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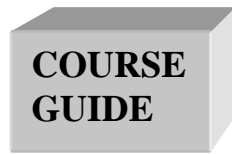
COURSE CODE :EDT822

COURSE TITLE: CONTEMPORARY ISSUES IN EDUCATIONAL TECHNOLOGY

COURSE GUIDE

**EDT822
CONTEMPORARY ISSUES IN EDUCATIONAL
TECHNOLOGY**

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Introduction

Courseware for the course EDT822 is presented to you in two packages, this course guide and the main course content, both in print format.

This guide familiarises you with the expected study guidelines. Please go through it thoroughly before you start your study of the main course content.

What You Will Learn in this Course

EDT822 exposes you to contemporary issues in Educational Technology. The course is designed to bring you abreast of technological developments in ICTs and how these have influenced the conduct of pedagogic affairs globally. You will be introduced to web-based resources for learning and will be prompted to embrace technology fully by participating in international activities and practices in the educational technology discipline.

Course Aims

The course is to:

- expose you to new technologies of education
- assist you to appreciate the transformation in education brought about by the new technologies
- improve your understanding of the globalisation and universalisation of educational cultures through the new technologies
- encourage you to participate in global educational processes engendered by access to new technologies especially the internet
- enable you contribute positively to the development of good educational practices in your country.

Course Objectives

At the end of this course, you will be able to:

- describe the developments in educational technology occasioned by developments in information and communication technology
- discuss some basic digital technological products as they are used in teaching and learning
- appraise the Nigerian educational delivery systems against a backdrop of what is possible globally
- discuss the distance learning options available and their technologies of delivery

- describe the limitations to the quality of educational services in Nigeria
- design simple technology-based instructional systems.

Working through this Course

To complete this course, you are required to read each unit and other materials which may be provided by the National Open University of Nigeria on-line. Each unit contains self-assessment exercises for this course and at certain points in the course; you would be required to submit tutor-marked assignments for assessment purposes. At the end of the course, there is a final examination. This course should take you a total of 17 weeks to complete. You will find listed below all the components of the course, what you have to do and how you should allocate your time to each unit in order to complete the course on time and successfully.

I would advise that you avail yourself the opportunity of attending the tutorial sessions where you will have the opportunity of exchanging information with your peers.

Course Materials

Major components of the course are:

1.　The Course Guide
2.　Study Units
3.　References
4.　Assignments
5.　Presentation Schedule

Study Units

There are 15 study units as listed below in 4 modules.

Module 1　Developments in Teaching and Training Technologies

Unit 1　　Digitalisation of Educational Media
Unit 2　　Learning Environments
Unit 3　　Virtual Reality

Module 2　Overcoming Spatial and Temporal Barriers in Education

Unit 1　　Open Learning Systems
Unit 2　　Facilities/Media for Distance and Open Learning
Unit 3　　On-line Course Delivery

Module 3   Education and Globalisation

Unit 1   Education in an Era of Globalisation
Unit 2   Universalisation of Education
Unit 3   Equality of Access to New Technologies in Education
Unit 4   Quality Control of Educational Services

Module 4   New Challenges in Curriculum and Instruction

Unit 1   Issues Related to Efficiency of Media Programmes
Unit 2   Curriculum Design Issues
Unit 3   Teacher Development and New Technologies
Unit 4   Contemporary Instructional Strategies

Each unit is written in the following format

- Introduction to the unit
- Objectives of the Unit
- Contents (in many subtitles)
- Conclusion
- Summary of content
- Tutor-Marked Assignment (TMA) to be submitted to your course tutor
- References and further Reading.

There are self assessment questions at the end of each unit. These give you the opportunity to reflect on the content presented and indulge in some practice as required by the content.

Presentation Schedule

Your course materials will give you important dates for the early and timely completion and submission of your TMAs and attending tutorials. You should remember that you are required to submit all your assignments by the stipulated time and date. You should guard against lagging behind in your work.

Assignment File

There are assignments embedded into the learning schedule in each unit of this course. These are designed to ensure that you really understand each of the units. In this file, you will find all the details of the work you must submit to your tutor, for marking. Remember your assignments are as important as the examinations as they carry the weightings 40 per cent for undergraduate.

Assessment

Two major methods will be used to access this course. The first major method is through assignments while written examination will be second one. The course material has been prepared to assist you to do these assignments. You are also expected to use information and knowledge from the recommended text at the end of each unit. The assignment will carry 60 per cent of the total marks.

Tutor-Marked Assignments (TMAs)

The TMA is a continuous assessment component of your course. It accounts for 30 per cent of the total score. You are required to submit at least four TMAs before you are allowed to sit for the end of course examination. The TMAs would be given to you by your facilitator and you are to return them to the facilitator as and when due.

Assignment questions for the units in this course are contained in the assignment file. You will be able to complete your assignment from the information and materials contained in reading your study units and, references. However, it is desirable to demonstrate that you have read and researched more into other references, which will give you a wider view point and may provide a deeper understanding of the subject.

Make sure that each tutor–marked assignment reaches your facilitator on or before the deadline given in the presentation schedule and assignment file. If for any reason you cannot complete your work on time, contact your facilitator before the assignment is due to discuss the possibility of an extension. Extensions will not be granted if asked for after the due date.

Final Examination and Grading

The final examination for EDT822 will be for two hours duration and will carry 60 per cent of the total marks. The examination will consist of questions, which reflect the type of self testing, practice activities and tutor-marked assignments/problems you have encountered previously. All areas of the course will be accessed.

You may wish to form a discussion group with a few of your colleagues and practice or discuss the activities and assignments written in each unit before the examination period.

How to Get the Most from This Course

The course EDT822 is a PhD level course. You are therefore expected to have developed good study habits. Read through the content presented at your own pace. Source internet facilities for additional information; interact as much as possible with opportunities on net, including net seminars and learning programmes. Join some learned net-based associations for update on information (e.g. International Forum for Educational Technology and Society, IFETS).

Work diligently through the suggested learning activities at the end of each sub-unit.

Summary

Technology is currently the major change agent and it is itself ever changing. This course is designed to acquaint you with current issues emanating from the use of technology in education and issues that are addressed by educational technology in contemporary education.

Course Code   EDT822
Course Title   Contemporary Issues in Educational Technology

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MODULE 1   DEVELOPMENTS IN TEACHING AND TRAINING TECHNOLOGIES

Unit 1   Digitalisation of Educational Media
Unit 2   Virtual Reality
Unit 3   Quality of Learning Environments

UNIT 1   DIGITALISATION OF EDUCATIONAL MEDIA

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3.0   Main Content
        3.1   What is Digitalisation?
        3.2   Digital Systems
        3.3   Automation
4.0   Conclusion
5.0   Summary
6.0   Tutor-Marked Assignment
7.0   References/Further Reading

1.0   INTRODUCTION

Digitalisation of media refers to the process of converting materials from the analogue format into digital format. Modern technologies are based on digital systems or simply put, digital computers for operation. Therefore, discussions on development in teaching and training technologies must be hinged and founded on digital media.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- define digitalisation, automation and digital systems
- explain the concepts of digitalisation and automation
- describe the use of automation technology and digital systems in education
- describe the main components of intelligent tutoring systems
- provide a brief summary of different types of ITS
- explain two components of ITS.

3.0   MAIN CONTENT

3.1   What is Digitalisation?

You come across devices based on digital and analogue types of data on daily basis without notice. For example the old radio or television with knob for changing the stations, or the reading on a thermometer is a typical example of analogue devices based on continuous data. Another common example of analogue devices is the old telephones boxes which you have to dial each number by turning round the dial switch. The modern fuel dispensing machine, modern devices such as radio, television, digital telephone etc. count numbers in discrete and are referred to as digital devices.

From the examples above you can infer that digitalisation simply means converting data from any other form to digital.

Digitalisation, as defined by the Merriam-Webster online dictionary, refers to the act of converting data or images to digital form.

New media arises, in part, out of the process of digitalisation and by direct digital deliverables such as computer based created objects.

Microchips

A microchip is a small semiconductor used to relay information through specific electrical characteristics. In some cases, the words *microchip* and *integrated circuit* can be used interchangeably. The microchip is at the heart of many electronics known today, including computers, cell phones and even microwave ovens.

Digitalisation of Media

When you create new media objects on computers, they originate as a digitalised entity. However, "old media" objects can be input into a computer, or digitalised. The old media thus becomes new media.

For example, today's scanning technology allows you to convert a paper document into a digital representation. The scanner digitalises the paper document into a series of numbers. The computer deciphers the numbers into a representation of the document on a computer screen.

Other examples include:

- **World Wide Web**: A primary, public sphere of new media, consisting of objects created on a computer and/or uploaded from an analogue format.
- **Wiki**: Digital information sharing.
- **MP3**: A common, digital audio format.
- **Database**: Digitalised file cabinet of organised information.

SELF ASSESSMENT EXERCISE 1

1.   What is digitalisation?
2.   What is the relationship between microchips and digitalisation?

3.2   Digital Systems

You would have observed that there are more amateur photographers covering social events and producing high quality photographs these days. This is a result of digitalisation of everyday media. We do not use analogue telephones anymore. Our clock faces are now different and reading the time does not require much effort for a child. Apart from simple use, the storage capacities have also improved for some media like visual and audio media. I am sure you now view your photographs on your computer or your LCD TV screen, if you have a digital camera.

As a teacher you should take advantage of digitalisation in your teaching, or in managing the learning system. For example, store your photos from your digital camera on your computer; project it on a screen with the multimedia projector, not OHP anymore. Also note that these systems are getting more compact. Miniaturisation is also the order of the day.

Examples of new digital systems used for learning include: MP3, Digital Cameras, Smart Boards, etc.

MP3

MPEG-1 Audio Layer 3, more commonly referred to as **MP3**, is a patented digital audio encoding format using a form of lossy data compression. It is a common audio format for consumer audio storage, as well as a 'de facto' standard of digital audio compression for the transfer and playback of music on digital audio players.

The use in MP3 of a lossy compression algorithm is designed to greatly reduce the amount of data required to represent the audio recording and still sound like a faithful reproduction of the original uncompressed audio for most listeners. An MP3 file that is created using the setting of 128 kbit/s will result in a file that is about 1/11th the size of the <u>CD</u> file created from the original audio source. An MP3 file can also be constructed at higher or lower bit rates, with higher or lower resulting quality.

Digital Photography

Digital photography is a form of photography that uses digital technology to make images of objects. Until the advent of such technology, photography used photographic film to create images which could be made visible by photographic processing. By contrast, digital photographs can be displayed, printed, stored, manipulated, transmitted, and archived using digital and computer techniques, without chemical processing.

Smart Boards

The SMART Board interactive whiteboard is a large interactive whiteboard that uses touch technology to detect user input – e.g. scrolling, right mouse-click – in the same way normal PC input devices, such as a mouse or keyboard detect input. A projector is used to display a computer's video output on the whiteboard, which then acts as a large touch screen. The SMART Board typically comes with four digital pens, which use digital ink and replace traditional whiteboard markers. The SMART Board digital ink operates by using an active digitizer that controls the PC input for writing capabilities such as drawing or handwriting.

The SMART Board interactive whiteboard operates as part of a system that includes the interactive whiteboard, a computer, a projector and whiteboard software. The components are connected wirelessly or via USB or serial cables. A projector connected to the computer displays the computer's desktop image on the interactive whiteboard. The interactive whiteboard accepts touch input from a finger, pen or other solid object. Each contact with the SMART Board is interpreted as a left-click from the mouse.

SELF ASSESSMENT EXERCISE 2

1.   How would an English teacher take advantage of digital media in his work?
2.   Explain the relevance of the smart boards to media based education.

3.3   Automation

Automation refers to the use of computers to control a particular process to increase reliability and efficiency, often through the replacement of human workers.

Automation also includes the process of having a machine or machines accomplish tasks hitherto performed wholly or partly by humans. As used here, a machine refers to any inanimate electromechanical device such as a robot or computer.

The fundamental constituents of any automated process are:

(1)   a power source
(2)   a feedback control mechanism, and
(3)   a programmable command structure.

Programmability does not necessarily imply an electronic computer. For example, the Jacquard loom, developed at the beginning of the 19th Century, used metal plates with holes to control the weaving process.

While feedback is usually associated with more advanced forms of automation, so-called open-loop automated tasks are possible.

Elements of an automated system

Because of the growing ubiquity of automation, any categorisation of automated tasks and processes is incomplete. Nonetheless, such a categorisation can be attempted by recognising two distinct groups, automated manufacturing and automated information processing and control.

Automated manufacturing includes automated machine tools, assembly lines, robotic assembly machines, automated storage-retrieval systems, integrated computer-aided design and computer-aided manufacturing (CAD/CAM), automatic inspection and testing, and automated agricultural equipment (used, for example, in crop harvesting).

Automated information processing and control includes automatic order processing, word processing and text editing, automatic data processing, automatic flight control, automatic automobile cruise control, automatic airline reservation systems, automatic mail sorting machines, automated planet exploration, automated electric utility distribution systems, and automated bank teller machines.

A major issue in the design of systems involving both human and automated machines concerns allocating functions between the two. This allocation can be static or dynamic.

Static allocation is fixed; that is, the separation of responsibilities between human and machine do not change with time.

Dynamic allocation implies that the functions allocated to human and machine are subject to change. Historically, static allocation began with reference to lists of activities which summarised the relative advantages of humans and machines with respect to a variety of activities. For example, at present, humans appear to surpass machines in the ability to reason inductively, that is, to proceed from the particular to the general. Machines, however, surpass humans in the ability to handle complex operations and to do many different things at once, that is, to engage in parallel processing. Dynamic function allocation can be envisioned as operating through a formulation which continuously determines which agent (human or machine) is free to attend to a particular task or function. In addition, constraints such as the workload implied by the human attending to the task as opposed to the machine can be considered.

It has long been the goal in the area of automation to create systems which could react to unforeseen events with reasoning and problem-solving abilities akin to those of an experienced human, that is, to exhibit artificial intelligence. Indeed, the study of artificial intelligence is devoted to developing computer programs that can mimic the product of intelligent human problem solving, perception, and thought.

Why Automation?

There are many different reasons to automate. Increased productivity is normally the major reason for many companies desiring a competitive advantage. Automation also offers low operational variability. Variability is directly related to quality and productivity. Other reasons to automate include the presence of a hazardous working environment and the high cost of human labour. Some businesses automate processes to reduce production time, increase manufacturing flexibility, reduce costs, eliminate human error, or make up for a labour shortage.

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Applications of Artificial Intelligence in Education

Computers have been used in education for over 20 years. Computer-based training (CBT) and computer aided instruction (CAI) were the first such systems deployed as an attempt to teach using computers. In these kinds of systems, the instruction was not individualised to the learner's needs. Instead, the decisions about how to move a student through the material were script-like, such as "if question 21 is answered correctly, proceed to question 54; otherwise go to question 32." The learner's abilities were not taken into account.

While both CBT and CAI may be somewhat effective in helping learners, they do not provide the same kind of individualised attention that a student would receive from a human tutor. For a computer based educational system to provide such attention, it must reason about the domain and the learner. This has prompted research in the field of intelligent tutoring systems (ITSs). ITSs offer considerable flexibility in presentation of material and a greater ability to respond to idiosyncratic student needs. These systems achieve their ``intelligence" by representing pedagogical decisions about how to teach as well as information about the learner. This allows for greater versatility by altering the system's interactions with the student.

Intelligent tutoring systems have been shown to be highly effective at increasing students' performance and motivation. For example, students using Smithtown, an ITS for economics, performed equally well as students taking a traditional economics course, but required half as much time covering the material.

Components of Intelligent Tutoring Systems

Intelligent tutoring systems may outwardly appear to be monolithic systems, but for the purposes of conceptualisation and design, it is often easier to think about them as consisting of several interdependent components. Research has identified four major components: the student model, the pedagogical module, the domain knowledge module, and the communication module. A fifth component can be identified as the expert model.

Student Model

The student model stores information that is specific to each individual learner. At a minimum, such a model tracks how well a student is performing on the material being taught. A possible addition to this is to also record misconceptions. Since the purpose of the student model is to

provide data for the pedagogical module of the system, all of the information gathered should be able to be used by the tutor.

Pedagogical Module

This component provides a model of the teaching process. For example, information about when to review, when to present a new topic, and which topic to present is controlled by the pedagogical module. As mentioned earlier, the student model is used as input to this component, so the pedagogical decisions reflect the differing needs of each student.

Domain Knowledge

This component contains information the tutor is teaching, and is the most important since without it, there would be nothing to teach the student. Generally, it requires significant knowledge of engineering to represent a domain so that other parts of the tutor can access it. One related research issue is how to represent knowledge so that it easily scales up to larger domains. Another open question is how to represent domain knowledge other than facts and procedures, such as concepts and mental models.

Communications Module

Interactions with the learner, including the dialogue and the screen layouts, are controlled by this component. How should the material be presented to the student in the most effective way? This component has not been researched as much as the others, but there has been some promising work in this area.

Expert Model

The expert model is similar to the domain knowledge in that it must contain the information being taught to the learner. However, it is more than just a representation of the data; it is a model of how someone skilled in a particular domain represents the knowledge. Most commonly, this takes the form of a run able expert model, i.e. one that is capable of solving problems in the domain. By using an expert model, the tutor can compare the learner's solution to the expert's solution, pinpointing the places where the learner had difficulties.

Types of Intelligent Tutoring Systems

There are several ways of categorising ITSs: Let us concentrate on two dimensions: abstraction of the learning environment and the knowledge type of the instruction.

Abstraction of the Learning Environment

Many systems attempt to provide instruction by simulating a realistic working environment in which the student can learn the task. There are many reasons for developing such systems, including the possible danger of training using the actual equipment and the lack of domain experts who can devote their expensive time to training novices. Therefore, a realistic simulated learning environment can reduce both the cost and the risks of training.

An example of a simulation-based ITS is the Advanced Cardiac Life Support (ACLS) Tutor in which a student takes the role of team leader in providing emergency life support for patients who have had heart attacks. The system not only monitors student actions, but also runs a realistic simulation of the patient's condition and maintains an environment that is reasonably faithful to the "real life" situation. Thus, the goal is not only to test the student's knowledge about the correct emergency procedures, but also to allow him to experience practicing those procedures in a more realistic manner than is possible in a traditional classroom.

Some systems take a less rigorous approach to representing the environment; the situations presented are similar to the real world scenarios in which the knowledge could be applied, but they are not exact simulations. Smithtown for example takes this approach by providing a simulated setting for students to test hypotheses about economics. However, the underlying model of the environment is not an exact simulation of how the laws of economics would be applied in the real world. Another example of such a system is the Design for Manufacturing Tutor.

At the extreme opposite of the simulation based tutors are those that teach knowledge in a de-contextualised manner without attempting to simulate the real world. Many systems throughout the history of ITS research fall into this category. These systems provide problems for the learner to solve without trying to connect those problems to a real world situation and are designed to teach abstract knowledge that can be transferred to multiple problem solving situations.

Emphasis of Instruction

There is a long history of classifying instructional goals according to the type of knowledge being taught. An important early attempt at this classification is Bloom's taxonomy and much recent work in categorising knowledge has been derived from this. In addition to classifying learning goals by knowledge type, one can also examine

what the student will be able to do upon completion of the ITS's lesson. This can vary from the student being able to perform a set of skills in a manner similar to an expert to understanding abstract concepts such as Newton's third law.

For ease of development, systems tend to concentrate on teaching one type of knowledge. The most common type of ITS teaches procedural skills; the goal is for students to learn how to perform a particular task. There has been substantial research in cognitive psychology about human skill acquisition, so analysing the domain knowledge in this framework can prove beneficial to instruction. Systems that are designed according to these principles are often called cognitive tutors. The most common result of this analysis is a set of rules that are part of a run able expert model. This set of expert rules often serves double duty as knowledge of the domain and as the pedagogical module. If a student encounters difficulty, the specific remediation required can be determined from the expert model.

An example of a "cognitive tutor" is SHERLOCK, which has tutorial actions associated with each state in the "effective problem space". Another example of an ITS that uses an analysis of expert behavior is the LISP tutor, which encodes expert problem solvers' actions as production rules, and attempts to determine which rules the student is having difficulty applying.

Other ITSs concentrate on teaching concepts and "mental models" to students. These systems encounter two main difficulties. First, a substantial domain knowledge is needed for instruction. Second, since learning concepts and frameworks is less well understood than learning procedures, there is less cognitive theory to guide knowledge representation and the pedagogical module. For these reasons, ITSs of this type require a larger domain knowledge- base and are sometimes referred to as knowledge based tutors. As a result of not having a strong model of skill acquisition or expert performance, these systems are forced to use general teaching strategies. They also place more emphasis on the communication and presentation system in order to achieve learning gains. An example of such a system is the Pedagogical Explanation Generation (PEG) system which has an explanation planning component that uses a substantial domain knowledge based to construct answers to student queries in the domain of electrical circuits.

These classifications are really points along a continuum, and serve as good rules of thumb rather than a definitive method of classifying intelligent tutors. A system that does not fall into either of these categories is Coach, which teaches how to use UNIX mail. This is a procedural skill, and hence cognitive in nature. However, the emphasis

of this system is also knowledge based and involves generating explanations and using general pedagogical tactics for generating feedback.

Generally, tutors that teach procedural skills use a cognitive task analysis of expert behavior, while tutors that teach concepts and frameworks use a larger knowledge based and place more emphasis on communication to be effective during instruction. There are exceptions to these rules, but they serve as useful guidelines for classifying ITSs.

The Student Model

This is the component of an ITS that records information about the student. This information reflects the system's belief of the learner's current knowledge state. Since only overt student actions are visible, and the ITS only has a relatively narrow channel of communication with the user, there is difficulty in obtaining an accurate representation of the student's abilities. Therefore, the model of the student may not be perfectly accurate and steps must be taken to ensure that the system's actions on the basis of this inaccurate information are not inappropriate. For example, a tutor that interferes too much with a learner who is performing satisfactorily can obviously be detrimental.

After considering the above difficulties, an obvious question concerning student models is why to have one? Simply put, the student model is necessary in order to tailor instruction to a student's idiosyncrasies and learning needs. Without this knowledge, the pedagogical component of the tutor has no basis on which to make decisions, and is forced to treat all students similarly. This is analogous to earlier efforts in CBT and CAI which did not customize instruction for individual learners.

Representation of the Student Model

There are many methods for representing information about the student. Two commonly used techniques are overlay models and Bayesian networks.

The standard paradigm for representing a student model is the overlay model in which the student's knowledge is considered to be a subset of the expert's knowledge. With this representation, an ITS presents material to the student so that his knowledge will exactly match that of the expert. The knowledge types that can be represented within an overlay student model include "topics", which correspond to elements of the domain knowledge, and production rules.
A drawback of this approach is that it does not acknowledge that students may have beliefs that are not part of the expert's knowledge

based. For example, students frequently have misconceptions about a domain. Therefore, an extension to the overlay model explicitly represents "buggy"' knowledge that the student may have. This extension allows for better remediation of student mistakes, since the fact that a student believes something that is incorrect is pedagogically significant.

Another mechanism for recording a student's knowledge is Bayesian networks. These networks probabilistically reason about a student's knowledge state based on his interactions with the tutor. Each node in the network has a probability indicating the likelihood of the student "knowing" that piece of knowledge.

Pedagogical Module

The pedagogical module uses information from the student model to determine what aspects of the domain knowledge should be presented to the learner. This information, for example, may be new material, a review of previous topics, or feedback on the current topic. One pedagogical concern for an ITS is the selection of a meta-strategy for teaching the domain. For example, the system could decide to use the Socratic Method or it could select a topic and present an example of a problem within that topic. Once the meta-strategy is selected, low level issues, such as the exact example to use, must be decided. These low level issues have been fairly well researched, and thus will be discussed first.

Low Level Issues

The tutor must decide the content of the material to be presented to the student. This involves decisions about the topic, the problem, and the feedback.

Topic selection: To select a topic to present, the tutor must examine the student model to determine the topics on which the student needs to focus. Many possibilities exist for the most appropriate topic on which a student should work. For example, if the meta-strategy indicates that review is in order, the tutor will select a topic the student has already "learned." On the other hand, if new information is to be presented, the tutor will choose a topic that the student does not yet know.

Problem generation: Once the topic has been selected, a problem must be generated for the student to solve. The grain size of the problem is determined by the domain. For example, in SHERLOCK, the student will be asked to diagnose the fault in the station used to repair an F-15, while in MFD, the student will be given a simple math problem, such as

adding two fractions. Whatever the granularity of the problem generated, it is important that the difficulty be appropriate for the student's level of ability, which can be determined from the student model.

Feedback: Most tutors work smoothly as long as students get everything right. Problems arise when the student has difficulties and needs help from the tutor. In these situations, the tutor must determine the kind of feedback to provide. The issue of how much help to provide the student is also a very complex issue as too little feedback can lead to frustration and floundering (Anderson,1993) while too much feedback can interfere with learning.

Once the system decides how much feedback to give, it must determine the content of the advice. The feedback should contain enough information so that the student can proceed to the next step in solving the problem. Furthermore, the advice given to the learner should be appropriate for her ability level. Some systems use the student model to select a hint that most closely matches the learner's level of ability. For example, in MFD, the more proficient the student is at a particular skill, the more subtle the hint is. On the other hand, a student with low proficiency in a skill would be presented with a more obvious hint. By using this technique, learners will not be required to wade through many levels of hints before receiving useful help.

Meta-Strategy Selection

High level strategy selection in ITSs has not received the same amount of attention as the low level decisions. This is not to say that meta-strategies have not been researched. To the contrary, educational research has identified many potential teaching strategies for use by an ITS. Examples of these kinds of strategies include spiral teaching (Bruner, 1992) and the Socratic Method.

However, implementing these meta-strategies in an ITS has proven a formidable problem. Most ITSs do not explicitly identify the strategies they are using for teaching and implicitly implement one of the well-known strategies. A better method is to use the student model to select an appropriate strategy from those maintained by the system. Ideally, a student's model could track the instructional strategies that are most effective for teaching him. However, because most systems do not have multiple teaching strategies, student models have not been designed to provide selection information. Thus, representing multiple strategies explicitly and the control knowledge to select among them is beyond the capabilities of most current systems.

