in your university to create awareness on sustainable development for students in recent past?	196 (10.7)	370 (20.2)	449 (24.5)	819 (44.7)	1.97	1.037
12	Are you aware that university education should provide students with education and training needed to cope with demands of sustainable development?	406 (22.1)	538 (29.3)	389 (21.2)	503 (27.4)	2.46	1.113
13	Are you aware Students' knowledge of Sustainable Development would be significantly enhanced in your institution if attempt is made to communicate it formally through an organised curriculum?	382 (20.8)	639 (34.7)	376 (20.4)	438 (23.8)	2.53	1.102
14	Are you aware that offering a course on Sustainable Development can enhance your understanding of the concept of sustainable development?	464 (25.4)	640 (35.0)	332 (18.2)	392 (21.4)	2.64	1.080
15	Are you aware that attending a workshop, seminar, symposium (a conference on sustainable development can enhance your knowledge of sustainable development	526 (28.7)	667 (36.3)	282 (15.4)	360 (19.6)	2.74	1.076

Weighted Mean = 2.07

Table 4.1 shows that 585 representing 31.6% of the students are aware of the concept of sustainable development while 1263 representing 68.4% of the students are not aware of sustainable development concept. Furthermore, 528 representing 28.6% of the students are aware of Sustainable Development Goals while 1,318 representing 71.4% of the students are not aware of Sustainable Development Goals. In the same vein, 481 representing 26.5% of the students are not aware of Education for Sustainable Development while 1,334 representing 73.5% of the students are not aware of Education for Sustainable Development. Moreover, 498 representing 27.2% of the students rated their knowledge of sustainable development positively while 1,334 representing 72.8% of the students rated their knowledge of sustainable development as not aware. Still, 341 representing 18.6% of the students are aware that sustainable development has three focal areaswhile, 1481representing 81.2% of the students are not aware that sustainable development has three focal areas.

Furthermore, the table shows that 433 representing 23.6% of the students are aware of their university's strategy/approach on how to achieve Sustainable Development in their university while, 1,400 representing 76.4% of the students are not aware of their university's strategy/approach on how to achieve Sustainable Development in their universities. Moreover, 455 representing 24.8% of the students are aware of their university's centrefor research in education and policy development on Sustainable Development while 1,379 representing 75.2% of the students are not aware if their universities have any centrefor research in education and policy development on Sustainable Development. Furthermore, 431 representing 23.5% of the students are aware of initiative being taken by their universities to create Sustainable Development awareness in their universities while, 1,406 (76.5% of the students are not aware if any initiative is being taken by their universities to create Sustainable Development awareness in their universities.

In the same vein, 524 representing 27.5% of the students are aware of programmes undertaken by their universities to orientate students towards sustainable development while 1,310 representing 71.5% of the students are not aware of programmes undertaken by their universities to orientate students towards sustainable development. Still more, 518

(28.4%) of the students are aware of student group directly promoting initiative on sustainable development in their universities while, 1,309 representing 71.7% of the students are not aware of student group directly promoting initiative on sustainable development in their universities. Furthermore, 566 representing 30.9% of the students are aware of workshops, seminars, symposium or a conference organised in their universities to create awareness on sustainable development for students in recent past while 1,268 representing 69.2% of the students are not aware of any workshop, seminar, symposium or a conference organised in their universities to create awareness on sustainable development for students in recent past.

However, 946 (51.4%) of the students are aware that university education should provide students with education and training needed to cope with demands of sustainable development while, 892 (48.6%) of the respondents are not aware that university education should provide students with education and training needed to cope with demands of sustainable development. Consequently, 1021 representing 55.5% of the students are aware that Students' knowledge of Sustainable Development would be significantly enhanced in their institution if attempt is made to communicate it formally through an organised curriculum while, 814 representing 44.2% of the students are not aware that Students' knowledge of Sustainable Development would be significantly enhanced in their institution if attempt is made to communicate it formally through an organised curriculum. In the same vein, 1,104 representing 60.4% of the students are aware that offering a course on Sustainable Development can enhance their understanding of the concept of sustainable development while 724 representing 39.6% of the students are not aware that offering a course on Sustainable Development can enhance your understanding of the concept of sustainable development.

Finally, 1,193 representing 65.0% of the students are aware that attending a workshop, seminar, symposium or a conference on sustainable development can enhance their knowledge of sustainable development while, 640 representing 35.0% of the students are not aware that attending a workshop, seminar, symposium or a conference on sustainable development can enhance their knowledge of sustainable development.Hence, the Curriculum on Education for Sustainable Development is needed given the low

awareness of undergraduates as indicated by the weighted mean which is less than 2.5 which was considered as the criterion norm.

4.2.2 Research Question 2: Would undergraduates' level of knowledge of Sustainable Development Goals authenticate the need for curriculum on Education for Sustainable Development in Nigerian universities?

Table 4.3: **Summary of the Descriptive Analysis of University Undergraduates' Level of Knowledge of Sustainable Development Goals**

	N	Minimum	Maximum	Mean	Std. Deviation
D Valid N (listwise)	1852 1852	0	35	.92	3.721

Table 4.2 presents the undergraduates' level of knowledge of sustainable development. It shows that 0 is the minimum score, while 35 is the maximum score. The mean score (.92) which is less than 1 shows that undergraduates' knowledge of the Sustainable Development Goals is critically low. The standard deviation (3.721) is also very scattered. Hence, the low level of undergraduates' knowledge of sustainable development and the Sustainable Development Goals as shown by the mean score indicated the need for Curriculum on Education for Sustainable development in Nigerian universities.

4.2.3: Research Question 3: To what extent would the level of Sustainable Development practices of Nigerian universities substantiate the need for curriculum on Education for Sustainable Development in Nigerian universities?

Table 4.4: **Summary of the Descriptive Analysis of the extent of Sustainable Development Practices of Nigerian Universities**

S/N	ITEM **TO WHAT EXTENT**:	Not at All F (%)	A Little Extent F (%)	Some Extent F (%)	Great Extent F (%)	Mean	STD.
1	Does your university mission statement reflect its commitment to Sustainable Development?	201 (11.0)	573 (31.3)	547 (29.9)	506 (27.7)	2.26	1.003
2	How will you rate your institution's sensitisation of students towards sustainable development programme?	195 (10.8)	485 (26.9)	604 (33.8)	521 (28.8)	2.21	1.081
3	Does your university organise orientation programme(s) on sustainable development for staff and students in your university?	344 (18.9)	463 (25.5)	467 (25.7)	542 (29.8)	2.34	1.095
4	Is energy conserved in your university?	254 (14.2)	395 (22.0)	542 (30.2)	603 (33.6)	2.17	1.055
5	Does your university attempt to recycle solid waste (paper, glass, plastic, metal) in your university?	273 (15.2	365 (20.3)	403 (22.5)	753 (41.9)	2.09	1.115
6	Does your university attempt to conserve water through efficient toilets, harvested rain water, minimal irrigation etc.?	241 (13.4)	409 (22.7)	467 (25.9)	685 (38.0)	2.12	1.072
7	Does your university conserve trees, native plants, minimizing lawn, and integrated pest management?	308 (17.1)	447 (24.9)	442 (24.6)	597 (33.2)	2.27	1.123
8	Does your university campus rely on food/daily supplies from the city (vegetables, toiletries, pastries)?	312 (17.4)	415 (23.1)	546 (30.4)	522 (29.1)	2.29	1.065
9	Is sustainable transportation programme encouraged in your university through (bicycle, pedestrian friendly systems, bus programmes, car pools)?	259 (14.5)	436 (24.4)	518 (28.9)	576 (32.2)	2.21	1.050
10	Does your university embark on sensitizing host and neighbouring communities on sustainable development?	315 (17.5)	460 (25.5)	493 (27.4)	531 (29.5	2.13	1.075

Weighted Mean = 2.10

Table 4.3 presents the sustainable development practices of Nigerian Universities. The table shows that 201 representing 11.0% of the students indicated that their universities mission statement does not all reflect its commitment to Sustainable Development, 573 (31.3%) of the students indicated that their universities mission statement in a little extent reflect its commitment to Sustainable Development, while, 547 (29.9%) of the students indicated that their universities mission statement to some extent reflect its commitment to Sustainable Development and 506 (27.7%) indicated their universities mission statement reflect in a great extent its commitment to Sustainable Development. It also shows that 195 (10.8%) of the students indicated their institutions' sensitisation of students towards sustainable development programme to be nonexistent, 573 (31.3%) of the students indicated that their institutions sensitises students towards sustainable development in a little extent while 547 (29.9%) of the students indicated that their institutions to some extent sensitises students towards sustainable development and 506 (27.7%) of the students indicated their institutions to a great extent sensitises students towards sustainable development.

Furthermore, 344 (18.9%) of the students their universities do not organise orientation programme(s) on sustainable development for staff and students, 463(25.5%) of the students indicated that in a little extent their universities organises orientation programme(s) on sustainable development for staff and students while, 467 (25.7%) of the students indicated that to some extent their universities organises orientation programme(s) on sustainable development for staff and students and 542 (29.8%) of the students indicated that to a great extent their universities organises orientation programme(s) on sustainable development for staff and students. In the same vein, 254 (14.2%) of the students indicated that attempt in not made at all to conserve energy in their university, 395 (22.0%) of the students indicated that their universities made attempt in a little way to conserve energy while 542 (30.2%) of the students indicated that their universities to some extent attempts to conserve energy and 603 (33.6%) indicated that their universities in a great extent attempt to conserve energy.

Again, 273 (15.2%) of the students indicated that their universitiesdo not in any way attempt to recycle solid waste (paper, glass, plastic, metal, etc.), 365 (20.3%) of the

students indicated that their universities in a little extent attempts to recycle solid waste (paper, glass, plastic, metal, etc.) while, 403(22.5%) of the students indicated that their universities to some extent attempts to recycle solid waste (paper, glass, plastic, metal, etc.) and 753 (41.9%) of the students indicated that their universities to a great extent attempts to recycle solid waste (paper, glass, plastic, metal, etc.).

Moreover, 241 (13.4%) of the students indicated that their universities do not attempt to conserve water through efficient toilets, harvested rain water, minimal irrigation etc., 409 (22.7%) of the students indicated that in a little way their universities attempts to conserve water through efficient toilets, harvested rain water, minimal irrigation etc. while, 467 (25.9%) of the students indicated that their universities to some extent attempts to conserve water through efficient toilets, harvested rain water, minimal irrigation etc. 685 (38.0%) of the students indicated that their universities in a great extent attempts to conserve water through efficient toilets, harvested rain water, minimal irrigation etc. The table shows further that, 308 (17.1%) of the students indicated that their universities do not at all conserve trees, native plants, minimizing lawn, and integrated pest management, 447 (24.9%) of the students indicated that their universities in a little extent conserve trees, native plants, minimizing lawn, and integrated pest management while, 442 (24.6%) of the students indicated that their universities to some extent conserve trees, native plants, minimizing lawn, and integrated pest management and 597 (33.2%) of the students indicated that their universities in a great attempt conserve trees, native plants, minimizing lawn, and integrated pest management. More so, 312 (17.4%) of the students indicated that their university campuses do not at all rely on food/daily supplies from the city (vegetables, toiletries, pastries), 415 (23.1%) of the students indicated that their university campuses to a little extent rely on food/daily supplies from the city (vegetables, toiletries, pastries) while, 546 (30.4%) of the students indicated that their university campuses to some extent rely on food/daily supplies from the city (vegetables, toiletries, pastries) and 522 (29.1%) of the students indicated that to a great extent their university campuses rely on food/daily supplies from the city (vegetables, toiletries, pastries).

Again, 259 (14.5%) of the students indicated that sustainable transportation programme is not at all encouraged in their university campuses through (bicycle, pedestrian friendly systems, bus programmes, car pools, etc.), 436 (24.4%) of the students indicated that their universities in a little extent encourages sustainable transportation programme in their campuses through (bicycle, pedestrian friendly systems, bus programmes, car pools) while, 518 (28.9%) of the students indicated that their universities to some extent encourages sustainable transportation programme in their campuses through (bicycle, pedestrian friendly systems, bus programmes, car pools, etc.) and 576 (32.2%) of the students indicated that their universities encourage sustainable transportation programme in their campuses through (bicycle, pedestrian friendly systems, bus programmes, car pools, etc.).

Lastly, 315 (17.5%) of the students indicated that their universities do not at all embark on sensitizing host and neighbouring communities on sustainable development, 460 (25.5%) of the students indicated that their universities in a little extent embark on sensitizing host and neighbouring communities on sustainable development while, 493 (27.4%) of the students indicated that their universities to some extent embark on sensitizing host and neighbouring communities on sustainable development and 531 (29.5%) of the students indicated that their universities to a great extent embark on sensitizing host and neighbouring communities on sustainable development. Therefore, the sustainable development practices of Nigerian universities as shown by the weighted mean is low (below the established 2.50 criterion norm)hence, there is need for Curriculum on Education for Sustainable development in Nigerian Universities.

4.2.4: Research Question 4: To what extent does the objective of the developed curriculum on Education for Sustainable Development promote the acquisition of sustainable development competencies among students in Nigerian universities?

Table 4.5: **Summary of the Inter Rater Analysis of the Extent to which the Objective of the Developed Curriculum on Education for Sustainable Development Promotes Sustainable Development Competencies among Students**

S/N	Items	Rater 1 (Aggregate Score)	Rater 2 (Aggregate Score)	Rater 3 (Aggregate Score)	Mean
1	Does the stated curriculum objective cover relevant areas in Sustainable Development? i.e. The three thematic areas	34	34	33	33.66
2	Does the objectives of curriculum on ESD address relevant issues pertinent to achieving Sustainable Development Goals in Nigeria	38	34	36	36.00
3	Do the objectives state the competencies learners are expected to attain in ESD?	35	34	34	**34.33**
4	Do the objectives of curriculum on ESD help the learners to develop skills, competencies and values required for Sustainable development?	34	31	32	**32.33**
5	Do you consider stated teaching-learning experiences in the curriculum as relevant to meeting sustainable development challenges of Nigeria	37	35	36	**36.00**
6	Do classroom teaching-learning activities reflect the objectives of the curriculum	33	36	35	**34.66**

Minimum Score = 10 Maximum Score = 40 Expected Mean = 25.0

Table 4.4 shows that item 1 was rated 34, 34 and 36 by raters 1, 2 and 3 respectively, with the mean scoreof 33.66 (which is higher than the expected of 25.0). It also shows that, item 2 was rated 38, 34, and 36 by raters 1, 2 and 3 respectively with the mean score of 36.00 (which is higher than the expected mean score of 25.0). Furthermore, item 3 was rated 35, 34 and 34 by raters 1, 2 and 3, given the mean score of 34.33 (which is higher than the expected mean score of 25.0) Moreover, item 4 was rated 34, 31 and 32 by raters 1, 2 and 3 respectively. The mean score being 32.33 (which is higher than the expected mean score of 25.0) Similarly, item 5 was rated 37, 35, 36 by raters 1, 2 and 3 respectively with the mean score of 36.00 (which is higher than the expected mean score of 25.0). Lastly, item 6 was rated 33, 36 and 35 by raters 1, 2 and 3 respectively with the mean score of 34.66 (which is higher than the expected mean score of 25.0).

Table 4.6: Inter Raters Patterns of Scoring, Agreement/Differences

Rater	Mean	STD.	N
Rater 1	35.17	1.941	6
Rater 2	34.00	1.673	6
Rater 3	34.33	1.633	6

Table 4.5 shows that rater 1 gave out the highest score with total mean score of 35.17 higher than raters 3 and 2 who had the total mean score of 34.33 and 34.00 respectively. The table shows that there is no strong disparity (wide gap) in their rating patterns.

Table 4.6: **Intraclass Correlation Coefficient Determining the Reliability of the raters Objective of the Developed Curriculum on Education for Sustainable Development**

Measures	Inraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.469[a]	-.048	.885	3.653	5	10	.039[a]
Average Measures	.726[c]	-.160	.959	3.653	5	10	.039[a]

Table 4.6 shows that a degree of reliability was found between rater 1, 2 and 3 measurements. The average measure was .726; (F5,10)=3.653;P < .05).Therefore, the inter rater measurement of the objective of the developed curriculum on Education for Sustainable Development is reliable.

4.2.5: **Research Question 5:** To what extent does the content of the curriculum on Education for Sustainable Development dealt with local sustainable challenges in Nigeria?

Table 4.7: **Summary of the Inter Rater Analysis of the Extent to which the Content of the Curriculum on Education for Sustainable Development Dealt with Local Sustainable Challenges in Nigeria**

S/N	Items	Rater 1	Rater 2	Rater 3	Mean
7	Does the content of the curriculum on Education for Sustainable Development considered the three spheres of sustainable development?	34	30	33	**32.33**
8	Do learners reaction to the curriculum content shows that the content is suitable for the target audience?	32	30	34	**32.00**
9	Are the competencies learners' are expected to attain in the curriculum on Education for Sustainable practicable in Nigeria context?	34	34	34	**34.00**
10	Do learners show that the experiences/activities packaged in the curriculum are appropriate?	36	36	37	**36.33**
11	Does the content of the curriculum on teaching and learning (education) for sustainability draw learners' attention to local issues in a global context?	35	35	35	**35.00**
12	Do learners show willingness to acquire sustainable development competencies through the curriculum?	34	32	33	**33.00**

Minimum Score = 10 Maximum Score = 40 Expected Mean = 25.0

Table 4.6 shows that item 1 was rated 34, 30, and 33 by raters 1, 2 and 3 respectively, with the mean score of 32.33 (which is higher than the expected mean score of 25.0). It also shows that item 2 was rated 32, 30, and 34 by raters 1, 2 and 3 respectively. The total mean score being 32.00 (which is higher than the expected mean score of 25.0). Furthermore, item 3 was rated 34,34 and 34 by raters 1, 2 and 3 obtaining the mean score of 34.00 (which is higher than the expected mean score of 25.0). Moreover, item 4 was rated 36, 36, and 37 by raters 1, 2 and 3 obtaining the mean score of 36.33 (which is higher than the expected mean score of 25.0). Similarly, item 5 was rated 35, 35 and 35 by raters 1, 2 and 3 respectively. The mean score obtained is 35.00 (which is higher than the expected mean score of 25.0).lastly, item 6 was rated 34, 32 and 33 by raters 1, 2 and 3 and the mean score is 33.00 (which is higher than the expected mean score of 25.0).

Table 4.8: Inter Raters Patterns of Scoring, Agreement/Differences

Rater	Mean	STD.	N
Rater 1	34.17	1.329	6
Rater 2	32.83	2.563	6
Rater3	34.33	1.506	6

Table 4.8 shows that rater 3 gave out the highest score with total mean score of 34.33 higher than raters 1 and 2 who had the total mean score of 34.17 and 32.83 respectively. The table shows that there is disparity in their rating patterns, especially rater 2 when compared with raters 3 and 1.

Table 4.9: **Intraclass Correlation Coefficient Determining the Reliability of the raters Content of the Developed Curriculum on Education for Sustainable Development**

Measures	Inraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.599[a]	.140	.919	7.446	5	10	.004
Average Measures	.818[c]	.328	.971	7.446	5	10	.004

Table 4.9 shows that a high degree of reliability was found between rater 1, 2 and 3 measurements. The average measure was .816; ($F(5,10)=7.446; P < .05$). Therefore, the inter rater measurement of the content of the developed curriculum on Education for Sustainable Development is reliable.