Another obstacle in representing multiple teaching strategies is the limitations imposed by other components of the ITS in addition to those placed by the student model. In particular, the difficulty of representing knowledge impedes the ability to explicitly represent teaching strategies. For example, the Socratic Method requires substantial "common sense" knowledge beyond what is maintained in a domain knowledge based. This problem of scaling up the knowledge based is not unique to ITSs and is common to many areas of AI.

Future Challenges

Let's consider some of the open questions in intelligent tutoring systems research. In general, many of these questions fall into two categories: (1) reducing the time and cost of development and (2) allowing students to work collaboratively.

Reducing development time and cost

One of the main difficulties in designing intelligent tutoring systems is the time and cost required. A large team, including computer programmers, domain experts, and educational theorists, is needed to create just one ITS. There is certainly need for techniques that will help alleviate these difficulties for instructional development. These include:

- **Authoring tools**: The goal of authoring tools is to provide a (relatively) simple development environment and as a result, fewer developers would be needed for the construction of educational software. There are two main approaches to achieving this goal: (1) provide a simple development shell for educators to author their own courseware and (2) provide a means for programmers to more easily represent the domain and teaching strategies. Authoring tools that fall into the first category generally have a restricted scope of the types of instructional interactions a user can create, whereas those in the second category allow for considerably more flexibility at the cost of more complex authoring.
- **Modularity:** Another approach to simplifying ITS construction is to take advantage of the modularity of each system. Despite the natural breakdown of an ITS into the five components discussed previously, there has been little effort towards reusing components from one system in the development of another. This should not involve developers just reusing their own components, but should also mean sharing components among different designers.

Collaborative Learning

Collaborative learning refers to students working in groups to solve problems. In these situations, the focus of the interactions is not typically between the teacher and the learners, as students can teach each other without input from the instructor. In this unit, the term collaborative learning refer to students working together, with the aid of an ITS, via a computer network. Because other students are involved in the learning, the design of the ITS should be easier since the instruction does not have to be perfect for example, should a student become confused, another student may be able to help without relying on the ITS for assistance.

An important aspect of collaborative environments is that in group situations, not all students will be of the same ability. This creates two problems. The first, the classic problem of credit assignment, affects how student models are updated. Should credit be awarded only to the first person to produce the correct answer or should all members of the group receive equal reward? The second problem concerns the pedagogical decisions of how to advance the group through the curriculum. Should one learner dictate the pace of the entire group? And if so, which one?

Although collaborative learning as we have defined it is in its infancy, there have been some efforts in this direction. For example, Belvedere provides a set of tools to help groups of students construct theories (for example, on evolution), and can then critique these theories.

SELF ASSESSMENT EXERCISE 3

1.   Identify the components of intelligent tutoring systems
2.   Differentiate between static and dynamic in the allocation functions in automation

4.0 CONCLUSION

Automation and specifically, intelligent tutoring systems have been shown to be highly effective in increasing student motivation and learning. In designing these systems, it is useful to view them as being composed of five components: the student model, the pedagogical module, the domain knowledge, the communications module, and the expert model. Research has been done on each of these modules, but only a few are very well understood. Specifically, incorporating multiple teaching strategies in the pedagogical module is a large open research question.

In addition to the continuing work on these components, one important research issue is reducing the time and cost to develop such systems. Current strategies for doing this include the development of authoring tools and creating systems in a modular fashion. Solving this problem will be an enormous breakthrough in ITS research, since more systems could be constructed and thus more research into the effectiveness of computer based instruction could be performed.

5.0   SUMMARY

This unit focuses on the integration of digital systems into the entire system of education. We have examined the concept of digitalisation of media, its impact in the automation of instruction and the process of maximising intelligent tutoring systems.

6.0   TUTOR-MARKED ASSIGNMENT

1.   Discuss the relevance of automation in the delivery process of education
2.   What do you understand by collaborative learning?

7.0   REFERENCES/FURTHER READING

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UNIT 2   VIRTUAL REALITY

CONTENTS

1.0   INTRODUCTION

The teaching and learning process has taken a 'flight' out of the 'cage' of traditionalism that is known to you and I from the ages to the recent past (or should I say presently?), into a modern computer based instructional strategy that is most befitting of a 21st Century education. I am sure you know by now that the world has become a 'global village' that a most modern educational system should take advantage of technology in the delivery of education. More often than not, within the traditional school system, certain learning facilities may not be readily available, inadequate or access to them is remote. These facilities such as rare textbooks, journals, academic papers, laboratory or practical procedures, desired skills development (some of which may be delicate to create or re-create in the normal classroom situations), or even resource persons and experts in relevant fields that could not be brought to have direct contacts with the learners are provided to learners with the effects of REALITY, in what is called, ***virtual realities***. The application of Information and Communication Technologies (ICT) or simply, the applications of computers or Information Technologies (IT) to learning are the basic tools and procedures for learning in 'virtual reality'.

This unit will expose you to virtual reality as a modern development in teaching, training and learning technologies that can be utilised in achieving effective learning of difficult concepts within the framework of the traditional school system and virtual learning environment, bringing remote experts (usually in short supply as a result of the most recent learners' population explosion) or vicarious experiences into the classroom or learning environment, and in providing educational opportunities and facilities to desiring learners like you. By the way, the word 'vicarious' simply means, 'experienced in the imagination through the feelings or actions of another person' (Concise English Dictionary). Consequently, you can acquire vicarious experience by not experiencing the actions directly yourself or by experiencing them in virtual reality.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- define the concept of 'virtual reality' using your own words
- relate the concept of 'virtual' to; 'learning' (virtual learning), 'classrooms' (virtual classrooms), 'libraries' (virtual libraries), 'universities' (virtual universities), etc
- state brief history of; Virtual Learning, Virtual Classrooms, Virtual libraries and Virtual Universities
- state the advantages and disadvantages of Virtual Classrooms
- enumerate some virtual learning environments
- express the teaching modes for virtual learning
- identify skills needed for online studies.

3.0 MAIN CONTENT

3.1   Virtual Reality

3.1.1 What is Virtual Reality?

The concept of virtual reality has been described as, 'the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by using special electronic equipments' (Concise English Dictionary). Poole (1997) described virtual reality as computer systems that stimulate reality using computer controlled 3D video imaging. He stated further that the computer is a useful medium for putting the child into an artificial world where experimentation can take place, limited only by the availability of the appropriate software and hardware and that the computer can be programmed to stimulate virtually any reality, hence the growing interest in "virtual reality" systems. The virtual reality

interface has the potential to complement existing approaches to science instruction through creating immersive inquiry environments for learners' knowledge construction (Dede *et al.*, 1994). For instance, you can imagine a Biology lesson about child birth where the teacher's knowledge is augmented by the learner's ability to read and talk about the concept, all in the context of an interactive simulation of child birth. From these descriptions of virtual reality, you imagine what to expect when the concept is applied to learning, classrooms, libraries, universities or even trainings such as provided for pilots on any new aircraft (flight simulators), or soldiers on new war equipments. In all these situations, the learners do not have the luxury of making mistakes learning with the real equipment in real situations. In your own case, the 'luxury' here is your inability to be part of a real learning environment as a result of your peculiar situations. So, learning virtually or in a virtual classroom or university such as NOUN, or using facilities of a virtual library are all modern developments in ensuring that you are provided with an education of equal quality as in a real learning environment, in a virtual learning environment (VLE).

In their paper on Virtual Reality: History, Application, Technology and Future, Mazuryk, T and Gervautz, M (1996) quoting some other researchers gave some basic definitions of virtual reality:

- "Real-time interactive graphics with three-dimensional models, combined with a display technology that gives the user the immersion in the model world and direct manipulation." [Fuch92]
- "The illusion of participation in a synthetic environment rather than external observation of such an environment. VR relies on a three-dimensional, stereoscopic head-tracker displays, hand/body tracking and binaural sound. VR is an immersive, multi-sensory experience." [Giga93a]
- "Computer simulations that use 3D graphics and devices such as the Data Glove to allow the user to interact with the simulation." [Jarg95]
- "Virtual reality refers to immersive, interactive, multi-sensory, viewer-centered, three-dimensional computer generated environments and the combination of technologies required building these environments." [Cruz93a]
- "Virtual reality lets you navigate and view a world of three dimensions in real time, with six degrees of freedom. (...) In essence, virtual reality is clone of physical reality." [Schw95]

Although there are some differences between these definitions, they are essentially equivalent as you would have noticed.

How Does Virtual Reality Work?

In a description of how virtual reality works, Poole (1997) explains that the user in a virtual reality simulation usually dons headgear or Head Mounted Display (HMD) that enables a set of monitor screens to be suspended in front of the eyes. He went further to state that computer-generated images of some predetermined simulation (such as the voyage to the bottom of the ocean) are displayed on the screens, and a tiny camera inside the hood of the headgear tracks the user's eyes as they look around the scene that unfolds. The computer pans across the scene in response to the user's eye movements, creating the illusion that the user is immersed in the scene as if really there—"virtually there". You should take note that for effective learning to take using the technology of virtual reality, the learner should be able to interact with the scene (virtual environment) and possibly manipulate its components. This is made possible if for instance, you as the learner wear a pair of gloves that is wired to the virtual reality system. This will allow you to reach out into the simulation displayed inside the headset, pick up objects to examine them, and otherwise interact with the scene (Poole, 1997).

In education, **virtual learning environment** (VLE) is a system that creates an environment designed to facilitate teachers in the management of educational courses for their students, especially a system using computer hardware and software, which involves distance learning (Wikipedia, 2009). A VLE will normally work over the Internet and provide a collection of tools such as those for assessment (particularly of types that can be marked automatically, such as multiple choice), communication, uploading of content, return of students' work, peer assessment, administration of student groups, collecting and organizing student grades, questionnaires, tracking tools, etc. New features in these systems include wikis, blogs, RSS and 3D virtual learning spaces (Wikipedia, 2009). While originally created for distance education, VLEs are now most often used to supplement traditional face-to-face classroom activities, commonly known as Blended Learning. These systems usually run on servers, to serve the course to students Multimedia and/or web pages.

Characteristics of Virtual Reality

In virtual reality, there are three basic characteristics according to Zeltzer (1992):

- Autonomy
- Presence
- Interaction

These characteristics imply that VR is an ***interactive*** and ***immersive*** (with the feeling of presence) experience in a simulated (*autonomous*) environment and this measure will be used to determine the level of advance of VR systems (Mazuryk and Gervautz (1996).

In order words, the user or learner is in an ***autonomous*** virtual learning environment experiencing *presence* and can ***interact*** with components of the VLE as if he/she is physically present in it. These characteristics lend themselves to constructivist learning where learners experience the knowledge world directly and construct their own learning.

Virtual Reality Applications

Virtual reality has found a wide range of applications in practically all fields of human endeavors. Mazuryk, T. and Gervautz, M. (1996) identified some of these applications in:

- Different areas of science (architecture, physics, chemistry, biology, medicine, surgery, astronomy etc.
- Historical explorations
- Education (schools, trainings, etc.)
- Information retrieval and searching (virtual libraries of books, films, music, stock exchange data, etc.)
- Augmented reality
- New senses
- Passive entertainment
- Active entertainment
- Communication and collaboration
- Remote operations or remote sensing
- Interactive designs.

SELF ASSESSMENT EXERCISE 1

Using the knowledge of virtual reality, describe a virtual learning environment for any concept in your subject area.

3.2   Virtual Learning

3.2.1 Definition of Virtual Learning

Having learned about virtual reality and its equivalence in education, virtual learning environment, it will be quite easy for you to relate the concept of 'virtual' to learning, classroom, libraries, and universities, etc. In all these, it simply implies that learning, classrooms, etc, are not conducted in the physical sense but rather through the presentation of a

virtual environment in which learners can interact with the virtual components of the environment and construct their own learning. This technology has eliminated the challenges associated with learning in the face-to-face traditional school system. According to Heppell (2007) in his foreword to, 'Virtually There', a book and DVD on virtual learning, "Learning is breaking out of the narrow boxes that it was trapped in during the 20th century; teachers' professionalism, reflection and ingenuity are leading learning to places that genuinely excite this new generation of connected young school students - and their teachers too. VLEs are helping to make sure that their learning is not confined to a particular building, or restricted to any single location or moment." This comment shows you that virtual learning has the potential of making learning very interesting to the 21st century learners most of whom prefer multi-sensory learning made possible by computer interfaced multimedia system and the Internet.

Terms Synonymous with Virtual Learning

Many schools in the United States of America, United Kingdom and many European countries have integrated virtual learning into their educational systems under different acronyms such as VLE a computer program that facilitates computerised learning or e-learning. Such e-learning systems are sometimes also called Learning Management System (LMS), Content Management System (CMS), Learning Content Management System (LCMS), Managed Learning Environment (MLE), Learning Support System (LSS), Online Learning Centre (OLC) or Learning Platform (LP); it is education via computer-mediated communication (CMC) or Online Education (Wikipedia, 2009). The source further stated that in the United States, CMS and LMS are the more common terms; however, LMS is more frequently associated with software for managing corporate training programs rather than courses in traditional education institutions.

In the United Kingdom and many European countries the terms VLE and MLE are favoured; however, it is important to realize that these are two very different things. A VLE can be considered a subsystem of an MLE, whereas MLE refers to the wider infrastructure of information systems in an organisation that support and enable electronic learning on a wider scale. In fact a rather pedantic reading of the term MLE could be extended to encompass the physical environment in which learning takes place (i.e. a school). Also the use of VLE avoids confusion with the use of LMS to mean "Library Management System" (which is more commonly referred to as Integrated Library System, or ILS, in the United States).

Becta, in the UK, have coined the term *learning platform* to cover both MLE and VLE as used in the schools sector. The term learning platform describes a broad range of ICT systems used to deliver and support learning. Through a learning platform, hardware, software and supporting services are brought together to enable more effective ways of working within and outside the classroom. At the heart of any learning platform is the concept of a personalised online learning space for the pupil. This space should offer teachers and pupils access to stored work, e-learning resources, communication and collaboration with peers, and the facility to track progress. I hope you are not already feeling that the Nigerian education system is outdated? Never mind, the challenge is on you to fashion a way out for your country to get involved in current best practices in education or should I say, get immersed in virtual learning in educating its children.

List of some virtual learning environments

Learning management systems

- Claroline
- Desire2Learn
- eFront - An Open-Source web-based Learning Management System
- LAMS - the Learning Activity Management System
- SharePointLMS - a LMS based on MS SharePoint
- JoomlaLMS - a LMS based on Joomla platform.

Course management systems

- Desire2Learn
- Dokeos (free software and open source)
- ILIAS (free software and open source)
- Moodle (free software and open source)
- Sakai (free software and open source)
- OpenCourseWare
- Coggno - e-learning software platform and courseware creation toolkit

Virtual learning environment

- Blackboard - a family of software
- WebCT - (Now a part of Blackboard) software applications designed to enhance teaching and learning
- FirstClass - messaging and communications solution
- Desire2Learn - Desire2Learn eLearning solutions

- CyberExtension - Virtual Managed Learning Environment
- It's Learning - Norwegian Closed Source System (written in ASP.NET)
- WebTrain - Virtual live classes, enrollment, attendance, attention monitoring.

(Source: Wikipedia, 2009)

You should find out more information about each of the virtual learning environments highlighted in 3.2.3 above.

SELF ASSESSMENT EXERCISE 2

In your own words, explain the concept of virtual learning, and enumerate the various synonymous terms associate with it worldwide.

3.3   Virtual Classrooms/Virtual Schools

Virtual classrooms are synonymous with virtual schools and virtual universities. From this point of view, you can use some basic information about one for the others.

3.3.1 Brief History of Virtual Schools

Virtual schools are offshoots of correspondence schools which were also referred to as correspondence distance learning schools. These schools utilised the postal service for student-teacher interaction, or used two-way radio transmissions, sometimes with pre-recorded television broadcasts. Students were expected to study their learning material independently and, in some cases, meet with a proctor to be tested. Modern virtual schools provide similar alternatives to students with a more ubiquitous and, often, interactive approach.

Virtual Schools now exist all around the world. Some of these virtual schools have been integrated into public schools (particularly in the United States), where students sit in computer labs and do their work online. In other situations, students can be completely homeschooled, or they can take any combination of public/private/homeschooling and online classes (Wikipedia, 2009).

Virtual School Materials

The following categories of materials are very essential for virtual schools:

- Computers (Laptops or Desktops)
- Operating Systems (Microsoft, Linux or Apple Macintosh)

- Internet
- Software products (Adobe, Corel, Macromedia, MS-word, MS-excel, MS-PowerPoint)
- E-learning software packages (dedicated courseware).

Advantages and Disadvantages of Virtual Schools

Advantages

1. Learners do not need to be physically present in a classroom.
2. Integration of digital media into the curriculum in an interactive format making teaching and learning more student-centered is made possible by online study.
3. More people who ordinarily could not gain access to the traditional school system have the opportunity of education through online studies.
4. Immediate knowledge of results is made possible most especially when evaluation of course content is by multiple choice questions.

Disadvantages

1. Learners in virtual schools must be self motivated as it is practically impossible to motivate them through the Internet in the asynchronous model.
2. Lack of socialisation of learners in the synchronous model of online studies.
3. Virtual learning has a reputation problem as quality teaching and standards assurance are considered as challenges.

SELF ASSESSMENT EXERCISE 3

Discuss the advantages and disadvantages of virtual schools.

3.4   Virtual Universities

3.4.1 Definition of Virtual Universities

The term **"virtual university"** is used to describe any organisation that provides higher education programs through electronic devices such as the computer. Some of the Universities are real institutes, the bricks and mortar type that provide online learning as part of their extended university courses while others provide courses only on-line (Wikipedia, 2009).

In describing virtual universities further, Wikipedia (2009), stated that some of these organisations exist only as loosely tied combines of universities, institutes or departments that together provide a number of courses over the Internet, television or other media, that are separate and distinct from programs offered by the single institution outside of the combine. Others are actual organisations with a legal framework, yet named virtual because they appear only on the internet, without a physical location aside from administration units. Still, other virtual universities can be organised through specific or multiple physical locations, with some having actual campuses to receive program delivery through technological media that is broadcast from another location, where real professors give televised lectures.

Goal of Virtual Universities

The goal of Virtual Universities is to provide access to that part of the population who would not be able to attend a physical campus, for reasons such as: (1) distance - where students live too far from a physical campus to attend regular classes; (2) need for flexibility – some students need the flexibility to study at home whenever it is convenient for them to do so.

Program delivery in a virtual university is administered through information communication technology such as web pages, e-mail and other networked sources. When the term "virtual" was first coined in the computational sense, it applied to things that were simulated by the computer like virtual memory. Over time, the adjective has been applied to things that really exist and are created or carried on by means of computers.

Students taking so called "virtual" courses are doing "real" work to get their degrees and educators preparing and teaching those courses spend plenty of "real" time in doing so. That is, students meet rigorous academic learning outcomes and evaluations through programs constructed by credible academics according to standard university-level criteria. Many Virtual Universities are accredited in the same way as traditional universities and operate according to the same academic standards. These universities can grant degrees that will be recognized around the world. Online programs can be marketed to any person who has on-line access to provide learning experiences and training in an open access format.

A Brief History of Virtual Universities

Before the advent of Virtual Universities most higher education institutes offered some distance education which consisted of print-

based correspondence courses. These courses were often referred to as a "course in a box". Whenever a student signed up for a course through distance education, they would receive a package from the university that included all of the materials that they would need for the course. There are still courses being offered this way and most universities have distance education or continuing education departments. The downside to the old correspondence courses was that, if a student had a question or a problem then they had to rely on the regular mail to get their answers. This could involve weeks of waiting for a reply. The good news is that today, students who study through correspondence like courses can get almost immediate feedback from professors and online tutors through e-mails or online discussions. The defining characteristic of all forms and generations of distance education is the separation of student and teacher in time and space. Distance education can be seen as the precursor to online learning.

The Open University in the United Kingdom was the world's first successful distance teaching university. It was founded in the 1960's on the belief that communications technology could bring high quality degree-level learning to people who had not had the opportunity to attend campus universities. The idea for a "wireless university" was first discussed at the BBC (British Broadcasting Corporation) by the educationalist and historian J. C. Stobbart. From these early beginnings more ideas came forth until finally the Labour Party under the leadership of Harold Wilson formed an advisory committee to establish an Open University.

With the goal of bringing higher education to all those who wanted to access it, the committee came up with various scenarios before settling on the name Open University. The first idea floated in the UK was to have a "teleuniversity" which would combine broadcast lectures with correspondence texts and visits to conventional universities. In the "teleuniversity" scenario courses are taught on the radio and television and in fact many universities adopted the use of this technology for their distance education courses. The name "teleuniversity" morphed into the "University of Air" which still had the same goal of reaching the lower income groups who did not have access to higher education. The name "University of Air" did not stick and by the time the first students were admitted in January 1971 the name had become what it is today "Open University". 'OU' proved that it was possible to teach university-level courses to students at a distance.

(Source: Wikipedia, 2009).

Skills Needed for Online Studies

Highlighted, are some of the skills that you need for online studies:

- Mastering software tools
- Developing new study habits
- Knowing how to access on line academic resources
- Confidence to do well. Students who lack self-confidence, often have poor learning skills and may develop considerable anxiety and fear of failure
- Students need to be highly motivated and be able to learn on their own without much direction,
- Need excellent time management skills to ensure that they get the work completed when it is due,
- Ability to ask for help. Services for students often include tutorials between student-tutor, and student-student, help desks, counselling and advising plus technical support.

Online Teaching Modes

When on-line courses first began the primary mode of delivery was through a two way audio/video network. Then, as well as now, many of the virtual study programs were/are mainly based on text documents, but multimedia technologies have become increasingly popular as well. These web-based delivery modes are used in order to expand access to programs and services that can be offered anytime and anywhere. The spectrum of teaching modes in virtual education includes courses based on hypertext, videos, audios, e-mails, video conferencing. Teaching on the web through courseware such as WebCT and BlackBoard are also used (Wikipedia, 2009).

SELF ASSESSMENT EXERCISE 4

Describe the concept of virtual universities stating the skills that you will need for a successful study in one such as the NOUN that you have registered in.

3.5   Virtual Libraries

3.5.1 Definition of Virtual Library

Virtual library is digital and Internet based. A digital library would be simply a library that involves information technology, whether a brick-and-mortar library equipped with networked computers or a library that exists exclusively in electronic form, whereas a virtual library could only be the latter of these. (The Free Online Dictionary, 2009). Put in

another way, a virtual library is basically a library that is completely online. In a virtual library, you can find virtual encyclopedias and journals as well as books pertaining to any subject. A virtual library is typically used in the university settings.

Examples of Virtual Libraries

It will interest you to know that there are thousands of virtual libraries on the Internet and on any subject that you can access for your online study. Some of them are listed below:

- ITT Virtual Library
- Free Virtual Library
- Alabama Virtual Library
- United States Virtual Library
- Kentucky Virtual Library
- National Library of Virtual Manipulative
- Read Books Online Free
- Free Online Library
- Library of Congress

(Source: Ask.com Answer.mht, 2009.)

As you can see, some of these virtual libraries are entirely free while in some others, you will be required to register as a member on the Internet (i.e. virtually) before you can use the facilities.

SELF ASSESSMENT EXERCISE 5

Define the concept of virtual library stating five examples and how you can use their facilities.

4.0   CONCLUSION

Virtual reality has undergone tremendous development since the early 50s when it was first mooted. It has since gained global attention in providing high tech approaches to the ways we learn, do science and explore difficult terrains of the earth including the human body. For instance, the number of people who had been educated virtually had greatly increased over the years. Virtual reality promises to be the 'real' method of executing 'difficult' activities as we experience in modern times and in educating a large number of people. So many library resources could be accessed virtually on the Internet from virtual libraries at only the press of your fingers on the computer keyboards.

5.0　SUMMARY

In this unit, you learnt about the concept of virtual reality and have been exposed to how to relate it to learning and education in general especially, virtual schools and virtual universities. Skills and materials that you need to undergo a successful online study like the one you are currently doing at NOUN. We also discussed brief history of virtual schools and virtual universities. You learnt that online studies developed out of the old correspondence schools into what they are today as a result of developments in computing and the Internet and have made education possible for many people like you who ordinarily could not study in the traditional school systems.

6.0　TUTOR-MARKED ASSIGNMENT

1.　In your own words, define the concept of virtual reality.
2.　Relate the concept of 'virtual' to learning, classrooms, universities and libraries.
3.　State the advantages and disadvantages of virtual schools.
4.　Enumerate the skills and materials needed for studying online.
5.　List five virtual learning environments and write brief notes on each.
6.　What are the teaching modes required for virtual learning?
7.　State a brief history of virtual universities.

7.0　REFERENCES/FURTHER READING

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UNIT 3   QUALITY OF LEARNING ENVIRONMENTS

CONTENTS

1.0   INTRODUCTION

The word 'platform' has adopted a technical meaning especially when the term "learning Platform" is used. This refers to the software adopted by a school for effecting its learning programmes in shared web-based learning spaces. In this unit the word "platform" will be used in a more generic form to describe the physical environment that supports a learning programme.

The forgoing developments in technology based facilities for learning, as described in units 1 and 2 above demand that the physical space for learning should also be adaptive, stimulating and dynamic.

This unit will attempt to draw your attention to evolutions in the types of learning environments required for the 21st Century learning modes. Some contrasts will also be drawn between classrooms in the developing world and those in more technologically advanced countries.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

• describe new architectural developments in school building design
• discuss the school environment problems of third world nations
• advice on school construction for your own part of the world
• develop designs for classroom space to accommodate different learning experiences.

3.0 MAIN CONTENT

3.1   Learning Environment in the 21st Century

Today's learners are described as "digital natives" in contrast to their teachers who learnt under less technology based school cultures. They work on learning platforms which can be described as a collection of virtually spread digital tools that enhance communication between teacher and learner, learner and learner, learning groups and learning communities.

Such communication in the simplest forms, include e-mails, facebook, blogs, virtual chat rooms, etc. Can you mention any more shared virtual learning spaces or environments? Which ones have you experienced? The digital native generations are multi-taskers. They live virtually on-line, constructing and collaborating, supported by universally available digital tools and resources.

However, whether privately, or in a school setting, virtual learning is supported by a physical environment consisting of computer ware, furniture, walls, windows etc. Every learning space has physical boundaries and facilities. The school environment has therefore witnessed more attention from architecture in a bid to keep pace with space designs for the new learning modes.