4.2.6 **Research Question 6:** What are the observers' overall assessments of the classroom utility of the curriculum on Education for Sustainable Development?

Table 4.10: **Summary of the Inter Rater Analysis of Observers Classroom Utility of the curriculum on Education for Sustainable Development**

	Items	Rater 1	Rater 2	Rater 3	Mean
13	Does the curriculum product satisfactorily achieve specified learner outcomes with the target audience?	36	39	38	**37.66**
14	Do the learners consider their learning outcome in the curriculum as valuable to achieving sustainable development?	34	34	34	**34.00**
15	Did teaching and learning process allow students to identify local sustainable challenges and their implications on development?	35	29	33	**32.33**
16	Are the teaching and learning activities/exercises adequate for learners to acquire competencies in sustainable development areas?	34	30	30	**31.33**
17	Does the curriculum specified learners classroom interaction	36	34	34	**34.66**
18	Were students allowed to proffer practical solutions to identified sustainable challenges in their areas?	36	32	34	**34.00**
19	Does the teacher involve learners in activities that can facilitate the development of sustainable skills?	37	35	36	**36.00**
20	Does the teaching-learning process encourage participatory learning, group discussion and dialoguing?	37	37	38	**37.33**
21	Do teachers present instructional materials in logical and organized manner	38	38	38	**38.00**
22	Does teaching and learning in the classroom explore the use of technology?	36	32	34	**34.00**
23	Do the instructional materials work as intended?	39	36	36	**37.00**
24	Does instructional delivery in the curriculum foster learners' participation/involvement in the classroom discussion?	38	36	37	**37.00**
25	Do teachers encourage students' participation in the teaching learning process?	34	34	35	**34.33**
26	Did the teacher in the process of instructional delivery utilized appropriate pedagogical skills needed to teach different sustainable concepts	35	34	35	**34.66**
27	Did the teacher demonstrate the use of relevant pedagogical skills appropriate for the age/maturity of the learners	36	34	34	**34.66**
28	Did the teacher utilize questioning strategies to elicit learners perceptions on sustainable development concepts	36	35	34	**35.00**
29	Did the teacher employ effective assessment strategies to evaluate learners' achievement?	34	32	33	**33.00**
30	Do the assessment strategies cover the three domains of competence? i.e. Hard Skills, soft skills and emotional intelligence	36	34	40	**36.66**

Minimum Score = 10 Maximum Score = 40 Expected Mean = 25.0

Table 4.10 shows that item 1 was rated 36, 39 and 38 by raters 1, 2 and 3 respectively, with the mean score of 37.66 (which is higher than the expected of 25.0). It also shows that, item 2 was rated 34, 34, and 34 by raters 1, 2 and 3 respectively with the mean score of 34.00 (which is higher than the expected mean score of 25.0). Furthermore, item 3 was

rated 35, 29 and 33 by raters 1, 2 and 3, given the mean score of 32.33 (which is higher than the expected mean score of 25.0) Moreover, item 4 was rated 34, 30 and 30 by raters 1, 2 and 3 respectively. The mean score being 31.33 (which is higher than the expected mean score of 25.0) Similarly, item 5 was rated 36, 34, 34 by raters 1, 2 and 3 respectively with the mean score of 34.66 (which is higher than the expected of 25.0). In the same vein, item 6 was rated 36, 32 and 34 by raters 1, 2 and 3 respectively with the mean score of 34.00 (which is higher than the expected of 25.0).The table also shows that item 7 was rated 37, 35 and 36 by raters 1, 2 and 3 respectively, with the mean score of 36.00 (which is higher than the expected of 25.0). It also shows that, item 8 was rated 37, 37, and 38 by raters 1, 2 and 3 respectively with the mean score of 37.33 (which is higher than the expected mean score of 25.0).

Furthermore, item 9 was rated 38, 38 and 38 by raters 1, 2 and 3, given the mean score of 38.00 (which is higher than the expected mean score of 25.0) Moreover, item 10 was rated 36, 32 and 34 by raters 1, 2 and 3 respectively. The mean score being 34.00 (which is higher than the expected mean score of 25.0) Similarly, item 11 was rated 39, 36, 36 by raters 1, 2 and 3 respectively with the mean score of 37.00 (which is higher than the expected mean score of 25.0). In the same vein, item 12 was rated 38, 36 and 387 by raters 1, 2 and 3 respectively with the mean score of 37.00 (which is higher than the expected mean score of 25.0).Still, it shows that item 13 was rated 34, 34 and 35 by raters 1, 2 and 3 respectively, with the mean score of 34.33 (which is higher than the expected of 25.0). It also shows that, item 14 was rated 35, 34, and 35 by raters 1, 2 and 3 respectively with the mean score of 34.66 (which is higher than the expected mean score of 25.0).

More so, item 15 was rated 36, 34 and 34 by raters 1, 2 and 3, given the mean score of 34.66 (which is higher than the expected mean score of 25.0) Again, item 16 was rated 36, 35 and 34 by raters 1, 2 and 3 respectively. The mean score being 35.00 (which is higher than the expected mean score of 25.0) Similarly, item 17 was rated 34, 32, 33 by raters 1, 2 and 3 respectively with the mean score of 33.00 (which is higher than the expected of 25.0). Lastly, item 18 was rated 36, 34 and 40 by raters 1, 2 and 3 respectively with the mean score of 36.66 (which is higher than the expected of 25.0).

Table 4.11: Inter Raters Patterns of Scoring, Agreement/Differences

Rater	Mean	STD.	N
Rater 1	36.11	1.844	18
Rater 2	34.17	2.572	18
Rater 3	35.17	2.383	18

Table 4.11 shows that rater 1 gave out the highest score with total mean score of 36.11 higher than raters 3 and 2 who had the total mean score of 37.17 and 32.83 respectively. The table shows that there is disparity in their rating patterns, especially rater 2 when compared with raters 1 and 3.

Table 4.12: **Intraclass Correlation Coefficient Determining the Reliability of the raters Classroom Utility of the Developed Curriculum on Education for Sustainable Development**

Measures	Inraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.561[a]	.250	.792	6.611	17	34	.000
Average Measures	.793[c]	.499	.919	6.611	17	34	.000

Table 4.12 shows a high degree of reliability was found between rater 1, 2 and 3 measurements. The average measure was .816; ($F(17,34)=6.611; P < .05$). Therefore, the inter rater measurement of the classroom utility of the developed curriculum on Education for Sustainable Development is reliable.

4.1.7 Research Question 7: To what extent did participants perceive the relevance of the curriculum on Education for Sustainable Development in promoting the achievementof Sustainable Development Goals in Nigeria?

Table 4.13: **Summary of the Descriptive Analysis of participant'sAggregate Perception of the Relevance of the Curriculum on Education for Sustainable Development in promoting the achievement of Sustainable Development Goals in Nigeria**

S/N	ITEM	Not at All F (%)	A Little F (%)	Quite A Bit F (%)	A Great Deal F (%)	Mean	STD.
1	Do you consider the content of the curriculum as adequate to educate learners towards acquiring Sustainable Development competencies?	1 (.4)	40 (16.6)	45 (18.7)	155 (64.3)	3.47	.780
2	Do you consider the content of the curriculum as suitable/appropriate for learners in tertiary institution?	1 (.4)	30 (12.4)	47 (29.5)	163 (67.6)	3.54	.724
3	Do you consider teaching-learning experiences in the curriculum as relevant to meeting sustainable development challenges in Nigeria?	1.(.4)	26 (10.8)	76 (31.5)	138 (57.3)	3.46	.701
4	Does the content of the curriculum expose you to facts and information you considered as new about sustainable development?	1 (.4)	22 (9.1)	52 (21.6)	166 (68.9)	3.59	.672
5	Are facts/topics in the curriculum logically presented?	7 (2.9)	21 (8.7)	55 (22.8)	158 (65.6)	3.51	.775
6	Do you consider teaching and learning participatory in the training?	9 (3.7)	26 (10.8)	64 (26.6)	142 (58.9)	3.41	.827
7	Is there sufficient, suitable and relevant instructional materials	12 (5.0)	59 (24.5)	68 (28.2)	102 (42.3)	3.08	.930
8	Do topics and the content of the curriculum address Sustainable Development challenges in your locality?	8 (3.3)	21 (8.7)	53 (22.0)	159 (66.0)	3.51	.789
9	Do you consider your learning outcome in this training as prerequisite to achieving sustainable development in Nigeria?	5 (2.1)	24 (10.0)	69 (28.6)	143 (59.3)	3.45	.757
10	Has your participation in this training exercise expose you to ways and methods sustainable Development can be achieved in Nigeria?	1 (.4)	23 (9.5)	59 (24.5)	158 (65.6)	3.55	.682
11	Has your participation in this training on ESD equipped you with skills and	5 (2.1)	34 (14.1)	74 (30.7)	128 (53.1)	3.35	.798

	competencies to solve Sustainable Development problems in your locality and beyond						
12	Did you identify and practically provide solutions to local sustainable challenges in your locality during this training?	14 (5.8)	41 (17.0)	97 (40.2)	89 (36..9)	3.08	.876
13	Having participated in the training, will you recommend that ESD should be introduced as a taught course in your University?	1 (.4)	26 (10.8)	84 (34.9)	130 (53.9)	3.42	.698
14	Having participated in the training exercise on ESD will you be willing to take a course in ESD in your institution?	6 (2.5)	29 (12.0)	78 (32.4)	128 (53.1)	3.36	.789
15	Do teachers present instructional materials in logical and organized manner	4 (1.7)	63 (26.1)	80 (33.2)	94 (39.0)	3.10	.844
16	Does the curriculum specified learners interaction in the classroom	11 (4.6)	38 (15.8)	78 (32.4)	114 (47.3)	3.22	.875
17	Do teachers encourage students' participation in the teaching learning process?	4 (1.7)	53 (22.0)	53 (22.0)	131 (54.0)	3.29	.865
18	Does teaching and learning in the classroom explore the use of technology?	9 (3.7)	48 (19.9)	59 (24.5)	125 (51.9)	3.24	.900
19	Does the teaching-learning involve learners in activities that can facilitate the development of sustainable skills?	9 (3.7)	47 (19.5)	92 (38.2)	93 (38.6)	3.12	.848
20	Did the teacher demonstrate the use of relevant pedagogical skills appropriate for the age/maturity of the learners	3 (1.2)	36 (14.9)	131 (54.4)	71 (29.5)	3.12	.694
21	Did the teacher in the process of instructional delivery utilized appropriate pedagogical skills needed to teach different sustainable concepts	3 (1.2)	44 (18.3)	98 (40.7)	96 (39.8)	3.19	.772
22	Did the teacher utilize questioning strategies to elicit learners perceptions on sustainable development concepts	3 (1.2)	39 (16.2)	84 (34.9)	115 (47.7)	3.29	.779
23	Did the teacher employ effective assessment strategies to evaluate learners' achievement?	4 (1.7)	37 (15.4)	85 (35.3)	115 (47.7)	3.29	.778
24	Do the assessment strategies cover the three domains of competence? i.e. Hard Skills, soft skills and emotional intelligence	9 (3.7)	34 (14.1)	107 (44.4)	91 (37.8)	3.16	.803

Weighted Mean = 3.27

Table 4.13 shows that 1 (.4%) of the participants does not at all consider the content of the curriculum as adequate to educate learners towards acquiring Sustainable Development competencies, 40 (16.6%) of the participants considered the content of the curriculum a little adequate to educate learners towards acquiring Sustainable Development competencies while 45 (18.7%) of the participants considered the curriculum content quite a bit in educating learners towards acquiring sustainable development competencies and 155 (64.3%) of the participants considered the curriculum as adequate in educating learners towards acquiring sustainable development competencies.

The table also shows that 1 (.4%) of the participants did not consider the content of the curriculum as suitable/appropriate for learners in tertiary institution, 30 (12.4%) of the participant considered the content of the curriculum a little suitable/appropriate for learners in tertiary institutionwhile 47 (29.5%) of the participants considered the content of the curriculum a bit suitable/appropriate for learners in tertiary institution and 163 (67.6%) of the participants considered the content of the curriculum greatly suitable/appropriate for learners in tertiary institution. Furthermore, 1 (.4%) of the participants does not at all consider teaching-learning experiences in the curriculum as relevant to meeting sustainable development challenges in Nigeria, 26 (10.8%) of the participants considered teaching-learning experiences in the curriculum a little relevant to meeting sustainable development challenges in Nigeria while, 76 (31.5%) of the participants considered teaching-learning experiences in the curriculum quite a bit relevant to meeting sustainable development challenges in Nigeria and 138 (57.3%) of the participants considered teaching-learning experiences in the curriculum a great deal relevant to meeting sustainable development challenges in Nigeria.

Moreover, 1 (.4%) of the participants indicated that the content of the curriculum does not at all expose them to facts and information they considered as new about sustainable development, 22 (9.1%) of the participants indicated that the content of the curriculum exposed them a little to facts and information they considered as new about sustainable developmentwhile 52 (21.6%) of the participants indicated that the content of the curriculum exposed them quite a bit to facts and information you considered as new about sustainable development and 166 (68.9%) of the participants indicated that the

content of the curriculum exposed them a great deal to facts and information they considered as new about sustainable development. Similarly, 7 (2.9%) of the participants indicated that the facts/topics in the curriculum are not at all logically presented, 59 (8.7%) of the participants indicated that the facts/topics in the curriculum are a little logically presented while, 55 (22.8%) of the participants indicated that facts/topics in the curriculum are quite a bit logically presented and 158 (65.6%) of the participants indicated that the facts/topics in the curriculum are logically presented.

In the same vein, 9 (3.7%) of the participants does not at all considered teaching and learning participatory in the training, 26 (10.8%) of the participants considered teaching and learning a little participatory in the training while, 64 (26.6%) of the participants considered teaching and learning quite a bit participatory in the training and 102 (58.9%) of the participants considered teaching and learning greatly participatory in the training. Furthermore, 12 (5.0%) of the participants indicated that there were no sufficient, suitable and relevant instructional materials at all, 59 (24.5%) of the participants considered suitability and relevance of instructional materials little, while 68 (28.2%) considered it as quite a bit while 102 (42.3%) considered it as greatly sufficient, suitable and relevant.Again, 8 (3.3%) of the participants does not at all consider topics and the content of the curriculum address Sustainable Development challenges in their locality, 21 (8.7%) considered it a little while 53 (22.0%) considered it quite a bit and 159 (24.5%) of the participants considered it a great deal.

Moreover, 5 (2.1%) of the participants did not at all considered their learning outcome in the training as prerequisite to achieving sustainable development in Nigeria, 24 (10.0%) considered their learning outcome in the training as a little prerequisite to achieving sustainable development in Nigeria while 69 (28.6%) considered it quite a bit as prerequisite to achieving sustainable development in Nigeria and 143 (59.3%) considered it a great prerequisite to achieving sustainable development in Nigeria. Still, 1 (.4%) of the respondents indicated their participation in the training exercise has not expose them at all to ways and methods sustainable Development can be achieved in Nigeria, 23 (9.5%) indicated it has a little, 59 (24.5%) indicated it has quite a bit expose them to ways and methods sustainable development can be achieved in Nigeria, while 158 (65.6%) of the

participants indicated that it has greatly expose them to ways and methods sustainable Development can be achieved in Nigeria.

Similarly, 5 (2.1%) of the participants indicated that the training has not equipped them with skills and competencies to solve Sustainable Development problems in their locality and beyond, 34 (14.1%) of the participants said it has a little, 74 (30.7%) indicated it has quite a bit while 128 (53.1%) indicated that the training has equipped them a great deal with skills and competencies to solve Sustainable Development problems in your locality and beyond. The table shows further that, 14 (5.8%) of the participants indicated that they did not identify and practically provide solutions to local sustainable challenges in their locality during the training, 41 (17.0%) indicated that they did a little, 97 (40.2%) indicated that they did quite a bit while 89 (36.9%) indicated that they identify and practically provide solutions to local sustainable challenges in their locality during in the course of the training. Still, 1 (.4%) of the participants indicated that they will not at all recommend that ESD should be introduced as a taught course in their universities, 26 (12.0%) indicated that they will recommend it for their universities a little, 84 (34.9%) indicated that they will quite a bit recommend it while, 130 (53.9%) of the participants indicated that they will greatly recommend the curriculum on Education for Sustainable Development (ESD)as a taught course in their universities. Moreover, 6 (2.5%) of the participants indicated that they will not at all be willing to take a course on ESD in their universities, 29 (12.0%) indicated they will be willing a little, 78 (32.4%) indicated that they will quite a bit willing while 128 (53.1%) of the participants indicated that they will be willing to take a course on ESD in their universities.

However, 4 (1.7%) of the participants indicated that teachers did not at all present instructional materials in logical and organized manner, 63 (26.1%) of them indicated that they did a little, 80 (33.2%) of them indicated they did quite a bit while 94 (39.0%) of the participants indicated that teachers greatly present instructional materials in logical and organized manner. Furthermore, 11 (4.6%) of the participants indicated that the curriculum did not at all specify learner's interaction in the classroom, 38 (15.8%) indicated that it did a little, 78 (32.4%) indicated that it quite a bit did while 114 (47.3%) indicated that it greatly specify learner's interaction in the classroom. In the same vein, 4

(1.7%) of the participants indicated that the teachers did not at all encourage students' participation in the teaching learning process, 53 (22.0%) indicated that they did a little, 53 (22.0%) indicated that they did quite a bit while 131 (54.0%) of the participants indicated that the teachers greatly encourage students' participation in the teaching learning process.

Still, 9 (3.7%) of the participants indicated that teaching and learning in the classroom did not all explore the use of technology, 48 (19.9%) indicated that it did a little, 59 (24.5%) indicated that they quite a bit did while, 125 (51.9%) of them indicated that teaching and learning in the classroom greatly explore the use of technology. Similarly, 9 (3.7%) of the participants indicated that the teaching-learning did not at all involve learners in activities that can facilitate the development of sustainable skills, 47 (19.5%) indicated that it did a little bit, 92 (38.2%) indicated that it quite a bit did while, 93 (38.6%) of the participants indicated that it greatly did. In the same vein, 3 (1.2%) of the participants indicated that the teacher did not at all demonstrate the use of relevant pedagogical skills appropriate for the age/maturity of the learners, 36 (14.9%) indicated that they did a little, 131 (54.4%) indicated that they quite a bit did while 71 (29.5%) indicated that they did a great deal. Still, 3 (1.2%) of the participants indicated that the teachers did not at all utilized appropriate pedagogical skills needed to teach different sustainable concepts, 44 (18.3%) indicated they did a little, 98 (40.7%) indicated they quite a bit did while 96 (39.8%) of indicated that teachers utilized appropriate pedagogical skills needed to teach different sustainable concepts a great deal.

Similarly, 3 (1.2%) of the participants indicated that the teachers did not at all utilize questioning strategies to elicit learner's perceptions on sustainable development concepts, 39 (16.2%) indicated that they did a little, 84 (34.9%) indicated that they quite a bit did while 115 (47.7%) indicated that they utilize questioning strategies a great deal to elicit learners perceptions on sustainable development concepts. However, 4 (1.7%) of the participants indicated that the teachers did not at all employ effective assessment strategies to evaluate learners' achievement, 37 (15.4%) indicated that they did a little, 85 (35.3%) indicated that they quite a bit did while, 115 (47.7%) indicated that the teachers greatly employed effective assessment strategies to evaluate learners' achievement.