The "classroom" has witnessed transformation into hi-tech environment. You will need to visit some school design websites to view architectural transformations of school space. Download some school site plans and building plans and try to relate them to the following factors:

a)   the geographical location and climate
b)   the school programmes accommodated
c)   the learning facilities required for the school programmes
d)   the level of schooling (kindergarten, secondary, etc)
e)   the technological support available for school work.

When you have concluded the above assignment, you would have observed that much attention is given to making learning spaces very roomy and adaptive.

Another item in school space that is gaining attention is furniture. Collaborative learning is encouraged by the placement of furniture and equipment. The school space has been made to recognise ergonomic principles promoting comfort in a work place. Furniture, work surfaces/ stations, ventilation, temperature, lighting, colour schemes, all attract

more attention now in school design. These designs acknowledge the flexible nature of modern learning.

Trends in school design also include:

- Open learning designs (provisions for on-line delivery)
- Community centre designs (where the school shares facilities with the community)
- Classrooms of the future (where projections are made to accommodate anticipated shifts in curriculum, technologies, and facilities).

SELF ASSESSMENT EXERCISE 1

Reflect on education in your country. When do you expect the "digital natives" to arrive? How would you prepare the school environment to accommodate them? Make sketches of your answer.

3.2　Compromised Learning Environments

Here is food for thought. The following article appeared in the *Thisday* newspaper recently (25/1/2010):

- "Dawn has just broken but classes have already started in the village school of Aqualaar in the Garissa district of Kenya's arid north-east. Around 30 children, mostly from the families of Somali herders, sit listening as an enthusiastic 18-year-old teacher, Ibrahim Hussein, gives an arithmetic lesson. The school is really little more than a sandy patch of ground under an acacia tree. Mr. Hussein's blackboard hangs from its branches. There are no chairs or desks. Pupils follow the lesson by using sticks to scratch numbers on the sand".

Can you think of any part of your country where the above passage can describe the education provision? Examples abound every where even in the most advanced states of Nigeria. Rural, riverine, mountainous, and nomadic communities all suffer one form of neglect or the other (Nwaboku, 2006). These issues will be discussed in module 3.

In the poorer nations of the world, school in its traditional sense of four walls enclosing a space with desks and chairs is still a luxury. In rural areas "open" learning is the norm. The educational technologist and teachers in these areas are led to grapple with the concept known as "improvisation". Teachers are taught to develop instructional materials from locally found or discarded used materials. In basic level science

classes this strategy of instructional material provision has assumed an all important position in the teacher training curriculum.

It is your business as an educational technologist to draw attention to the need for basic amenities to be provided in schools, and to find ways of improving the instructional process in schools, irrespective of the financial constraints.

In urban communities the learning environment in schools are usually in considerably better condition. Can you give the reasons for this? You can however assist in the improvement of facilities in your community without necessarily committing more funds. Pay a visit to your neighbourhood school. Can you think of changes in the layout of the buildings that could have improved the aesthetic appearance of the school? Can you make suggestions for colour use to improve the look of the buildings? Which important facilities could be added at affordable costs? How attractive is the whole environment for learning?

SELF ASSESSMENT EXERCISE 2

Where else could the school described be held in Aqualaar? Prepare a document for the local authorities in Garissa, outlining why attention should be paid to the plight of learners in the district and give suggestions on a line of action.

3.3   Adapting Classroom Space

The following skills have been identified as vital for 21st century citizenship and could serve as a framework for preparing students for a global economy.

- Mastery of core subjects
- Collaboration, i.e. working as part of a team
- Critical thinking, i.e. ability to tackle complex problems and concepts
- Oral communication, the ability to present ideas verbally
- Technology use
- Citizenship understanding civic and international issues
- Career learning; engaging in internship and experiential learning
- Content, conducting research and developing content to support all the above skills.

The learning content and strategies required for developing the above skills in a learner will also be diverse and require different settings of the learning environment. Following the design principle of "form follows

function" can you adapt a single classroom for the strategies that would develop any five of the skills above?

A school in a rich neighbourhood could afford to equip a different space for the learning of each skill. It would however be much more economical to adapt a single classroom to accommodate as many strategies and modes as possible. Think of ways in which learning corners could be culled out of a normal classroom.

When consulting for a new school, you may not be an architect, but you should be in a position to advice on how to make a room more flexible for learning. First, start with the idea that a classroom does not have to be rectangular. A built in storage space is better than shelves in the classroom. Carpets on parts of the floor can be used by children for sitting or working on the floor. A reserved space for private reading or group work is not out of place in a class room.

SELF ASSESSMENT EXERCISE 3

Draw a floor map of a classroom of your own design, showing 4 parts specially designed for different activities,

4.0   CONCLUSION

The nature of learning in the 21st Century has led to new dimensions in the design of learning spaces. Learning space is now adapted to support the use of information and communication technologies, provide more space for constructive and collaborative learning processes and be generally flexible in nature to allow for sharing for various activities.

A contrast has been drawn between school facilities in rich and poor communities of the world. An attempt has been made to draw your attention as an educational technologist to issues related to adequacy of facilities for schools.

5.0   SUMMARY

In this unit you would have learnt the nature of the physical environment that supports on-line virtual learning programmes, computer managed learning and traditional school environments. Your attention has been drawn to the need to improve learning environments in the more impoverished communities.

You should also have visited relevant websites for the study of school designs and visited your neighbourhood schools with the intention of making suggestions for their improvement.

6.0   TUTOR-MARKED ASSIGNMENT

1.   What are the skills required by a learner for functioning in a 21st century economy?
2.   How would you provide learning spaces in a Nigerian school for developing these skills?

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MODULE 2   OVERCOMING   SPATIAL   AND TEMPORAL BARRIERS IN EDUCATION

Unit 1   Open Learning Systems
Unit 2   Facilities / Media for Distance and Open Learning
Unit 3   On-line Course Delivery

UNIT 1   OPEN LEARNING SYSTEMS

CONTENTS

1.0   Introduction
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        3.4   Electronic Learning (e-learning)
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5.0   Summary
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1.0   INTRODUCTION

A major strategy in overcoming spatial and temporal barriers in education is the provision of instruction to learners who may not have direct access to the traditional teacher-learner contact within the framework of a school, through the open learning system. Modern computer mediated technologies and other instructional media are used in delivering 'regular' instructions and learning facilities in educating the students who desire to get educated despite constraining opportunities. As you may likely agree, judging from your own situation that it is, not every individual that desires education has the opportunity of realising such dreams in a regular school or institution for one reason or the other. Consequently, it is important for the educational system to cater for the aspirations of such individuals through the provision of qualitative education similar to what they would have got in any school or institution by utilising modern technologies in 'filling the gaps'.

 One of such technologies in recent times is referred to as ubiquitous learning (u-learning). The concept of ubiquitous learning is closely associated with what is generally referred to as ubiquitous computing, a component of the open learning system, as you will soon find out in this unit. You will also come to terms with the fact that the concepts of u-

learning, open learning, distance education and electronic learning (e-learning) are closely related and in actual fact, they are components of the open learning system.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- explain the concept of open learning system
- enumerate the characteristics of the open learning systems
- define the concept of 'ubiquity' using your own words
- relate the concept of 'ubiquity' to; 'learning environment' as in 'ubiquitous learning environment'
- state some learning theories that support ubiquitous learning
- explain the concept of 'open learning'
- describe open educational resources
- define electronic learning
- express the teaching modes for electronic learning.

3.0   MAIN CONTENT

3.1   Open Learning Systems

Defining Open Learning Systems

In looking at the concept of open learning systems, you should first understand the concept of 'openness' which has been described in Wikipedia (2009) as a communal management, and open access to the information or material resources needed for projects; openness to contributions from a diverse range of users/producers/contributors. If you now relate this to 'learning' then you have an 'open learning' which means a learning that is free to all to access and contribute to through the Internet. I am sure that you know that the term 'system' connotes an entity with several interrelated components that work together for a common purpose; in this case, learning that can be freely accessed over the Internet.

Characteristics of Open Learning Systems

The open learning system is a learner oriented educational system that has completely changed the traditional role of the teacher to that of a manager and facilitator of the learning system. Wedemeyer (1973) identified the following characteristics of open learning systems:

1. The system must be capable of eliciting, interpreting and analysing the learner goals at the entry point and throughout the student's contact with the instructional and learning programme.
2. The system must acknowledge that it embodies two separate but related programmes—the instructional programme carried on by the system, and reflecting the needs and aspirations of learners working towards mutually agreed goals; and the learning programme carried on by learners with the assistance of the system.
3. The system must be capable of enabling learners to participate in the programme of learning and instruction without imposing traditional academic entry requirements, and without the pursuit of academic degree or other certification as the <u>exclusive</u> reward.
4. The system must require formulation of learning objectives in such a way that they can serve as the basis for decisions in instructional design, including evaluation, and in such a way that they will not only be fully known and by the students, but so that the students can participate in decision making.
5. As an operating principle, the system must be capable, after reaching a critical minimum of aggregation, of accommodating increased number of learners without a <u>commensurate</u> increase in the unit cost of the basic learning experience: i. e., costs must not be <u>directly</u> and <u>rigidly</u> volume sensitive. After reaching the necessary level of aggregation, unit costs should show a diminishing relationship to total system costs.
6. The system should make it operationally possible for the methodologies for instruction and learning to employ sound, television, films and print options to mediating learning experiences.
7. The system must use testing and evaluation principally, to diagnose and analyse the accomplishment of specified learning objectives, including the objective of self-directed rather than other-directed learning.
8. The system must be able to tolerate distance between the instructional staff resources, the learner, and employ the distance factor as a positive element in the development of independence learning.
9. The system must accept the learner and his surround as the environment for learning, and must concentrate on enriching that environment instead of concentrating solely on developing specialised teaching environments which intrude barriers of place, space, time and direction of learning.
10. The system must seek, obtain and maintain the active cooperation of the community and regional resources which can be a factor in enriching the learning environment in diminishing learner dependence on a single resource, and in returning learning as a

natural and continuing activity to the living space, the indigenous learning environment which includes; living, working recreating and learning as an essential step towards the "learning society".

Now, if you critically study these characteristics of the open learning system as posited by Wedemeyer (1973), you would have noticed that they might have developed out of what you can call conditions for an effective open learning system. He himself went on further to accept that these characteristics were tentative and therefore still developing as at that time (1973) and some of them will remain, some will go or be modified or combined with others, and new ones will be formulated.

SELF ASSESSMENT EXERCISE 1

Study the characteristics of the open learning system as given by Wedemeyer (1973) and find out which of them are quite obsolete now, which can be retained or combined by sourcing for more modern characteristics of the open learning system on the Internet.

3.2   Ubiquitous Learning Environment (UVE)

It is very essential that you are able to put into the right perspective, the concept of ubiquitous learning (u-learning) with respect to other computer-based technologies of the instructional system. U-learning is of course the most recent or if you like, most advanced of these two computer based technologies in education; electronic learning (e-learning) and mobile learning (m-learning). U-learning or the creation of the u-learning environment (ULE) arose out of the work of Mark Weiser, a researcher at Xerox PARC who coined the term, 'ubiquitous computing' in the late 1980's (Jones and Jo, 2004). The questions here are:

- What is ubiquitous computing?
- What is ubiquitous learning?
- What is ubiquitous learning environment?
- What does the concept of ubiquitous portend?
- When you understand the last question, you will be able to use it in answering the other three.

Defining the Concept of 'Ubiquity'

'Ubiquitous' is an adjective which simply means any of these:

- Ever-present
- Everywhere
- Omnipresent

In other words, whatever 'ubiquitous' describes, is 'ever-present', 'everywhere' or; 'omnipresent'. It takes place without you actually knowing.

What is Ubiquitous Computing?

Ubiquitous computing can be described in the words of Jones and Jo (2004) as the process of seamlessly integrating computers into the physical world. As we move towards a more ubiquitous computing environment, the presence of computers is becoming less conspicuous and will eventually blend into our everyday lives. When using a PC the user's attention is, in general, focused on the screen. As computers become ubiquitous, they will cease to be the focus of activity, allowing them to fade into the background. As well as personal computers (PCs), ubiquitous computing includes computer technology found in microprocessors, mobile phones, digital cameras and other devices. The implication of this description of ubiquitous computing is that, in these modern times, computing is no longer limited to working on computers alone but with any device that has a microprocessor in it such as; a personal digital assistance (PDA), cell phones, key boards, digital cameras, palmtop computers, etc. Many of these devices are these days available to an individual that is technology immersed, leading to a concept referred to by Weiser (1993) as: 'many to one relationship between computer and human'.

What is Ubiquitous Learning?

The quality of ubiquitous computing has been related to learning where a student may interact with many microprocessor-embedded devices or objects for learning purposes. In the ubiquitous classroom, students move around Ubiquitous Space (u-space) and interact with the various devices (Jones and Jo, 2004) thus learning in the process. This sort of learning is seamless and can take place at anytime and anywhere (a concept referred to as 'right time and right place learning/RTRPL) without the traditional teaching and learning structures that could be stressful. Learning in a u-space or u-learning environment takes place at the beckon of the learner and consequently, more interesting and rewarding to the learner than learning in the traditional setting.

What is Ubiquitous Learning Environment?

An ubiquitous learning environment is any setting in which students can become totally immersed in the learning process:

- **Ubiquitous** = pervasive, omnipresent, ever present, everywhere
- **Learning** = educational, instructive, didactic, pedagogical
- **Environment** = surroundings, setting, situation, atmosphere

So, a **ubiquitous learning environment (ULE)** is a situation or setting of pervasive (or omnipresent) education (or learning). Education is happening all around the student but the student may not even be conscious of the learning process. Source data is present in the embedded objects and students do not have to do anything in order to learn. They just have to be there (Jones and Jo, 2004). According to them, A ULE can provide the props and stimuli needed to easily encourage student involvement but without needing the active attention of the student. The benefits of the many to one relationship found in u-learning include the potential for one ULE (of many devices) to service an unlimited number of individuals at once. Essentially, 'the many to one relationship' exists for every one of the students within the environment.

Your major job at this moment is to think about how to create a ULE in your subject area and give your learners endless joy of learning the way they want to these days.

To help you, let's take a look at a ULE described by Jones and Jo (2004) in order to assist you in developing your own ULE:

Figure 1 shows an example of four students within a ULE in which there are five ubiquitous objects/devices. Each student is part of the many to one relationship within this u-space. It is immaterial which particular device the student is currently interacting with, as all devices are networked and communicating within the Ubiquitous Space (u-space) - see the purple dotted lines linking the objects in figure 1.

So if **Student 1** is interacting with **Object 1**, all devices that are part of the network are aware of this interaction. However, for each student the relationship is unique and their interaction is uninterrupted by the interaction of others. This also allows each student to progress through the learning experience at their own pace.
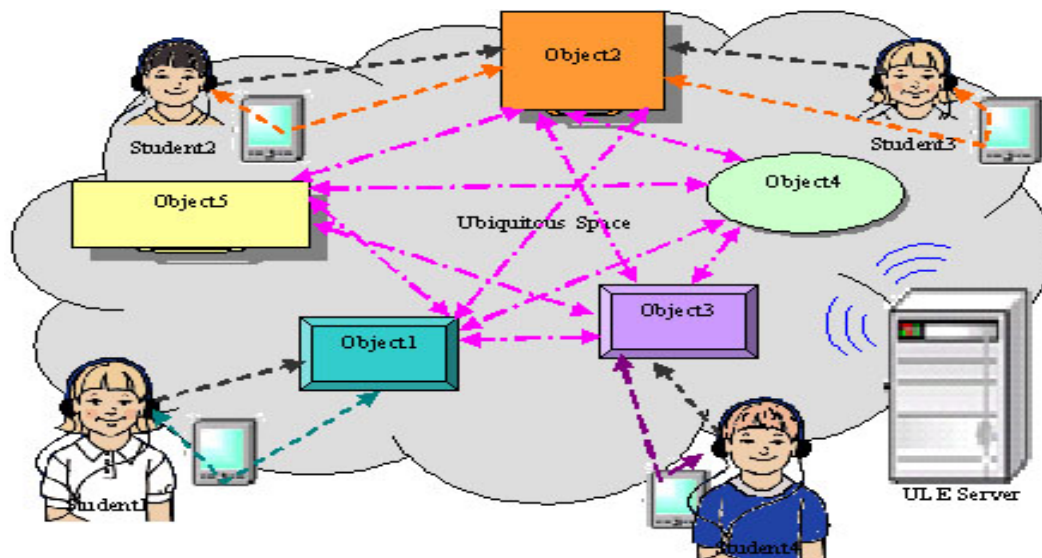
Fig. 1:   Students within U-space
(Source: Jones and Jo, 2004)

Components of a Ubiquitous Learning Environment

The ULE components according to Jones and Jo (2004) include:

1. *Microprocessors* with memory will be embedded in every object/device. The information each microprocessor will hold will be about the object. When a student approaches, the sensor detects their presence and will start relaying information to the student's PDA.
2. *ULE Server Module* will include the Server, the Educational Strategies Unit and a Database:

The *ULE server* manages the network resources:

*   **The *Educational Strategies Unit*** allows for the application of strategies to reinforce and aid student understanding through interaction and feedback. It analyses student responses to short quiz questions and returns more information or information in a different form when needed
*   *Data Base* – stores all the data about the 'objects/devices', the users and the interactions that occur.

3. *Wireless Technology* – this will be in the form of Bluetooth and Wi-Fi:

*   *Bluetooth* has weak signal strength, uses little power and covers a relatively short distance. Its low power consumption and ability to communicate with many devices is extremely beneficial when using handheld devices.

- *Wi-Fi,* based on the IEEE 802.11 specification, has a range and speed which surpasses that of
- *Bluetooth.* It is compatible with any brand of Access Point and client hardware built to the Wi-Fi standard (Brevard User's Group, 2002).

4.   *Sensors* will be used to detect any changes in surroundings. These will be placed adjacent to the objects/devices and will be used to recognise the presence of students. The sensors used will include proximity, to detect movement, and light, to detect changes in light intensity.

Characteristics of Ubiquitous Learning

The main characteristics of ubiquitous learning are shown as follows (Chen et al., 2002; Curtis et al., 2002. In Ogata and Yano, 2009):

- **Permanency:** Learners can never lose their work unless it is purposefully deleted. In addition, all the learning processes are recorded continuously in everyday.
- **Accessibility:** Learners have access to their documents, data, or videos from anywhere. That information is provided based on their requests. Therefore, the learning involved is self-directed.
- **Immediacy:** Wherever learners are, they can get any information immediately. Therefore learners can solve problems quickly. Otherwise, the learner may record the questions and look for the answer later.
- **Interactivity:** Learners can interact with experts, teachers, or peers in the form of synchronies or asynchronous communication. Hence, the experts are more reachable and the knowledge is more available.
- **Situating of instructional activities:** The learning could be embedded in our daily life. The problems encountered as well as the knowledge required are all presented in the nature and authentic forms. It helps learners notice the features of problem situations that make particular actions relevant.
- **Adaptability:** Learners can get the right information at the right place with the right way.

Moreover, ubiquitous learning can be Computer Supported Collaborative Learning (CSCL) environments that focus on the socio-cognitive process of social knowledge- building and sharing.

Learning Theories that Support Ubiquitous Learning

Three major learning theories support ubiquitous learning. They are:

- Adaptive learning theory, and
- Collaborative learning theory
- Constructivist learning theory.

Now, I want you to find out about these three learning theories and relate them to ubiquitous learning and ubiquitous learning environments.

SELF ASSESSMENT EXERCISE 2

Explain the concept of 'ubiquitous' and relate it to: computing, learning and environment; giving five components and five characteristics of ubiquitous learning environment.

3.3   Open Learning, Open Educational Resources

Defining Open Learning

Open learning has been described as a type of teaching method that allows students' self – determined, independent and interest-guided learning (Wikipedia, 2009). In open learning or open education, knowledge, ideas or important aspects of teaching methodologies or infrastructure are shared freely over the internet (Wikipedia, 2009). If you take a critical look at these two descriptions of the same concept, 'open learning', you will observe that they describe the totality of the instructional system including the pedagogy, content (knowledge or ideas) and infrastructure or resources all to be shared FREELY that is, with open access over the internet. So, we cannot talk about open learning without giving considerations to open educational resources which are the conveyors of open learning or education.

Defining Open Educational Resources (OER)

UNESCO (2002) described open educational resources giving their components as:

> …educational materials and resources offered freely and openly for anyone to use and under some licenses re-mix, improve and redistribute. Open educational resources include:

- *Learning content*: full courses, course materials, content modules, learning objects, collections, and journals.

- ***Tools****:* Software to support the creation, delivery, use and improvement of open learning content including searching and organisation of content, content and learning management systems, content development tools, and on-line learning communities.

- ***Implementation resources****:* Intellectual property licenses to promote open publishing of materials, design-principles, and localisation of content.

The definition of OER currently most often used according to OECD/CERI (2007) is "digitalised materials offered freely and openly for educators, students and self-learners to use and reuse for teaching, learning and research". OER includes learning content, software tools to develop, use and distribute content, and implementation resources such as open licenses. This OECD/CERI (2007) definition suggests that "open educational resources" refers to accumulated digital assets that can be adjusted and which provide benefits without restricting the possibilities for others to enjoy them.

You should please note that, despite the facts that open learning, open education or open educational resources are freely accessible on the internet, their utilisation for whatever purposes especially academic are not without intellectual property concerns or guidelines as the two definitions above have shown. We should be talking about this later in Module 3, Unit 4.

Who is Using and Producing OER and How Much?

The learning content at issue is open courseware, i.e. educational material organised as courses and typically distributed as PDF files, as well as smaller chunks of learning, often referred to as learning objects. The content may involve websites, simulations, text files, images, sound or videos in digital format, some only for use and others open also for adaptation and reuse. Although no definite statistics are available, there is a rapid expansion in the number of OER projects, as well as the number of people involved and the number of resources available. In January 2007, the OECD identified over 3,000 open courseware courses available from over 300 universities worldwide. In repositories such as MERLOT, Connexions, Open Learn and others, there are hundreds of thousands of pieces of content or materials representing thousands of freely available learning hours.

Although the dominant language so far is English, translation of resources combined with a growing number of non-English OER

projects cater for greater language diversity and increased global use. The potential number of users is enormous.

With the scattered data available, only a general picture can be given of the users.

Williams and Flora Hewlett Foundation

It will be practically impossible to acquire information about open learning or open educational resources without mentioning the roles of the William and Flora Hewlett Foundation in the development of open learning systems. You will need to check out the involvement of the foundation from its website:

http://www.hewlett.org/Programs/Education/OER/openEdResources.htm.

The website contains information about the projects the Foundation has funded including grantee reports.

SELF ASSESSMENT EXERCISE 3

Explain the concepts of 'open learning' and 'open educational resources (OER)' detailing the components of OER.

3.4   Electronic Learning (e-learning)

Defining E-Learning

Much of what you have done so far in this unit could be termed electronic learning or e-learning (e-Learning). These are two ways of referring to the same concept. According to Wikipedia (2009), it does not have a common definition but most frequently it seems to be used for web-based distance education, with no face-to-face interaction. However, also much broader definitions are common. For example, it may include all types of technology enhanced learning (TEL), where technology is used to support the learning process (Wikipedia, 2009). This is the situation in most current instructional systems deployed in some private schools and some public schools with organisational supports from GSM companies such as MTN in Nigeria. More often than not, the definition of e-learning could be ambiguous, depending on what it is used for and who is using it.

One thing you should understand here is that, e-learning signifies some sort of pedagogy with which learning is transported via digital technology of any kind that use the computer in most cases. Clark (2002), simply defines e-learning as, "content and instructional methods

delivered on a computer (whether on CD-ROM, the Internet, or on intranet), and designed to build knowledge and skills related to individual or organisational goals." In whatever form that it is used, e-learning connotes that learners' access information online or use the internet to receive instructions from expert instructors separated from them in time and space. In this case, the face-to-face traditional pedagogy is completely eliminated. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term Blended learning is commonly used (Wikipedia, 2009).

E-Learning Vs Traditional Learning

The e-learning lends itself to personalised learning. Martinez (2002), observed that the transition from classroom teacher-directed to online user directed has not always been smooth. According to her, students have learned to depend (often too much) on instructors for their motivation, direction, goal setting, progress monitoring, self-assessment and achievement. Contrasting this attitude, in online learners (e-learners), greater responsibilities have been taken by the learners for what they know even if they do so reluctantly due to their long exposures to the traditional pedagogy for too long.

Teaching Modes for Electronic Learning

You should investigate the utilisation strategies that you can deploy in applying the e-learning system in your subject area. In executing this assignment, you will need to access information using the appropriate search engine on the Internet.

4.0 CONCLUSION

Overcoming spatial and temporal barriers in education is fast becoming a great reality in education with the advent of modern computer technologies and products. Education has been brought closer to distance learners who now receive some sort of qualitative education via the internet. In making the education really qualitative, organisations like UNESCO/IIEP, OECD/CERI and other private and corporate organisations have developed open educational resources (OER) of various modalities in ensuring that distance learners have open access to quality courseware needed for cost effective distance education based on the principles of Right Time and Right Place Learning (RTRPL). Further developments such as the ubiquitous learning environments are still being made as more advanced computer technologies are evolving.

5.0 SUMMARY

In this unit, you had studied the concept of open learning system and come to terms with the concepts of; 'ubiquitous' as an adjective describing and ever-present, everywhere and omnipresent situations or components, thus relating it to computing, learning, and learning environments. We had been able to define the concepts of 'openness' in relation to open learning and open educational resources. We realised that despite the fact that the OERs are open and free to use, manipulate and distribute, they have the challenge of requiring licenses for implementation purposes in order to run foul of intellectual property laws (remember that we said that we will study this concept in Module 3, Unit 4).

You were able to find out that it would have been practically impossible to have the open educational resources as they are today without the funding of the William Flora Hewlett Foundation that sponsored most of the developments of OERs. Finally, you also studied the concept of e-learning in its ramifications.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the concept of "open learning system", giving five characteristics of open learning systems.
2. Relate the concepts of 'ubiquitous computing' and ubiquitous learning.
3. Describe a ubiquitous learning environment stating its components.
4. State two learning theories that support open learning.
5. How did the William and Flora Hewlett Foundation assist in the development of OER?
6. Define electronic learning (e-learning) and state its teaching modes.

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UNIT 2   FACILITIES/MEDIA FOR DISTANCE AND OPEN LEARNING

CONTENTS

1.0   Introduction
2.0   Objectives
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       3.3   Digital/Virtual Library
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5.0   Summary
6.0   Tutor-Marked Assignment
7.0   References/Further Reading

1.0   INTRODUCTION

Many Distance Education (DE) courses make use of the internet and its associated technologies to deliver course work to learners' desktop.

DE courses vary in format and may be supported with a variety of technology tools and media. Some are structured such that learner can complete them on their own, while others provide a more specific set of deadlines and opportunities to collaborate with classmates. With either option, a faculty member will provide direction to all learners to complete the course.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- identify various facilities in use for distance and open learning
- explain different options and technologies for internet access in open and distance learning
- explain the concept of semantic web
- explain the concepts of digital and virtual libraries
- identify challenges to digital/virtual libraries.

3.0   MAIN CONTENT

3.1   Internet Facilities and Access

A variety of options and technologies are available for consideration when deciding whether and how to access the Internet.

Simulated Internet

If direct connection to the Internet is not possible, for economic or technical reasons, students and teachers can still gain simulated access to a selection of internet resources by copying valuable Websites to CD-ROMs. Then they can use the CDs to access these sites, thus simulating the Internet.

Also, since these internet resources are stored locally, no time is spent waiting for Websites to load. Even if Internet access is available, a CD with copied Websites can make it easier for students to access Internet resources rather than relying on a slow, congested connection.

Dial-up Connection

The simplest and lowest-cost connection to the Internet is through dial-up access using a single standard phone line. A dial-up connection can provide Internet access to a single computer (for example, in a lab, classroom, teachers' room, or library) or, by using software on a server, networked computers can share this single connection. However, with a shared connection, access can become very slow, since the total available bandwidth (the total amount of data that can be moved through the network per unit of time) is divided among all the computers sharing the same Internet connection.

If two or three phone lines are available, these lines can be combined using an analog router to enable multiple phone line access to an ISP, thus increasing available bandwidth.

Dedicated Connection and Other Connectivity Options

Schools can get faster and more reliable Internet access by using permanent "dedicated" high-speed connections where they are available and affordable.

A variety of dedicated high-bandwidth options may be available to schools, including integrated services digital network (ISDN), digital subscriber line (DSL), terrestrial wireless, digital cable, radio modem, and satellite access, as described below.

Terrestrial Wireless

Cellular telephony has become the first and only telephone service for many *Cellular* people in developing countries, where it may be available much sooner than fixed-line service. If no fixed lines are available, but there is cellular service, a cell phone with a cellular modem can be used

to allow access to the Internet. However, cellular access is often quite costly, and bandwidth is limited.

It is likely to be more practical for short bursts of use for e-mail communication than for surfing the Web.

Wireless local loop: Wireless local loop systems can be used to extend local telephone services to rural schools without laying cable or stringing copper wire. Thus, instead of a fixed-line connection, schools would have a wireless link to the telecommunications network.

Point-to-point wireless systems: If the telephone company does not provide wireless local loop, schools may be able to install or lease their own wireless links to the Internet. Point-to-point fixed wireless, such as microwave systems, can provide high-speed Internet access by connecting to an ISP's point of presence (POP). These fixed wireless links may be the least expensive means of getting high-speed Internet access if wire line-services are not available.

Cordless: Short-range cordless extensions can provide the link from wireless outstations to subscriber premises; the DECT (digital European cordless telephone) technology standard also can allow the base station to act as a wireless private branch exchange (PBX) and reduce costs further.

Wireless access protocol: This wireless protocol has been developed to make it possible to transmit Web pages and other data to cellular phones. It can be adapted for wireless services in developing countries so that Internet information can be transmitted to low-bandwidth wireless systems. However, the variety of Web content accessible through devices enabled by this protocol is still very limited.

Third-generation mobile services: Third-generation mobile networks are beginning to be introduced in some industrialized countries, and eventually may be made widely available in developing regions. They offer greatly increased bandwidth over existing mobile networks, with the possibility of Internet access to handheld devices such as portable phones, personal digital assistants, and small personal computers.

Satellite Technologies

Very small aperture terminals (VSATS): Small satellite earth stations operating with geosynchronous satellites can be used for interactive voice and data as well as for broadcast Infrastructure reception.

Internet via satellite: Internet gateways can be accessed via geostationary satellites. They include; *high-speed downlink; interactive access via VSAT; data broadcasting by satellite; global mobile personal communications systems; store-and-forward messaging*; and *bandwidth on demand.*

Wireline Technologies

Innovations in wireline technology make it possible to provide high-speed Internet access over telephone lines, rather than having to upgrade existing copper networks. These technologies may be used in urban areas where basic telephone service is available.

Integrated services digital network (ISDN): Regular twisted pair copper telephone lines can carry two 64 kbps channels plus one 16 kbps signaling channel. One channel can be used for voice and one for fax or Internet access, or two can be combined for videoconferencing or higher-speed Internet access. Developed in Europe, ISDN may be available from telephone companies in some urban and suburban areas of developing countries.

Digital subscriber line (DSL): Several variations of DSL technology have been developed that provide data rates from 384 kbps or more downstream over existing telephone lines. This technology is replacing ISDN in industrialised countries because of its greater bandwidth. It can be used in urban areas where copper wire is already installed, but its range is limited to about 1 km from a telephone exchange.

Cable modems: Some cable television systems can also be used for high-speed Internet access via cable modems. Like DSL, cable offers much higher bandwidth than dial-up telephone lines. However, a high volume of users may result in congestion of a shared cable network, and older networks may not be converted easily for two-way connectivity.

Optical fiber: Telephone companies upgrading their networks may install optical fiber for institutional customers such as hospitals, schools, and businesses. The advantage of fiber is its enormous bandwidth, which can be used for high speed Internet accessing or other services such as videoconferencing. However, the price of access may be prohibitive.

Some schools have managed to gain free or heavily discounted access to so-called "dark fiber," excess capacity that has been installed but is not yet in use.

Hybrid fiber/coax: A combination of optical fiber and coaxial cable can provide broadband services such as TV and high speed Internet access as well as telephony; this combination is cheaper than installing fiber all the way to the customer premises. Unlike most cable systems, this hybrid allows two way communications. The fiber runs from a central telephone switch to a neighborhood node; coaxial cable links the node to the end user such as a school. Developing countries with such projects include Chile, China, India, and Malaysia.

Other Technologies

Other technological innovations that can be used for educational communication in developing regions include:

- *Internet telephony* (**voice over IP**): Packetized voice communication can be transmitted very inexpensively over the Internet. Schools with Internet access may be able to use their networks for voice communications as well (regulations vary by country). Using Internet protocols for voice and data is much less expensive than using regular telephone networks.

- *Community radio:* Small community radio broadcasting stations can be important news sources for the community and can be used to broadcast educational radio programmes for listening in school, at home, or in community centers.

Some school and tele-centre projects are combining computer facilities with community radio stations, so that information received via the Internet can be communicated more widely. Portable windup or solar-powered radio receivers are practical for school and community use.

Selecting an Internet Service Provider (ISP)

In addition to choosing a means of connecting to the Internet, it also will be necessary to choose an Internet service provider (some ISPs bundle connectivity with services).

Factors to consider include:

- *Distance to point-of-presence (POP):* Ideally, the ISP should provide local connectivity so that long distance calling charges are not incurred. However, in many rural and developing regions, local access is not available. In such cases, it will be important to consider the price charged by telecommunications operators to reach the POP, and whether there are any toll-free or flat-rate options.

- ***Speed and reliability of access to the Internet:*** The speed of access to the Internet depends not only on the bandwidth available to reach the ISP, but also the number of ports at the ISP and the bandwidth it has available to reach an Internet gateway. In addition to asking the ISP for such information, it is useful to check with other customers to determine whether they experience outages or delays, and whether they have noticed any improvement or degradation in access over time.

- ***Batched and compressed e-mail accounts:*** Users can save money in telecommunications charges if they can compose messages offline and send and receive e-mail in batches to the Internet service provider (ISP). A batched e-mail service using the compressed UUCP (UNIX to UNIX copy) transfer protocol is four to eight times faster than the standard TCPIP/POP (post office protocol) used by most e-mail clients.

- ***Web hosting:*** The ISP should provide Web-hosting capability if another Web-hosting site is not already available in the country. Alternatively, schools can use one of the free web-hosting services made available by some U.S., European, or Australian sites.

SELF ASSESSMENT EXERCISE 1

1.   Identify internet access options available for
2.   Enumerate factors to be considered in the selection of Internet Service Provider for distance education

3.2   Semantic Web

The **Semantic Web** is an evolving development of the World Wide Web in which the meaning (semantics) of information and services on the web is defined, making it possible for the web to "understand" and satisfy the requests of people and machines to use the web content.

At its core, the semantic web comprises a set of design principles, collaborative working groups, and a variety of enabling technologies. Some elements of the semantic web are expressed as prospective future possibilities that are yet to be implemented or realised.

Other elements of the semantic web are expressed in formal specifications. Some of these include Resource Description Framework (RDF), a variety of data interchange formats (e.g. RDF/XML, N3, Turtle, N-Triples), and notations such as RDF

Schema (RDFS) and the Web Ontology Language (OWL), all of which are intended to provide a formal description of concepts, terms, and relationships within a given knowledge domain.

Some of the challenges for the Semantic Web include vastness, vagueness, uncertainty, inconsistency and deceit. Automated reasoning systems will have to deal with all of these issues in order to deliver on the promise of the Semantic Web.

SELF ASSESSMENT EXERCISE 2

1.   What do you understand by semantic web?
2.   Enumerate the elements of semantic web

3.3   Digital/Virtual Library

A digital library is a library in which collections are stored in digital formats (as opposed to print, , or other media) and accessible by computers. The digital content may be stored locally, or accessed remotely via computer networks. A digital library is a type of information retrieval system.

The first use of the term *digital library* in print may have been in a 1988 report to the Corporation for National Research. The term *virtual library* was initially used interchangeably with *digital library,* but is now primarily used for libraries that are virtual in other senses (such as libraries which aggregate distributed content).

A distinction is often made between content that was created in a digital format, known as born-digital, and information that has been converted from a physical medium, e.g., paper, by digitalising. The term hybrid library is sometimes used for libraries that have both physical collections and digital collections. For example, American Memory is a digital library within the Library of Congress. Some important digital libraries also serve as long term archives, for example, the ePrint arXiv, and the Internet Archive.

Academic Repositories

Many academic libraries are actively involved in building institutional repositories of the institution's books, papers, theses, and other works which can be digitalised or were 'born digital'. Many of these repositories are made available to the general public with few restrictions, in accordance with the goals of open access, in contrast to the publication of research in commercial journals, where the publishers

often limit access rights. Institutional, truly free, and corporate repositories are sometimes referred to as digital libraries.

Digital archives

Physical archives differ from physical libraries in several ways. Traditionally, archives are defined as:

- Containing primary sources of information (typically letters and papers directly produced by an individual or organisation) rather than the secondary sources found in a library (books, periodicals, etc)
- Having their contents organized in groups rather than individual items
- Having unique contents.

The technology used to create digital libraries has been even more revolutionary for archives since it breaks down the second and third of these general rules. In other words, "digital archives" or "online archives" will still generally contain primary sources, but they are likely to be described individually rather than (or in addition to) in groups or collections, and because they are digital their contents are easily reproducible and may indeed have been reproduced from elsewhere. The Oxford Text Archive is generally considered to be the oldest digital archive of academic physical primary source materials.

Searching the Library's Collection

Most digital libraries provide a search interface which allows resources to be found. These resources are typically deep web (or invisible web) resources since they frequently cannot be located by search engine crawlers. Some digital libraries create special pages or sitemaps to allow search engines to find all their resources. Digital libraries frequently use the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) to expose their metadata to other digital libraries, and search engines like Google Scholar, Yahoo! and Scirus can also use OAI-PMH to find these deep web resources.

There are two general strategies for searching a federation of digital libraries:

- **Distributed searching**

Distributed searching typically involves a client sending multiple search requests in parallel to a number of servers in the federation. The results

are gathered, duplicates are eliminated or clustered, and the remaining items are sorted and presented back to the client.

- **Searching previously harvested**

Searching over previously harvested metadata involves searching a locally stored index of information that has previously been collected from the libraries in the federation.

When a search is performed, the search mechanism does not need to make connections with the digital libraries it is searching - it already has a local representation of the information. This approach requires the creation of an indexing and harvesting mechanism which operates regularly, connecting to all the digital libraries and querying the whole collection in order to discover new and updated resources.

Construction and organisation

Frameworks

A digital library can be built around specific repository software. The best known examples of this are DSpace, Eprints, Fedora, dLibra (Poland), and Greenstone.

Digital Library Software

Digitisation

In the past few years, procedures for digitising books at high speed and comparatively low cost have improved considerably with the result that it is now possible to plan the digitisation of millions of books per year for creating digital libraries.

Advantages of Digital Libraries

The advantages of digital libraries as a means of easily and rapidly accessing books, archives and images of various types are now widely recognised by commercial interests and public bodies alike.

Traditional libraries are limited by storage space; digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain it. As such, the cost of maintaining a digital library is much lower than that of a traditional library.

A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Digital libraries may reduce or, in some instances, do away with these fees. Both types of library require cataloguing input to allow users to locate and retrieve material. Digital libraries may be more willing to adopt innovations in technology providing users with improvements in electronic and audio book technology as well as presenting new forms of communication such as wikis and blogs; conventional libraries may consider that providing online access to their OPAC catalogue is sufficient. An important advantage to digital conversion is increased accessibility to users. They also increase availability to individuals who may not be traditional patrons of a library, due to geographic location or organisational affiliation.

- **No physical boundary.** The user of a digital library need not to go to the library physically; people from all over the world can gain access to the same information, as long as an Internet connection is available.
- **Round the clock availability.** A major advantage of digital libraries is that people can gain access to the information at any time, night or day.
- **Multiple Access:** The same resources can be used simultaneously by a number of institutions and patrons. This may not be the case for copyrighted material: a library may have a license for "lending out" only one copy at a time; this is achieved with a system of digital rights management where a resource can become inaccessible after expiration of the lending period or after the lender chooses to make it inaccessible (equivalent to returning the resource).
- **Information retrieval.** The user is able to use any search term (word, phrase, title, name, and subject) to search the entire collection. Digital libraries can provide very user-friendly interfaces, giving clickable access to its resources.
- **Preservation and conservation.** Digitization is not a long-term preservation solution for physical collections, but does succeed in providing access copies for materials that would otherwise fall to degradation from repeated use. Digitized collections and born-digital objects pose many preservation and conservation concerns that analog materials do not. Please see the following "Problems" section of this page for examples.
- **Space.** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information; simply because digital information requires very little physical space to contain them and media storage technologies are more affordable than ever before.

- **Added value.** Certain characteristics of objects, primarily the quality of images, may be improved. Digitalisation can enhance legibility and remove visible flaws such as stains and discoloration.

Challenges to Digital/Virtual Libraries

Digital Preservation

Technological standards change over time and forward migration must be a constant consideration of every library. Migration is a means of transferring an unstable digital object to another more stable format, operating system, or programing language. Migration allows the ability to retrieve and display digital objects that are in danger of becoming extinct. This is a rather successful short-term solution for the problem of aging and obsolete digital formats, but with the ever-changing nature of computer technologies, migration becomes this never-ending race to transfer digital objects to new and more stable formats. Migration is also flawed in the sense that when the digital files are being transferred, the new platform may not be able to capture the full integrity of the original object. There are countless artifacts sitting in libraries all over the world that are essentially useless because the technology required to access the source is obsolete. In addition to obsolescence, there are rising costs that result from continually replacing the older technologies. This issue can dominate preservation policy and may put more focus on instant user access in place of physical preservation.

Copyright and licensing

Some people have criticised that digital libraries are hampered by copyright law, because works cannot be shared over different periods of time in the manner of a traditional library. The republication of material on the Web by libraries may require permission from rights holders, and there is a conflict of interest between them and publishers who may wish to create Web versions of their content for commercial purposes.

There is a dilution of responsibility that occurs as a result of the spread-out nature of digital resources. Complex intellectual property matters may become involved since digital material isn't always owned by a library. The content is, in many cases, public domain or self-generated content only. Some digital libraries, such as Project Gutenberg, work to digitalise out-of-copyright works and make them freely available to the public.

Metadata creation

The ability to find works of interest in large libraries is directly related to how well they are catalogued. While cataloguing electronic works digitalised from a library's existing holding may be as simple as copying moving a record for the print to the electronic item, with complex and born-digital works requiring substantially more effort. While full text search can be used for some searches, there are many common catalog searches which cannot be performed using full text, including:

- finding texts which are translations of other texts
- linking texts published under pseudonyms to the real authors
- differentiating non-fiction from parody.

SELF ASSESSMENT EXERCISE 3

1.   What do you understand by digital libraries?
2.   What is the relevance of digital libraries to distance education

4.0   CONCLUSION

Distance education relies so much on internet to communicate with learners and the efficiency of on-line programmes depend so much on access to the internet and digital resources by such learners. Despite the challenges facing the utilisation of digital libraries, they possess many merits over the traditional libraries

6.0   SUMMARY

Several internet access technologies options are available for distance education institutions. Digital libraries are vital resources in distance education and should be utilises maximally at all time.

6.0   TUTOR-MARKED ASSIGNMENT

1.   List the advantages of digital libraries.
2.   Discuss issues related to copyright/licensing of digital libraries contents.

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UNIT 3   ON-LINE COURSE DELIVERY

CONTENTS

1.0   Introduction
2.0   Objectives
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        3.2   Delivery Issues
        3.3   Cooperation and Collaboration
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1.0   INTRODUCTION

The success of any on-line education is dependent on several factors such as the quality of instruction available to learners and this depend on; the design of the instruction; the method or strategies employed and presentation mode. All these factors must be thoroughly examined to ascertain how to improve, and get the most out of on-line courses.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

•   explain issues related to the design of on-line courses
•   explain on-line course delivery issues
•   explain the concept of collaboration
•   identify the various types of collaboration for distance education.

3.0   MAIN CONTENT

3.1   Design Issues

Systematic design and development

Willis (1992) describes the instructional development process for distance education, consisting of the customary stages of design, development, evaluation, and revision. In designing effective distance instruction, one must consider not only the goals, needs, and characteristics of teachers and students, but also content requirements and technical constraints. If unusual delivery systems are required, they must be made accessible to all participants.

Revision based on feedback from instructors, content specialists, and learners is an ongoing process. Provisions must be made for continually updating courses which depend on volatile information, to keep the subject matter current and relevant (Porter, 1994).

Interactivity

Successful distance education systems involve interactivity between teacher and students, between students and the learning environment, and among students themselves, as well as active learning in the classroom. Interactivity takes many forms; it is neither just limited to audio and video, nor solely to teacher-student interactions. It represents the connectivity the students feel with the distance teacher, the local teachers, aides, and facilitators, and their peers. Garrison (1990) argued that the quality and integrity of the educational process depends upon sustained, two-way communication. Without connectivity, distance learning degenerates into the old correspondence course model of independent study. The student becomes autonomous and isolated, procrastinates, and eventually drops out.

Active learning

As active participants in the learning process, students affect the manner in which they deal with the material to be learned. Learners must have a sense of ownership of the learning goals (Savery & Duffy, 1995). They must be both willing and able to receive instructional messages. Salomon's study (as cited in Saettler, 1990), found that the mental effort which a learner will invest in a learning task depends on his own perception of two factors:

- the relevance of both the medium and the message which it contains
- learners' ability to make something meaningful out of the material presented.

Visual imagery

Researchers have consistently found that instructional television can motivate and captivate students, and stimulate an interest in the learning process. Ravitch (1987), however, cautions us against the unintended side effects of educational television in particular as well as "edutainment" in general. Reliance on exciting visuals may distort the curriculum by focusing students' attention on the entertaining and provocative features of the presentation rather than encouraging thoughtful analysis of their underlying meaning.

White (1987) adds that if complex issues are presented in short units, through powerful images which may occur in any order, the end result may be oversimplification and superficiality. Students must learn to discriminate between "junk" information and quality information, to judge its reliability or bias, to identify distortions and sensationalism, to distinguish facts from persuasion, and to understand how the technology itself shapes the information it carries.

Effective communication

Shneiderman (1992) cautions all instructional designers to begin with an understanding of their intended users, and to recognise them as individuals whose outlook is different from the designer's own. Horton (1994) states the golden rule for designers of instructional visuals:

- "communicate unto others as they would communicate unto themselves". In other words, if you want the learner to construct an idea which is similar to yours, then use an image for your presentation which will trigger a similar idea in the learner's mind, in the context of the learning environment and the learner's prior experiences.

SELF ASSESSMENT EXERCISE 1

1.   Compare and contrast the design of on-line and conventional educational programmes
2.   Explain the relevance of communication to the design of on-line courses.

3.2   Delivery Issues

Methods and strategies

Guided practice

The more familiar teachers are with the instructional design and delivery process, the more effective their presentations will be. On a practical note, they need training in instructional message design, strategies for delivering instruction on-camera, methods of diversifying types of presentation, selecting various mixes of student-teacher activities and interactions, choosing situations and examples which are relevant to their students, and assessing the level of learning by distant students.

Inquiry learning

Inquiry learning is a new technique to many teachers. No longer is the teacher "the sage on the stage" Ñ the deliverer of a fixed body of information; she becomes the facilitator of discovery learning for her students, through progressive discourse. Thus, even if a teacher is well-practised and at ease with the equipment in the classroom, she still requires training in order to integrate new teaching strategies with the technology.

Teamwork

Progressive teachers who are early adapters of technology can become change agents for their peers (Pacific Mountain Network, 1994). They can support other teachers by planning ahead as a group, and by working with the learning modules and equipment before using them in the classroom. Facilitators can try out learning modules as videotapes, building in interactivity as it suits the learning styles of their particular students, and then integrate real-time satellite programmes into their schedule later on.

Distance learners

Many important issues stem from the characteristics of distance learners, whose aims and goals may be quite different from those of traditional students.

Modes of learning

Another important variable in learning effectiveness is the preference of the student for a particular mode of learning, i.e., cooperative, competitive, or individualised (Johnson & Johnson, 1974). Many current distance education projects incorporate cooperative learning, collaborative projects, and interactivity within groups of students as well as between sites.

Learner support

There are many ways of facilitating learner support. Studio teachers may visit the distant site, or students may take a trip to the studio.

Operational issues

These involve planning, administration, management, and economics, all of which are crucial for a successful distance education programme. In particular, we must consider the roles of the teacher-facilitator-

student triad, training of teachers and staff, implementation and adoption of new technology, and policy issues such as facilities, cost, and scheduling.

The teacher-facilitator-student triad

In traditional education, teachers interact directly with their students. They prepare their own support materials, lecture notes, and tests, and are autonomous within their classroom. In contrast, distance learning teachers are not in direct classroom contact with their students. Communication is mediated not only by the technology, but also by a host of team partners which may include editors, designers, producers, technicians, media specialists, local tutors, aides, site facilitators, and service providers. Since many people must collaborate to produce and disseminate quality distance educational programming, the need to plan and coordinate staff activity is essential. In particular, we must define the roles of two key people: the teacher and the site facilitator.

The teacher

The distance learning teacher, or studio teacher, is the common thread throughout the distance learning process. She must be certified for the appropriate grade level, knowledgeable in her subject area, and trained in effective distance education strategies. She is responsible for knowing the subject matter, preparing lesson plans and producing an instructional module or course, selecting support materials, delivering the instruction effectively on-camera, determining the degree of student interaction, and selecting the form of distance evaluation or assessment.

A studio teacher must be better organised than an ordinary classroom teacher. Additionally, she must be at ease with the equipment, and not let the technology get in the way of her presentation. This requires ongoing training in the form of regular observation of a master teacher, training in the use of carefully selected print, audio, graphics, and video materials, hands-on hardware training, and the chance to network with other teachers and facilitators on course progress (Talab & Newhouse, 1993).

Schlosser and Anderson (1993), identify the new skills which teachers must learn as they assume the role of distance educators:

- understanding the nature and philosophy of distance education
- identifying learner characteristics at distant sites
- designing and developing interactive courseware to suit each new technology
- adapting teaching strategies to deliver instruction at a distance

- organising instructional resources in a format suitable for independent study
- training and practice in the use of telecommunications systems
- becoming involved in organisation, collaborative planning, and decision-making
- evaluating student achievement, attitudes, and perceptions at distant sites
- dealing with copyright issues.

The site facilitator

The site facilitator is an extension of the studio teacher, though he need not be a teacher himself. His responsibilities are to motivate and encourage the remote site students, keep up their enthusiasm, and maintain discipline in the classroom. He is also responsible for smooth running of equipment, helping students with interaction, handing out, collecting, and grading papers, guiding collaborative groups who are working with manipulative, answering questions when necessary, and assisting the studio teacher when asked.

Technology adoption

Purchasing and maintaining appropriate equipment, and training teachers and facilitators to use it effectively, are necessary conditions, but are not sufficient in themselves to assure a school district of an excellent distance education programme. There are other factors involved, many of which are affective rather than cognitive, such as user-friendliness and the ability to implement learner support.

Management and policy issues

Distance education changes the learning relationship from the common, centralised school model to a more decentralised, flexible model. It also reverses social dynamics by bringing school to students, rather than students to school. This leads to a host of new issues for administrators to debate, including:

- the impact of electronic education on tenured teaching
- balancing the budget with potentially low-cost electronic learning options
- redefining what it means to have a teacher present in the classroom
- revising teacher certification requirements to accommodate those teachers who electronically cross service area boundaries.

Team personnel

A distance education delivery team requires well-trained individuals in addition to teachers, site facilitators, and administrators. Old roles are redefined, and new roles emerge.

- The principal or district administrator handles logistics, acquires equipment, and provides training and support.
- Some school districts have funds for a media specialist or technology coordinator.
- Certain technologies like microwave video-conferencing; require a technician to run specialised equipment in a control room.
- Technical support staffs to install, maintain, and upgrade equipment.
- Clerical personnel process requests for equipment acquisition and repair, as well as reproduction and distribution of course material.
- Technologically astute students often assist teachers with new hardware and software and serve as peer tutors for slower students.

SELF ASSESSMENT EXERCISE 2

1. Explain the merits and demerits of the delivery methods identified in this unit
2. Which of the delivery methods identified in this unit is more appropriate for on-line course delivery and why?