Lastly, 9 (3.7%) of the participants indicated that the assessment strategies did not at all cover the three domains of competence, while 34 (14.1%) indicated that it did a little, 107 (44.4%) indicated it quite a bit did and 91 (37.8%) indicated that it did a great deal.The weighted mean (higher than the established 2.50 criterion norm) showedthat the participants perceived the curriculum as relevant in promoting the achievement of Sustainable Development Goals in Nigeria.

4.2.8 Research Question 8: What are the participant's perceptions of their learning outcomes in the curriculum on Education for Sustainable Development?

The results of the interview conducted to determine participant's learning outcomes in the curriculum on Education for Sustainable Development are categorised into five thematic areas. These are:

i. Knowledge of Sustainable Development before participating in the tryout of curriculum on Education for Sustainable Development.
ii. Knowledge of Sustainable Development after participating in the tryout of curriculum on Education for Sustainable Development.
iii. Benefits derived from participating in the tryout of the curriculum on Education for Sustainable Development.
iv. Willingness to undertake personal/joint effort in volunteering for community action in addressing sustainable challenges in their Immediate Community.
v. Readiness to recommend the curriculum of Education on Sustainable Development for Nigerian university undergraduates.

4.3 Discussion of Findings

4.3.1 Nigerian University Undergraduates' Level of Awareness of Sustainable Development

This study found that nearly 70% of the undergraduates accounting for nearly two third of the total sample when asked about their awareness of sustainable development and the SustainableDevelopment Goals indicated that they are not at all aware or are less aware of the concept of sustainable development and the Sustainable Development Goals.Several reasons could be attributed to the very low rate of awareness about sustainable

development and the Sustainable Development Goals among undergraduates in Nigerian Universities. One of these reasons could be as pointed out by UNESCO, (2014) when it maintained that education for sustainable development is still an evolvingarea of concern among Higher Education Institutions in Africa. The fact that undergraduates in Nigerian universities remained unaware of the SDGs three years after the commencement of its implementation remains a source of concern, this is because if there exist a below average level of consciousnessamong university students, it therefore means that not much can be xpected from the general public.

According to Omisore, Babarinde, Bakare and Asekun-Olarinmoye, (2017) one of the problems associated with the MDGs was the low level of awareness in both developed and the developing countries and the level of awareness has been described as the backbone of achievement. Without sufficient awareness there cannot be attainment which makes it difficult for every actor to discover what their roles are in contributing to the achievement of the SDGs. However, in a study named the Sustainable Literacy Test conducted by the Higher Education Sustainability Initiative's (HESI) in 2017 among 170 universities, it was reported that undergraduates had relatively high homogenous awareness of the SDGs even though none of them had complete awareness of the SDGs.This is not in agreement with the finding of this study and could be attributed to a lot of reasons. The first being that many universities in the developed nations have utilised the UN Decade of Education for Sustainable Development to scale up activities to integrate education for sustainable development into their curricula, campus operation and university administration and as rightly described by UNESCO (2014), several of the indication of advancement on teaching and learning (education)for Sustainable Development in tertiary institutions emanates from Latin America and Europe.

It is against this backdrop that the findings of HESI 2017 can be said to be untrue in the Nigerian Experience. In a similar study carried out by Omisore et al (2017), among university lecturers and students in a university in Southwest Nigeria, they found a low level of awarenessof students and lecturers about the sustainable development goals and decried the low level as a result of non-teaching and learning about the SDGs and little or no research about sustainable development related issues.Low level of sustainable development awareness in a university community is detrimental to the future of the SDGs

in Nigeriaespecially since universities have been assigned a leading role in many importantpronouncements such as the Talloires Declaration of 1990, Agenda 21 in 1992, the Kyoto Declaration of 1993, the Global Higher Education for Sustainability Partnerships in 2000, etc. If the SDGs would be achieved in Nigeria by 2030 universities have to wake up to their role in promoting sustainable development through a viable curriculum on education for sustainable development.

Already, universities across the world have woken up to this challenge which is why many of them have restructured their curricula, campus operation and research to focus on sustainable development. The low level of awareness of sustainable development and the SDGs justifies the need for the development of Curriculum on Education for Sustainable Development for universities in Nigeria.

4.3.2 University Undergraduates' Level of Knowledge of Sustainable Development Goals

The finding from the study about basic knowledge of the meaning of sustainable development goals presented a very poor level of undergraduates' knowledge of the concept. The result showed that more than 92.4% (see table 4.2) of the undergraduates had zero (no knowledge at all) of sustainable development (the SDGs and only about .8% had an adequate knowledge while the rest (6.4%) had a scattered knowledge of the concept of sustainable. This result clearly showed that some of the undergraduates (30%) who earlier claimed to have had awareness about the Sustainable Development Goals really do not have any knowledge about the concept of sustainable developmentor the Sustainable Development Goals.

This result is a poor reflection of Nigerian universities commitment to sustainable development which has become a parameter for rating the quality of any university globally. In a similar study carried out in Alabama and Hawaii by Emanuel and Adams (2011) more than seven years ago to find out Alabama and Hawaii undergraduates knowledge of sustainable development, they found out that a larger proportion of the students of the Alabama and the Hawaii students had a significant knowledge of sustainable development especially when asked to identify the term they do associate with sustainability.

Furthermore, a larger proportion of the student had a great knowledge of what campus sustainability entails and also showed willingness to voluntary embark on campus sustainability community and personal actions. It is worthy to state that this study was carried out before year 2015 when the SDGs were approved by the United Nations General Assembly for full implementation in 2016. The difference in the findings between the study conducted in Alabama and Hawaiii and that of this study can be attributed to the fact that sustainable programmes and practices are being implemented on a number of college campuses in Alabama and Hawaii. Earlier on in 2007, a Forbes article titled "America's greenest states" had identified Hawaii as the fourth greenest state and Alabama as the 48th greenest (Wingfield and Marcus, 2007).

Emmanuel and Adams (2011) explained that the first step towards sustainability and sustainable practices is through education which includes a deliberate attempt to familiarize students with a host of new sustainable concepts. Similarly, Omisore et al (2017), found out a low level of knowledge of sustainable development concepts among lecturers and students alike with less than 5% of their sample having what they termed good knowledge of the SDGs, and as suggested by them there, is a need for a good buy-in of the educational sector in making SDGs the fulcrum of strategic plans and development. In Nigeria, the poor level of undergraduate's knowledge of sustainability and sustainable development goals could be traceable to their university's low commitment to sustainable development and could be significantly enhanced if attempt is made as suggested by Emanuel and Adams to familiarise students with a host of new concepts in sustainability and sustainable practices through education. This finding has justified the need for curriculum on teaching and learning (education)for sustainable development in Nigerian universities.

4.3.3 The extent of Sustainable Development Practices of Nigerian Universities

The result of the finding showed that the students rated the sustainable development practices of their universities very high. Forinstance, 62.4% of the students indicated that their university to a great extent sensitises students towards sustainable development programme, 54% indicated that their universities organises awareness programmes on sustainable development for staff and students.Furthermore,on all campus sustainable indicessuch as conservation of energy, recycling of solid waste, water conservation, tree

conservation, sustainable transport systems and sensitization of neighbouring communities on sustainable development, more than 55% of the students rated their universities very high on these indices reflecting that their universities are committed to these sustainable practices.

Critically looking at the result on the extent of sustainable development practices of Nigerian universities, one cannot but wonder that if universities in Nigeria do this much on and for sustainable development in their universitiesas claimed by these students how then has these practices not increase students' awareness and knowledge of sustainable development concept and of the SDGs. Previous studies conducted by Abubakar, Al-shiri and Sayed (2015) on campus sustainability in Saudi Arabia showed that there is a strong connection between students' assessment of campus sustainability, sustainability concepts teaching and inculcation of sustainable behaviours among students. Interrogating the findings of Abubakar et al (2015) further, implies that if the teaching, sensitisation and practices of campus sustainabilityinculcate sustainable behaviour among students in Saudi Arabia, why is it that the extent of Nigerian universities campus sustainable practices has not increased the awareness and knowledge on sustainable development among Nigerian undergraduates, bearing in mind that behavioural change hardly occur when knowledge has not taking place.

One of the reasonsthat can be provided for this result would be that students in providing answers to thequestions on their universities campus sustainability practices could have thought that the outcome of thestudy would be used in determining the ranking of universities and as such gave out information that was not a true reflection of sustainable campus practices in their universities. Again, it could be that the students merely flowed in the direction of the question as they deemed good for the image of their university, for instance, a twisted question that sought to know if their universities rely on food/daily supplies from the city (vegetables, toiletries, pastries)had more than 59% indicating that their universities does to a great extent, this could be a true reflection of other indices of campus sustainable practices of Nigerian universities.

In a related twist, Ifegbesan, Ogunyemi and Rampedi (2017) in a study conducted on sustainable practices of Nigerian universities maintained that indiscriminate littering; open dumping of waste; weedy and overgrown lawns; proliferation of power generating sets;

uncollected refuse sites and defaced walls with postings are among the major campus sustainability challenges Nigerian universities are still battling with. Based on this assertion, it is a fact that the extent of sustainable campus practices of many Nigerian universities leaves nothing to be desired and calls for a paradigm shift. This finding justifies the need for the development of a curriculum on education for sustainable development with which Nigerian universities can facilitate teaching and learning towards sustainable development.

4.3.5 Objectives of the Developed Curriculum on Education for Sustainable Development

Promotes Sustainable Development Competencies among Students

The result showed that the objectives of the curriculum on education for sustainable development promote sustainable competencies among the target group. This is asestablished by the agreement discovered between the reliability of the raters' position on all the indices of determining the validity of the curriculum objectives.In validating the objectives of a curriculum, there is no universally accepted rubric for determining the validity of a curriculum and as such every curriculum developer would validate a newly developed curriculum by developing a rubric based on the goals of the curriculum that has been developed.In a similarstudy conducted in Inter American University, in Puerto Rico by Rodriguez (1995) to developan adult education curriculum, he validated the curriculum using the following criteria: was the objective of the curriculum clearly stated?Did it indicate the competencies to be attained by learners? Is it based on principles and practices of the subject? Did it follow curriculum development principles in design and content as suggested in literature?

While this study made attempts to validate the curriculum based on the elements in the curriculum, the Rodriguez approach made attempt to validate the curriculum by lumping together all the elements. However, in a more recent study by Tractenberg, Usmans, and McCarter (2010), the validity evidenceof curriculum objectivesis derived from the decisions that are supported or made about the curriculum based on the rubric designed to validate the curriculum. According to them, in order to ensure curriculum objectives validity and relevance, three elements of assessment must be present which include: what is/are the knowledge, skills, and abilities (KSA) that students should possess at the end of

the curriculum? What actions/behaviours by the students will reveal these knowledge, skills and abilities? What task will elicit these specific actions or behaviours? In her view, articulating curriculum objectives in a manner consistent with these features seeks to make the curriculum valid and relevant.

To show that there is no universally acceptable rubric for determining curriculum validation the United States Department of State has a rubric through which they determine the validity of a curriculum. These include:are the progarmme's learning objectives challenging, clear, and appropriate?Do learning objectives reflect the vision promoted in national standards? Does it address important individual and societal needs? Provisions of answers to these questions through the designed rubric to a great extent lend credence and relevance to a newly developed curriculum.

A critical reflection on all the indices of past studies earlier discussedshowed that the indices adopted to validate the curriculum objectives of the curriculum on education for sustainable development reflects the core areas/indices that curriculum validation should be focused on.Therefore, the criteria used in validating the curriculum brought about in this study is based on the principle that the curriculum is able to do what it has been designed to doand that is to promote sustainable competencies among undergraduates in Nigeria universities.

4.3.6 Extent to which the Content of the Curriculum on Education for Sustainable Development Dealt with Local Sustainable Challenges in Nigeria

The validityrating by the raters showed that the content of the curriculum on education for sustainable development dealt with local sustainable challenges in Nigeria. This is as established by the agreement discovered between the reliability of the raters position using intraclass correlation coefficient on all indices of determining the validity of the curriculum content.Crucial to any curriculum is the content and just like validating curriculum objectives, there are no rigid methods when it comes to validating curriculum content, the validation of a curriculum content is influenced largely by persons conducting the validation.

However, as noted by Zapata (2005), there are basic underlying assumptions and one of these fundamental assumptions is that curriculum objectives largely influence the direction of the curriculum content in terms of tasks to be performed in the teaching learning

process, pedagogic style or strategies, the materials to be deployed in facilitating classroom interaction/instruction and the goal of learning. In determining the curriculum content according to United States Department of State, curriculum content should meet the following criteria:can the content be implemented, adopted, or adapted in multiple educational settings? does it address individual and societal needs?is the curriculum content aligned with the learning goals/objectives? Is the subject matter appropriate for the audience? Does the content make a measurable difference in student learning?

Also, Rodriguez (1995) indicates that for curriculum content to be valid it should indicate the subject matter that students must take, should consider internal and external plan, and should have an implementation plan. Zapata (2005) also maintained that curriculum content should be properly sequenced by progressing from simple and general elements into more complex and detailed elements and that curriculum contents should make attempts to present the global picture of issues with local analogies and practical illustrations to see how learners fit into such global issues.

Consequently, reflecting on the indices of curriculum content validation espoused in past studies showed that the indices adopted to validate the curriculum content of the curriculum on teaching and learning (education)for sustainable development reflects core areas/indices that curriculum content validation should include. Therefore, contents of the curriculum dealt adequately with sustainable development issues not leaving behind the sustainable issues that are pertinent to Nigeria.

4.3.7 Classroom Utility of the curriculum on Education for Sustainable Development

Findings showed that the Curriculum on Education for Sustainable Development had classroom utility. These were determined by the aggregate responses of the raters and the intraclass correlation coefficient which was further carried out to determine the agreement of the raters on all indices of the classroom utility of the curriculum, it showed that the agreement was statistically significant. In a similar study conducted by Food and Agriculture Organisation of the United Nations in 1996 where an attempt was made at validating the functionality of a newly developed population education curriculum, they made attempt to establish the utility of the curriculum based on the following: the suitability of the curriculum product for the target audience, Does the curriculum product

satisfactorily achieve learning outcome with the target audience? From the perspective of the learner does learning have value? Do the pilot version in all settings (delivery mode/pedagogy, learning materials and learning conditions/environment) work as intended? Do pilot groups include the diversity of conditions and settings of the group you expect to use the final product and were tools such as pre and post-test (questionnaire, interviews, evaluation and observation) employed in gathering necessary data for feedback?

Furthermore, Cudmore (2000), in a guideline by Northwest Centrefor Sustainable Resources (NCSR) explained that in conducting pilot testing of a curriculum and ascertaining the efficacy of a curriculum the followings should be paid attention to:content and relevance in attaining student outcomes; effectiveness of time allocation to cover the materials/activities; students readiness to learn the knowledge, skills and behaviours intended to achieve the learning outcome; appropriate identification of equipment, material resources and its proper deployment; selection and usage of appropriate pedagogical approaches in delivering the content/martials of the curriculum; student interest, involvement and participation in the learning process; appropriateness and effectiveness of the student assessment processes and appropriate sequencing of modules to attain the overall curriculum outcomes.

Sufficiently, the criteria used in prosecuting the pilot testing and ascertaining the classroom utility of the Curriculum on Education for Sustainable Development agrees strictly with past indices and criteria used in determining the classroom functionality of a newly developed curriculum.

Therefore, the Curriculum on Education for Sustainable Development can be said to have passed classroom validity test and is valid to be used for similar audience in any classroom situation.

4.2.8 Perception of the Relevance of the Curriculum on Education for Sustainable Development in Promoting the Achievement of Sustainable Development Goals in Nigeria

This section in an effort to determine the students' perception of the relevance of the curriculum in promoting the achievement of the Sustainable Development Goals in Nigeria asked questions about students' direct experiences of their classroom involvement with the curriculum on teaching and learning (education) for sustainable development during the period of participating in the trial testing.This is important because the extent to which the students perceive the curriculum as relevant to them and in equipping them with sustainable development skills determine a great deal the relevance of the curriculum in promoting the achievement of the SDGs.The finding showed that a larger proportion of the students (90%) perceived their learning outcome during the trial testing as one of the prerequisite requirements of achieving sustainable development in Nigeria.

Furthermore, another large proportion of the students (91.1%) of the students who took part in the training indicated that their participation in the trial testing of the curriculum has exposed them to ways and methods sustainable development can be achieved in Nigeria. Similarly, a greater percentage of the students explained that the training and their participation in the trial testing opened their eyes to sustainable development problems in their immediate environment and practical sustainable solutions were identified for the problems, In the same vein, more than three quarter of the students (83.1%) indicated that through their participation in the training they have been equipped with skills and competencies with which they can take personal and joint action in confronting sustainable development challenges in their community.

Looking at the trend of these findings, one of the things that can be deduced is that even though many of these students were participating for the first time in the trial testing of the sustainable development curriculum, the curriculumwas greatly able to open their horizons to the crucial issues in sustainable development with a corresponding knowledge, positive attitude and skills. Another interesting finding is that more than three quarter (88.8%)of the students who participated in the trial testing of the curriculum recommended that the Curriculum on teaching and learning for (education)for Sustainable Development be

introduced as a taught course in the university and again more than three quarter (85.5%) of the students who participated in the curriculum trial testing stated that they will be willing to take courses in Education for Sustainable development in their university if such is introduced.This calls for the need to introduce courses on education for sustainable development Nigerian Universities.

The students' willingness to recommend the curriculum to be taught in the university system and their interest to take courses in education for sustainable development can be attributed to the knowledge, the skills and the competencies they were able to acquire during the trial testing which they considered as new and different from their everyday curriculum in their respective disciplines.This is because a larger proportion of the students (90.5%) who participated in the trial testing indicated that the curriculum on education for sustainable development exposed them to facts and information they considered as new about sustainable development.

In the past, studies were carried out to test the general perception of undergraduates on sustainable developmentand to also determine their awarenessof campus sustainability and general knowledge about sustainable development without an introduction of any curriculum package on sustainable development. For instance, Abubakar et al (2006), determined students' assessment of campus sustainability; Emmanuel and Adam (2011), determined college students' perceptions of campus sustainability; Agboola and Emmanuel (2016), carried out awareness of climate change and sustainable development while, Omisore et al (2017),determined the awareness and knowledge of the sustainable development goals in south west Nigeria.

4.3.8.1 Knowledge of Sustainable Development before Participating in the Tryout of Curriculum on Education for Sustainable Development

The finding shows that the learning outcomes of the students were greatly enhanced as a result of their exposure to the curriculum on education for sustainable development. The result of the student's interview conducted to determine their prior knowledge of sustainable development and the sustainable goalsbefore the tryout of the Curriculum on

teaching and learning (education)for Sustainable development showed that all of them had a wrong knowledge of sustainable development and the SDGs before the trial testing.