3.3   Cooperation and Collaboration

In spite of the many advantages of Online Learning Environment (OLE), numerous experts agree that more research, experimentation and better tools are needed to approach the maximum potential this new technology offers. A major concern of students is the lack of comradeship and collaboration that would occur in a face-to-face (FTF) classroom environment. Many experts have agreed that the person-to-person interactions that are typical of classroom education play an important part in learning and that similar interactions should be encouraged in OLEs.

Considerable studies have been done on methods of collaboration in OLEs and similar systems. Among the earliest were the Electronic Information Exchange System experiments in the late 1970s by Hiltz and Turoff. These National Science Foundation experiments studied methods of making group decisions and collaborating on projects and documents.

Collaboration as a concept

Collaboration can be defined as two or more people working together to create meaning, explore a topic, or improve skills. There is ample evidence from traditional classroom environments, non-traditional FTF environments, and OLEs to indicate that collaboration can enhance learning. Jarvis [1987] stated that learning always occurs in social situations. He goes on to state that learning is both a social and a personal phenomenon. The sharing of multiple perspectives tends to increase the knowledge learned and the satisfaction derived from the process. In OLEs, collaboration has been defined as a process where "... both teachers and learners are active participants in the learning process; knowledge is not something that is 'delivered' to students, but rather something that emerges from active dialog among those who seek to understand and apply concepts and techniques" [Hiltz ,1994].

Collaboration Tools

An advantage of the OLE over the traditional FTF classroom is the many additional teaching tools available. Many of these tools can be used as an aid to collaboration with the benefits collaborative learning brings. These tools have evolved from the inspired ideas of the pioneers to the market driven packages available today.

These tools are highlighted below:

1. ***Electronic Mail or e-mail.*** "A broader range of activities is possible when many-to-many communication is tied to e-mail writing. For example, with a class bulletin board or e-mail discussion list, students can collaboratively work in pairs, small groups or the whole class throughout the entire week. The asynchronous nature of e-mail makes it suitable for more complex writing and problem-solving tasks than could be accomplished via synchronous discussion in a class.

2. ***The public conference*** is an excellent collaborative tool for both instructor-student collaboration and student-student collaboration. "A computer conference is a stored transcript of a discussion by a group in easily accessible format" [Harasim, Hiltz, Teles, & Turoff, 1995].

    The ability to see a group of related conversational items (commonly called a thread) is a great advantage of conferences over e-mail.

3. *Gated conference:* An extremely powerful tool that is seldom implemented is the gated conference. When facilitating a discussion in a public conference, the students can reread all the previous answers before giving their own opinion. This has the effect of limiting the diversity of responses since some students may want to agree with their peers. It also opens up the possibility of plagiarism. In the gated conference, the question must be answered before the other answers and general discussion can be accessed. The gated conference, which has also been described as question and answer protocol [Turoff, 1999], gives better results than a classroom conversation for the same reasons. The gated conference structure was developed as part of the computer based decision support experiments at NJIT during the 1980's and proved a valuable tool in forcing equal participation and independent thought .

4. *Shared document capabilities* are a great aid to collaboration. These tools allow the author of a document to permit others to make changes to the document. This permits the creation of a shared work without the constant transfer of the document between participants and the logistical challenges associated with it. For example, each student might contribute a section to the document. Then, they might review the total document making changes until a final product was agreed upon.

5. *Videotape:* Although it seems to be declining in popularity, videotape can be used as a collaborative tool. The primary advantage of videotape is in its asynchronous nature and its ability to hold very large amounts of information. A detailed lecture using sound, video, pictures and animation can be distributed to the students in lieu of a long multimedia lecture.

Fostering Collaboration in OLE's

Having a good set of tools is critical to the OLE, but is usually insufficient to cause spontaneous collaboration. Methods have been developed by educators for centuries to foster collaborative learning in students utilising the FTF medium. Many of these are applicable to the OLE, as well as some unique new strategies.

1. Posting of a public introduction and basic bio by the instructor and all of the students as an initial requirement of the course. This gives the members of the class insight into each other's background, interests and skills.
2. The ongoing discussion is another method that can be used to stimulate collaborative learning.

3.   The debate is a collaborative learning tool that can be used in the OLE as well as in the FTF medium.

4.   Group projects are another method that can be used to foster collaborative learning in the OLE. Students can be divided into manageable groups to collaborate on a project.

5.   A group paper can be assigned to foster collaborative learning when the proper tools are available. Each student can be assigned to write a portion of the paper. They can then actively merge the sections together or appoint an editor to do the assembly. This usually involves more cooperation and participation than simple group projects, and sufficient time to complete the project must be allotted.

6.   Group list creation; the class or group create the initial list and then debate upon the importance or order of the items on the list.

7.   In group voting activities a set of choices are presented and the class or a group within it vote on the importance, order, or make similar selections from the choices. Participants can then make comments advocating their selections and try to convince others to support their selections.

8.   Other collaborative learning tools involve group tests, group stories, role playing and synchronous group activities.

Institutional Collaboration

Education institutions worldwide are experiencing funding cuts, even as global demand for training in new skills and for professional upgrading increases. Providing courses and programmes at a distance is one of the proven ways institutions meet higher learning and training demands, yet coming up with the funding and resources for both traditional as well as distance education (DE) services remains a concern. In response to this challenge, many education institutions are sharing their financial, administrative and infrastructure burden with others on a local, national, regional and global level.

Defining Institutional Collaboration

Institutional collaboration is sharing resources of any type with one or more partner institutions.

In distance education, collaboration may be between institutions in the same neighborhood or state, within the same country or region, and anywhere in the world. Institutions do not have to have similar interests or a similar level of expertise to collaborate, but they do need to have resources that other institutions would like to share. In collaboration, institutions share:

- Knowledge and expertise, for example joint research projects, designing and delivering curriculum and course material
- Infrastructure, for example information and communications technology (ICT) facilities such as video, audio conferencing equipment and computer rooms
- Human resources, for example formal arrangements for external examination or peer review
- Services, such as libraries, bookstores, student counselling
- Costs of starting or maintaining educational programmes
- Institutional culture and perspective, for example through student or faculty exchange programmes.

Possible areas of institutional collaboration include:

- Administration
- Advertising
- Certification
- Curriculum design
- Curriculum development, including choice of media i.e. print, audio, video, Internet
- End-term evaluation
- Library support
- Mid-term evaluation
- Network support
- Student admission/selection
- Student support/academic counselling.

Benefits of Institutional Collaboration

A culture conducive to collaboration exists in many distance education environments, as faculty and staff are trained to work with diverse people and situations. In distance education, institutions collaborate primarily to share the financial burden of developing, providing and maintaining educational resources. Institutions that will benefit most from collaboration are those from small or developing nations that lack the individual expertise or funds to develop course material, or to maintain a wide range of services.

SELF ASSESSMENT EXERCISE 3

1.   What do you understand by collaboration?
2.   Apart from funding, identify other reasons for collaboration among distance education institutions

4.0　CONCLUSION

Collaboration can be effectively used to improve the quality and quantity of education in online learning environments. There are numerous tools and methods that can be used to facilitate and stimulate collaboration in online education

6.0　SUMMARY

A well designed programme must be balanced in its presentation considering individual differences in learners/end users level, of interactivity among the elements of the instructional systems and enrich the content of the courses by combining efforts with other institutions with similar interest to share human and material resources.

6.0　TUTOR-MARKED ASSIGNMENT

Using the various issues discussed in this unit explain with examples how Nigerian universities can collaborate for a unified education

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MODULE 3   EDUCATION AND GLOBALISATION

Unit 1   Education in an Era of Globalisation
Unit 2   Universalisation of Education
Unit 3   Equality of Access to New Technologies in Education
Unit 4   Quality Control of Educational Services

UNIT 1   EDUCATION IN AN ERA OF GLOBALISATION

CONTENTS

1.0   Introduction
2.0   Objectives
3.0   Main Content
        3.1   Processes and Functions of Education
        3.2   Education and Globalisation
        3.3   Emergent Issues from Globalisation
4.0   Conclusion
5.0   Summary
6.0   Tutor-Marked Assignment
7.0   References/Further Reading

1.0   INTRODUCTION

You would have encountered the term globalisation in literature in many disciplines and in public discuss. This unit takes you through the main issues related to globalisation and how these issues affect developments in education.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- define globalisation from at least two points of view
- explain the processes of education in terms of its global relevance
- discuss the interplay between education and globalisation.

3.0   MAIN CONTENT

3.1   Processes and Functions of Education

Education in any form and at all levels can be classified as a package or a process. As a package, education is purposefully planned, designed, packaged and delivered to a defined clientele. The package is planned to fit the **order**, but the quality of the finished **product** is limited by the

proficiency of the **producers**, the **environment** of production, and the quality of the **delivery systems**. Take your time and reflect on this parallel between education and any other product in industry. Some words have been purposely highlighted. Think about these words and identify their examples in the various forms of educational enterprise you are familiar with; an apprenticeship scheme, a secondary school system, etc. Note that educational technology is primarily concerned with the efficiency of the delivery systems. The evidence of having received the package is often sort in certification.

On the other hand, education as a process is judged by more behavioral parameters, socialisation and acculturation.

Socialisation process of education:

- Acquisition of fact and concepts, collecting and processing and using information
- Acquisition of required skills for contemporary industry, world of work
- Acquisition of acceptable attitudes, values, manners and mannerisms, reactions, in line with cultural norms, and social orders of communities at various levels.

Acculturation process of education:

- Acquisition of intrinsic behaviour in reaction to the environment.
- Assimilation of cultural values and ethics, world views, interests, mind sets, etc.
- Setting of identities.

Education in any society is characterised by three factors; content, context and the format. Again, try to exemplify these three factors in any educational system of your choice.

The content of education varies for different communities according to their **perceived needs.** Education responds to nationally set goals to meet individual, community and national **aspirations**. The context is defined by the limitations of information available, and the physical and **philosophical** infrastructure on which education is built. The format or mode of educational delivery is again related to available information and resources, including **human resources**.

Reflect on the highlighted words and examine how these differ for nations or communities, and also how they are similar because of international changes in opportunities occasioned by developments in the field of human communication.

This process of converging global needs leads to the concept of globalisation. You would have observed that differences in world cultures have been eroded in recent times as a result achievements in communications and transport industries. New generations in local communities are beginning to challenge the restrictions of their cultural values. There is a pervading social demand everywhere for a change from conservative tendencies in traditions. Also work and trade definitions are expanding in every community.

SELF ASSESSMENT EXERCISE 1

For any country of your choice compare (differences and similarities) to Nigeria, of educational needs, aspirations, philosophies, human and technological resources.

3.2   Education and Globalisation

The functions of education for the community at local and national levels are known to include:

- Major development agent for the individual, community and nation
- Channels of information
- Generating and creating reservoirs of knowledge and information.

You should also be familiar with the effects of education as listed below:

- On the individual: imbues knowledge and skills, raises earning power, underlies wellbeing, enhances social status
- On communities: related to productivity, health, economic growth and civilisation
- On the nation: a measure of level of development
- On the world: basis for human progress, enhancing productivity.

In sum total you can deduce that education enhances **economic well being** as an all encompassing end. Global developments are also primarily hinged on the enhancement of economic well being of individuals and communities.

Globalisation therefore is both a concept and a phenomenon. It spans the following areas:

- **Economic:** World Bank, IMF, World Trade and issues

- **Ideological:** Free trade, free enterprise, human rights, non exclusion, and equity
- **Political:** Internationality, regional governance, convergence of cultures
- **Technological:** technological revolution, including the technologies of education.

As a concept 'Globalisation' is commonly used as a shorthand way of describing the spread and connectedness of production, communication and technologies across the world. That spread has involved the interlacing of economic and cultural activity.

As a phenomenon globalisation can be defined as "a set of processes by which the world is rapidly being integrated into one **economic space** via increased international trade, the internationalisation of production and financial markets, the internationalisation of a commodity culture, promoted by an increasingly networked global telecommunication system" (Graham, 1996).

These definitions seem to exclude education, but, can you discern the patterns of interplay between education and globalisation?

The agents of globalisation are Science and Technology

- Information
- Communication
- Transportation
- Commerce & Industry

Science: Globalisation started with scientific advancements:

- study of nature - the intricacies of God's creative powers, harnessing and unleashing the tremendous energies stored up in nature
- hinged on research and discoveries
- deployed for defense, offence, peace, and development.

Technology

- Information and Communication: telephone, photography, radio, video, television, computers, the web, satellite systems, etc.
- Transportation-motorised vehicles, road transport, rail, aviation industry, space travel
- Commerce and industry, manufacturing, construction, extractive, processing
- Resultant worldwide commodity trade.

The speed of communication and exchange, the complexity and size of the networks involved, and the sheer volume of trade, interaction and risk give what we now label as 'globalisation' its peculiar force.

The Nature of Globalisation

Globalisation can be described as:

- Transformational/ change agent
- Neo-liberalism
- Convergence of cultures
- Internationalism- economics, culture, education,
- New global Technologies

According to UNDP, globalisation transcends socio-economic and political barriers that the countries of the world are prone to build around themselves. It is not only a process integrating just economy, but culture, technology and governance. It is giving rise to new markets, foreign exchange and capital markets linked globally, new tools, internet links, cellular phones, media network, new actors; the World Trade Organisation with authority over national governments, the multi-national corporations with more economic power than many states, new rules, multi-national agreements and intellectual property, multi-lateral agreements on trade" (Human Development Report, 1999).

SELF ASSESSMENT EXERCISE 2

Can you state the relationship between education and globalisation from the foregoing?

3.3   Emergent Issues from Globalisation

The following are the emergent issues of globalisation which now pose challenges to education:

- **Ethics:** ensuring less violation of human rights
- **Equity:** resulting in reducing disparities within and between nations
- **Inclusion:** less marginalisation of people and countries
- **Human security:** less instability of societies and less vulnerability of people
- **Sustainability:** less destruction of environment; and conservation of resources
- **Development:** less poverty and deprivation.

Can you justify the relevance of education to each of the above issues?

As a direct response to globalisation there have been tremendous shifts in the contents, contexts and modalities of education worldwide. These shifts affect the following areas in education:

* Content of Education (knowledge, skills, attitudes)
* Processes of education
* Teaching (skills, methodologies, strategies, etc)
* Learning (skills, options, modes, etc)
* Facilities (infrastructure, technologies, spaces, media etc.)
* Modes (individualised options, collaborations, etc)
* Ethics and values
* Certification
* Research
* Opportunities (job descriptions)
* Training needs
* National identity.

Educational Content –the knowledge economy

* In a globalised world, as technology becomes its main motor, knowledge assumes a powerful role in production, making its possession essential for nations, if they are successfully to pursue economic growth and competitiveness (Stromquist, 2000). Education, being the most potent instrument of creation, assimilation and transmission of knowledge, assumes a central role in the process.
* Information is generated at such speed (information explosion) that the currency of educational packages is under constant threat.
* Information processing and packaging has become a high skill enterprise- information data base etc.
* Knowledge and information have transformed into a saleable commodity.

This has generated new task descriptions in education, viz:

* constant renewal, upgrading of curriculum content. Curriculum content is now flexible and amenable to change
* productivity orientation in education (vocationalisation)
* values education- new emphasis on global issues: environment, health, life skills, etc.

Teaching

- New job definitions for teachers from teaching, to guiding, to managing
- Promotion of activity based learning strategies. Encouraging cooperation and collaboration amongst learners
- Need to update knowledge and skills
- Expanding job opportunities.

Learning

- New emphasis on learning to learn; i. e. accessing and upgrading knowledge independently
- Lifelong education, self paced learning, open learning options
- Vocationalisation, shift to skills and productivity.

Facilities and learning environment

- With electronic media in the fore- front
- Information processing / virtual libraries / internet
- More attention to and modifications in learning space- transformation of classrooms
- New architectural designs that accommodate the new technologies
- Learning environments that motivate learners.

Modes

- Distance learning more popular- making education more affordable and expanding access
- Virtual learning systems
- Promotion of interactivity and individualisation through technology based/ assisted learning

Ethics and Values

- Moving from personal concerns to global issues
- Democracy, gender sensitivity, security, intellectual property,
- Equity, inclusion, relevance, cooperation rather than competition,
- Excellence challenged by equal opportunities- quality of manpower, sustainability, addressing poverty and deprivation.
- Costs of education and equity.

Certification

- Spurious? Challenges to standards
- Need for monitoring of institutions through harmonisation of curricular, facilities, staffing, etc.

Research

- More attention has been given to developmental research, instrumentation, etc.
- Innovation and resourcefulness are engendered
- Industry sector has intensified efforts in the funding of research, thereby alienating developing nations.

Opportunities and Training Needs (Changing job descriptions)

- Education has to keep abreast and stay relevant to emerging skills. This is challenging as technology has made the future quite unpredictable by its nature of generating change
- Emergent training needs for new job descriptions (e. g. in Nigeria, in biotechnology, forensic medicine, environmental science, actuarial science, etc.)
- Coping with new technologies. The constant development of new technologies has in itself created a vicious circle of inadequacies. There has to be an unending training to cope with new developments. For example, while some countries are preoccupied with the acquisition of contemporary computing skills, the computer technology is ever evolving.

National Identity

- Cultural imperialism: convergence of cultures and cultural domination through ICTs
- impinging on norms of ethics and morals of local groups
- Erosion of national identities.

4.0 CONCLUSION

New developments in information and communication technologies have affected all facets of life on the globe blurring the international boundaries of needs and services. There is therefore a resultant change in educational needs across the globe to cater for the emergent content, skills and human resources needed to drive world economies.

5.0   SUMMARY

In this unit you have learnt about the concept of globalisation and the challenges it poses to education.

6.0   TUTOR-MARKED ASSIGNMENT

Discuss the main challenges of globalisation to education as relates to:

(a)   Research and development
(b)   Content of education
(c)   Teaching.

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UNIT 2   UNIVERSALISATION OF EDUCATION

CONTENTS

1.0   INTRODUCTION

Universal education implies education for all. In 1990, the global community pledged at the world conference on "Education for all' (EFA) in Jomtien, Thailand to achieve Universal primary education (UPE) and strive to reduce illiteracy by year 2000. By 2000, seeing the impossibility of attaining EFA, the pledge of 1990 was repeated at the world education forum hosted by UNESCO in Dakar, Senegal with a target date of 2015. This resulted in the millennium development goals (MDG) which are expected to be realised by 2015. With education made universal, it becomes a powerful tool for combating the ills of the society. When education for all becomes a reality, the millennium development goals (MDGs) become realisable.

Can you recall the MDGs? These focus on issues such as eradicating extreme poverty and hunger, achieving universal primary education, promoting gender equality and women empowerment, reducing child mortality, combating HIV/AIDS, malaria and other diseases among others. Despite the benefits realisable from a qualitative universal education, statistics have shown that most of the children in developing countries especially girls fail to complete primary school and only about 17% get enrolled in secondary schools. (Sperling, 2005). This scenario is worse off with in those with disabilities, nomads and migrants. Apart from that, a 2003 UNESCO global monitoring report indicated that most of the children leave school without the mastery of basic skills! In Nigeria, the concept of universal basic education is entrenched in our National Policy on Education (NPE, 2004). The NPE emphasised the provision of a UBE for all citizens and this is made up of 6years primary school and 3years in the junior secondary school (JSS). By the time the child graduates from the JSS, basic skills that may launch the child into

a vocation must have been acquired. Such a child may proceed into a technical school. On the other hand, a child with the requisite academic aptitude may proceed to the senior secondary school.

A free and qualitative basic education is an avenue for ensuring functional education for all. This will result in enormous benefit in terms of better health, faster economic growth, women empowerment and basic human dignity. Bearing in mind the potential of education in attaining the MDGs, how do we ensure that every child of school age, all individuals irrespective of disability, location, and finance get access to education? How do we ensure education for all? If we succeed, how do we solve the attendant problem of increased (bloated) classroom size that may result from such?

Here comes the advent of technology – precisely educational technology. Can its infusion in to our education system break the barriers to universalisation of education? This unit embraces issues related to universalisation of education; benefits resulting from education when all of us – young, old, disabled, nomad, migrant all have a basic education. How can educational technology ensure that basic education for all becomes a feasible task?

2.0   OBJECTIVES

At the end of this unit, you should be able to:

* describe the concept of universalisation of education
* discuss the benefits of universal education
* identify the challenges of a universal education
* mention how the challenges can be overcome
* recognise the role of educational technology in ensuring universal education.

3.0   MAIN CONTENT

3.1   Benefits of Universal basic Education

Providing a qualitative universal basic education whether through formal schooling or by alternative means will:

* **Prevent wide spread poverty –** a functional education will enlighten the populace and enable one to uplift him/herself, the home and the society as a whole. It provides economic benefits.

- **Serve as a check against rapid population** – studies have shown that girls/couples that are educated are mostly able to relate child bearing to their economic capability. Most will want a family size they can comfortably/conveniently be able to cater for. For example, educated girls easily understand the need for child spacing.

- **Create awareness on social injustices and environmental problems** – education is light, it brightens up one's mind. An educated person is most likely able to defend his/her right and fight for social justice. Education improves social justice and development of society. Similarly, education makes us recognise the issue/concept of environmental degradation and how such can be combated in our own little way.

- **Builds strong societies and polities** – with education, individual differences are easily understood and we are all able to live amicably with one another despite our individualities. Education encourages political participation as it builds confidence.

- **Improves health, promote hygiene and better nutrition** – education enables us to understand the rationale for certain actions taken to enhance our health status. Education frees one's mind from myths that ordinarily would bind us to poor health/poor nutrition (e.g. a child who is fed on egg has tendencies to pilfer!-an old wives tale). Education gives us more hind sight into the need for better nutrition. An educated mother will adapt to changes more readily than an illiterate one. Issues of immunisation, ensuring proper nutrition for babies amongst others are readily embraced by educated mothers than illiterate mothers. Education serves as tool for preventing the spread of most diseases (e.g. HIV/AIDS, malnutrition) as it creates awareness. Educating girls have been found to reduce infant mortality by 5% to 10% as educated girls are most likely to take necessary precautions during pregnancy.

Conclusively, a country with more educated labour force can expect faster economic growth as evident in most developed nations of the world. The surest way of attaining economic growth is by improving education and this is only possible when our schools are strengthened.

SELF ASSESSMENT EXERCISE 1

1. In three sentences, explain the concept of universalisation of education.
2. Highlight at least four benefits of universal education.

3.2   Challenges of Universal Education in Nigeria

Using Nigeria as an example, some factors may pose challenges to a universal education in our nation. Some of these factors are:

- **Apathy of parents to the education of the girl-child** – sending girls to school may be beneficial to the girl and her country. However, in most poor nations, girls are great sources of extra income for their parents. Girls are involved in domestic and farming activities in the home. These include working on the farm, getting firewood for cooking, caring for their younger ones and so on. Based on this, the parents who have the final say on the schooling of the girl may deprive her of this benefit. The girl-child while involved in the running of the home becomes an indispensable unpaid labour.

- **Inadequacy of resources-** a free and compulsory enrollment of pupils in schools as envisaged by the UBE will result in a population explosion in our schools. The resultant explosion will give rise to an over bloated classroom size. You know quite well that many of our public schools have an astronomical class size! Resources which include both human and material(teachers & support staff; fund, infrastructure-accommodation, instructional-materials etc.) needed to accommodate the attendant population increase are not provided in adequate amount .A sharp drop in the quality of teaching will be experienced due to these inadequacies. Pupils become disinterested as the teacher will not be able to reach them all due to the large class size. A significant drop in learners' performance will occur. Teaching becomes predominantly teacher dominated and a lecture method which consists of note copying is mostly favored in this circumstance.

- **Inadequacy of teachers** – teachers are grossly inadequate for the increasing pupils population. The acute teacher shortage is felt more in rural areas where there are migrant fishermen and nomads. The shortage experienced may increase dropout rates and a decline in learning out comes in such locality.

- **Poor remuneration of teachers** – generally, teachers are poorly paid by government. A poorly paid teacher is poor in spirit and has a low self esteem. A low self esteem does not encourage dynamism. Due to the poor remuneration, many competent hands leave the teaching profession for better greener pastures. With the over bloated classroom situation, the few available teachers will be overworked and may not be able to cope.

- **Inconsistent training programmes for teachers** – these adversely affect the quality of teaching. The quality of education in a nation depends on the quality of the teaching staff. Teachers are not exposed to dynamic in-service training. Most teachers are not computer literate. Are you computer literate? Most teachers are not equipped with the skills required for coping with an over bloated class size.

The challenges are unending. Can you suggest others not mentioned here?

3.3 Overcoming the Challenges of Universal Education

In 3.2, some of the factors which may limit the universalisation of education were highlighted. How do we overcome these challenges? What are some of the ways by which education can be made universal?

Jamison & Radelet (2005); Okebukola (2005); Sperling (2005) and Oke (2009) suggested some means of ensuring a universal basic education for the developing nations as ours. Some of these include:

- **Reducing the cost of education incurred by parents** – in reducing cost, elimination of tuition fees by parents is advocated. When school fees are not paid but borne by government, more poor parents will prefer to enroll their children in schools. Part of the freeness of the Universal Basic Education (UBE) program in Nigeria is the non-payment of tuition fees in all public schools. However you are quite aware that it is the political party's policy that determines if fees will be paid in schools or not (in Lagos and Edo States for instance, it is the Action Congress party's policy to ensure that all children of school age are compulsorily and freely enrolled in schools).This is to ensure a universal and qualitative basic education.

- **Eradication of child labour** – it is important to eradicate child labour especially for girls by encouraging poor parents to send girls to schools. Letting them know the benefits inherent in a girl-child education is necessary. Most parents will rather choose a better future for their children.

- **Provision of text books** – it is important to ensure that every child is provided with adequate text books in all subjects taught in schools. Researches on impact evaluation of a nationwide textbook program have revealed improved learning gains in pupils with adequate textbooks. In Lagos State, government provides textbooks in all subjects for learners in public schools.

The provision of textbooks serves to improve learner's performance and ensure that all of them have access to reading materials.

- **Provision of a basic school health and nutrition programmes:** these include treating for intestinal worm infections, immunisations against diseases such as polio, malaria and so on. Furthermore, providing meals for pupils through school feeding especially at the primary schools is recommended. Part of the recommendation of the UBE is to ensure that every child in the primary school has access to milk and an egg every day in the school. Do you know of any public school in your locality where this act is already being implemented? Evidences have shown that providing meals serve as an incentive to regular attendance in schools!