The followings are the excerpts of student's responses when the researcher asked students to describe their prior knowledge of sustainable development before the tryout:

Participant 1 – *Yes I know about sustainable development. But I know it to be the survival of the fittest.*

Participant 2 –*Prior to the training I had little knowledge about sustainable development I knew there were goals but I do not know my roles in making this goals work. I just saw it something on the outside. I didn't see myself in the process of making the goals achievable. I didn't see myself as working and being a part of the process of how the goals could be attained.*

Participant 3 - *I have heard about the phrase on news but I had no idea as to what it was about. I thought it had something to do about employment and things of government.*

Participant 4 – *I came across the SDGs once when it was inaugurated in 2015, it was in the news I just saw it in passing and it never left any impression and I really don't know anything about it until now that I participated in this training.*

Participant 5 - *Before the training it sounded very weird like….. I have actually not heard about it before.*

4.2.8.2 Knowledge of Sustainable Development after Participating in the Tryout of Curriculum on Education for Sustainable Development

The interview conducted to determine students' knowledge of Sustainable Development after the tryout showed that the students' learning outcome greatly improved in the areas of system thinking, futuristic thinking, problem solving skills, partnership building, readiness to take action, environmental responsibility and consciousness, conservation of resources, knowledge of campus sustainability, gender equality, reduction of wastages, pollution and burning of fossil fuel, recycling of waste, knowledge of the three dimensions of sustainable development, readiness to take personal/joint action to solving

sustainable development problems in their communities, and willingness to form and participate in student clubs/initiative for campus sustainability.

The followings are the excerpts of student's responses when the researcher asked students to describe their benefits of participating in the tryout of the curriculum on sustainable development:

Participant 4 -*I now know that Sustainable Development refers to development in which you meet the present need without compromising the ability of the future generation to meet their own needs. And that I now know that the SDGs is not for government alone to implement and I have a role to play in it. Just by the switching off of my bulb before coming out of my room in the morning is thinking and acting sustainably by deciding to conserve energy/power. Again, I now know that just by deciding to walk or take a bicycle I have actually acted and think sustainably because I have decided not to board a car which in turn burns petrol which is a fossil fuel that will release co2 into the atmosphere thereby harming the environment. I have actually gained a deep insight into sustainable development and my role in implementing the SDGs.*

Participant 1 -The training has opened my minds to so many things that we do as mankind especially human activities that can hamper the environment just like burning of fossil fuels and other things that destroys the environment. It has opened my eyes to those things and see how we can bsegin to change our actions towards sustainable ways of recreating the environment.

Participant 3 - I see myself as being part of the goals, being part of the people that will put thestep in the right direction so these goals can be achieved.

Participant 6 - *The fact that energy can be conserve and the fact that things that are just everywhere could be used for the betterment of people and for the betterment of the future is very exciting to know*.

Participant 8 -*During the course of the training I have learnt the 17 goals of SD, the implementation of the 17 goals and how it is expected to be implemented within 15 years and how work is being done to ensure that the goals is being achieved and how university*

can adopt the principle of campus sustainability in ensuring that they serve as model towards achieving the goals in areas of transportation, energy conservation, food etc.

Participant 7 - *Now I know that as human beings we are able to think about the future. Like it's not just all about yourself, it's not about your generations only, we are also able to do things that will affect the future generations to come and this knowledge is one the things that excites me the most about this programme.*

Participant 2 -*I have begun to see that little thing that we do can actually help us to attain Sustainable Development Goals. There was an example that actually got to me, like crossing the lawn. Now I know that crossing the lawn is not good. FOR somebody who wants to achieve the Sustainable Development Goals, it is not good to cross the lawn. My knowledge about this has increased and it has helped me a lot. Now the way I live my life is different from the way I lived it before because now I try to see if my actions are aligning to the principles of sustainable development.*

Participant 3-*I now have an idea as to what the SDGs are and now I can work better towards making the environment better for me and also for the future generations. I feel that if things go on as it is now, in years to come, so many things will go wrong and the future generation will suffer so much from what is going on now especially the little things that we think are little that are going on today that is very harmful and injurious to the world.*

Participant 4 - *It was a revelation that I didn't have to wait for the government to start, I can start it myself, that was a big revelation to me because I thought it is something to be left to the government to do. But this training has made me realise that I have a part to play. It has been exciting and its being a good training, I have enjoyed it*.

Participant 9 - *It has create my awareness into looking at ways we can better our environment, reduce wastages, pollution and burning of fossil fuels and also create a better world for the next generation.*

Participant 5 -*From this training I have been made to realise that instead of wasting some of these resources that seems excessive around us we can put them to better use, for example water, light even papers we could make better use of them like recycling etc.*

Participant 6 -*I have been able to gather a concrete experience to the extent I can now say that I know what SD Goals is all about. I can now say this is the aims, this is what I am supposed to do to assist in achieving the goals, actions to sustain the environments. At least I know the three arms of sustainable development and where it leads to. I think I have been able to gather something from the training.*

4.2.8.3 Benefits derived from participating in the tryout of the curriculum on Education for Sustainable Development

The result of the interview conducted showedthat students derived several benefits from the training. The followings are the excerpts of students' responses when the researcher asked students to describe their knowledge of sustainable development after the tryout:

Participant 2 - *Basically it is in my knowledge, the ways I see things now are now different. I have begun to see that little thing that we do can actually help us to attain Sustainable Development Goals. There was an example that actually got to me, like crossing the lawn. Now I know that crossing the lawn is not good. FOR somebody who wants to achieve the Sustainable Development Goals, it is not good to cross the lawn. My knowledge about this has increased and it has helped me a lot. Now the way I live my life is different from the way I lived it before because now I try to see if my actions are aligning to the principles of sustainable development.*

Participant 1 –*It empowered me, especially the aspect when they talked about gender equality and food for all. Normally I believe that we cannot have equality that some people will remain poor while others will remain rich but this training enlightened me that if we all could come together we can have a better society and there will be food for all. Everything will be sufficient for everybody just if we employ this particular development strategy*.

Participant 3 – *I now have an idea as to what the SDGs are and now I can work better towards making the environment better for me and also for the future generations. I feel*

that if things go on as it is now, in years to come, so many things will go wrong and the future generation will suffer so much from what is going on now especially the little things that we think are little that are going on today that is very harmful and injurious to the world.

Participant 4 - *I have benefited immensely, because it has really been an eye opener. It was a revelation that I didn't have to wait for the government to start, I can start it myself, that was a big revelation to me because I thought it is something to be left to the government to do. But this training has made me realise that I have a part to play. It has been exciting and its being a good training, I have enjoyed it.*

Participant 3 – , *I now have an idea as to what the SDGs are and now I can work better towards making the environment better for me and also for the future generations. I feel that if things go on as it is now, in years to come, so many things will go wrong and the future generation will suffer so much from what is going on now especially the little things that we think are little that are going on today that is very harmful and injurious to the world*.

Participant 5 - *From this training I have been made to realise that instead of wasting some of these resources that seems excessive around us we can put them to better use, for example water, light even papers we could make better use of them like recycling etc.*

4.2.8.4 Willingness to Undertake Personal/Joint Effort in Volunteering for Community Action in Addressing Sustainable Challenges in their Immediate Community

Findings showed that the students based on the effect of the curriculum were willing to join and get committed to volunteering to take actions for sustainable benefits of their communities. The followings are the excerpts of student's responses when the researcher asked in the interview whether the students will be willing to undertake volunteering activities for their community development:

Participant 2 - *Really, the impact and impression this curriculum left on me was so strong that I have decide together with my colleagues in this class to start a student sustainable development initiative. It will take the form of a student club where every student on campus can join and get to know more about sustainable development and the SDGs. Plans are ongoing to get it registered.*

Participant 4 - Yes! I will be very willing and I think I have joined the student club on SD because it would enable us to make impact with those that have not have the privilege of participating in this training. We can then be ambassadors and then train them also to think sustainable like we already are doing.

Participant 3 - *Yes of course (with full nodding) because I cannot be saying I want things to be better and that I want others to have an idea when I am not interested in taking part because I have a part to play. I know that I have a part to play, so I have to join for me to be able to play my part.*

Participant 6 - *Yes I will because my aim is to help other people to align with the objectives of sustainable development goals. So I think I will also recommend it for all students*.

4.2.8.5 Readiness to Recommend the Curriculum of Education on Sustainable Development for Nigerian University Undergraduates

Findings showed that the students based on the effect of the curriculum were willing to recommend the curriculum for Nigerian university undergraduates. The followings are the excerpts of student's responses when the researcher asked in the interview whether the students will be ready to recommend the curriculum for undergraduates in Nigerian universities:

Participant 3 - *I will recommend seriously that it be put in the curriculum. This training should be implemented even at the primary schools through secondary schools and tertiary institutions because if we don't start now on educating people, it is easier to change the mindset of people from younger age than when they are grown because if you grow up with an ideology it is usually very hard to change it than when they are young.*

Participant 4 - *Yes I would I recommend it for the Nigerian universities people who think that all things is for the government. It should be taught and everyone should be enlightened. If all Nigerians can educated in this form, then all of us starts thinking the same way, then we can join hands together to build a better Nigeria. A subject like this can be introduced secondary schools and just like we have the General Studies Programme in this university we can also introduce a course on sustainable development where everybody will take it once you come into the university as a compulsory course not as a departmental specific course it should be for everybody. Course like this can be put into the GSP for all students.*

Participant 5 - *YES 100%. Because majority of people that are, emn! That are in this school, undergraduates as a whole we are…. I want to believe that we are not really informed about this so it is better that there is a course that goes on like this for the knowledge of students on the principles of sustainable development*.

Participant 6 - *Yes! I will recommend the training for Nigeria Undergraduates. Like I said it is time we will begin to like take into considerations how our present actions affect our future. This programme is just not about now, it also makes room for the future and for what happens to future generations so I think I will recommend it because it makes us take into account how our actions will affect what happens to our future generations.*

Participant 7 - *Yes I would want the programme to be included in the university curricular and even be pushed to lower educational system like secondary schools. FOR example, this is first time of hearing about this sustainable development and I am in 300 level Law, at least I have not encountered this type of programme before in any form at all from my childhood or secondary school so we can actually extend the borders of audience we want to reach out to. Okay since they are the younger ones so before they even come to this place (university) before being in the university at all, I would have heard a lot about this programmme and maybe I would have develop my interest many years back even before now.*

Participant 8 - *Yes! This training will be a very good one for Nigerian undergraduates because they will be able to learn more of the SDGs and how they can put in their own partnership to ensure that the SDGs work out.*

These learning outcomes highlighted through the 5 thematic areas in the interview agrees with the learning outcome exemplified by Svanstrom, Lozano-Garcia and Rowe (2008), in their work titled "Learning Outcomes for Sustainable Development in Higher Education" and the UNESCO (2017), "Learning Objectives on Sustainable Development Goals.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

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

5.1 Summary of Findings

Findings of the study are summarised below in the order in which they were presented:

1. Undergraduate's level of awareness substantiated the need for curriculum on Education for Sustainable Development.
2. Undergraduate's level of knowledge of the Sustainable Development Goals authenticated the need for curriculum on Education for Sustainable Development.
3. The Level of sustainable development campus practices of Nigerian universities substantiated the need for curriculum on teaching and learning (education)for sustainable development in Nigerian universities.
4. The objectives of the developed curriculum on Education for Sustainable Development promoted the acquisition of sustainable development skills and competencies among students.
5. The content of the Curriculum on Education for Sustainable Development dealt with local sustainable challenges in Nigeria.
6. The observers' assessment of the classroom utility of the Curriculum on Education for Sustainable development was valid and reliable.
7. The students who participated in the trial testing of the Curriculum on Education for Sustainable Development perceived the curriculum as relevant in promoting the achievement of Sustainable Development Goals in Nigeria.
8. The learning outcomes of the students that participated in the trial testing of the Curriculum on Sustainable Development were greatly enhanced as a result of being exposed to the curriculum.
9. Students who participated in the trial testing as a result of their leaning outcomes recommended the curriculum to every undergraduate.

10. Students who participated in the trial testing of the curriculum have formed a students' sustainable development club with which they will mobilise other students in their university towards sustainable development action.

5.2 Conclusion

The United Nations Sustainable Development Goals popularly referred to as agenda 2030 has placed a huge responsibility on universities to reorient their curricula to accommodate the teaching and learning of sustainability. This study developed a curriculum on education for sustainable development for university undergraduates in Nigeria employing a 4D curriculum approach which included; development, design, demonstration and disemnination having observed a gap in Nigerian university undergraduate awareness and knowledge of sustainable development concepts and goals and another gap in the sustainable campus practices of Nigerian universities who have been saddled with the responsibility of providing leadership in the area of greening the curricula, research and development and mobilising societal support towards sustainability.

A need assessment carried out across universities in Southwest Nigeria before developing the curriculum showed that the assumptions upon which this study is based is right with a larger proportion of the undergraduates surveyed having little or no awareness of the concept of sustainable development and the Sustainable Development Goals and another larger proportion having a zero knowledge of what sustainable development or the SDGs is about.The findings showed that the criteria used in determining the validity, relevance, suitability and utility of the objectives, contents and the classroom utility of the Curriculum on teaching and learning (education)for sustainable developmentwas reliable and valid. Furthermore, it showed that the curriculum on Education for Sustainable Development during tryout significantly improved the learning outcomes of undergraduates who took part in the curriculum try out.

It was concluded thatthe universities in Nigeria need to wake up to their responsibility of educating undergraduates towards the acquisition of sustainable development skills and competencies.One of the unique the way these can be done is in the area of reorienting their curricula to accommodate the teaching and learning in sustainable development. The curriculum on Education for Sustainable Development which is the output of this study offers a unique blueprint on what sustainable education

entails and should be adopted or adapted by universities to provide instruction in sustainable development for their students. It is only when this is done that the aim of achieving the Sustainable Development Goals in Nigeria is realistic.

5.3 Implications of the Findings

The findings of the study have the following implications:

1. Undergraduate'snon awareness of sustainable development and zero knowledge of the Sustainable Development Goals is a reflection of their universities poor commitment to the principle of sustainable development.
2. The developed curriculum on Education for Sustainable development is validto educateundergraduates in Nigerian universities towards the acquisition of relevant knowledge, skills, competencies and practices of sustainable development.
3. Adoptingor adapting the Curricula on Education for Sustainable Development by Nigerian universities to educate their students is one of the unique steps towards integrating sustainability into their campus operations
4. Exposing undergraduates to the Curriculum on Education for Sustainable Development will provide a platform for the students to take personal/joint actions in their communities or campuses towards solving sustainable problems and to mobilise others to do same.
5. The curriculum on teaching and learning (education) for sustainable development provides a platform for undergraduates to embrace disciplinary and multidisciplinary approach to tackling sustainable development challenges through their profession.

5.4 Contributions of the Study to Knowledge

This study has contributed to knowledge in the following ways:

1. It has established that there exist a low level of awareness and poor knowledge of sustainable development concepts and the SDGs among undergraduates in Nigerian universities.
2. It has identified that most campuses of Nigerian universities are not managed on campus sustainability principles and are therefore not sustainable development compliant.
3. It has provided a blueprint (curriculum) on education for sustainable development through which Nigerian universities educate their undergraduates to acquire competencies in teaching and learning (education)for sustainable development.
4. It has provided a suitable paradigm for developing curriculum on contemporary issues of global relevance for sustainable development.
5. It has established that there is a nexus between deliberate education/teaching of undergraduates for sustainable development and their development of knowledge, skills and practices in sustainable development.
6. It has through the tryout of the Curriculum on Education for Sustainable development stimulatedand mobilised undergraduate's interest, involvement and support for the achievement of the Sustainable Development Goals.
7. It has provided researchers with information on the need to explore teaching and learning (education)for sustainable development as a tool for achieving the Sustainable Development Goals.
8. It has provided policy makers with a framework to construct and implement curriculum on teaching and learning (education)for Sustainable Development at all levels in Nigeria.
9. It has established a link between universities implementation of sustainable development and the realisation of the sustainable Development Goals in Nigeria.

5.5 Recommendations

1.Universities as a matter of urgency should strive at greening their curricular by integrating teaching and learning (education)for sustainable development into their taught courses. The curriculum on teaching and learning (education)for sustainable development has provided an existing framework and could be easily adopted or adapted. It should be made compulsory for all students as a core course.

2.In an effort to integrate the Education for Sustainable Development into the university curricular, attempt should be made to re-train university lecturers to have an insight into sustainable development concepts and how they can promote it in their teaching and research.

3.Universities should come up with elaborate campus sustainable practice model in all areas, such as; energy generation and conservation, recycling of wastes and solid materials, sustainable transportation, sustainable construction, leadership management, etc. This should go beyond establishing sustainable development centres and running of academic programmes.

4.Universities should promote, support and encourage students' campus clubs orinitiatives aimed at promoting sustainable development practices on campuses. This is a way of raising students' leaders who are committed to sustainability.

5.Regulatory bodies such as the National Universities Commission (NUC) should articulate government policy that promotes education for sustainable development in Nigerian universities, since several declarations to which Nigeria is a signatory have articulated the important role of universities in educating for sustainable development.

5.6 Limitations to the Study

1.It was difficult to enlist the support of lecturers to release their class to be used for the tryout of the curriculum as many could not see the relevance of the study.

2.There was no sufficient time to fully cover every topic stipulated in the curriculum during the tryout because the lecturers needed to cover their course outline.

3.Securing students' interest to fill the research instruments during the need assessmentstage was quite difficult as many felt there is no need to attempt it since they do not know anything about it.

4.Getting the attention of the students to participate in the try out was initially challenging, it was midway into it before they found it interesting.

However, in spite of these limitations and constraints, the findings of this study constitute important milestone for educating, teaching and learning of sustainable development concepts in Nigerian universities.

5.7 Suggestions for further Studies

1.The study can be replicated in another geo-political zone of Nigeria and in other countries of Africa to determine the validity of the claims of this study.

2.Study can be carried out on a larger sample to determine the effect of the implementation of the curriculum on education for sustainable development on university undergraduates learning outcome in sustainable development.

3.Studies can also be carried out to determine the effect of university campus sustainable practices and the awareness of sustainable concepts among undergraduates in Nigeria.

4.Relevant studies can also be carried out to determine university lecturers' awareness, attitude and knowledge of sustainable development and how these influence their classroom teaching and research in Nigerian universities.

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APPENDIX I

Curriculum on Education for Sustainable Development Need Assessment Questionnaire(CESDNAQ)

Dear respondent,

This is a need assessment survey questionnaire intended to determine undergraduate students' awareness of sustainable development goals, their university commitment to their realisation and their disposition to the inclusion of curriculum on Education for Sustainable Development into the university curricula. Confidentiality and anonymity of records identifying you as a participant will be maintained. Information supplied will be purely used for research purposes. Thanks.

Section A: Demography information of respondent

1. Name of institution: …….
2. Level:……
3. Gender:…….
4. Department:…….
5. Faculty:……

Section B: Students' Awareness of Sustainable Development

Key: 4= Very Much Aware, 4= Aware, 1= Less Aware, 1= Not Aware.