- **Ensuring proximity of schools to home -** when schools are close to pupils' homes, it reduces the distance children travel to and from school. This will equally reduce parental anxiety and safety of their children. In cosmopolitan cities such as Lagos, Kano, Onitsha where traffic situation could be chaotic, pupils travelling long distances get to schools late and tired.

- **Providing respectable class sizes:** the present bloated class sizes of a teacher: pupil ratio of 1: 100 experienced in most public schools do not encourage effective and efficient instructional process. A respectable class size should be maintained in order to ensure qualitative instruction.

- **Providing qualitative input:** qualitative inputs in terms of trained teachers, instructional materials and facilities are suggested. Priority should be given to qualitative in service training of teachers. In areas of shortages, more teachers should be employed. Instructional materials that are indigenous or adaptable to our local setting should be used during instruction. Facilities that will promote a conducive learning environment should be put in place.

- **Infusion of educational technology in the school setting-** use of media will ensure a wider coverage and access of pupils to instruction. Teachers should be trained in the use of media. Instructional radio/T.V can be re-introduced to improve the quality of core instruction in subjects like Mathematics, English language, and the Sciences. Mobile libraries, school on wheels, extension education should be provided.

- Other measures that could encourage universalisation of education include better management of available resources in schools, ensuring more parental involvement in school management through a virile parents and teachers association (PTA), providing adult literacy classes amongst others.

It is important to stress that the attainment of a universal education is a responsibility of all. Education for all is a responsibility of all. Hence, it involves the government, private sector and community. All hands are needed on deck.

SELF ASSESSMENT EXERCISE 2

1.   Suggest five possible means of ensuring a universal education.
2.   Apart from the suggestions made in this unit, what other ways do you think universalisation of education can be made realisable?

3.4   Role of Educational Technology in the Attainment of a Universal Education

Can educational technology be a viable means of ensuring an all embracing Education For All?

Educational technology is a systematic application of the results of research and validated experience to solve educational problems. Infusing technology into our educational system can enhance the universality of education. Educational technology can promote education for all.

Technology is regarded as a powerful tool especially in the area of education. Infusing technology in education may ensure the universalisation of education. Technology improves efficiency among teachers and increases motivation in students. Technology will ensure mass education that will promote individualised instruction. With the use of technology, there is cost effectiveness as resources applied for one child can be multiplied a thousand fold. Technology makes education more effective and readily available. A large scale introduction of technology into the teaching learning process will provide a basis for raising teachers' salaries to professional levels. Educational technology will result in a universal, individualized education where every person will be educated and no two persons will be educated alike.

Can you still recall from your modules one and two, the various developments in teaching and training technologies including the various means of instructional delivery you were exposed to? For you in

Nigeria, such technologies may be as simple as the radio, television, audio tape/disk, video tape/disk, interactive video, video text, to the more complex information and communication technologies-ICT (internet, e-mail, cable satellite etc).Various technologies deliver different kinds of content and serve different purposes in the classroom. Some of these are explained below:

Radio- can enrich basic education. This is more economical relative to the televisions or ICTs. Radio can either support or supplement print based materials. It can be used as a follow up to formal classroom instruction .Radio is easily affordable and mobile. It can readily be used in rural areas. It can be used live as a broadcast or in a deferred mode (recorded programme).

Television- Both the radio and television can be used to instruct a vast number of students at the same time. It is not as cheap as the radio but cheaper and simpler than the computer.

ICT- in a developing nation as ours, access to ICTs remains a luxury. Despite poor connectivity and scarce resources, ICTs are making a noticeable difference both in classroom performance and teacher training. You will learn more about this in your course on ICTs in education.

New digital radio technology-this is an improvement on the radio transmission. It is able to bring interactive options to people in remote areas across Africa. UNICEF in Sudan has successfully used digital radio technology in its education programme.

Satellite transmission can beam instructional materials to sites thousands of miles away. Satellite television has been used to disseminate instruction in developed countries such as China and Germany.

Internet- do you send e- mails to your friends? This will be possible on the internet. The internet is used for collecting information. It promotes collaboration among students.
Computer can be used in various modes such as; computer assisted instruction, games, simulation, drill and practice, graphics etc. Computer graphics can create "virtual environment'

Virtual school programmes- this permits students to receive instruction on line. Hence, wireless networks can be created in places with no access to formal school. Schools in rural areas without adequate teaching staff can receive instruction on line or through video conferencing and the web on such subjects/ courses that lack teachers. Similarly, when schools are connected to high speed or broad band

internet service, they provide greater access to information and permit the use of multimedia.

Electronic books-these are electronic forms of texts that have been published in a digital format. These are displayed on specialised reading devices or computers. E-books are available in several formats that can be read with their associate e-book soft ware. Incorporating e- books into education will ameliorate the acute shortage of textbooks in our schools because of the shared access by a large number of learners.

ICTs can have a multiplier effect and are likely to have cost advantage over conventional ways of supporting and updating them. ICT have the potential to reduce the isolation of remote rural areas. When ICT are effectively harnessed, they can help to achieve EFA goals at an affordable cost. ICT should not be used in isolation but can be combined with more traditional technologies such as radio etc. Intelligent use of technology will improve the access to basic as well as lifelong learning.

4.0   CONCLUSION

To ensure a successful universal basic education there is a need to restructure our teacher training institutions and equip them with modern instructional technologies. A virile in service training of teachers which will produce dynamic, creative and computer literate teachers is necessary. Teachers need to be motivated and encouraged to use ICT in the teaching -learning process. Teaching needs to be made an attractive profession so that only competent and committed personnel are absorbed. Education for all (EFA) will result in benefits that are unquantifiable in the lives of our citizenry if well implemented, financed and supervised.

7.0   SUMMARY

In this unit, you have learnt about universalisation of education, benefits of UBE and some of the factors which may pose challenges to the attainment of UBE. Furthermore, ways of overcoming these challenges were suggested. The infusion of educational technology as a means of combating some of the challenges was discussed.

6.0   TUTOR-MARKED ASSIGNMENT

1.   Describe the concept of universalisation of education.
2.   Discuss five factors that may pose challenges to attainment of a universal education.
3.   Identify two ways by which educational technology can be used in achieving universal education.

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UNIT 3   EQUALITY OF ACCESS TO NEW TECHNOLOGIES IN EDUCATION

CONTENTS

1.0   INTRODUCTION

Equality implies that everyone has a chance of being involved; having an equal opportunity. You have been part of a group in which at one time or the other you might have insisted that all members of the group must be treated equally. Equality of access to new technologies of education therefore refers to a means of making sure that all of us – young, old, physically challenged, disadvantaged population amongst us all have equal opportunities of accessing the new technologies of education.

Equality of access to new technologies of education implies that irrespective of one's socio-economic status, location, gender, ethnic background etc, one should not be excluded from accessing new technologies of education. New technologies are typified by computers and ICTs.

In this unit, the need for equality of access to new technologies will be emphasised. Also, means of increasing access to new technologies in education will be discussed. Furthermore, factors limiting equality of access to new technologies shall be highlighted.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- describe the concept of equality of access to new technologies of education

- describe the means of increasing access to new technologies of education
- highlight the factors limiting accessibility to new technologies of education.

3.0   MAIN CONTENT

3.1   Equality of Access to New Technology

The National policy on Education (2004): section1, subsection emphasises on the need for equality of educational opportunities for all Nigerian children irrespective of any real or imagined disabilities each according to his or her ability. Similarly, subsection 5c of the policy advocates the provision of equal access to educational opportunities for all citizens of the country at all levels of education both inside and outside the formal school system. Furthermore, section 8, subsection 80c of the policy caters for the needs of special children as it states that all necessary facilities that would ensure easy access to education shall be provided. From the National policy, you would have seen that the government has already addressed the issue of equality amongst its citizenry. Education is light, it is synonymous with development. The world today is governed by technology and Nigeria cannot afford to be left behind, hence the need for encouraging equal access to technology use in education. When technology is infused into our education system, it will enhance economic gains and promote rapid development of the nation.

Increased access to new technologies would imply a paradigm shift in our traditional class room set up. For any education to be meaningful, the circle of opportunity must be expanded, potential extended to those one might otherwise not have considered worthy enough. The bottom line is that everyone should be fairly treated. That in essence is what equality connotes. Everyone should have equal access to new technologies of education so that we can all contribute to the growth and development of our nation.

SELF ASSESSMENT EXERCISE 1

In three sentences only, briefly explain the concept of equality of access to new technologies of education

3.2   Increasing Equality of Access to Technology Use in Education

Full integration of technology into the teaching-learning process will involve a systematic and balanced approach that will ensure prolong

access to technology use. Such access must be regular to ensure proficiency in its application. The following are suggested as means of increasing equal access to technology use in education.

- **ensuring equity and fair play-** all learners irrespective of their socio-economic status, location, gender, disability amongst other variables must have equal access to technology use where available. In essence, it is important that equity and fair play should be entrenched in the use of technology so that all categories of learners can be adequately catered for. Also, state of the art digital audio and multimedia technology including digital satellite broadcast can be used in building global learning networks and beaming such to rural communities and other communities where formal school setting may be absent. Open school strategies can be utilised in catering for children and youth including adults who cannot be accommodated in formal schools. Special learners such as those with loss of vision can be equipped with "talking books" which have been recorded. Also, Braille library can be provided for such. Embossed graphics and diagrams are used in explaining text in such books. With equal opportunities, special children can compete and even excel.

- **teacher support should be a priority -** a successful access to technology use by students must consider support from the teacher. Teachers must be involved in the planning and execution of technology use by students. The support of the teacher is essential so that technology use can be infused in the teaching learning process.

- **provision of technical support and maintenance –** technical support is essential so that teachers will not be discouraged by equipment failure or software behavior which they do not understand. Such technical support must be available on demand. Such technical assistance include:

1. Helping to plan for technology uses and acquisition
2. Providing training in how to use new hardware's and soft wares
3. Providing demonstration and advice on how to incorporate technology into instruction
4. Providing on demand help when software problems or hardware failure arise
5. Performing low level maintenance on the system.

- embracing intensive technology use in teacher training programme – teacher training institutions need to put more

emphasis on technology use in their teacher preparation programmes and ensure technology competence.

- professional development in technology use by teachers through dynamic in service training is necessary. When teachers are ICT compliant they are more favourably disposed to its use in the teaching- learning process.

- provision of computer ,ICT and other related technologies in the schools-for accessibility, schools must be provided with more wireless and portable technologies that can be used in and out of the classroom. Both teachers and learners must have unrestricted access to ICTS. Access by teachers and learners should be available on demand .As such, adequate amount of technologies must be available especially during instruction. Similarly ,students and teachers must have access to high speed internet service and more appropriate instructional soft ware (in Lagos state ,selected schools were provided with computer laboratories which had internet facilities; in recent times though, the laboratories are gradually becoming a shadow of themselves and the internet facilities are absent). Was your school a part of such privilege?

- commitment and sincerity of government in facilitating equal access of the populace to technology use-all levels of government should monitor the access to technology that exists for traditionally disadvantaged population. Government should be prepared to do what is possible to ensure equality of access.

It is important to note that technology is a catalyst for change in the way students learn and teachers teach. Teachers can and will embrace technology if they are provided with the requisite professional development and support.

SELF ASSESSMENT EXERCISE 2

1. Discuss three ways of increasing access to new technologies of education.
2. Apart from the ways mentioned in this unit, suggest other means by which increased and equal access to new technologies of education can be met?

3.3   Constraints to the Accessibility of New Technologies of Education

Access to education may invariably increase one's access to technologies of education. The following are constraints that may limit equal access to technologies.

- **Socio-economic status (SES) -** SES of the family determines to a large extent the learner's access to education. Access to education is directly linked to the learner's access to technology use. Statistics have shown that children from low socio-economic status and ethnic minorities are less likely to have access to computers at home and in essence may not be bold enough to attempt to use such in schools. Similarly, there is a gender difference in technology access; boys have more access to computers than girls. These can most probably be linked to the assertiveness of the boys in claiming computer time than girls. Furthermore, learners in urban areas are most likely to have access to computer and ICT technology than those in rural areas.

- **Cost-** availability of new technologies depends on fund. Often times, fund allotted to education is usually inadequate, this inadequacy will affect the purchase of hardware and the necessary soft wares. Invariably, this will limit access to such technologies.

- **Absence of appropriate infrastructure-** for technologies to be placed in schools, infrastructure such as computer laboratories, multimedia centres, etc are usually not provided for in schools.

- **Inadequate resources-** resources in terms of support staff (technical and maintenance crew) are inadequate to train and also offer services to the few privileged schools with technologies. Due to this, teacher's and learner's access to technology and support is inadequate and insufficient to support equal opportunities.

- Technology training-most training for technology use put in place by the authority focus more on the administrative function of the ICTS while ignoring the instructional use of technologies. Technology training for teachers and learners in instruction are limited in scope and infrequent. Also, technology use are restricted to mostly ICTS (computer, internet) while others like the video, radio, CD, audio tape are hardly used.

Other limiting constraints include inefficient electricity supply and erratic telephone system

SELF ASSESSMENT EXERCISE 3

1. Identify three constraints that may limit equal access to technology use in education.
2. Suggest means of eradicating the identified constraints.

4.0   CONCLUSION

For education to remain a common good of shared value, there is need to accommodate the ever increasing demands for access to new technologies which our education will be exposed to. A nation not striving for equal access to the new technologies will in the nearest future become educationally redundant. The demand for the products of such a redundant educational system will gradually decline in the international labour market. Equality of access to new technologies in education should incorporate a qualitative use of the available technologies. Accessibility should not be mixed up with quantity alone but quality should be ensured. New technologies of education can assist in ensuring equity and access to good quality education in our nation.

7.0   SUMMARY

In this unit, you have learnt about:

- The concept of equality as contained in our national policy on education
- The need for equality of access to new technologies of education
- The means of increasing accessibility to new technologies of education
- Those factors which may limit access to new technologies of education.

6.0   TUTOR-MARKED ASSIGNMENT

1. In three sentences only, explain the concept of equality of access to new technologies of education.
2. Discuss briefly how access to new technologies of education can be increased in our nation.
3. State three factors that may hinder one's access to technology use in education.

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UNIT 4   QUALITY CONTROL OF EDUCATIONAL SERVICES

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1.0   INTRODUCTION

One of your major job descriptions as an Educational Technologist in a school system should be the quality control of educational services of whatever school (primary, secondary, college, polytechnic or university) that you may work in, granted that you do not just acquire your educational technology certification and head back into the classroom to continue teaching your subject specialisation. This is usually the case with most of us who are educational technologists; the system simply does not provide special roles for us as it does for others (guidance counselors, educational planners and managers, etc.). If you give thoughtful considerations to what I have just said, you will agree with me that by your special training as an Educational Technologist, your job is essentially and in all ramifications, ensuring that the educational

services provided in schools are qualitative in nature. This starts with the quality of the schools' guiding philosophy, to the quality of the educational facilities and human resources (teaching and non-teaching) planned for the schools (this seems to be your area of core competence; isn't it?), the quality and choice of the curriculum put in place to achieve the schools' philosophies and of course the quality of administrative leaderships installed for the management of the schools, and the quality of students, academics (instructional system/teaching and learning), and students' academic achievements. You might wonder, what has your training as Educational Technologist got to do with all these? Take a hard look at your training curriculum as an Ed. Tech. specialist, you will observe that it involves all the fields there are to train people in for the provision of quality educational services in schools and not just in instructional and media designs, and their managements. You (Educational Technologist) are about the only category of school professionals in that position. **Consequently, by your training as Educational Technologist, you are qualified to be an all round Educational Consultant**, granted that you develop yourself to that level. You therefore need to equip yourself with **global education best practices.** This unit is designed to assist you in developing such skills by providing you with information on some contemporary issues in education and globalisation as identified below.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- describe the concept of 'quality control' and distinguish it from 'quality assurance
- discuss cultural and expertise issues in educational services
- discuss safety and security of ICTs
- evaluate media programmes
- define the concept of 'plagiarism' stating how to recognise and prevent it
- state the WIPO concept of 'intellectual property' and describe its categories
- describe any latest research and, or development in any named field of educational technology.

3.0 MAIN CONTENT

3.1 Defining the Concept of 'Quality Control' (QC) and 'Quality Assurance' (QA)

3.1.1 Quality Control (QC)

The concept of quality control has been defined as a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer (Whatis.com, 2009). Going by the peculiar situation of education, the manufactured product here is the student or learner, the performed service is; educational service while the client or customer is represented by; parents, the society (including the global community), governments, employers of labour and other stakeholders of education.

3.1.2 Quality Assurance (QA)

Whatis.com (2009) expressed the fact that QC is similar to, but not identical with, quality assurance (QA). QA is defined as a procedure or set of procedures intended to ensure that a product or service under development (before work is complete, as opposed to afterwards) meets specified requirements. QA is sometimes expressed together with QC as a single expression, quality assurance and control (QA/QC). From these two descriptions of QC and QA, you would have noticed that whereas QC focuses on the quality of the finished product, QA puts emphasis on what to do in ensuring the quality of the finished product. QA, as the precursor of QC should be worked critically into the school's sub-systems such as the policy design, educational facility, admission, staff recruitment, instructional, administrative leadership and school administration, examination, pastoral, and school-community relations.

3.1.3 QC, QA and Educational Standards

You should always bear in mind that in setting up quality control system for your school, there is the need to first set specific standards against which to measure the quality of the school's products (graduate students). The question here is; what standards would you want the school products to be compared with? This is where your job as a quality control professional (educational technologist) within the school system lies. Remember that I had earlier told you that QC should be one of your major job descriptions as educational technologist in any school system. You just have to take the gauntlet in designing and executing the QC system for the school. Now that you know that the Quality Control system (QCS) for a school should be set against some specific standards,

I am going to leave you in setting out these standards. Bear in mind that in setting the standards, you must find data in the following aspects of an effective school that can measure up to global standards:

- School philosophy (vision, mission, motto, values, etc.)
- Policy designs in implementation process
- Educational facilities and plants' management
- Staff recruitment
- Admissions
- Instructional system (teaching and learning process)
- Knowledge sharing and management system
- Examination system
- Staff professional development
- Administrative system
- Boarding system
- Health system (school clinic)
- Information and Communication Technology (ICT) system (as it applies to classroom interactions and school-community relations)
- Security system
- School-to-work programme.

You will need to find out about agreeable standards for these guiding sub-systems or programmes of an effective school, or any other ones that you may find out from your further research. These standards could be local, national and international if your 'school' would compare favourably with global standards. In executing the QC programme, you must always collect real data about your school system and compare them with set standards that you have at your disposal. Where there are limitations, remediation procedures should be put in place.

Finally, the QC process must be ongoing to ensure that remedial efforts, if required, have produced satisfactory results and to immediately detect recurrences or new instances of trouble (Whatis.com, 2009).

SELF ASSESSMENT EXERCISE 1

Define the concepts of QC and QA with particular reference to education and the school system and distinguish between the two concepts.

3.2   Cultural Issues, Safety and Security Issues in ICT, Expertise in Educational Services

3.2.1 Cultural Issues

It is very important that you understand the fact that the culture of a people is the basis for the type of education that they have or use in training their youths and in sustaining that culture for perpetuity. Since education can be considered as the major tool for socio-cultural, economic and political developments of a people, its added implications for scientific, technological and industrial developments cannot be over emphasised. Developed countries have achieved their feats in consonance with their societal needs within the framework of their cultures. It is essential that you take note that all the various curricula operating in developed countries have cultural undertones. So, when educational services have traversed the international borders or students of different cultural backgrounds migrate into a country for education, they are bound to have some cultural challenges in their education in the foreign countries. For instance, Li (2003), investigating culture and classroom communication in a case study of Asian students studying in New Zealand language school, primarily found out that in spite of the New Zealand teachers' dedication to improving education quality, their success was questionable in terms of the level of satisfaction of these Asian students. The methods adopted by New Zealand teachers, featured by classroom spontaneity, interactions, involvement, participation, group work, democracy, and learner autonomy, seem to run counter to the Asian discourses of coherence, sequence, strict discipline, competition, reflection, precision, concretisation, in-depth and logical analyses. He went on further to sate that imposing the Western TESOL models upon Asian students without taking into account cultural compatibility could lead to serious pedagogical challenges. Some teachers' lack of intercultural communication skills and their narrow range of teaching approaches has become a barrier hindering them from adapting their teaching to learner needs and to communicate successfully with Asian students in their teaching. In the words of one of the Asian students as reported by Li (2003), "These teachers are very kind, but they do not know how to teach us."

The reported case study above typifies the challenges encountered by international students that leave their countries for an oversea education or those students who do not leave their countries but might be taught by foreign (expatriate) teachers, right there in their own countries. As I have pointed out earlier, the culture of a people is of significance in their education and its pedagogy. This assertion is corroborated by different researchers as reported in Li (2003) that it is important to point out that pedagogy is shaped by specific cultural values and ideologies suitable to

the society where it originates (Prabhu, 1996). It contains socially approved methods and therefore the enactment of these methods becomes an imposition of cultural values by an arbitrary power (Bourdieu & Passeron, 1977). Cultural compatibility of pedagogical actions is largely responsible for the teaching outcomes. I do not know whether you know this, **you cannot teach in Japan unless you are Japanese**. The reasons for this is largely hinged on the Japanese culture which only the Japanese understands and can rightly and appropriately transmit to the Japanese young learners or, for the reason of quality assurance and quality control of their education thereby elimination cultural conflicts in their education system. Except a country's educational system is completely closed, there is no way one would not have international students or teachers (expatriates) especially for European courses or in countries like Nigeria where financial gains are additional motivation for economic growth of the schools. In a situation like this, it is very essential to internationalise the curriculum of delivering educational programmes (Bates, 1999). This according to him will prepare the students for an increasingly global economy and society, if courses are planned from the start with an international focus, especially if they involve contributions from or joint development with institutions in other countries.

Programs that have not only students but teachers from other countries studying and teaching collaboratively can provide a strong international perspective that would be difficult to achieve in other ways. This is more the case with trans-border distance education or online programmes. Language of delivery has been found to have a major cultural implication for the delivery of online courses which also have some advantages over face-to-face teaching for students working in another language than their own. The asynchronous nature of online teaching allows students to take their time in composing responses in another language, whereas in classroom contexts often the conversation moves on before they have crafted an appropriate intervention (Bates, 1999).

It will not be only the language of delivery that will cause cultural challenges for learning through a trans-border educational programme. The general cultural background of the foreign learner may consequently interfere with academic achievement. You are likely to agree with me that in some European countries and to a minimal extent, dissent is even encouraged. These teaching strategies where learners can express themselves often lead to permanency of learning and the ability of learners to apply their knowledge in novel situations. In other cultures, there is great respect shown by students for the teacher, and it is culturally alien to challenge the teacher or even express an opinion on a topic. Consequently, it could be difficult for students from such cultures to learn effectively from online teachers or distance

programmes or online discussions in a synchronous environment as provided by the chatting portal of the Internet, and even international some Nigerian private schools, critical thinking skills, debate and discussion, where students' views are considered important, and where the views of teachers can be legitimately challenged and where student teachers (expatriates) either in their own countries or in the countries of these teachers.

Conclusively, culture plays a big role in the education of a people, what they learned and how they learn it. Research on the cultural issues in education is ongoing. You should source for more information on the concept.

3.2.2 Safety and Security of Information and Communication Technologies (ICTs)

You may wonder that we shall be discussing safety and security of the information and communication technologies (ICTs) in our quest to bring quality control into educational services. It is one concept that could affect your online studies either physically or through mental fatigue as you would soon find out. You agree with me that whatever affects you physically or mentally, affects your health and the quality of any endeavour that you engage in. Moreover, as an educational technologist in any school system you could obviously be in charge of the school's ICT applications in education. Consequently, the safety and security of equipment and persons are your responsibility.

We use ICT every day for homework, work, playing games, browsing the internet, instant messaging, downloading music, etc, but it's easy to do without thinking about the dangers that can exist to our health due to our posture, tripping dangers or even how close we are to the monitor. This can lead to problems with back pain, eye strain, pain in the hands and arms, as well as posing more serious dangers to ourselves and those around us because of poorly arranged cables and clutter (Bernardo, 2008).

By understanding these issues we can take action to improve the way we use ICT and therefore have a healthier and safer ICT environment.

Ergonomics of ICT Use

One major concept applicable to safe use of ICT is, **'ergonomics'**. In a simple term, ergonomics means, 'the science of designing a job, equipment, and workplace to fit the worker (Bernardo, 2008). By ergonomics of ICT use, it is assumed that as you work on the on the computer system, your health and safety could be compromised by your

continued stay on the computer, thereby standing the risk of long exposure to radiations from the monitor. The sitting position that you assume could have telling effects on your body posture and consequently, there is need to understand the ergonomics of a healthier computing environment. This starts with the arrangement of computers and furniture in the workplace in order to give comfort to the worker (students, teachers, administrators, etc.).

Arranging equipment in study area to achieve correct student posture

Students should arrange equipment in the study area in order to maintain correct posture while working in front of the computer.

The correct posture of a person working at the computer is:

- Feet are rested firmly on the floor or footpad
- Thighs are fully supported by chair seat except for a two-finger width space behind the knee
- Curve of lower back is supported by chair back
- Elbows, hips and knees are bent at approximately 90 degrees
- Shoulders are relaxed so shoulder blades are free to move
- Forearms are parallel to the floor or sloping slightly downwards to the desktop
- Wrists are straight and not bent up, down or to the side. Note: Wrist supports help to maintain natural, not extreme wrist position when working with a mouse. Wrist supports to be soft
- Top of screen is at eye level or slightly below, about arm length straight in front of your eyes
- Glare and reflection of the screen are avoided by changing angle and orientation of the screen
- Neck is relaxed and balanced; chin is not poking upwards.

Correct posture can be complemented with correct study behaviour as follows:

- Take short breaks while keying to relax your hands and prevent fatigue
- Take longer breaks every 30-60 minutes to get up, walk, and do exercises or another task to move your body and to increase your blood circulation
- Take time to look further away to help your eye muscle to relax
- Take breaks to drink water and have nutritious meals
- Change position often while obeying the same basic principles of correct posture.

(Source: The State of Queensland; Department of Education and Training Queensland Government).