S/N	ITEM	Very Much Aware	Aware	Less Aware	Not Aware
1	Are you aware of Sustainable Development (SD)?				
2	Are you aware of Sustainable Development Goals (SDGs)?				
3	Are you aware of Education for Sustainable Development (ESD)?				
4	How will you rate your knowledge of Sustainable Development?				
5	Are you aware sustainable development has three focal point?				
6	Are you aware of your university's strategy/approach on how to achieve Sustainable Development in your				

	university?				
7	Are you aware if your university has any center for research in education and policy development on Sustainable Development?				
8	Are you aware if any initiative is being taken by your university to create Sustainable Development awareness in your university?				
9	Are you aware of any programme undertaken by your university to orientate students towards sustainable development?				
10	Are you aware of any student group directly promoting initiative on sustainable development in your university?				
11	Are you aware of any workshop, seminar, symposium or a conference organised in your university to create awareness on sustainable development for students in recent past?				
12	Are you aware that university education should provide students with education and training needed to cope with demands of sustainable development?				
13	Are you aware Students' knowledge of Sustainable Development would be significantly enhanced in your institution if attempt is made to communicate it formally through an organised curriculum?				
14	Are you aware that offering a course on Sustainable Development can enhance your understanding of the concept of sustainable development?				
15	Are you aware that attending a workshop, seminar, symposium or a conference on sustainable development can enhance your knowledge of sustainable development				

Section C: Sustainable Development Practices in Nigerian Universities

Key: 1= Not at All, 2= A Little Extent, 3= Some Extent, 4= Great Extent

S/N	ITEM **TO WHAT EXTENT**:	Not at All	A Little Extent	Some Extent	Great Extent
1	Does your university mission statement reflect its commitment to Sustainable Development?				
2	Will you rate students' awareness of Sustainable Development and its goals in your institution?				
3	Does your university encourage students to promote Sustainable Development issues on campus?				
4	Are student groups involved in taking initiatives on Sustainable Development issues in your university?				
5	Will you rate your institution's sensitisation of students towards sustainable development programme?				

6	Does job fairs/career counseling focused on sustainable enterprising organised in your university?				
7	Does your university organise orientation programme(s) on sustainable development for staff and students in your university?				
8	Does your faculty/department offer courses which address topics related to sustainable development?				
9	Is sustainability reflected in your course of study?				
10	Does your course of study expose you to the knowledge of Sustainable Development?				
11	Does taught courses in your department relate to issues of Sustainable Development?				
12	Will you rate your lecturers' disposition towards sustainability discourse in the classroom?				
13	Is your faculty/department involved in research and projects focused on sustainable development?				
14	Is energy conserved in your university?				
15	Does your university attempt to recycle solid waste (paper, glass, plastic, metal) in your university?				
16	Does your university attempt to conserve water through efficient toilets, harvested rain water, minimal irrigation etc.?				
17	Does your university conserve trees, native plants, minimizing lawn, and integrated pest management?				
18	Does your university campus rely on food/daily supplies from the city (vegetables, toiletries, pastries)?				
19	Is sustainable transportation programme encouraged in your university through (bicycle, pedestrian friendly systems, bus programmes, car pools)?				
20	Does your university embark on sensitizing host and neighbouring communities on sustainable development?				
21	Do you think Education for Sustainable Development can mobilize university students towards acquisition and development of skills and values for sustainable development?				
22	Do you think a newly developed curriculum on Education for Sustainable Development will tackle sustainable development challenges among students Nigerian universities?				
23	Will you be disposed to the introduction of curriculum on Education for Sustainable development as a course in your university?				
24	Will you be willing to take courses on sustainable development if introduced in your university?				
25	Will you be willing to take courses on sustainable development if introduced in your university?				

Section D: Knowledge of Sustainable Development

1. What is Sustainable Development?
   .....
   .....
   .....
2. How many are the Sustainable Development Goals?
   ……
3. The SDGs is to be implemented for how many years?
   .....
4. What year marks the beginning of the implementation of the SDGs……..
5. What is the target year for the completion of Sustainable Development Goals (SDGs)
   ……
   ……
6. What are the three focal areas of Sustainable Development?
   ……
   ……
7. List any five of the Sustainable Development Goals known to you?

   ……
   ……
   ……
   ……
   ……
   ……
   ……
   ……
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   ……

APPENDIX II

Curriculum on Education for Sustainable Development Validation and Implementation Rating Guide (CESDIRG)

Dear Observers,

This is an instrument designed to investigate the classroom utility of the newly designed Curriculum on Education for Sustainable Development (ESD). Kindly assess the practicality of the curriculum using the provided rating guide. Thanks.

Section A: Demography information

1. Name of institution:
2. Highest qualification:
3. Area of specialization:
4. Gender:

Section B:

S/N	ITEM Curriculum Objectives	Not at All	A Little	Quite a Bit	A Great Deal
1	Do the stated curriculum objectives cover relevant areas in Sustainable Development? i.e. environment, economy and society				
2	Does the objectives of curriculum on ESD address relevant issues pertinent to achieving Sustainable Development Goals in Nigeria				
3	Do the objectives state the competencies learners are expected to attain in ESD?				
4	Do the objectives of curriculum on ESD help the learnersdevelopment of skills, competencies and values required for Sustainable development?				
5	Do you consider stated teaching-learning experiences in the curriculum as relevant to meeting sustainable development challenges of Nigeria?				
6	Do classroom teaching-learning activities reflect the objectives of the curriculum?				
	Curriculum Contents				
7	Does the content of the curriculum on Education for Sustainable Development considered the three spheres of sustainable development?				
8	Do learners reaction to the curriculum content shows that the content is suitable for the target audience?				

9	Are the competencies learners' are expected to attain in the curriculum on Education for Sustainable practicable in Nigeria context?				
10	Do learners show that the experiences/activities packaged in the curriculum are appropriate?				
11	Does the content of the curriculum on Education for Sustainable Development draw learners' attention to local issues in a global context?				
12	Do learners show willingness to acquire sustainable development competencies through the curriculum?				
	Classroom Utility of the Curriculum				
13	Does the curriculum product satisfactorily achieve specified learner outcomes with the target audience?				
14	Do the learners consider their learning outcome in the curriculum as valuable to achieving sustainable development?				
15	Did teaching and learning process allow students to identify local sustainable challenges and their implications on development?				
16	Are the teaching and learning activities/exercises adequate for learners to acquire competencies in sustainable development areas.				
17	Does the curriculum specified learners classroom interaction				
18	Were students allowed to proffer practical solutions to identified sustainable challenges in their areas?				
19	Does the teacher involve learners in activities that can facilitate the development of sustainable skills?				
20	Does the teaching-learning process encourage participatory learning, group discussion and dialoguing?				
21	Do teachers present instructional materials in logical and organized manner				
22	Does teaching and learning in the classroom explore the use of technology?				
23	Do the instructional materials work as intended?				
24	Does instructional delivery in the curriculum foster learners' participation/involvement in the classroom discussion?				
25	Do teachers encourage students' participation in the teaching learning process?				
26	Did the teacher in the process of instructional delivery utilized appropriate pedagogical skills needed to teach different sustainable concepts				
27	Did the teacher demonstrate the use of relevant pedagogical skills appropriate for the age/maturity of the learners				
28	Did the teacher utilize questioning strategies to elicit learners perceptions on sustainable development concepts				
29	Did the teacher employ effective assessment strategies to evaluate learners' achievement?				
30	Do the assessment strategies cover the three domains of competence? i.e. Hard Skills, soft skills and emotional intelligence				

APPENDIX III

Curriculum onEducation for Sustainable Development Participants Perception Scale (CESDPPS)

Dear participant,

This is a questionnaire intended to have your input on the Curriculum on Education for Sustainable Development having participated in the try-out of the curriculum as a learner for the period of 13 weeks. Kindly, respond to the questions objectively as your responses will help the researcher to effect relevant adjustment of the curriculum for better functionality. Thanks.

Section A: Demography information

1. Name of institution:……
   ...
2. Area of specialization:……
3. Department:……
4. Faculty:……
5. Gender:…….

Section B: Participants Perception of the Curriculum on Education for Sustainable Development

KEY: 4=Excellent; 3=Satisfactory; 2=Needs improvement; 1= Very weak

S/N	ITEM	**Excellent**	**Satisfactory**	**Needs improvement**	**Very weak**
1	Do you consider the content of the curriculum as adequate to educate learners towards acquiring Sustainable Development competencies?				
2	Do you consider the content of the curriculum as suitable/appropriate for learners in tertiary institution?				
3	Do you consider teaching-learning experiences in the curriculum as				

	relevant to meeting sustainable development challenges in Nigeria?				
4	Does the content of the curriculum expose you to facts and information you considered as new about sustainable development?				
5	Are facts/topics in the curriculum logically presented?				
6	Do you consider teaching and learning participatory in the training?				
7	Is there sufficient, suitable and relevant instructional materials				
8	Do topics and the content of the curriculum address Sustainable Development challenges in your locality?				
9	Do you consider your learning outcome in this training as prerequisite to achieving sustainable development in Nigeria?				
10	Has your participation in this training exercise expose you to ways and methods sustainable Development can be achieved in Nigeria?				
11	Has your participation in this training on ESD equipped you with skills and competencies to solve Sustainable Development problems in your locality and beyond?				
12	Did you identify and practically provide solutions to local sustainable challenges in your locality during this training?				
13	Having participated in the training, will you recommend that ESD should be introduced as a taught course in your University?				
14	Having participated in the training exercise on ESD will you be willing to take a course in ESD in your institution?				
15	Do teachers present instructional materials in logical and organised				

	manner?				
16	Does the curriculum specified learners interaction in the classroom?				
17	Do teachers encourage students' participation in the teaching learning process?				
18	Does teaching and learning in the classroom explore the use of technology?				
19	Does the teacher involve learners in activities that can facilitate the development of sustainable skills?				
20	Did the teacher demonstrate the use of relevant pedagogical skills appropriate for the age/maturity of the learners?				
21	Did the teacher in the process of instructional delivery utilise appropriate pedagogical skills needed to teach different sustainable concepts?				
22	Did the teacher utilise questioning strategies to elicit learners' perceptions on sustainable development concepts?				
23	Did the teacher employ effective assessment strategies to evaluate learners' achievement?				
24	Do the assessment strategies cover the three domains of competence? i.e. Hard Skills, soft skills and emotional intelligence				

APPENDIX IV

Curriculum on Education for Sustainable Development Learning Outcome Interview Guide (CESDLOIG)

1. What was the participants' prior experience of SD before participating in the training?
2. In what ways have the participants benefited from the training on SD?
3. What excites the participants the most about the SD Training?
4. Would you recommend the sustainable development training for Nigeria Undergraduates?
5. Why will you do that?
6. Will you be willing to take voluntary/joint community action on sustainable development as a result of the knowledge you have acquired in the training?
7. Summarise your experiences during the training?
8. Share your Final words/thought on the training?

APPENDIX V

Full Transcript of Participant's Interview after the Tryout of Curriculum on Education for Sustainable Development

Knowledge of Sustainable Development before Participating in the Tryout of Curriculum on Education for Sustainable Development

In order to determine the participant's knowledge of sustainable development before participating in the tryout an interview was conducted with some of the participants and their responses are presented below.

Participant 1

Researcher: *Please can you describe your knowledge of sustainable development before participating in this curriculum on Education for Sustainable Development Tryout?*

Response: *Yes I know about sustainable development. But I know it to be the survival of the fittest, like if you know some things you will be able to survive even in this particular world.*

Participant 2

Researcher: Tell us your prior experience of Sustainable Development before this tryout?

Response: *Prior to the training I had little knowledge about sustainable development I knew there were goals but I do not know my roles in making this goals work. I just saw it something on the outside. I didn't see myself in the process of making the goals achievable. I didn't see myself as working and being a part of the process of how the goals could be attained. But now I see myself in it. I see myself as being part of the goals, being part of the people that will put the step in the right direction so this goals can be achieved.*

Participant 3

Researcher: What was your knowledge/Experience of Sustainable Development before you took part in this curriculum tryout?

Response:*Priorthe first day of class, we were given a questionnaire to fill and I found out that I had zero idea about what it meant. I have heard about the phrase on news but I had no idea as to what it was about. I thought it had something to do about employment and things of government. I didn't know it had something to directly do with me.*

Participant 4

Researcher: *Please can you describe your knowledge of Sustainable Development before you participated in this curriculum tryout?*

Response:*I came across the SDGs once when it was inaugurated in 2015, it was in the news I just saw it in passing and it never left any impression and I really don't know anything about it until now that I participated in this training.*

Partcipant 5

Researcher: Kindly inform me about *your knowledge of Sustainable Development before you participated in this curriculum tryout?*

Response: *Before the training it sounded very weird like….. I have actually not heard about it before the training. Basically before the training it was just something that did not existed to me.*

Participant 6

Researcher: *Please can you describe your knowledge of Sustainable Development before you participated in this curriculum tryout?*

Response:*Before this training, my knowledge of sustainable Development was really dim. (Cuts in) I didn't really know much about it. The only thing I know was the*

Millennium Development Goals, Vision 2020 but at that time I hadn't really set my mind on getting to know much about this. I didn't really know much.

Participant 7

Researcher: How will you describe your knowledge of sustainable development before participating in this curriculum tryout?

Response:*Before this programme I have heard of SD before but I have not come to picture what it could be like or what the Nitti gritty of the whole programme is. But I have… but maybe it's in my sub conscious because I have had of letters of SDGs somewhere ….. but I have not come to understand what the whole development was about. I knew it was about development.*

Participant 8

Researcher: *please tell me how will you describe your knowledge of sustainable development before participating in this curriculum tryout?*

Response:*Before this training I had knowledge of Sustainable Development cause as regards the 17 goals that it was an offshoot of the MDGs. However, with the introduction of this training I have learnt more about sustainable development.*

Knowledge of Sustainable Development after Participating in the Tryout of Curriculum on Education for Sustainable Development

In an effort to determine the participant's knowledge of sustainable development after participating in the tryout an interview was conducted with some of the participants and their responses are presented below.

Participant 4

Researcher: What can you say you now know about Sustainable Development and SDGs having participated in the curriculum tryout these past weeks?

Response:*I now know that Sustainable Development refers to development in which you meet the present need without compromising the ability of the future generation to*

meet their own needs. And that I now know that the SDGs is not for government alone to implement and I have a role to play in it. Just by the switching off of my bulbbefore coming out of my room in the morning is thinking and acting sustainably by deciding to conserve energy/power. Again, I now know that just by deciding to walk or take a bicycle I have actually acted and think sustainably because I have decided not to board a car which in turn burns petrol which is a fossil fuel that will release co2 into the atmosphere thereby harming the environment. I have actually gained a deep insight into sustainable development and my role in implementing the SDGs. That it is not for the government oruniversity administration alone to implement but that I also have a role to play in it.

Participant 1

Researcher: *Can you please describe what you have learnt about sustainable development in the course of participating in this curriculum tryout?*

Response:*The training has opened my minds to so many things that we do as mankind especially human activites that can hamper the environment just like burning of fosil fuels and other things that destroys the environment. It has opened my eyes to those things and see how we can begin to change our actions towards sustainable ways of recreating the environment*

Participant 2

Researcher: *Can you please describe what you have learnt about sustainable development in the course of participating in this curriculum tryout?*

Response: During the course of the training I realised that there are some things that the past generations have done wrong that is causing harm for our society and environment. After the training I realised that even if we do something better it will be beneficial to our next generation and everybody can enjoy together and build a better society.

Participant 3

Researcher: *Can you please describe what you have learnt about sustainable development in the course of participating in this curriculum tryout?*

Response:*I see myself as being part of the goals, being part of the people that will put the step in the right direction so these goals can be achieved.*

Participant 4

Researcher: *How would you like to describe your knowledge of sustainable development and SDGs after participating in the curriculum tryout*

Response:*well, from the first day I was indifferent and nonchalant about it. It was from the second lecture that I started to pay attention and listen and I know that it had something to do with making Nigeria and the world better. And now I know that there are certain things that should be done, and that there are certain things that should be stopped and that some things need to be put in place to help the country and to help the world at large and to also help the future generation to be able to live a better live than us.*

Participant 6

Researcher: *What do you now know about Sustainable Development having participated in the curriculum tryout?*

Response:*The fact that energy can be conserve and the fact that things that are just everywhere could be used for the betterment of people and for the betterment of the future is very exciting to know.*

Participant 7

Researcher: *What do you now know about sustainable development?*

Response: *Now I know that as human beings we are able to think about the future. Like it's not just all about yourself, it's not about your generations only, we are also able*

to do things that will affect the future generations to come and this knowledge is one the things that excites me the most about this programme.

Participant 8

Researcher: *What do you now know about Sustainable Development having participated in the curriculum tryout?*

Response: *During the course of the training I have learnt the 17 goals of SD, the implementation of the 17 goals and how it is expected to be implemented within 15 years and how work is being done to ensure that the goals is being achieved and how university can adopt the principle of campus sustainability in ensuring that they serve as model towards achieving the goals in areas of transportation, energy conservation, food etc.*

Benefits Derived from Participating in the Tryout of the Curriculum on Education for Sustainable Development

In order to determine the benefits derived from participating in the tryout of the curriculum on Sustainable Development an interview was conducted with some of the participants and their responses are presented below.

Participant 4

Researcher: How have you benefited from participating in this curriculum tryout?

Response: *I have benefited immensely, because it has really been an eye opener. It was a revelation that I didn't have to wait for the government to start, I can start it myself, that was a big revelation to me because I thought it is something to be left to the government to do. But this training has made me realise that I have a part to play. It has been exciting and its being a good training, I have enjoyed it.*

Participant 2

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response:*Basically it is in my knowledge, the ways I see things now are now different. I have begun to see that little thing that we do can actually help us to attain Sustainable Development Goals. There was an example that actually got to me, like crossing the lawn. Now I know that crossing the lawn is not good. FOR somebody who wants to achieve the Sustainable Development Goals, it is not good to cross the lawn. My knowledge about this has increased and it has helped me a lot. Now the way I live my life is different from the way I lived it before because now I try to see if my actions are aligning to the principles of sustainable development.*

Participant 3

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: Like I said before, I now have an idea as to what the SDGs are and now I can work better towards making the environment better for me and also for the future generations. I feel that if things go on as it is now, in years to come, so many things will go wrong and the future generation will suffer so much from what is going on now especially the little things that we think are little that are going on today that is very harmful and injurious to the world.

Participant 1

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: It empowered me, especially the aspect when they talked about gender equality and food for all. Normally I believe that we cannot have equality that some people will remain poor while others will remain rich but this training enlightened me that if we all could come together we can have a better society and there will be food for all. Everything will be sufficient for everybody just if we employ this particular development strategy.

Participant 9

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: I have benefitted because it has changed my view about the society. Also, the fact that the training made me realise things that I have been doing which are actually wrong and that even every other people do. It has creat my awareness into looking at ways we can better our environment, reduce wastages, pollution and burning of fossil fuels and also create a better world for the next generation.

Participant 5

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: From this training I have been made to realise that instead of wasting some of these resources that seems excessive around us we can put them to better use, for example water, light even papers we could make better use of them like recycling etc.

Participant 6

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: *Okay! I think I am from this training I have been able to gather a concrete experience to the extent I can now say that I know what SD Goals is all about. Like I previously said that I had a vague knowledge of what it is, I can now say this is the aims, this is what I am supposed to do to assist in achieving the goals, actions to sustain the environments. At least I know the three arms of sustainable development and where it leads to. I think I have been able to gather something from the training.*

Participant 7

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: *During and after this programme I have come to learn a lot and benefit a lot too. I have come to know a lot of things that the SD we are talking about is a development that is not so restrictive from my own perspective it is a development that cuts across every angle of life that will affect development. How management of resources, leadership skills about how to manage resources, human resource too the*

ability to coordinate all of this resources to bring about development and the development is not talking about Africa, I believe it cuts across the whole world.

Participant 8

Researcher: *How have you benefited from participating in this curriculum tryout?*

Response: *I have benefitted from this training by the knowledge I have gotten from the campus sustainability and how the SDGs would improve the economy, the environment and the society*

Readiness to Undertake Personal/Joint Effort in Volunteering for Community Action in Addressing Sustainable Challenges in their Immediate Community

In order to determine participants Readiness to undertake personal/joint effort in volunteering for community action in addressing sustainable challenges in their immediate community an interview was conducted with some of the participants and their responses are presented below.

Participant 2

Researcher: *Will you be willing to undertake any personal or joint community action on sustainable development as a fall out of your exposure to this curriculum?*

Response: *Really, the impact and impression this curriculum left on me was so strong that I have decide together with my colleagues in this class to start a student sustainable development initiative. It will take the form of a student club where every student on campus can join and get to know more about sustainable development and the SDGs. Plans are ongoing to get it registered.*

Researcher: Why would you form a student sustainable development club?

Response:*like I said, I see it as an avenue for impact. I see it as something we need to start now to safeguard a better future ahead because of the future we desire. I believe that in Nigeria I really see shortcoming in the way we are going about the this*

SDGs and I believe that if we can start something like this in the universities it is going to help a lot so that in Nigeria our future can be secured.

Participant 4

Researcher: *Will you be willing to undertake any personal or joint community action on sustainable development as a fall out of your exposure to this curriculum?*

Response: *Yes I will be willing*

Researcher: *One of your colleagues has volunteered in the course of the training to start a SDG club for the students in the university. Will you be willing to join such a club or organization?*

Response: *Yes! I will be very willing and I think I have joined because it would enable us to make impact with those that have not have the privilege of participating in this training. We can then be ambassadors and then train them also to think sustainable like we already are doing.*

Participant 3

Researcher: *Will you be willing to undertake any personal or joint community action on sustainable development as a fall out of your exposure to this curriculum?*

Response: Yes of course (with full nodding)

Researcher: *One of your colleagues has volunteered in the course of the training to start a SDG club for the students in the university. Will you be willing to join such a club or organization?*

Response: *Yes of course. Because I cannot be saying I want things to be better and that I have others to have an idea when I am not interested in taking part because I have a part to play. I know that I have a part to play, so I have to join for me to be able to play my part.*

Participant 1

Researcher: *Will you be willing to undertake any personal or joint community action on sustainable development as a fall out of your exposure to this curriculum?*

Response: *Yes I will be willing to join such organization because I want to make an impact in the world.*

Participant 6

Researcher: *Will you be willing to join any student's initiative that promotes personal or joint action on Sustainable Development in your campus?*

Response: *Yes I will because my aim is to help other people to align with the objectives of sustainable development goals. So I think I will also recommend it for all students*

Participant 8

Researcher: *One of your colleagues has volunteered in the course of the training to start a SDG club for the students in the university. Will you be willing to join such a club or organization?*

Response: *Yes I would as far as the organization is acting in line with the objectives of sustainable development and if I can benefit from it effectively.*

Readiness to recommend the Curriculum of Education on Sustainable Development for Nigerian University Undergraduates

In order to determine the participant's readiness to recommend the Curriculum of Education on Sustainable Development for Nigerian University Undergraduates an interview was conducted with some of the participants and their responses are presented below.

Participant 3

Researcher: *Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?*

Response:*Yes of Course. I mean, like they say no man is an island and that a tree cannot make a forest so just me having this knowledge will not change anything per see, because I cannot do it alone. I need jointed effort from many other persons, so I want a lot of people to know about this because we can only, I mean this thing can only work when we work hand in hand there is need for a concerted effort.* I will *recommend seriously that it be put in the curriculum. This training should be implemented even at the primary schools through secondary schools and tertiary institutions because if we don't start now on educating people, it is easier to change the mindset of people from younger age than when they are grown because if you grow up with an ideology it is usually very hard to change it than when they are young*.

Participant 4

Researcher: *Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?*

Response: *Yes I would because my notion is also shared by a lot of people that everything should not be left to the government. So I recommend it for the Nigerian people who think that all things isfor the government. It should be taught and everyone should be enlightened. If all Nigerians can educated in this form, then all of us starts thinking the same way, then we can join hands together to build a better Nigeria.*

Researcher: At what level do you think it should be taught?

Response: *At all levels because adults, youths and children need to know. A subject like this can be introduced secondary schools and just like we have the General Studies Programme in this university we can also introduce a course on sustainable development where everybody will take it once you come into the university as a compulsory course not as a departmental specific course it should be for everybody. Course like this can be put into the GSP for all students.*

Participant 5

Researcher: *Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?*

Response: *YES 100%. Because majority of people that are, emn! That are in this school, undergraduates as a whole we are…. I want to believe that we are not really informed about this so it is better that there is a course that goes on like this for the knowledge of students on the principles of sustainable development.*

Participant 6

Researcher: Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?

Response: *Yes! I will recommend the training for Nigeria Undergraduates. Like I said it is time we we begin to like take into considerations how our present actions affect our future. This programme is just not about now, it also makes room for the future and for what happens to future generations so I think I will recommend it because it makes us take into account how our actions will affect what happens to our future generations.*

Participant 7

Researcher: Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?

Response: *Yes I would want the programme to be included in the university curricular and even be pushed to lower educational system like secondary schools. FOR example, this is first time of hearing about this sustainable development and I am in 300 level Law, at least I have not encountered this type of programme before in any for at all from my childhood or secondary school so we can actually extend the borders of audience we want to reach out to. Okay since they are the younger ones so before they even come to this place (university) before being in the university at all, I would have heard a lot about this programmme and maybe I would have develop my interest many years back even before now. That is what I would want to say about that.*

Participant 8

Researcher: Judging from how you have benefited from the curriculum tryout would you recommend the sustainable development training for Nigeria Undergraduates?

Response: Yes! This training will be a very good one for Nigerian undergraduates because they will be able to learn more of the SDGs and how they can put in their own partnership to ensure that the SDGs work out.

APPENDIX VI

CROSS SECTION OF PARTICIPANTS AT THE DISSEMINATION STAGE OF THE CURRICULUM

APPENDIX VII

CURRICULUM ON EDUCATION FOR SUSTAINABLE DEVELOPMENT

Preamble

Why Sustainable Development?

Development has gone through different stages in human history, and since the publication of *Our Common Future* in 1974 where the concept of sustainable development was popularly defined as *the development that meets the need of the present without compromising the ability of the future generations to meet their own needs*; the concept has continued to evolve. The essence of sustainable development is to protect world's finite resources and maintain equilibrium between the environment, economy and the society in a way that each of these pillars are carefully considered when making developmental choices.

This approach to development is different from environmental protection as many have misconstrued it to mean protection of the environment or other green activities. However, the goal of sustainable development is to balance economic, environmental and social issues on a long term plan in order to achieve integrated development without depleting the earth's resource base.

Urgent need for Action

The earth has witnessed massive changes over the past century, those living in this century (twenty first century) are faced with enormous challenges different from that of their great and grand-parents. This is as a result of changes that have occurred in rapid human population growth which presently is estimated to be about 7 billion compared with 3 billion people occupying the earth in 1961. This rapid population has brought with it attending consequences among which is the increase in the consumption of world's resources made possible by new inventions, technologies and prosperityfrom industrialised economies.

The earth's resources and the ecosystems that support the life of humans, animals and other forms are seriously placed under threat. In different places unique species, such as plants and animals are disappearing and beautiful weather conditions are giving way to harsh and extreme weather conditions such as earth

and sea quakes, hurricanes, wild fire etc. Moreover, waste and pollution arising from human activities has become a threat to the health of the air, rivers, oceans and earth surfaces.

Population growth, consumption of resources, climate change, pollution etc. has a significant impact on the life of all people including living in regions that can be classified as less develop. This is because these problems do not obey national borders, because problems caused by industrialized countries will affect everyone.

Consequently, the United Nations has introduced the Sustainable Development Goals (SDGs) also known as the "Agenda 2030" to be implemented by all member states from 2016 – 2030 in an effort to secure economic development, social equity and protect the environment. The 17 SDGs has been described as a bold step towards sustainability, especially because of the responsibility it places on all nations to implement the goals irrespective of their level of development and industrialisation.

The UN Decade of Education for Sustainable Development (UN-DESD)

Education is the surest path to development that is sustainable and there can be no sustainability without learning. Learning is the key to transforming the people and the society towards sustainability. The United Nations acknowledged the need for constant learning to transform towards sustainability which was why the United Nations in 2002 declared 2005 to 2014 as the United Nations Decade of Education for Sustainable Development (UNDESD) UNESCO was affirmed as the coordinating agency to manage the programme. The focus of the programme was to incorporate the values, ideologies, practices and competencies of sustainability into all level and structure of education including formal, semi-formal and non-formal, elementary, secondary and tertiary education to encourage changes in attitude and conduct towards sustainable development. Education institutions where formal education is delivered and the teachers who deliver instruction are critical actors in teaching and learning (education)for Sustainable Development (ESD)

Rationale for Curriculum on Education forn Sustainable Development in Nigerian Universities

Nigeria as a country isendowed withhuge resources both human and natural resources and is characterised by varieties of culture, and development opportunities. In spite of development opportunities available to Nigeria, the country is confrontedwith some sustainable development issues such as climate change, deforestation, over-exploitation of resources, insecurity, etc. which pose a great threat to the natural environment, social and the social and economic welfare of Nigerians.

The new path to an integratedand rounded development of the currenttimes without limiting the development of the upcoming generation is sustainable development and universities, due to their strategic role of teaching and research have been assigned a crucial role in its implementation. Via teaching, universities are supposed to educate and instruct students about sustainable development with a view to motivating them to make sustainable decisions. Several universities have taken up this role by redesigning their curricula to accommodate education for sustainable development and there is need for Nigerian universities to key into this global agenda of educating and teaching decision makers and experts of the future to address sustainability and other societal problems in Nigeria.

Therefore, it becomes necessary for Nigerian universities to live up to global best practices inengaging university education through sustainable teaching-learning, and research in achieving Sustainable Development Goals by 2030 hence, the need for a curricula on education for sustainable development.

Module Development

This curriculum material was designed by Samuel Oluwasanmi Babalola as a part fulfillment for the award of Doctor of Philosophy (Ph.D) in the University of Ibadan. The curriculum aims to assist in achieving the Sustainable Development Goals by laying a practical emphasis on the dominant and indispensible role of education and active learning for sustainable development in the higher education institution (HEIs) in Nigeria.

Teaching Strategies/Pedagogy

Teaching strategies are centered on the learners. Their experience, interests, views and opinion is of paramount importance. It is expected that teaching and learning should interactive and adhere to recommended strategies for each topic while efforts could be made vary them where necessary.

Teaching strategies are centered on critical thinking approach, where learners are free to play active roles in sharing and generating new ideas about matters they are presented with. Furthermore, systemic thinking, reflective thinking and ability to make connections between complex issues are what the teaching strategies should promote.

The need for teachers to carefully reflect on other strategies such as storytelling, simulation, issues analysis, class discussions, etc. that could promote the realisation of the broad objectives of the curriculum and support teaching and learning that are consistent with sustainable development will give a great outcome.

Assessment Techniques

Education for Sustainable Development has a multi-outlook to teaching and learning, and assessment methods ought to be varied and differentiated, with standards withcomprehension of subject-matter/content knowledge, recognisionfor several points of view and efficient usage of communication strategies. Furthermore, expression of attitudes and values and ability to build partnership, collaborate and work in groups are examples of skills that should be assessed. As such the following assessment techniques are germane to this curriculum; interviews, journal entries, blogs, peer assessment, teacher observation, performance of process skills, group or individual projects, rubric development, written tests, narration, communication, etc.

Learning Outcomes

On successful completion of the curriculum on education for sustainable development students can:

1. Describe common understanding of the terms sustainable development and Sustainable Development Goals.
2. Identify the three interlocking areas of sustainable development.

3. Explain the rationale for education for sustainable development.
4. Acquire the capacity to engage in multi-disciplinary and interdisciplinary thinking.
5. Promote social equity, justice and fairness.
6. Embark on actions that promote good governance for sustainable development.
7. Connect unsustainable resource use to depletion and scarcity of resources and environmental hazards.
8. Link sustainable resource use to healthy eco-system.
9. Promote community activities for sustainable transport system.
10. Connect the importance of informed choices in sustainable development.
11. Initiate collective community actions to promote sustainable agriculture.
12. Articulate the impacts of climate change on the environment.
13. Become environmental ambassador by promoting sustainable environmental practices.
14. Initiate community strategies to promote sustainable primary health care.
15. Apply relevant skills to peacefully co-exist in a culturally diverse society.

Contents

1. The Concept of Sustainable Development
2. The Three Pillars of Sustainable Development
3. Sustainable Development Goals
4. Implications of the Seventeen Goals to the Developed and Developing Countries
5. Education for Sustainable Development
6. Sustainable Development Skills
7. Renewable Resources Systems
8. Sustainable Transportation
9. Sustainable Resource Use
10. Campus Sustainability
11. Equitable Education and Lifelong Learning
12. Global Citizenship and Good Governance
13. Limits of Natural Systems
14. Sustainable Energy
15. Sustainable Building and Construction
16. Public Health

17. Sustainable Consumption and Production
18. Food Security and Sustainable Agriculture
19. Equality and Equity
20. Inequality and Social Justice
21. Environmental Stewardship
22. Overcoming poverty
23. Gender equality
24. Health promotion
25. Environmental protection and conservation
26. Climate change
27. Global Partnerships
28. Rural transformation
29. Human rights
30. Intercultural understanding & peace
31. Sustainable production and consumption
32. Cultural diversity
33. Information & communication technologies

Week one – Lecture

The concept of Development and Sustainable Development

Specific objectives

- Explain the concept of development.
- Give definitions of Sustainable Development.
- Trace the historical path to Sustainable Development.
- Identify the relevance of Sustainable development to all countries of the world

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The Concept of development before the era of Sustainable Development.
- Definitions of Sustainable Development
- Historical Background to Sustainable Development.
- The Benefits of Sustainable Development to Nigeria.

Method of Lesson Delivery

Critical analysis of issues to promote critical thinking, class discussions, storytelling and questioning method to arouse robust discussions, logical

thinking and ability to identify relevance of sustainable development.

Learning Activities

Teachers

- Engaging learners with the concept of Sustainable Development
- Telling relevant stories to illustrate the need and call for Sustainable Development.
- Explaining the benefits of Sustainable Development to all countries of the world.
- Asking students to identify the benefits of sustainable development to their country.

Students

- Actively listens to teacher's explanations and illustrations on Sustainable Development.
- Contribute to the classroom interaction by discussing benefits of Sustainable Development to their country.
- Ask relevant questions from the teacher on issues of sustainable development.

Materials/Resources

Related internet resources such as video clips, images, textbooks, etc

Reflect

Reflect on why Sustainable Development? And Why sustainable actions are needed right now?

Assessment

Observation of students' participation, interaction and demonstration of communication skills in the classroom

Assess student's ability to show interconnection of related issues and their implications to sustainable Development. Short quizzes and project assessment as determined by the teacher.

Week Two – Lecture

Dimensions of Sustainable Development

Specific objectives

- Identify the three Dimensions of Sustainable Development.
- Explain the importance of each Dimension to Sustainable Development.
- Show the interconnection of each of the dimensions in the circle of Sustainable Development.

Content

This topic introduces students to the three significant aspects of sustainable development and how their interconnection helps to achieve sustainable development.

- The three dimension of environment, economy and society in sustainable development.
- Importance of each dimension to sustainable development
- Interconnections and interaction cycle of the dimensions of Sustainable Development

Method of Lesson Delivery

Classroom discussions, issues analysis, grouping of students based on the three dimensions of SD. to facilitate and promote group interaction, system thinking and problem solving.

Learning in Activities

Teacher

- Explain to the students the dimensions of sustainable development to facilitate discussion and provoke thoughts
- Demonstrate the interconnection using appropriate images
- Divide the class into groups of three to discuss each of the dimensions

Students

- Participate in the classroom discussion.
- Contribute in the group activities and discussion of the dimensions of sustainable development.
- Ask relevant questions on the day's activities.

Material/Resources

Related online resources, video clips, web images, textbooks, relevant local materials etc.

Reflect

Reflect on the unique importance of the three dimensions of sustainable development.

Assessment

*O*bservation of student's classroom interaction and group participation, ability of students to demonstrate and connect the existing relationship between the SD dimensions, Short quizzes, assignments, etc.

Week Three – Lecture

Sustainable Development Goals

Specific objectives

- List the Sustainable Development Goals.
- Get familiar with every goal and identify its importance in achieving Sustainability.
- Identify the time frame for the imple/,MNmentation of the goals.
- Recognise the roles various organisations and bodies saddled with implementation of the goals.
- Discover the importance of partnerships between various individuals, organisations and bodies to achieve the goals.

Content

This topic introduces students to the sustainable development and its goals and familiarizes them with the goals intricacies.

- The 17 Sustainable Development Goals.
- The importance of each goal to achieving sustainability
- Time duration for the implementation of SDGs
- Roles of International Organisations, National Governments, Multi-national Organisations in Implementing the SDGs.
- The need for Partnership Building in achieving the SDGs.

Method of Lesson Delivery

Classroom discussions, issues analysis, simulation, grouping to encourage partnership building and relate the goals to the three dimensions of SD

Learning Activities

Teacher

- Introduce students to the SDGs.
- Organise students into 3 groups to identify each of the goals as it relates to the three focal areas of sustainable development.
- Facilitate classroom discussion on the roles of the International Organisations, national governments, multi-national organisations in Implementing the SDGs and their role in partnership building in SDGs implementation.

Student

- Participate in classroom discussion and group activities.
- Associate each of the goals to the three dimensions of sustainable development.
- Identify the roles of international agencies, national governments and multi-national corporations in building partnerships to implement the SDGs.
- Ask relevant questions on the days class activities.

Material/Resources

Related internet links, video clips, images and visual materials, including textbooks and locally sourced materials

Reflect

Reflect on the importance and benefits of mutual cooperation and collaboration of nations in achieving Sustainable Development Goals

Assessment

Observation of student's interaction in groups, communication skills and demonstration of futuristic thinking and problem solving skills, etc. Short quizzes and oral assessment

Week four– Lecture

Implications of the SDGs to Develop and Developing Countries

Specific objectives

- Connect the importance of the SDGs to Nigeria's quest for sustainable Development.
- Identify specific unsustainable practices peculiar to developed and developing countries.
- Connect how unsustainable practices in the developed economies can negatively affect the developing economies and vice-versa
- Establish the importance of partnerships among member states to achieve sustainability.

Content

This topic connect students to the areas of importance of the SDGs to develop and developing nations alike and how they can both profit from the goals for sustainable development.

- The importance of SDGs to Nigeria's quest for sustainable development as a developing state

- Unsustainable practices that are peculiar to different regions of the world (Developed and Developing States)

- Impact of Unsustainable practices in and around different regions of the world (Developed and Developing States)

- Importance of Partnership among member states to achieve sustainable development.

Method of Lesson Delivery

Issue analysis to expose critical areas of benefits of the SDGs to nations of the world irrespective of their developmental stride. Also, place-based analysis, analyses of local contexts, social critique, classroom discussions, simulations and storytelling.

Learning Activities

Teacher

- Commences the lesson by analysing the importance of the SDGs to sustainable development in Nigeria.
- Ask students to examine and identify unsustainable practices in their immediate environment and in other places and how it

affects development across countries.

- Refer students to the impacts the highlighted unsustainable practices poses to achieving sustainable development.
- Lead discussions on the importance of partnership and collaboration among member states to achieve Sustainable Development.