The foregone discussion on safety in ICT use constitutes just the basics. You should investigate the following issues in relation to the concept:

- Online safety and language use on the Internet
- Security behaviours from hacking.
- Viruses and how they can be prevented in your system.
- Monitoring Internet use by students
- Dangers of improper disposal of e-waste. (Use Nigeria as example)
- Effects of ICT multiplicity of the environment
- Concept of Green ICT
- Storage and protection of ICT against theft.

3.2.3 Expertise

The concept of expertise or experts in educational services delivery hinges on certain fundamental issues in education which basically boil down to the provision of quality services. Experts are supposed to have extra skills in relevant fields and may be called into an organisation like the school where there are no expertises in such fields in the school or organisation to guarantee the required quality. These experts are often referred to as consultants. In educational services, there could be need for experts if:

- Quality of school personnel, especially teachers are inadequate.
- Population of learners outstrips those of required teachers.
- There is the need to bring in resource persons (experts) in training or teaching learners on certain concepts or skills where the teacher's knowledge is inadequate.
- There is need for online designs and delivery of instructional systems for distance learning or education.
- There is the need for professional development for the teaching staff in pedagogy or manipulative skills on educational technologies in the instructional system.
- Quality school management staff or strategies are desired.
- Need for expert advice in solving perceived problems of running an effective sub-system of the school such as the administration of the school's accounting system and staff salary system.

These and a couple of other reasons may call for expertise in delivering certain aspects of educational services. Remember that in all of these,

quality control and quality assurance are the keywords that make expertise necessary.

SELF ASSESSMENT EXERCISE 2

Discuss how cultural issues, safety and expertise affect the quality of educational services.

3.3   Evaluation of Media Programmes

3.3.1 What is Evaluation of Media Programmes?

The key words here are, 'evaluation', 'media' and 'programme'. You should be able to put these three words into proper perspectives and consequently set out the criteria and utilisation of an effective media programme evaluation. Evaluation has been variously described; Mosher (2009) describes evaluation as, 'the assessment of a program's impact'. Goods, 1973 in Sun, 1986) defines evaluation as, 'the process of ascertaining of judging something by use of a standard of appraisal, includes judgment in terms of internal and external criteria'. You will notice in this definition of evaluation that standards and criteria (internal and external) are obviously of importance in evaluating any programme. Standards against which any evaluation will be made are functionally determined by the goals and objectives set for the media programmes at inception. These in themselves stem out of the needs analysis and assessment conducted which, necessitate the media programme in the first place. According to Valenza (2007), evaluation is employed to determine the degree of excellence that a programme has achieved. Remember that at the start of this sub-unit, I did say that any evaluation should definitely have a purpose or uses to which its result will be used. Stufflebeam (1979 in Sun, 1986) bringing out this utilisation factor of evaluation describes evaluation as, 'the process of delineating, obtaining, and providing useful information for judging decision alternatives'. This definition and the previous ones stated above should have shown you that in evaluating any media programme, the information provided will serve in taking quality decisions meant in improving the programme in all ramifications of its design, in line with predetermined goals and objectives and against a set of standards based on internal and external criteria.

3.3.2 Terminologies of Evaluation

Valenza (2007) identified the following terminologies of evaluation:

- **Checklist**: A prepared list of items used for the purpose of observation or evaluation.

- **Criteria**: Standard, norm, or judgment selected as basis for comparison. Evaluation criteria therefore, are the standards against which the media programme may be checked.
- **Standard**: Goal or objective or criterion of education expressed either numerically or philosophically as ideal of excellence.

These basic terminologies will make up your tools for evaluating any media programme. It is your responsibility to determine or set these tools before embarking on a media programme evaluation. For instance, in designing the checklist tool, you will need to put into consideration the philosophy of the programme, its pre-determined goal and objectives and the impact it is having on those that are using the programme. Sometimes, it may not be out of place to adapt or adopt any evaluation rubrics designed to evaluate media programmes similar to your own. You can get some of these online. Remember to give appropriate acknowledgement so as not to fall foul of the intellectual property law.

3.3.3 Purposes of Evaluating Media Programmes

As earlier on pointed out to you, you do not evaluate for the sake of doing so but in serving some purposes. Anderson and Ball (1978 in Sun, 1986) identified six basic purposes of evaluation:

A.   To contribute to decision about program installation.
B.   To contribute to decision about program continuation, expansion, or certification.
C.   To contribute to decision about decision about program modification.
D.   To obtain evidence to rally for support for a program.
E.   To obtain evidence to rally for opposition to a program.
F.   To contribute to the understanding of basic psychological, social and other processes (regarding the programme-MINE).

These purposes could vary from programme to programme, they however indicate the basic reasons of evaluation which are usually technical, political or psycho-social in nature irrespective of the system in which the media programme works.

3.3.4 Some Techniques for Evaluation of Media Programmes

Valenza (2007) identified some techniques for evaluating media programmes. These include:

- **Checklist:** The checklist technique is unique in that it has an advantage of many lists and standards being available online. The lists could however be out of date or data and may not apply to

your specific needs. So, the best that you can do here is to be guided by any interesting checklist, in designing a most appropriate one to your situation.

- **Observation:** This is a direct examination approach. It relies on your judgments as you carry out a direct observation or examination of the media programme in action. The advantage of this technique is that when it is carried out by an outsider, it can be an objective evaluation of the programme. Contrarily, the process could be time consuming and an evaluator may not be there on time to make appropriate observations.

- **Statistics:** Collecting statistical data on the programme could be advantageous in that it could be easily computerised. On the other hand, it has a disadvantage in the fact that it deals strictly with quantity and not quality of the programme.

- **Survey and Interviews:** Conducting surveys and interviews can provide you with most current information relating directly to the users of the programme. Contrarily, it can be very time consuming.

You may choose to use any of these techniques or a combination of them. Whatever you decided to do, you have to justify your choice appropriately.

SELF ASSESSMENT EXERCISE 3

Think about how you will evaluate a media programme that you are supervising. What will be your various considerations for evaluating the programme?

3.4   Plagiarism, Intellectual Property

3.4.1 Defining Plagiarism

Plagiarism could be a writer's or speaker's 'Achilles' heel' when he/she arrogates to himself/herself knowledge or information that he/she knows is obviously borrowed from another source for which no acknowledgment is offered. Wadsworth.com (2009) expressed the fact that plagiarism is a Latin word which simply means, 'to kidnap'. The website went on to say that, 'if you plagiarize you're kidnapping and stealing others' hard work and intellectual property. It is academic and public dishonesty.'   IUB (2005) defines plagiarism as, 'presenting someone else's work, including the work of other students as your own'. The Council of Writing Program Administrators (WPA, 2003) in a contextual definition of plagiarism states that, 'In an instructional setting, plagiarism occurs when a writer deliberately uses someone else's language, ideas, or other original (not common-knowledge)

material without acknowledging its source'. This is a most authoritative definition of plagiarism. According to the WPA council, this definition applies to texts published in print or on-line, to manuscripts, and to the work of other student writers.

The School of Education, Indiana University, Bloomington (IUB, 2005) identified five basic conditions needing credits and acknowledgment in order to prevent students from falling victims of plagiarism:

- Directly quoting another person's actual words whether oral or written.
- Using another person's ideas, opinions or theories.
- Paraphrasing the words, opinions or theories of others, whether oral or written.
- Borrowing facts, statistics or illustrative materials.
- Offering materials assembled or collected by others in the form of projects or collections without acknowledgment.

What you have had so far on plagiarism is the basic that you need to know. You however need to carry out more research on the concept. Your best reference on plagiarism is the work of the Council of Writing Program Administrators (WPA) on ://www.wpacouncil.org. It deals with:

- Definition and causes of plagiarism
- Documenting sources appropriately
- Shared responsibilities on plagiarism
- Best practices on preventing plagiarism among students.

Ensure that you check out this work and any others on the concept.

3.4.2 Defining Intellectual Property

Intellectual property is a concept that goes hand-in-hand with plagiarism. If you commit the grievous offence of plagiarism then you have automatically infringed on the intellectual property right of someone else. These twin offences could land you into very serious trouble in any academic or entertainment environments. The global authority on intellectual property (IP) is the World Intellectual Property Organisation (WIPO). WIPO (2004) defines intellectual property as, '…the creation of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce'.

The organisation classified intellectual property into two categories:

- **Industrial property**: which includes inventions (patents), trademarks, industrial designs, and; geographic indications of sources;
- **Copyright**: which includes literary and artistic works; such as novels, poems and plays; films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performance, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.

You may wish to do further reading on intellectual property. WIPO (2004) has published an Intellectual Property Handbook, detailing; policy law and uses of intellectual property. You can access the handbook on URL: ://www.wipo.org. You may also wish to check on Intellectual Property and Copyright Act (CAP.68) in Nigeria.

SELF ASSESSMENT EXERCISE 4

1. Define the concept of plagiarism stating how you can identify and prevent it.
2. State the WIPO definition of intellectual property and categories.

3.5   Research and Developments in Educational Technology

This sub-unit is the crux of the matter in educational technology developments and practice. The field of educational technology is forever dynamic. It keeps improving as new technologies see the light of the day. The latest for instance in the ubiquitous learning or information gathering environment created by the Google's iPod hardware and software system. Research is ongoing in the various field of educational technology that this sub-unit cannot possibly deal with in this course. It will be up to you to avail yourself with current research and developments in educational technology from time to time. It is the only way that you can upgrade and develop your knowledge and skills in educational technology. In this regard, I am requesting you to search the web for some new developments and research in any field of educational technology (instructional technology most especially) for the purpose of this sub-unit.

SELF ASSESSMENT EXERCISE 5

Give a concise description of any latest development in instructional technology that you have recently studied.

4.0   CONCLUSION

Globalising education especially higher education, typified by distance learning or education seems to be an extremely essential move in these modern terms, and in view of the needs for a distributive, profitable and qualitative education. This is reflected in the growth of new information technologies, the prospective liberalisation of trade in educational services and the emergence of various forms of borderless education (UNESCO, 2002). These developments call for a lot of debates in the quality control and quality assurance of educational services and of course, with the advent of the Internet, the 'transport vehicle' of a vast volume and forms of information, issues of plagiarism, intellectual property and copyright comes into play. So also are the issues of culture, safety and expertise given serious considerations if the quality of what is learned or transferred across the international borders will be guaranteed. Your involvement in all of these processes becomes crucial in view of your training as an educational technologist and leading school personnel in the quality control of educational services in a school system.

5.0   SUMMARY

In this unit, you have studied the concept of globalisation and education, bordering on the provision of quality control systems in the provision of educational services. Issues such as; cultural, safety and security of ICTs utilisation, and expertise that could affect this quality have been discussed. You have also found out that one of the major ways of improving or ensuring quality in global education is to evaluate medial programmes in order to ascertain that they deliver their pre-planned instructions effectively. Your role in all these is very essential to their qualities. Consequently, you have come to realise that you have to keep yourself abreast of research and developments in educational technology if you are to remain relevant and develop yourself in the field of educational technology.

6.0   TUTOR-MARKED ASSIGNMENT

1.   Define the concepts of QC and QA with particular reference to education and the school system, and distinguish between the two concepts.
2.   Discuss how cultural issues, safety and security of ICT and expertise affect the quality of educational services.
3(a)   Outline the ergonomic principles for the safe use of ICT in a school
(b)   In what ways can multiplicity of ICTs affect the environment?

4. Discuss consideration and strategies that you will use in evaluating a **named** media programme.
5. Define the concepts of plagiarism stating how you can identify and prevent it.
6. State the WIPO definition of intellectual property and categories.
7. Explain the concepts of plagiarism and intellectual property stating how you can detect plagiarism and possibly prevent it.
8. Give a concise description of any latest development in instructional technology that you have recently studied.

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## MODULE 4	NEW CHALLENGES IN CURRICULUM AND INSTRUCTION

Unit 1		Issues Related to Efficiency of Media Programmes
Unit 2		Teacher Development and New Technologies
Unit 3		Contemporary Instructional Strategies

## UNIT 1	ISSUES RELATED TO EFFICIENCY OF MEDIA PROGRAMMES

CONTENTS

1.0	Introduction
2.0	Objectives
3.0	Main Content
	3.1	Cost Issues: Acquisition, Running Costs and Maintenance
	3.2	Rapid change Issue, Constant New developments, Upgrading, etc
	3.3	Funding Challenge and Constraint, etc.
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

## 1.0	INTRODUCTION

Distance learning institutions in Africa are often started without adequate provision for funds and many of the institutions grow and expand so rapidly beyond the available resources. As a result they may be unable to maintain both the quantity and quality of their services as well as the efficiency of their operations.

The cost implication of introducing media programmes are numerous ranging from cost of acquiring modern technologies, power generation, competing source for the slim budget provision for education to time cost for integrating the new technologies into the existing system.

## 2.0	OBJECTIVES

At the end of this unit, you should be able to:

- identify cost related issues to media programmes
- identify the influences of copyright laws on media programmes
- explain various factors influencing the funding of media programmes
- suggest funding mechanisms for media based education.

3.0   MAIN CONTENT

3.1   Cost Issues: Acquisition, Running Costs and Maintenance

Assessing the benefits of ICT investment against its substantial costs has proven to be a challenge. McDougall and Jones (2006) argue against the over-emphasis on quantitative cost benefits analyses of ICT implementation, preferring instead greater stress on qualitative studies, based on research and learning theory, teaching methodology and student activity. Gulbakar (2007) reports that; massive educational technology investments in Turkey for example have produced little evidence of success, resulting from a lack of planning especially at local levels. He discovered that, although school teachers and administrators feel technically competent with ICT tools, neither group expresses satisfaction about the efficacy of curricular integration.

Also in America, Kaestner (2007) avows that credible measures for calculating costs and assessing benefits of ICT are yet to be developed.

Cost effectiveness studies on the efficacy of ICT implementation in schools therefore leaves many questions unanswered. For example, available research typically fails to address the quality of implementation. Costs may be assessed against goals and objectives that were not appropriate to the kinds of investment made. Original investments may have lacked components essential for success (such as professional development for teachers).

By reducing the number of years a student spends in the system and producing better-prepared workers, technology-mediated projects improve the efficiency and effectiveness of educational systems and promote savings in the long run. Cost comparisons based solely on short-term objectives will not reflect those savings.

Inadequate Capacity Incentives for Faculty Members

Lack of infrastructure and professional competencies remain important barriers. In many African countries there is a dire shortage of qualified staff required for guiding and influencing the development of media policies and for planning, developing, managing, and evaluating open distance educational programmes.

These technical and economic constraints also create concerns regarding budget and costs for sustaining media programmes in higher education. Scarce funding for media resource development is a major problem for an efficient and effective curriculum and instruction in schools. Lack of

funding and faculty members' participation in such programmes could defeat the mission altogether.

The lack of incentive participation for faculty members is a social barrier. The greatest concern for institutions is the lack of dedication spent toward the development of media resources due to time commitment. The faculty is the most important ingredient to foster in higher education environments. Without faculty recognition, there will be little interest for faculty to volunteer their time and resources to contributing to the technological integration movement.

An incentive programme in higher education to support media programmes is an achievable goal. For one, higher education can create and mandate an incentive programme for faculty members. Faculty members are required to meet goals every few years in order to keep in tune with their instruction and career endeavour with the institution. A policy set forth with these incentives that provide support and encouragement should not be seen as a burden to faculty yet should be viewed as an integral part of the institution.

Open Licenses

Copyright laws are a troublesome spot for higher education and especially media programmes. Copyright serves by protecting the creators work and also grants them monopoly rights. The internet has made it possible for content to be spread throughout the web at little or no cost and this has caused much disruption in copyright laws.

Copyright laws have darkened the spirit for educators in academia   to adapt causing friction in OER platforms. Fortunately, due to the digital revolution a solution for copyright laws exists: **Open licenses**.

One of the most popular open licenses is the Creative Commons license. According to (OECD, 2007) Creative Commons released copyright licenses for public use in December 2002. These machine-readable licenses are solely implemented for creative material such as websites, blogs, music and most importantly educational materials. Creative Commons licensing created a new way of protecting copyright laws by also allowing the copyright owner to choose from a number of licensing options. These options not only protect the integrity of the work but also generate new ways of sharing and collaboration while protecting and abiding by copyright laws.

Existing copyright laws is one of the most prominent barriers in the OER movement and technology. This open access in higher education is a great way for faculty to publish their scholarly work online without restrictions.

Increased awareness of copyright issues needs to be outlined and discussed in higher education. Copyright issues are taken very seriously in higher education environments and these institutions should pay close attention and inform their faculty of the new copyright policies.

SELF ASSESSMENT EXERCISE 1

1.   Identify cost determinants in distance education
2.   What do you understand by open licenses in distance education?

3.2   Rapid Change Issue, Constant New Developments, Upgrading, etc

One cannot dispute that there is proliferation of new information. "In the past, information doubled every 10 years; now it doubles every four years" (Aslanian, 2001, Finkelstein, 1996).

Knowledge, both basic and applied, is being generated very quickly and is growing exponentially. More new information has been produced within the last three decades than in the last five millennia (Hadad & Draxler, 2002). We should therefore be poised for dramatic technological advances and breakthroughs in the macro frontiers of the universe on the one hand, and microscopic secrets of the human body on the other hand—and everything in between. This growth in information will certainly continue to dramatically media based education and learning in general. For example, knowledge proliferation may increase content-breadth demands on media based education, spreading distance education resources ever thinner and complicating development decisions.

Technological and Economic Shifts

In technology-mediated programmes, two different types of expertise are required: the technical expertise related to the hardware employed, and the content expertise in using the technology for educational purposes. Projects fail when planners invest heavily in hardware and software, but minimally in hiring and training competent people, thus leaving the project without expert support and guidance.

Equipment failures are common, particularly in the initial stages of projects, when the lack of familiarity with the technology increases the numbers of errors. The more complex the equipment, the greater the probability that technical problems will occur.

Let us explore the technological and economic benefits behind the technological integration movement in education. Presently, we experience high speed broadband that will support any open education resources format provided online at a quality speed. As technology expands to new heights so does the availability to download and review educational resources. It has become easier now more than ever to step outside our environment and with the click of the mouse; we have the ability explore a class topic of our choice at a cutting edge institution. These new learning tools are an incredible achievement toward the advancement in technology.

As technology continues to rapidly change, so does the accessibility to courseware. We now enter an *economic and social barrier to people who are not able to afford or keep up with the latest technology*. These are the groups that should greatly benefit from such open education movement. These lacks of resources deny the freedom of education to all individuals.

If the mission of globalisation of instruction for example is to provide free knowledge without limitations, yet these limitations are vivid when only a select group can access these courses.

The lack of resources are not the only element attributed to software and hardware issues, but also the technological skills needed to utilise these new media programmes as the formats keep changing. Consequently, this is not only a technical barrier but also an economic barrier. There are significant barriers that exist in developing countries that affect the mission of open education resources. For one, how can a self-learner in another country that also speaks a different language use these resources when there are no available tools to aid the learner? It is evident that developing countries face both technical and economic issues.

On another note we also have a self-educator and/or faculty member who has the resources to share their knowledge on a platform but does not have any idea how to share, reuse, create and post their content to the internet. These are concerns that need to be addressed. Technology based programmes need to be more of a priority during these transitions that meet both the technical and economic criteria.

SELF ASSESSMENT EXERCISE 2

1.   What is the impact of knowledge proliferation on media based education
2.   Explain with a typical example the socio-economic effect of rapid technological change on media based education.

3.3   Funding Challenge and Constraint, etc.

Decisions on the use of technology for education are, first of all, educational decisions. Yet, the immediate costs of a technology project often have greater impact on decision makers than its potential benefits.

While distance learning is a potential solution to decreasing resources and rising demand, the issue is far from being resolved. A study from the Colorado Department of Education reported that "the cost per student of a high-quality online learning programme is the same as or greater than the per-student cost of physical school [i.e., traditional] education" (Branigan, 2003). The study also explained that most costs in education are for staffing. EDUCAUSE reported similar results: "IT Funding Challenges has become the number-one IT-related issue in terms of its strategic importance to the institution, its potential to become even more significant, and its capture of IT leaders' time" (Crawford et al., 2003).

According to Haddad and Draxler (2002), educational projects frequently suffer from having only short-term objectives. Within this perspective, investing in technology may not seem reasonable. However, Technologies that replace conventional teaching, rather than complement it, also have an immediate cost advantage, since personnel tends to be the largest component of the variable costs in education.

Educational projects using technologies require start-up investments that may challenge the limited resources of poor countries or locales. However, technologies also offer solutions that help to defray costs without jeopardising the quality of the projects hence creativity is essential to overcome potential barriers.

Therefore, large-scale projects on the use of technology for education such as distance education could be financed through partnerships between governmental agencies and bilateral and international organizations, such as the U.S. Agency for International Development (USAID), the World Bank, and the United Nations Educational Scientific and Cultural Organisation (UNESCO). Within countries, projects may be financed through interdepartmental partnerships.

Other factors determining the funding of distance or ICT based education are as follows:

Lack of Political Support and Legitimacy

Lack of understanding about both the potential and limitation of open distance education is widespread in many African countries. It is believed that media based education cannot possibly offer the same quality of education as conventional campus-based education, many educational policy makers and planners remain skeptical about the legitimacy and quality of open education resources, hence this affect whatever funding decisions they take on such programmes. In other situations, different government come with different ideologies and programmes hence the provision of fund by successive government depend so much on their believe in the ideologies of their predecessors.

Policy Issues

Most African countries lack policies needed to guide the development and implementation of media programmes at national and international levels. This has been a major setback to many educational institutions in Africa. It is an established fact that educational programmes are successfully sustained where there is clear and unambiguous policy directives governing its application and implementation. For example, some nations may decide to invest in technology for education for the "glitz factor", the technology is there; it is fashionable to have the latest and the best, and it gives a sense of progress to use state-of-art-technology.

This can be described as the technology for its own sake rationale while other nations may base their investment decisions on the genuine case for improving the efficiency of their education systems or for some other benefits intrinsic to education.

Sustainability

Many media programme initiatives fail because they are not fully integrated into mainstream education systems. Consequently, such programmes tend not to attract the political support required for their successful implementation.

Africa faces huge socio-economic challenges. Moreover, there is an increasing recognition and acceptance that education may be the only way to ensure sustainability of communities and nations as healthy, vibrant and functioning societies and democracies, and for individuals to escape from the viciousness of poverty (Dhanarajan, 2000).

SELF ASSESSMENT EXERCISE 3

1.   What is relationship between objectives and funding of media based education
2.   Enumerate what could be done to justify the funding of media based education.

4.0 CONCLUSION

This unit began by examining issues related to costing, development and funding of media within which policies and strategies for applying digital technologies to education and training must be considered. While there are enormous benefits to be gained in terms of quality, enrichment, and flexibility in employing technologies in education, there is the need to consider many factors related to fund at commencement, as well during implementation and maintenance.

5.0 SUMMARY

The efficiency of media programmes and media -based education is hinged a well articulated plans considering the various costs in terms of immediate and distant benefits; government policies and readiness to adapt to changes in technologies to remain focused.

6.0 TUTOR-MARKED ASSIGNMENT

1.   Examine issues raised in this unit in line with the Nigeria IT policies
2.   Enumerate factors to be considered in determining the cost of media based education
3.   Explain the relationship between transitions in government and funding of distance/media based education
4.   What are the merits and demerits of open licenses

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UNIT 2 TEACHER DEVELOPMENT AND NEW TECHNOLOGIES

CONTENTS

1.0 INTRODUCTION

Technologies abound all around us ranging from the simple radio, our television, G.S.M. phones to the more complex Information and Communication Technologies (ICTS) typified by the computer and internet. Technology is fast transforming our society and the educational system in our nation cannot afford to be left behind. The major technological change is effected by computer technology. Its advent has revolutionised the world. ICT has turned the world into a global village. Technologies are important for the development of the necessary attitudes and educational opportunities for lifelong learning. Efficient usage of technology improves effectiveness in the instructional delivery process. Considering the dynamic world we live in coupled with the versatility and benefits of the computer, it is important we acquire skills and competence in the use of technology. Similarly, in order to remain relevant in the teaching profession, teachers require constant development and retraining so as to develop competence in the infusion of technologies during the instructional process. Consequently, a well planned professional development programme for technology use is essential. With such a programme, teachers will acquire the requisite

skills needed to incorporate the strengths of technology into the instructional process.

In this unit, you would be exposed to some of the benefits of technology in the teaching –learning process. Similarly, components of a successful teacher development programme for technology use will be discussed. With any innovation, there are bound to be changes in the user, a change in the traditional role of the teacher as a custodian of knowledge to that of a dynamic facilitator, guide and helper will be examined .The need to sustain teacher competence in technology use amongst other things will be discussed. Apart from this, you will also see some of the constraints which militate against an effective training of teachers in the use of technology.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- identify the various categories of technologies and their benefits in the teaching –learning process
- describe the components of a teacher development programme for efficient technology use
- identify the new roles open to teachers in the new educational technology environment
- suggest ways of sustaining teacher competence in technology use
- discuss constraints that may affect an effective teacher development programme for technology use.

3.0   MAIN CONTENT

3.1   Examples of Technologies

Herremans (1995) categorised available teaching and training technology used in the classroom as:

1.   Presentation tools
2.   Personal computer (PC) based technologies
3.   Non personal computer based technologies

1.   Presentation Tools – these are materials used for presentation during the teaching – learning process. The oldest and most widely used of these is the chalkboard. The chalkboard is gradually being replaced by more sophisticated presentation tools as the flip charts, whiteboards (electronic board), magnetic board, bulletin board, slides, transparences, audio tapes, audio disk, video tapes, video disks, etc.

2.   **PC – Based Technologies** – these are teaching and training technologies which are connected to a personal computer. They include electronic transparences, multimedia PCs, CD ROM player, video disk player, video tape player amongst others. All these are controlled by a personal computer.

3.   **Non - PC** Based Technologies – these are technologies whose usage is not dependent on a computer. Examples of these include the compact disk interactive (CD-I) and photo CD player. The CD-I exists in different versions and can also play audio – CDs. The photo CD player is connected to a TV monitor which enables one view images in different formats.

3.1.1 Benefits of technology in the Teaching-Learning Process

- The use of technology improves the quality of teaching and learning. Its use makes learning richer and more attractive. Learners' interests are sustained and teaching is made less tedious.