Students

- Participate in classroom discussion and responds to questions posed by the facilitator.
- Identify unsustainable practices and its effects on achieving Sustainable Development

Material/Resources

Relevant video clips, internet and online resources, images and text materials.

Reflect

Reflect on unsustainable practices that need to be stopped urgently in their local community and country.

Assessment

Observation of students' participation and interaction with other students in the classroom. Demonstration of sustainable development skills; such as critical thinking, systemic thinking and ability to establish connections between two or more inter-related variables

Week five – Lecture

Sustainable Development Skills

Specific objectives

- Identify the required skills individuals should possess to achieve sustainability.
- Determine possible Techniques to develop and acquire the sustainable development skills.
- Connect the relevance of Sustainable Development skills in achieving the SDGs
- Exhibit Sustainable Development Skills

Content

The selected body of knowledge exposes students to the required skill expected to optimally function in sustainable society.

- Requisite skills for Sustainable Development.

- Techniques of developing and acquiring sustainable development skills.
- Relevance of Sustainable Development skills in achieving Sustainable Development Goals.
- Practical sessions on ways of engaging sustainable development skills

Method of Lecture Delivery

Role modelling to describe types of required sustainable skills, simulations, classroom discussion and storytellingincluding problem solving strategies.

Learning Activities

Teacher

- Ask students to identify skills that are requisite for sustainable development.
- Lead discussions on techniques of acquiring sustainable development skills.
- Create scenarios for students to portray the relevance of sustainable development skills in solving sustainable development problems.
- Create students into different groups where students could play the roles of the sustainable development skills they have identified.

Students

- Participate in identifying the requisite skills for sustainable development.
- Get involved in the classroom discussions and group activities.
- Ask relevant questions based on the day's activities

Material Resources

Related video clip, online resources, images and videos, textbooks etc

Reflect

Reflect on sustainable development skills they will need to tackle identified challenges in their community.

Assessment

Observation of students participation, interaction and demonstration of sustainable development skills such as tolerance, respect for others feelings, systemic thinking etc.
Oral assessment and short quizzes.

Week Six – Lecture
Education for Sustainable Development

Specific objectives

- Explain the concept of Education for Sustainable Development.
- Identify the goals of ESD in promoting Sustainable Development.
- Classify the levels of teaching and learning (education)for Sustainable Development.
- Demonstrate the qualities of education for sustainability.

Content
The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of Education for Sustainable Development (ESD)
- Definitions of Education for Sustainable Development
- Goals of Education for Sustainable Development
- Competencies in Education for Sustainable Development

Method of Lesson Delivery
Issue analysis, classroom discussions, simulation, role play etc will be used to explain the concept of ESD and facilitate classroom interaction.

Learning Activities

Teacher

- Lead a discussion on the meaning of ESD
- Give several definitions of ESD to students and ask them to come up with their personal definition of the concept.
- Engage the students to identify the goals of ESD.
- Divide the students into groups to identify competencies of a student who is educated for sustainability

Students

- Participate in the classroom discussion.
- Give personal definition of ESD in class based on understanding of the concept.
- Participate in the group activities and ask relevant question on the topic.
- Make vital and relevant contributions to classroom discussions

Materials/Resources

Related internet and online resources such as video clips, images, textbooks, etc

Reflect

On the significance and importance of ESD to sustainable development and the need to acquire education in Sustainable Development.

Assessment

Observation of student's interaction, participation and display of critical thinking to translate classroom discussions into action.

Oral assessments and short quizzes

Week seven - Lecture

Equitable Education and Lifelong Learning

Specific Objectives

- Explain the concept of Equitable Education.
- Identify the need for girl child education.
- Discuss the concept of lifelong learning
- The importance of Life-long learning to Sustainable Development?

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of equitable education.
- The meaning and need for girl child education

- The meaning of life-long education.
- Importance of life-long learning to sustainable development.

Method of Delivery

Classroom discussions, issue analysis, questioning method, role play etc. will be used to deliver lecture and involve the learner in the teaching learning process.

Teacher

- Introduce the concept of equitable education.
- Discuss the rationale for girl child education.
- Lead a discussion on life-long learning.
- Motivate the students to identify the importance of life-long learning in achieving the sustainable development goals.
- Engages learner by leading a discussion on the concept of equality and equity.
- Invite a resource person to discuss social issues that promotes equity and equality and barriers and challenges to promoting equity.
- Create a scenario to enable students take action on promoting the principles of equality and equity in their community.

Teacher

- Participate in classroom discussion by answering relevant questions on the concept of equality and equity,
- Make contributions by identifying factors that promotes and hinders equality and equity in the society.
- Work in a group to promote the principles of equality and equity in their immediate community.

Material/Resources

Internet links, video clips, images, textbooks and other related materials.

Reflect

Reflect on how the principle of equality and equity promotes sustainable development.

Assessment

Observation techniques and project based assessment.

Week Eight– Lecture

Inequality and Social Justice

Specific Objectives

- Explain the concept of inequality.
- Discuss the meaning of social justice.
- Recognise the nature, status and effect of inequality globally, nationally and locally.
- Identify actions that reduce inequality and promotes social justice

  Participate in a community based activity that promotes social justice.

Content

- The concept of Social justice and inequality
- The nature, status and effect of inequality globally, nationally and locally.
- Actions that reduces inequality.
- Actions that promotes social justice.

Method of Lesson Delivery

Issue Analysis, classroom discussion, and storytelling will be used to involve the student in the teaching learning process.

Learning Activities

Teacher

- Lead a discussion on explaining inequality and social justice.
- Motivate students to identify the nature, status and effects of inequality in their immediate environment.
- Motivate students to undertake a community action to promote social justice

Student

- Participate in classroom discussions on inequality and social justice.

- Answer questions and make contributions on the nature, status and effects of inequality.
- Get involved in a project to promote social justice.

Material resources

Internet links, video clips, images, textbooks etc.

Reflect

Reflect on the most prevalent inequality and social justice common in their community.

Assessment

Observation techniques, assignments and project based assessment.

Week Nine – Lecture

Equality and Equity

Specific Objectives

- Discuss the concept of equality and equity.
- Distinguish between equality and equity in social related issues.
- Identify causes of inequality and inequity
- Demonstrate with relevant social examples the method through which equality and equity can be promoted in the society.
- Undertake an activity that promotes equality and equity.

Content

- The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.
- The Concept of Equality and Equity.
- Equality and equity in social issues such as gender, race, colour, development, etc.
- Causes of Inequality and inequity
- Ways by which equality and equity can be promoted in the society.
- Practical session on how equality and equity can be promoted.

Method of Lesson Delivery

Critical analysis of issues to show relationships and

connections.Simulations, classroom discussion, invitation of resource persons, etc.

Learning activities

Teacher

- Engages learner by leading a discussion on the concept of equality and equity.
- Invite a resource person to discuss social issues that promotes equity and equality and barriers and challenges to promoting equity.
- Create a scenario to enable students take action on promoting the principles of equality and equity in their community.

Student

- Participate in classroom discussion by answering relevant questions on the concept of equality and equity, make contributions by identifying factors that promotes and hinders equality and equity in the society.
- Work in a group to promote the principles of equality and equity in their immediate community.

Material resources

Related online resources, video clips, images, textbooks and other relevant materials.

Reflect

Reflect on how the principles of equality and equity promote sustainable development.

Assessment

Observation of student's practical demonstration of mastery and comprehension through his/her identification of factors that promotes equity and problem solving skills to proffer active solutions to identified problems.

Project based assessment, short quizzes, etc.

WeekTen– Lecture

Global Citizenship and Good Governance

Specific Objectives

- Communicate the meaning of global citizenship.
- Explain the concept of good governance.
- Recognise the factor that promotes good governance.
- Identify indicators of good governance.
- Undertake an activity that promotes good governance in the immediate community.
- Show how good governance connect to achieving sustainable development goals

Content

The lesson presents relevant and selected body of knowledge to comprehend the lecture.

- Meaning of global citizenship.
- Meaning of good governance.
- Factors that promotes good governance.
- Indicators of good governance.
- Activities that promotes good governance.
- The implications of good governance to the achievement of sustainable development

Method of Lesson delivery

Issues analysis to facilitate classroom discussion and student participation, simulation, class presentations, storytelling, etc.

Learning Activities

Teacher

- Facilitate a discussion among the students using issue analysis on the meaning of global citizenship and good governance.
- Guide the students through critical thinking to identify factors that promote good governance.
- Create a scenario for students to connect the link between good governance and sustainable development

Students

- Actively participates in the lesson to figure out the meaning of a global citizen.
- Through critical thinking identify factors that promote good governance.
- Logically establish the link between global citizenship, good governance and sustainable development

Material/Resources

Related internet and online materials including video clips, images and text materials.

Reflect

Reflect on basic values/things that connect the entire world together.

Reflect on individual responsibilities that can preserve these values.

Assessment

Demonstrate critical thinking, communication skills and systemic thinking and classroom debates and presentation.

WeekEleven– Lecture

Human Rights

Specific Objectives

- Explain the concept of human right.
- Discus of human right conventions and declarations.
- Identify types of Human rights.
- Discuss human rights violation and types of human rights violation.
- Recognise local and foreign agencies that protect human rights.
- Connect protection of human rights to sustainable governance.
- Embark on human activities that promote human rights.

Content

The lesson presents relevant and selected body of knowledge to comprehend the lecture.

- Meaning of Human Rights.
- Human Right Convention, Treatise and Declarations.
- Violation of Human Right.
- Agencies that protects Human Right.

- Relationship between protection of Human Rights and Good Governance.
- Activities that Promotes Human Rights.

Method of Lesson delivery

Issues analysis to facilitate classroom discussion, present case studies and student involvement in presentations and field activities

Learning Activities

Teacher

- Explain the meaning of human rights.
- Lead a discussion on human rights conventions and declarations.
- Engage the learners to identify agencies and their activities that promote and protects human right.
- Present case studies of how protection of human rights ensures good governance

Students

- Participates in classroom debates on how protection of human rights secures good governance.
- Logically connects the relationship between protection of human rights, good governance and sustainable development.
- Identify personal and teamwork activities that can promote human rights in his/her immediate community.

Material/Resources

Related internet and online materials including video clips, images and text and reference materials.

Reflect

Reflect on what individuals and agencies need to do differently to secure human rights.

Assessment

Demonstrate system thinking skills, communication skills and innovative thinking on securing human rights and stopping human right abuse.

Week Twelve – Lecture

Sustainable Resource Use

Specific objectives

- Communicate the meaning of sustainable resource use.
- Classify resources into non-renewable and non-recyclable, non-renewable but recyclable, quickly renewable, slowly renewable, environmental resources and flow resources.
- Connect unsustainable resource use to depletion and scarcity of resources and environmental hazards.
- Link sustainable resource use to healthy eco-system, availability of raw materials and non-depletion of natural resources.
- Identify areas where sustainable resource use could be achieved in the immediate environment.
- Embark on practical activity to encourage sustainable resource use in the immediate environment.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The Meaning of sustainable resource use.
- Methods of sustainable resource use.
- Implications of unsustainable resource use.
- Benefits of sustainable resource use.
- Practical activities on sustainable resource use.

Method of Lesson Delivery

Problem based learning approach will be used to deliver the lesson and to identify solutions to problems. Also, issue analysis class presentations, simulation and case study will be used.

Learning Activities

Teachers

- Lead a discussion on sustainable resource use.
- Motivate learners to identify and classify renewable and non-renewable resources.
- Divide students into groups to identify human activities that

encourage the depletion of natural resources.

- Create scenarios depicting the impact of unsustainable resource use on the three dimensions of sustainable development.

- Give projects to students based on the existing groups to adopt problem solving method to solve existing unsustainable resource activities in their environment.

Students

- Participates in the classroom discussions and in identifying and classifying renewable and non-renewable resources.
- Get involve in group activities to discover group activities that deplete natural resources and earth resources.Employ systemic thinking pattern to link sustainable resource use to environmental protection.

- Engage in problem solving activities to solve problems of unsustainable resource use in his/her immediate environment

Materials/Resources

Related internet resources such as video clips, images, textbooks, etc

Reflect

Reflect on lessons learnt through the classroom activity?

What actions will be required to solve the problems identified?

Assessment

Demonstrate competency in integrated problems solving skills.

Assessment of active interaction in group activity, demonstration of interpersonal skills.

Week Thirteen – Lecture

Renewable and Non-renewable Resources Systems

Specific objectives

- Identify renewable and non-renewable resources.
- Explain how overdependence on non-renewable resources can hinder the future generations and the environment.
- Describe how activities of non-renewable resources lead to depletion of resources and how it affects the environment.
- Describe different type and sources of renewable resources.
- Identify activities that serve as threats to renewable resources.
- Classify methods renewable resources can be preserved for future generation.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- Renewable resources and non-renewable resources.
- Types of renewable and non-renewable resources.
- Sources of renewable and non-renewable resources
- Alternatives to non-renewable resources.
- Environmental, economic and social implications of overdependence on non-renewable resources.
- Human activities that depletes renewable and non-renewable resources.
- How to conserve renewable and non-renewable resources.

Method of Lesson Delivery

Critical issue analysis of issues to promote critical thinking, Modelling, Differentiation, videos session, problem identification and class grouping will be used to facilitate interaction and generation of knowledge.

Learning Activities

Teachers

- Initiate a classroom discussion to explain renewable and non-renewable resources

- Grouping of students to identify types of renewable and non-renewable resources and alternative sources for non-renewable resources.
- Present a video clip that shows human activities that depletes renewable and non-renewable resources alike.
- Guide learners on a practical session on resource conservation

Students

- Participate in classroom discussion and group interaction.
- Make connection between overdependence on non-renewable resources and environmental, economic and social problems.
- Discover method of interventions required to conserve resources in his/her immediate environment

Materials/Resources

Related internet resources such as video clips, internet links, images and textbooks, etc.

Reflect

What will go wrong with the environment if there is overdependence on non-renewable resources?
What proactive step do I need to take to reduce usage on non-renewable resources?

What partnerships will aid my actions?

Assessment

Demonstration of futuristic thinking through observation, proficiency in classroom interaction and ability to communicate observed solutions in the classroom.
Project based assessment.

Week Fourteen – Lecture

Sustainable Transportation

Specific objectives

- Trace the history of current transport systems and its carbon imprints on the environments.
- Explain sustainable transport systems.
- Lead a discussion on indicators of sustainable transport systems.

- Describe examples of sustainable transport system and its environmental impacts.
- Discover the benefits of sustainable transportation to achieving sustainability
- Embark on community activities that promote the spread of sustainable transport system

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- History of transportation and its carbon imprint on the environment.
- Meaning of sustainable of sustainable transportation and transport systems.
- Indices of sustainable transportation and transport systems.
- Examples of sustainable transport practices.
- Environmental impacts of sustainable transport systems.
- Benefits of sustainable transportation.
- Activities and programmes that can promote sustainable transport systems.

Method of Lesson Delivery

Case study approach, open classroom discussion, *enquiry-based learning*, *cooperative learning* and *brainstorming* will be used to promote classroom interaction.

Learning Activities

Teachers

- Kick start discussion by given important dates in transportation history.
- Lead an interactive discussion on sustainable transport systems.
- Guide the students to identify what could be the indices and types of sustainable transportation.
- Engage students to explore in groups using provided online tools to determine the environmental impacts of unsustainable and sustainable transport systems.

- Using case studies motivate students to develop sustainable transport advocacy and actions in their community.

Students

- Participate in the classroom discussion and make relevant contribution.
- Interact in group activities to identify indices and types of sustainable transport systems.

- Explore through enquiry learning the environmental impacts of unsustainable transport systems and the sustainable transport system.
- Develop a personal responsibility towards advocating for green transport in his/her community and actions to practice sustainable transport.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

What is the impact of my journeys and my transportation options on the environment and how does it promote sustainable development?

Assessment

Demonstration of enquiry based learning, ability to maintain balanced group interaction and ability to connect sustainable transportation to the bigger idea of sustainable development.
Peer Assessment and project method.

Week Fifteen – Lecture

Sustainable and Renewable Energy

Specific objectives

- Explain the concept of renewable and non-renewable energy.
- Discuss unsustainable methods of sourcing energy.
- Identify different sources of renewable energy.
- Discover types of renewable energy.
- Describe specific ways solar power, hydropower and wind power work.

- Identify the benefits and disadvantages of using renewable resources.
- Connect the importance of renewable energy to sustainable development.
- Initiate actions to promote green energy consumption in their immediate community.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of sustainable and renewable energy.
- The concept of green energy.
- Sources of renewable energy.
- Types of renewable energy.
- Specific ways solar power, hydropower and wind power works
- Importance of renewable energy to sustainable development.
- Activities that promote green energy production and consumption.

Method of Lesson Delivery

Problem solving enquiry based learning, case study, class discussion, brainstorming and critical analysis of issues to promote classroom interaction during lesson delivery.

Learning Activities

Teachers

- Leads a brainstorming session on the importance of energy and its usage.
- Explain the meaning and concept of renewable and non-renewable energy.
- Using enquiry learning motivates students to identify sources, types of renewable energy and how renewable energy works.
- Direct students activities to embark on activities that promote renewable energy in their immediate environment.

Students

- Get involved in the classroom discussion and interaction as directed by the teacher
- Conduct an enquiry based activity on the internet to discover the sources, types and how renewable energy works.

- Participate in a group activity that promotes reduction in the reliance on high energy use.
- Take action on promoting the adoption of renewable energy in his/her neighbourhood.

Materials/Resources

Related online resources, video clips, internet links, images, textbooks, etc

Reflect

Reflect on the need to accelerate the use of renewable energy?

Assessment

Observation of student's interaction, participation and involvement in classroom activities project method and short quizzes.

Week Sixteen – Lecture

Sustainable Building and Construction

Specific objectives

- Explain the concept of sustainable building.
- Identify the goals and principles of sustainable building.
- Categorize different aspects of sustainable building.
- Discuss types of sustainable building.
- Connect the impact of sustainable building to environmental sustainability.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of Sustainable building and construction.
- The goals and principles of sustainable building.
- Aspects of sustainable building.
- Types of sustainable building.
- Environmental impact of sustainable building and construction
- Activities and programmes that can promote sustainable transport systems.

Method of Lesson Delivery

Case study, problem solving approach, *open classroom discussion*, *enquiry-based learning*, *cooperative learning,*

issue analysis and *brainstorming* will be used to promote classroom interaction.

Learning Activities

Teachers

- Facilitate discussion on the meaning of sustainable building and construction.
- Directs students activities towards enquiry into aspects of sustainable building
- Motivate students to develop solutions and action that promotes sustainable building.

Students

- Participates in class discussion on sustainable building and construction.
- Get involved in an enquiry based activity into aspects of sustainable construction and building.
- Take action in creating solutions that promotes sustainable building and construction.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

Reflect on the environmental impacts and benefits of sustainable construction and building?

Assessment

Observation of learner's participation in classroom activity.

Project based assessment etc Peer Assessment and project method.

Week Seventeen – Lecture

Sustainable Production and Consumption

Specific objectives

- Explain the concept of sustainable consumption.
- Explain the concept of sustainable production.
- Discuss the principles that underlie sustainable consumption.
- Show the link between consumption and production.

- Identify production patterns that threaten the environment and the future generations.
- Recognize consumer rights and duties in sustainable consumption.
- Classify needs and consumption patterns that are inimical to sustainable development.
- Connect the importance of informed choices in sustainable consumption.
- Initiate a community action to promote sustainable consumption

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of sustainable consumption.
- The meaning of sustainable consumption.
- Principles of sustainable production and consumption.
- Relationship between production and consumption.
- Patterns of production and consumption and its effects of the environment and future generations.
- Relationship Consumer rights, duties and informed choices in ensuring sustainable production and consumption
- Inimical production and consumptions and how it hinders achieving sustainable development.
- Practical steps to promote sustainable production and consumption.

Method of Lesson Delivery

Case study, problem solving approach, *open classroom discussion*, *enquiry-based learning*, *cooperative learning, issue analysis* and *invitation of resource person* will be used to promote classroom interaction.

Learning Activities

Teachers

- Lead a discussion on concept clarification such as sustainable production and consumption.
- Directs student's activities to make enquiries into patterns of production and consumption that

is inimical to future generations and the environment.

- Invite a resource person to interact with students on how they can make informed choices as consumers to ensure sustainable practices.
- Motivate students to develop actions and initiative that would stop unsustainable consumption in their communities.

Students

- Participate in classroom discussions in concept clarification.
- Make enquiries into patterns of production and consumption in his/her environment to discover the danger it portends to that community and the future generations.
- Interacts with invited facilitator to discover ways to make informed consumer choices that is sustainable.
- Carry out an activity to discourage and stop unsustainable production and consumption his/her immediate community.

Materials/Resources

Resource persons and related online resources such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

Reflect on the danger of unsustainable production and consumption and the danger it portends for future generations if nothing is done immediately to solve the problem.

Assessment

Ability to take action, interact, communicate his/her informed choices on sustainable consumption.Project based assessment.

Week Eighteen – Lecture

Food Security and Sustainable Agriculture

Specific objectives

- Explain the concept of food security and insecurity.
- Identify factors responsible for food insecurity and its effect on human lives.
- Discuss in detail the concept of Sustainable Agriculture.
- Connect sustainable agriculture as a means to achieving food security
- Identify fixed factors that aid sustainable agriculture.
- Connect sustainable agriculture to food production, distribution and consumption.
- Discover the environmental effect of unsustainable agricultural practices on hunger, poverty and diseases.
- Recognize the effect of global warming and increased temperature on agricultural practices.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of food security and insecurity.
- Factors that causes food insecurity and its effect on human lives.
- Concept of sustainable agriculture.
- Relationships between sustainable agriculture and food security.
- Factors that promotes sustainable agriculture.
- Sustainable agriculture, food production, distribution and consumption.
- Relationships of unsustainable agriculture and hunger, poverty and diseases.
- Effects of global warming and increased temperature on agricultural practices.

Method of Lesson Delivery

Case study, problem solving approach, *open classroom discussion*, *simulation,cooperative learning, issue*

analysis, grouping and *brainstorming* will be used to promote classroom interaction.

Learning Activities

Teachers

- Leads a discussion on concept clarification. Uses questioning to discover students views on the concepts to be discussed.
- Guide students activities into enquiry based learning to find out existing relationships between food security and sustainable agriculture. Also to discover factors causing food insecurity and food insecurity and diseases, hunger, etc.
- Present a case study to demonstrate sustainable agricultural production and how it solves the problem of food insecurity.
- Group students into groups to determine the levels of effects of global warming on sustainable agricultural practices.

Students

- Participate in classroom interaction during concept clarification and explanation.
- Enquire into the existing relationships between food security and sustainable agriculture.
- Interact at the group level to determine the levels of effects of global warming on sustainable agricultural practices.
- Identify during case study of sustainable agricultural practices and how it solves food related problems.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

Reflect on problems arising as a result of unsustainable agricultural practices and what actions are crucial to ensuring sustainable agriculture?

Assessment

Observation of Communication skills, ability to show connection between,

skills to proffer sustainable solutions to problem identified. Project Assessment, short quizzes

Week Nineteen – Lecture

Environmental Stewardship

Specific objectives

- Explain in detail the concept of environment stewardship.
- Recognize principles and challenges of caring for environmental stewardship.
- Identify types and activities of environmental stewards.
- Connect benefits of environmental stewardship programme to achieving sustainability.
- Take up an activity that promotes environmental stewardship.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of environmental stewardship.
- Principles and challenges of caring for environmental stewardship.
- Types and activities of environmental stewards.
- How environmental stewardship promotes the achievement of sustainable development.
- Practical activities to promote environmental stewardship

Method of Lesson Delivery

Case study approach, open classroom discussion, invitation of *resource person learning*, *modelling* and *brainstorming* will be used to promote classroom interaction.

Learning Activities

Teachers

- Facilitate a concept explanation on the meaning of environmental stewardship.
- Share together with the students the principles underlying environmental stewardship.
- Engage an environmental steward to interact with students on how to care for the environment.
- Motivate students into various practical outdoor activities that

promote environmental stewardship in their community

Students

- Participate in class discussions on concept explanation and clarification.
- Interact with students, teacher and the resource person to identify the principles underlying environmental stewardship.
- Discover during outdoor activities the methods and ways of caring for the environment.
- Embark on community activities to promote environmental stewardship.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

Reflect if it possible to achieve sustainable development without environmental stewardship?

Assessment

Observation to identify skills to solve environmental problems, interaction skills during classroom activities and communication skills.

Week Twenty – Lecture

Climate Change

Specific objectives

- Discuss the concept of climate change.
- Illustrate the impact of greenhouse gas emissions on the world climatic conditions.
- Articulate the impacts of climatic change on the environment.
- Describe active measures to prevent climate change.
- Show the implication of climate change on sustainable development

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- Meaning of climate change.
- The impact of greenhouse gas emissions on the climatic conditions of the world.
- Impacts of climate change on the environment.

- Measures to prevent climate change.
- Implications Climate change on sustainable development.

Method of Lesson Delivery

Critical *issue analysis* of issues to promote critical thinking, *simulation*, *differentiation*, *videos session*, *problem solving* and *resource person* will be used to facilitate interaction and knowledge generation.

Learning Activities

Teachers

- Lead a classroom discussion on climate change.
- Simulate the impact of greenhouse gas emission on climatic conditions.
- Engage resource person to interact with students on the measures to be taken to prevent climate change and its implications on achieving sustainable development.
- Motivate students to take actions to combat climate change in their community.

Students

- Participate in classroom discussion and group interaction.
- Make connection between overdependence on non-renewable resources and environmental, economic and social problems.
- Discover method of interventions required to conserve resources in his/her immediate environment

Materials/Resources

Resource person and related online materials such as video clips, internet links/websites, images/pictures and textbooks, etc.

Reflect

Reflect on what other measures could be taken to prevent climate change?

Assessment

Demonstration of problem solving skills, futuristic thinking, system thinking and ability to provide solutions to identified problems. Projects, short quizzes etc.

Week Twenty one– Lecture

Environmental Protection and Conservation

Specific objectives

- Discuss the concept of environmental protection.
- Identify the imperative of taking actions to protect and conserve the environment.
- Identify major current environmental problems.
- Discover ways the environment can be protected and conserved.
- Initiate plans on how to protect the environment in their immediate community

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of environmental protection.
- Necessary actions to protect the environment.
- Existing and current environmental problems.
- Ways and methods the environment can be protected.
- Practical activities to protect the environment in the neighbourhood.

Method of Lesson Delivery

Case study, *enquiry learning* and critical issue analysis to promote classroom interaction and critical thinking.*Simulation*, *outdoor activities*, and *resource person* will be used to facilitate knowledge generation and sharing.

Learning Activities

Teachers

- Lead a discussion to explain the meaning of environmental protection and conservation.
- Present to the learners the need and necessary actions to protect the environment.
- Engage the learners in an interactive session to determine ways the environment can be protected and explore practical activities to protect the environment

Students

- Participate in classroom discussion and activities on concept explanation.
- Actively interact with students and the teacher to determine ways the environment can be protected.
- Explore practical activities to acquire skills to protect the environment.

Materials/Resources

*R*elated internetmaterials such as video clips, website links/websites, images/pictures and textbooks, visits to related scenes in the environment.Etc.

Reflect

Reflect on what other measures could be taken to prevent climate change?

Assessment

Demonstration of problem solving skills, futuristic thinking, system thinking and ability to provide solutions to identified problems. Projects, short quizzes etc.

Week Twenty two – Lecture

Health Promotion

Specific objectives

- Explain the concept and of health promotion.
- Discover health promotion strategies.
- Connect the importance of health promotion in achieving sustainable development.
- Recognise the types and examples of health promotion.
- Initiate a community strategy to promote health in their community.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of health promotion.
- Strategies in implementing health promotion.
- The importance of health promotion in achieving sustainable development.

- Types and examples of health promotion.
- Practical community strategies to promote health in the neighbourhood

Method of Lesson Delivery

Issues Analysis, problem solving approach, *open classroom discussion*, *enquiry-based learning*, and *invitation of resource person* will be used to promote classroom interaction, knowledge generation and sharing.

Learning Activities

Teachers

- Lead a class discussion on the meaning of health promotion.
- Facilitate an interactive session to explore strategies used in implementing health promotion and its types.
- Invite a resource person to lead a practical discussion and activities on the strategies to promote health in the community.

Students

- Participate in the classroom discussion on concept definition.
- Get involved in an interactive session to explore the strategies used in implementing health promotion and its types.
- Actively participate in a practical activity to promote health in the community.

Materials/Resources

Resource persons and related online resources such as video clips, internet links/websites, images/pictures and textbooks, Etc.

Reflect

Reflect on how preventive health can improve health at every stage of life and how this can help in achieving sustainable development?

Assessment

Observation of student's pattern of interaction, systemic thinking and civic disposition.Demonstration of problem solving skills.Short quizzes.

Week Twenty three – Lecture

Public Health

Specific objectives

- Discuss the meaning of public health.
- Acquire information on personal health guides.
- Acquire information on issues that could causes epidemics and natural disasters in their immediate communities.
- Develop skills to prevent and combat epidemics and natural disasters in their immediate communities.
- Embark on health awareness campaign in their community.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of public health.
- Information on personal health guides.
- Causes of epidemics and natural disasters.
- Practical ways and methods to prevent and combat epidemics and natural disasters.
- Community initiatives that promotes public health.

Method of Lesson Delivery

Case studies, issues analysis, problem solving approach, *open classroom discussion*, and *invitation of resource person* will be used to promote classroom interaction, knowledge generation and sharing.

Learning Activities

Teachers

- Lead a class discussion on explaining the meaning of public health.
- Engage the students through interaction to highlight practical ways and methods to prevent and combats epidemics and natural disasters.
- Invite a public health expert to facilitate an interactive session on community initiatives to prevent epidemics and promote public health.
- Lead a community based activity to promote public health.

Students

- Participate in a classroom discussion on the definition and meaning of public health.
- Interact with the teacher and colleagues to discover ways and methods to prevent epidemics and natural disasters.
- Through interactive questioning and active listening discover practical activities to prevent epidemics.
- Engage in a collaborative effort to promote activity based community health intervention in a practical activity.

Materials/Resources

Resource persons and related online resources such as video clips, internet links/websites, images/pictures and textbooks, Etc.

Reflect

Reflect on the connection of public health to sustainable development

Assessment

Demonstration of problem solving skills, communication skills, interactive skills and ability to positively influence community in the right direction, project assessment.

Week Twenty four – Lecture

Overcoming Poverty

Specific objectives

- Discuss the concept of poverty.
- Identify causes of extreme poverty.
- Identify poverty indicators according to UN and World Bank definitions.
- Recognize different regions of the world where extreme poverty exists.
- Connect the effects of extreme poverty to other crimes and social vices.
- Describe the effects of poverty on the individual and the society.
- Detect practical solutions to end poverty.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- Meaning of poverty.

- Causes of extreme poverty.
- Indicators of poverty.
- Regions with extreme cases of poverty rate.
- The link between poverty and crimes, violence, hunger and social vices.
- Effects of poverty on individuals and the society.
- Practical solutions to end poverty and efforts of international organisations.

Method of Lesson Delivery

Case studies, issues analysis, problem solving storytelling, *open classroom discussion*, and *brainstorming* will be used to promote classroom interaction and solutions to identified problems.

Learning Activities

Teachers

- Use questioning to identify student's entry perception of poverty and lead a discussion to explain the meaning and causes of poverty.
- Plays a video clip to show the effects of poverty on children, women, environment etc.
- Lead an interactive session to connect poverty with crimes, lack of education, hunger and deprivation.
- Together with the students identify ways to end poverty and to identify efforts of international organisations in this regard.

Students

- Participate in classroom interaction to discover the meaning of poverty and causes of poverty.
- Actively watch a video clip on the effects on poverty on children, women, environment, etc.
- Connect poverty with crimes, deprivation, hunger etc.
- Identify practical ways to end poverty and the efforts of international organisation in ending poverty.

Materials/Resources

Related online materials such as video clips, internet links/websites, images/pictures and textbooks, Etc.

Reflect

Reflect on what is likely to be the rate of poverty in different regions if nothing is done to quickly arrest the scourge of poverty

Assessment

Observation of student's ability to articulate a logical thought on the effects of poverty, ability of students to demonstrate leadership on active ways to end poverty in his/her immediate environment. Project assessment, short quizzes, Etc.

Week Twenty five – Lecture

Rural Transformation

Specific objectives

- Explain the concept of rural transformation.
- Identify factors for rural development.
- Highlight the importance of rural development to national development.
- Connect the importance of rural transformation to Sustainable Development

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of rural transformation.
- Factors for rural development.
- The importance of rural development to national development.
- Importance of rural transformation to sustainable development.

Method of Lesson Delivery

Case studies, issues analysis, problem solving, open classroom discussion, and *brainstorming* will be used to promote classroom interaction and solutions to identified problems.

Learning Activities

Teachers

- Lead a classroom discussion on the meaning of rural transformation.
- Guide the students to identify the importance of rural transformation.
- Show the connection between rural transformation and sustainable development.

Students

- Participate in a classroom discussion on the meaning of rural transformation.
- Interact in the classroom to discover the importance of rural transformation to sustainable development

Materials/Resources

Related online materials such as; video clips, internet links/websites articles, images/pictures, textbooks, Etc.

Reflect

Reflect on the role of individuals, and civil organisations and government in promoting rural transformation.

Assessment

Observation of student's demonstration of problem solving skills, futuristic thinking, system thinking and collaborative skills, Etc.

Week Twenty six – Lecture

Cultural Diversity and Multiculturalism

Specific objectives

- Vividly explain the concept of cultural diversity.
- Discuss the meaning of multiculturalism, racism, nepotism, ethnocentrism, and bigotry.
- Identify factors that promote culturally diverse society.
- Recognise principles of a multicultural society.
- Highlight skills needed to peacefully co-exist in a culturally diverse society.
- Apply the required skills to peacefully co-exist in day-to-day life in the society.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of cultural diversity.
- The concept of multiculturalism, racism, nepotism, ethnocentrism and bigotry.
- Factors that promotes cultural diversity in a society.
- Principles of a multicultural society.
- Required skills to peacefully co-exist in a culturally diverse society.
- Practical session on the application of skills required to co-exist in a multicultural society.

Method of Lesson Delivery

Issue analysis, problem solving approach, *open classroom discussion*, and *brainstorming*, will be used to promote classroom interaction, knowledge generation and sharing.

Learning Activities

Teachers

- Engage the learner using a storytelling approach to illustrate and explain the concept of cultural diversity and multiculturalism.
- Facilitate a brainstorming discussion on the factors that

promotes cultural diversity in a society.

- Leads a session on the principles of multicultural society and the skills required to peacefully co-exist in a multicultural society.
- Lead an engaging practical session on the application of multicultural skills in a multicultural society.

Students

- Actively listen during the storytelling.
- Participate in the brainstorming session to identify factors that promotes multiculturalism in a society.
- Interacts with the teacher and other students to determine the skills required to peacefully co-exists in a multicultural society.
- Through practical activity apply the multicultural skills.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, Etc.

Reflect

Reflect on the role of cultural preservation and cultural consciousness in achieving sustainable development?

Assessment

Observation of interaction skills, consensus building, teamwork Etc. project assessment, short quizzes etc.

Week Twenty seven – Lecture

Intercultural Understanding and Peace

Specific objectives

- Discuss the concept of culture and intercultural understanding.
- Identify the principles for intercultural understanding.
- Show how intercultural understanding promotes world peace and sustainable development.
- Develop intercultural skills to promote peace in their community.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of culture and intercultural understanding.

- Principles for intercultural understanding.
- Ways intercultural understanding promotes peace.
- Practical activity to promote peace in the community.

Method of Lesson Delivery

Issue analysis, *classroom discussion storytelling*, and *brainstorming*, will be used to promote classroom interaction, knowledge generation sharing and application.

Learning Activities

Teachers

- Lead a classroom discussion to explain the meaning of intercultural understanding and peace.
- Engage students to identify the principles for intercultural understanding.
- With vivid illustration show how intercultural understanding promotes peace.
- Motivate students into practical projects that can promote peace in their environment.

Students

- Participate in the classroom discussion on the meaning of intercultural understanding and peace and identify principles for intercultural understanding and peace.
- Connect during classroom interaction how intercultural understanding promotes peace.
- Undertake a practical activity to promote peace in his/her community.

Materials/Resources

Related online resources such as video clips, internet links/websites, images/pictures and textbooks, Etc.

Reflect

Reflect on the activities of international organisations to promote peace and what needs to be done to promote intercultural understanding in their community.

Assessment

Demonstration of ability to cooperate and tolerate others, promote peace through negotiations and dialogue, project assessment.

Week Twenty eight – Lecture

Information & Communication Technologies

Specific objectives

- Explain the meaning of ICT.
- Identify the roles ICT in promoting Sustainable Development.
- Highlights the strength and weaknesses of ICT in promoting sustainable development.
- Recognise the environmental impacts of ICT.
- Identify the indispensability of ICT skills in tackling Sustainable Development challenges in their immediate community.

Content

The lesson presents varieties of body of knowledge relevant to equip learners to achieve the set objectives.

- The meaning of ICT
- The roles of ICT in promoting sustainable development.
- Benefits and Disadvantages of ICT to promote sustainable.
- Environmental impact of ICT.
- Application of ICT skills in solving sustainable development challenges.

Method of Lesson Delivery

Problem solving, *simulation* and critical *issue analysis* to promote classroom interaction and critical thinking.*Simulation*, *and brainstorming* technique, will be used to facilitate knowledge generation, sharing and application.

Learning Activities

Teachers

- Explain the concept of ICT.
- Lead a discussion on various ways ICT can facilitate the realisation of the SDGs.
- Guide the students to identify the benefits and limitations of ICT and its impact on the environment.
- Guide the students to identify different ICT skill required in confronting sustainable development challenges.

Students

- Participate in a discussion on the meaning of ICT.
- Interact during discussions and identify ways ICT can facilitate the realisation of the SDGs.
- Identify benefits and environmental impact of ICT on the environment during classroom interaction.
- Discover ICT skills required to solve sustainable development challenges.

Materials/Resources

*R*elated internetmaterials such as video clips, website links/websites, images/pictures and textbooks, visits to related scenes in the environment.Etc.

Reflect

Reflect on the crucial role of ICT in achieving sustainable development Goals.

Assessment

Demonstration of ICT competency skills, problem solving skills, system thinking etc. Projects, short quizzes etc.