- Learners are motivated to want to learn as they can access new and different types of information.

- Information exchange through the web, internet, e-mail is promoted with technology use. Using a variety of media, students and teachers alike can communicate with one another within the same locality or elsewhere in the world.

- Technology use will ensure faster and more frequent updates of instructional materials.

- Infusing technology in the teaching-learning process will reduce distribution cost as digital learning materials can be easily accessed on networks or sent at very low cost to multiple locations using computer   networks.

- Technology also provides opportunities for just in time learning as one can have access to education/training when needed.

The infusion of technology in the teaching-learning process requires competence and skill. Teachers can and will accept technology if they have access to professional development with adequate support.

SELF ASSESSMENT EXERCISE 1

1.   List three presentation tools you can easily get in your locality?
2.   Mention three benefits of technology use in the classroom.

3.2 Components of a Teacher-Development Programme for Successful Technology Use

The teacher is the linchpin of any educational change. Bearing this in mind, a successful and effective technology use cannot ignore the role of the teacher. A successful technology use involves an intensive computer literacy awareness campaign. Computer literacy enables you develop a functional understanding of the computer, ensure that you use the computer creatively and effectively during the instructional process, ensures that you overcome fear, myth and apprehension about the computer. How do you acquire computer literacy? Acquiring computer literacy is possible through a qualitative teacher development programme which focuses on effective technology use. Mckenzie (1993), Eko (1998), Rodriguez and Kruth (2000), and Nwaboku (2006), identified the following as the components of an efficient teacher development programme that will ensure effective technology use:

1. **Link technology use to students' learning –** the essence of a teacher being trained in the use of technology is to promote qualitative teaching that will improve students' learning, develop higher order thinking skills in learners, encourage learners to collaborate and expose learners to a variety of information. A teacher is more favorably disposed to a technology training programme if s/he sees a link between the technology use and students' learning. An efficient teacher development programme should be closely tailored to students learning.

2. **Technical assistance and support –** the best way to win wide spread use of a new technology is to provide just – in time support, assistance and encouragement when needed. When there is difficulty in accessing and implementing technology, one gets discouraged and may easily revert to the traditional method. Getting access to a technical personnel at the right time is essential for a successful implementation.

3. **Administrative support –** a supportive leadership by principals, administrators and other leaders within the school system is essential. Administrators within the school system must have a clear understanding of the roles that all staff must play in achieving a clear vision of technology use to support students learning. Administrators must be keenly interested in the programme for it to be a success. Direct involvement and support by institutional heads is important.

4. **On-going process:** a high-quality professional development programme should be conducted as an on-going process and not a one-shot approach (not a few days seminar!).A training programme should be sustained and embedded in the school's routine. Teachers need continued practice to become comfortable with the technology and effect change. A sustained development programme should advance teachers intellectually and professionally. Training programmes could be organised using existing private computer schools and their personnel (In Lagos State, teachers are trained on ICT through this means).

5. **Adequate time:** teachers need adequate time to become familiar with new technologies. Hence, it is important that learning and practice for sustained periods with adequate time will improve proficiency. With adequate time, teachers are provided with opportunities to discover what the technologies can do, learn how to operate them and experiment with ways to apply them.

6. **Easy access to technology use –** when teachers get access to technology use both at home and at school, they are able to improve on their proficiency. This instills confidence in them as they become more comfortable with the technology.

7. **Backing up developmental programmes with principles of adult education theory-** effective development training should be backed up with principles of adult education. Adults require relevant and concrete experiences with adequate support, relevant feedback and long term follow up. Adults learn new information when it is presented over a long time frame instead of a single session. Development programme can come in a variety of forms- mentoring, modelling, special courses, structured observations rather than the traditional workshop.

8. **Provision of `psychic rewards'** – to ensure that majority of the teachers participate in a technology development programme, they must be motivated to spend the time and energy necessary to develop technology competence. Motivation of teachers could be done through provision of psychic rewards which could be in form of incentives to teachers receiving training. However, all teachers should be encouraged to become proficient in the use of technology in content areas to support learning.

9. **Providing adequate resources** – resources in terms of material, financial and human is essential for a successful programme. Material resources in terms of hardware and software must be adequate for trainees. Similarly, adequate number of trainers that

can conveniently cater for the trainees must be ensured. Fund to provide teachers with technology that they can use at home or in private must be available. In Lagos State, the civil service union in collaboration with private computer marketers has encouraged purchase of personal computers to teachers and other civil servants on a long term repayment loan plan. Long term planning aided by continuous funding is essential for a worthwhile technology infusion programme.

10. **Built–in evaluation strategy:** there is need to determine if the developmental programme is relevant. This can be done through an in built evaluation specifically designed for such purpose. Evaluation can occur at 3 levels viz.: pre-formative, formative and summative. Pre-formative evaluation involves a needs assessment which directs the planning process and enables planners identify the vacuum to be filled. Formative evaluation is done during the development process. It provides feedback and determines how to make the programme more valuable to participants. Summative evaluation allows trainees judge the worth of the programme. It gives decision makers the information required to plan for the future.

SELF ASSESSMENT EXERCISE 2

1. List any three components of an effective teacher development programme which will aid an effective technology use by teachers.
2. Describe how any two of the components in (1) above will aid effective technology use.

3.3 New Roles for Teachers in the New Educational Technology Environment

Developments in Technology demand role change for teachers. Teachers take on new and expanded roles both in and outside of the classroom. In the class, technology supports student-centered instruction where the teacher becomes a guide, counsellor, a facilitator who helps learners discover and understand the subject matter. The teacher guides students in collaborative task. Learners will change their ways from a rather passive mode of learning to a very active one helped by teachers and technologies. Teachers and learners will be part of a multi media literate community. Outside of the classroom, technology supports collaboration within and among the teachers as they can work together on school wide programmes. The teacher's new role may involve distance collaboration with cross- school peer groups and study groups through telecommunications. Technology use will result in a division of labour

which will consequently result in specialisation in the teacher's role. Some of the means by which a versatile and dynamic teacher in a technology oriented environment can earn extra income are listed below:

a) **Instructional material production specialists –** this implies that you are involved in recording and production of instructional audio, video, VCD, DVD, CD-ROMS, including all forms of graphic materials produced for instruction. Do you know Mavis Beacon? This is a package which teaches typing. An ICT competent teacher like you will probably become can develop an instructional material in your subject area to teach a specific concept.

b) **Provision of high technology learning facilities –** you can set up a modern media library or a guided learning cybercafé. Most importantly this should aid learning.

c) **Internet publisher/web designer –** most of the printed books available will need to be put on-line. You can specialize in an on-line publication of such texts. e-books will be in great demand.

d) **Instructional method specialist –** one can be a specialist in contemporary instructional delivery strategies.

e) **Media librarian –** this involves you accessing information from the internet and other sources. Such information is made available for instruction.

f) **Educational broadcasters –** radio and television media will require specialists like you to take up educational broadcasting; educational feature writers and analysts for journals, magazines and newspapers will be required.

g) **Educational consultant-**you can provide technical advice and services for schools and individuals. Academic information and management services are embedded in the consult. Instructional systems developer for training facilities will also be in great demand.

h) **Others** include computer programmer, publishers of educational books and materials including software. With professional development, technology use provides opportunities for you to become comfortable and effective in your new role. You will gradually realise that the use of technology, specifically computer in the classroom does not involve a loss of your power but just a modification of it. Technology is not a substitute for the teacher, rather both elements complement each other for a successful learning process.

SELF ASSESSMENT EXERCISE 3

Identify three distinct roles you can carve out for yourself in the new educational technology oriented environment.

3.4 Re-Orientation for the New Educational Technology Environment

Infusing technology in the teaching - learning process will require a re-orientation in teacher development programme. Technology usage implies use of new materials and methods in classroom instruction. Based on these' you need to know that:

- there will be alternations in your behaviour, believe and attitudes
- you must make concerted effort to become creative users of technologies such as internet, CD-ROM, video images, multimedia etc. for collaboration with other teachers
- access to on - demand professional development will become a possibility. With adequate technology competence, you can be involved in development training on-demand using videos, CD-ROMs and suitable software made for such purposes. You can be involved in individualised self-paced development training rather than seminars / workshops in particular places and at a rigid time
- technology trained teachers will be able to construct data bases for lesson plans, interact with other teachers to share teaching ideas, help students become more self sufficient and creative in their school work.

3.5 Sustaining Teacher Competence in Technology Usage

It is always so easy to revert back to an old habit except if one makes a conscious and determined effort not to! Similarly, after you have attained the basic competence in technology use, it is important to sustain and improve on this. Hence it is important to create a computer awareness campaign and a need for computer literacy through these avenues:

- Ensuring that newly recruited teachers are computer literate. Competence in technology use should be part of the criteria for employment. Undergraduate teacher training programmes will as a matter of priority equip their students with computer skills prior to graduation.
- Old staff should be required to attain computer literacy within a stipulated time frame in order to maintain employment. Each teacher should be encouraged and be committed to a learning programme. How will this be ensured you may want to ask? Remuneration which will serve as incentive can be provided for a technology literate teacher.
- Continuous training and upgrading should be embarked upon by an already literate and skilled teacher in order to remain relevant within the system.

You should note that sustaining competence depends largely on a virile and dynamic teacher development programme. Using technology as a tool for instruction and not just for administrative uses, research or communication should be part of a quality induction programme for new teachers and part of the ongoing professional development programme for teachers technology use.

SELF ASSESSMENT EXERCISE 4

Apart from the issues mentioned in the module, what other ways can teachers' competence in technology to be sustained?

3.6   Envisaged Constraints in the Implementation of a teacher Development Programme for Technology Use

Infusing technology in the teaching – learning process through a teacher development programme may be faced with several constraints. Some of these are discussed used the following subheadings:

- **Management constraints -** these include high handedness of management which could result in unnecessary bureaucratic bottle neck. Also, the school climate may not be supportive of the changes in traditional method which results from on-going professional development in technology. Other constraints in terms of management include the inadequacy of training sessions and scope of content, absence of maintenance culture which may result in vandalisation or theft of computers and other technologies, low technical competence coupled with problems of poor leadership and inadequate time for successful training. The degree of authority's sincerity and commitment to informatics may be a major managerial constraint.
- **Inadequacy of resources -** resources include personnel, material and finance. In availability of competent and adequate trainers, hard ware, appropriate software and the required fund including the space for trainees may militate against a successful development programme. Other resources include telephone, air conditioner and constant power supply. All these limit the success of the development programme.
- **Attitudinal constraints -** these refer to lack of commitment on part of staff which may lead to low attendance and lackadaisical attitude towards organised training sessions. Also, the absence of the WILL to change old habit and upgrade working environment constitute a constraint.

4.0   CONCLUSION

You need constant practice to get acquainted with technology before you the teacher introduce such to students. Teachers need motivation, support and sincerity of management to cope in the new classroom environment resulting from technology use.

Furthermore, an effective staff development programme should ensure that designed activities result in the transfer of new knowledge and skills into classroom practice. Good leadership, strong technology infrastructure, adequate and equitable access to technology in schools are important for ensuring technology literate teachers.

8.0   SUMMARY

In this unit, you have learnt:

- categories of technology and their benefits in the teaching - learning process
- components of a teacher development programme for effective technology use
- opportunities available for a technology literate teacher
- the need for re-orientating teachers for the new educational technology environment
- how to sustain a teacher's competence in technology use
- the constraints that may limit a teacher development programme for technology use.

6.0   TUTOR-MARKED ASSIGNMENT

1. Describe any five components of a teacher development programme for technology use.
2. Identify any three constraints that may likely affect the infusion of technology in the   teaching - learning process.
3. How can one ensure that teachers remain committed to technology use for instruction?
4. List some of the opportunities available for a technology literate teacher.

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UNIT 3 CONTEMPORARY INSTRUCTIONAL STRATEGIES

CONTENTS

1.0 Introduction
2.0 Objectives
3.0 Main Content
    3.1 Factors Influencing the Choice of Instructional Strategies/Methods
    3.2 An Overview of Instructional Strategies
    3.3 Traditional Instructional Method
    3.4 Activity Based Instructional Methods
4.0 Conclusion
5.0 Summary
6.0 Tutor-Marked Assignment
7.0 References/Further Reading

1.0 INTRODUCTION

You must have had an event probably a birthday bash you intended celebrating. Before the party, there were considerations you must have put in mind-how do I organise the cooking? Do I cater it out or go to the eatery? These are plans you put in place before the party. The same thing the teacher does. The means by which a teacher accomplishes set out learning objectives is through the instructional strategy. An instructional strategy refers to the step-wise process by which a teacher/instructor communicates the content of instruction to the learners in order to ensure a goal-directed teaching process which will lead to the attainment of the set-out objectives. You see now that an instructional strategy is the plan/approach a teacher utilises in the attainment of learning objectives. Contemporary instructional strategies lean towards a learner centered rather than a teacher centered classroom. I mean that instructional strategies which ensure active involvement of learners during instruction are what modern learning theory advocates. Learners should no longer be seen as empty vessels that teachers must fill up. You as a learner should be able to decide what you want to learn and how the learning should be done.

In this unit, factors which guide you in the choice of a particular strategy/method are identified. Instructional strategies which encourage learners' active participation will be discussed. You will be able to recognise distinctions within each strategy. Similarly, various instructional methods that are contained within each strategy are described. You will also be able to identify the differences between a

traditional classroom and a constructivist one in which learners are able to take control over their learning.

2.0   OBJECTIVES

At the end of this unit, you should be able to:

- define an instructional strategy
- identify at least three   factors which determine/influence the choice of an instructional strategy/method
- describe at least three learner-centered instructional methods
- distinguish clearly between a traditional and a constructivist classroom
- utilise an identified instructional method in teaching a specific topic/concept in your subject area.

3.0   MAIN CONTENT

3.1   Factors Influencing the Choice of Instructional Strategies/Methods

- Content of the subject matter to be taught-the topic to be taught?
- Type of behavioural objective set out to be achieved at the end of the lesson-cognitive, affective or psychomotor?
- Learner characteristics-Age, class, intellectual capacity and background of the learner
- Class size-number of students to be taught
- Availability of materials-physical setting and resources
- Interest of the learners to the subject
- Time available for the lesson
- Cost implication of the method to be used-is it affordable?
- Teacher' competence-can you effectively use the method?

SELF ASSESSMENT EXERCISE 1

Can you identify some factors that will aid your choice of an instructional strategy?

3.2   An Overview of Instructional Strategies

Instructional strategies can broadly be categorised as direct, indirect, interactive, experiential or independent. Within these broad categories are interwoven methods which are utilised during the process of instruction.

- **Direct Instruction:** This is predominantly a teacher centered approach which is characterised by such methods as lecture, demonstration, practice and drill, didactic questioning amongst others. It is effective for the development of a stepwise skill and for providing information. It is usually deductive. Direct instruction typically describes a traditional and conventional instructional approach.

- **Indirect instruction:** This is mainly learner centred as it ensures a high level of student involvement in observing, investigating, drawing inferences from data or forming hypotheses. The teacher's role shifts to that of a facilitator/resource person. Methods such as case study, problem solving, inquiry, concept mapping and so on are contained in this category.

- **Interactive instruction:** This facilitates sharing and discussions among participants as students interact with one another and with the information and materials. The teacher is placed in the role of an organiser/facilitator. Peer teaching is enhanced and the development of social skills and abilities to organize thoughts and develop rational argument are encouraged. Interactive strategy permits grouping of students. Interactive methods such as class discussion, co-operative learning groups, role playing, problem solving are all contained in the strategy.

- **Experiential or discovery learning strategy:** This is a learner centred and activity oriented strategy which is highly inductive. Learners are active participants during the instructional process as it provides 'hands on experience'. This strategy increases understanding and retention. Learners are motivated due to active participation. This strategy emphasizes the process of learning and not the product. Methods such as field trips, games, simulation, role playing and conducting experiment are classified under experiential strategy.

- **Independent strategy:** This refers to the range of instructional methods which help to foster the development of individual student's initiative, self – reliance and self improvement. The students interact with the content more or less exclusive of external control of the teacher. With independent study, students take responsibility for planning and pacing their own learning. Some of the methods contained in this strategy include computer aided instruction, research projects, correspondence lessons, learning centers and so on. Figure 4.1shows the interrelationship between each strategy and summarises some of the methods and techniques embedded in each strategy

From the various instructional strategies in Fig. 4.1 below, you notice that direct instruction is neither learner centred nor activity based. Let us now look at some examples of instructional methods embedded within each strategy.
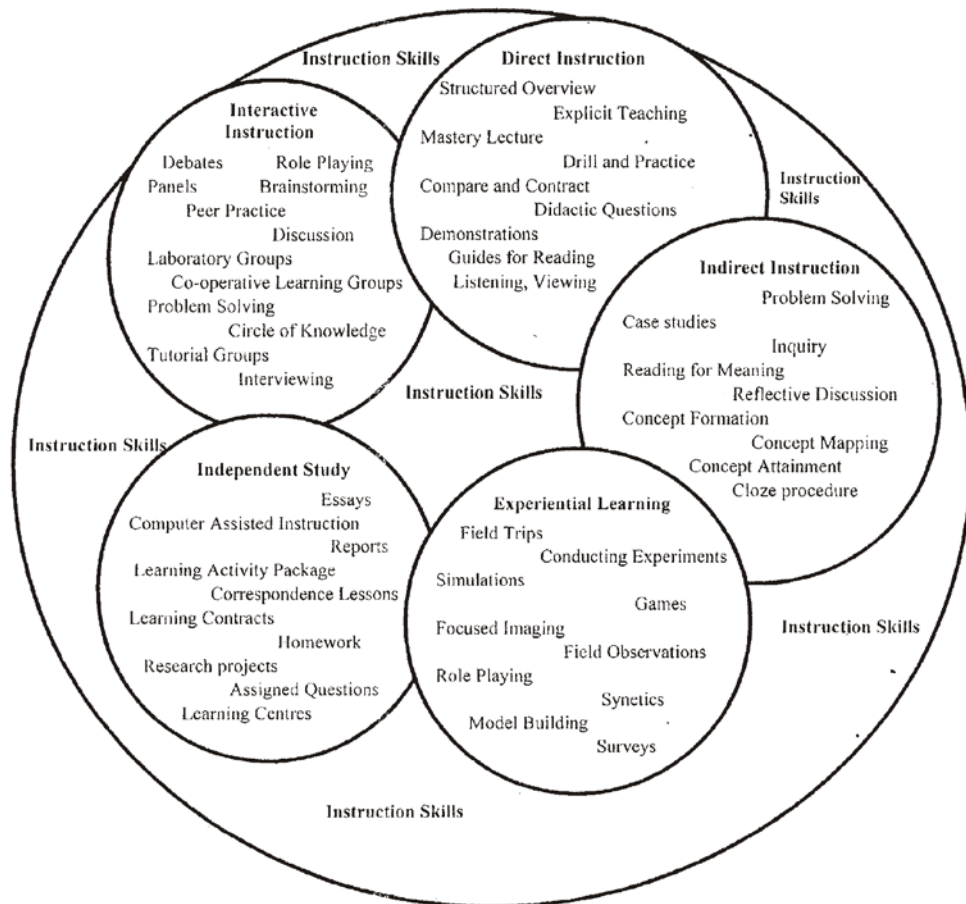

Fig.   4.1: Instructional Strategies and Methods
(Saskatchewan education, 1988)

SELF ASSESSMENT EXERCISE 2

What are the differences between direct and interactive instructional strategies?

3.3   Traditional Instructional Method

Lecture: this is the oldest instructional method which is typically used in education. It is highly teacher-centered. It involves the oral delivery of information to students by the teacher. You are quite aware of this method as this is what you have been exposed to in your various academic endeavour. Learners remain passive during the process of

instruction. Most times during lectures, one's attention may drift especially if the lecture is boring. It does not promote feed back as learning is often one way. It encourages rote learning. Despite its set back, the lecture method still remains the most widely used.

3.4   Activity- Based Instructional Methods

Modified lecture method: This is a deviation from the traditional lecture method. It involves a 2-way sharing of information between the teacher and the students. The teacher initiates the lecture by introducing the topic while students are encouraged to participate through the use of open-ended questioning techniques that will make teachers probe into what the students know and do not know. Students are also encouraged to ask questions and contribute meaningfully to the topic at hand. The modified lecture method embraces discussion, demonstration and also discovery. In using this technique, important points should be noted on the chalk board as this allows students see the relationship between points and ideas raised. As much as possible, the teacher needs to relate classroom activities to real life experiences of the learners to arouse interest which will facilitate transfer of learning. This method enhances the intellectual development of the student, promotes creativity which results from discussions interchange and collaboration.

Problem -based instructional method: This involves the identification and selection of meaningful problems as a basis for inquiry. You can also refer to it as inquiry learning. The teacher assists students in forming study groups, helps in planning and organising tasks that will aid in the solving of the problems. The presentation of findings by students concludes the exercise. Findings may be presented in different ways – reports, video, play, models, etc. After presentation, teacher assists students reconstruct and analyze their thinking processes and integrates their learning. In this method, the teacher is a facilitator as s/he probes, prompts, asks questions and provides support for learning. For example, in an Agricultural science class, the topic for the day may be "definition of weed and the harmful effects of weeds on crops". Here a problem can be given to students to solve e.g. why do we have low yield in a bushy maize crop plant? In using this strategy, the problem or question must be simple and easy to understand. All needed information and data must be available.

Advantages

1.   It is learner centered as learning is active and experiential
2.   Learners develop deep integrated understanding of content and process

3.   Students are actively engaged in various types of tasks hence it caters for learning needs of many different students
4.   learners self- esteem are enhanced
5.   It encourages interaction and social skills as learners work as a team
6.   It encourages peer teaching and collaboration as learners share ideas to find resolution to questions
7.   It promotes cooperation

Disadvantages

1.   It is time consuming
2.   It requires lots of effort and patience on part of teacher and students
3.   Students may lack experience of the new approach and show preference for a traditionally structured approach.

Constructivism: This is based on the belief that learning occurs as learners are actively involved in a process of meaning and knowledge construction rather than passively receive information. A constructivist class implies a shift in the way we think and a change about what attributes knowledge is. It requires a total re-orientation in our assumptions about teaching and learning.

It draws on the developmental work of psychologists such as Piaget, Vygotsky and Brunner amongst others. Do you still remember the psychological principles underlying learning? Constructivism dwells on the principles that:

- Learning is built on prior knowledge
- New learning occurs as we adapt and change our old ideas
- Learning involves inventing ideas rather than mechanically accumulating facts
- Meaningful learning occurs through re-thinking of old ideas and arriving at new conclusions about new ideas which conflict with our old ideas.
- Constructivist belief is hinged on the premise that we create our own ways of seeing the world in which we live, the world does not create them for us.

In adopting a constructivist approach, the first thing you do is:

- Establish your instructional objective
- Think of meaningful activities that would help learners attain the set out instructional objective

- Such activities should engage learners to explore and construct knowledge based on what they are reading and what they already bring to the activity (prior knowledge)
- Provide enough challenging activities for students to choose from
- Entrust learners with responsibilities
- Encourage learner generated activities
- Be there to serve as a facilitator, prompt, mediator, helper.

A constructivist classroom has different qualities. These are:

- Process approaches to learning – students are able to explore new ideas and experiences. Such ideas are allowed to develop in the learner's own mind through a series of related, supportive activities where taking risks and generating hypotheses are encouraged.
- Involves negotiation that is, the teacher deliberately sets out to motivate students to contribute and to modify the educational programme. Negotiation pushes learners to work better and engage in meaningful discovery that are long lasting.
- Role change as teacher becomes a guide, facilitator, resource person – teacher watches, listens, ask questions in order to clarify issues. Teacher facilitates a process of learning in which students are encouraged to be responsible and autonomous. Guided by the teacher, students construct their knowledge and activities rather than just mechanically ingesting knowledge from the teacher or textbook.
- Student centered – encourages hands-on experience, critical thinking, and curiosity. Students are involved in the "why, how, what, when" of issues. Engages students in applying their existing knowledge and real world experiences, learning to hypothesize, test their theories and ultimately draw conclusion from their findings.
- Promotes interaction between student-student; student-teacher' student work together in groups – learn from one another through interaction, students clarify issues with teacher, teacher ask questions and vice versa; this ensures a high degree of interaction.
- Results in a democratic classroom setting – a constructivist classroom emphasises shared responsibilities and decision making; in putting issues across, there is careful listening, meaningful discussion occurs, collaborative involvement is evident as the class/group work as a team, exchange of ideas and opinions occur and views are respected. The focus is on students learning rather than on teacher performance.

Adopting constructivist approach for instruction requires intelligence, creativity, patience, responsiveness, flexibility and dynamism on your part as a teacher. A constructivist teacher poses questions and problems, creates a scenario, guides students in arriving at meaningful answers. During the instructional process, the teacher infuses many instructional methods e.g.

- Prompting students to formulate their own questions (Inquiry)
- Encouraging numerous interpretations and expressions of learning (problem solving/ multiple intelligence)
- Encouraging group work and the use of peers as resources (collaborative learning).

Brooks (2004) highlighted the distinctions between a constructivist and a traditional classroom.

Table 4.1:   **A Comparison of a Constructivist and Traditional Classroom**

Traditional classroom	Constructivist classroom
• Strict adherence to fixed curriculum is highly valued • Materials utilized are mainly textbooks and workbooks • Learning is rote which is based on repetition • Teachers are dominant features who disseminate information to students (students are recipient of knowledge, hence passive listeners). • Knowledge is fixed • Students work primarily alone • Assessment is through testing, correct answers	• Students' questions and interest is valued. • Materials are from primary sources of • Learning is interactive as it builds on learners prior knowledge • Teachers dialogue with students and guide students as they construct their own knowledge (active participants). • Knowledge is dynamic as it changes with ones experience • Students work primarily a in group which ensures interaction, collaboration and peer learning. • Assessment includes students' works, observations, and points of view as well as tests, i.e. process is as important as product.

Source: Brooks (2004)

A constructivist approach in teaching a concept

Imagine a scenario in which a group of students in a science class discuss a problem in agricultural science – "our disappearing forest – how do we arrest this problem of deforestation?

The teacher knows the answer(s) to the problem/scenario. She/he focuses on assisting the students reframe their questions in useful ways:

- The teacher prompts each student to reflect on and examine his/her current knowledge, e.g. what do you know about Nigerian forest? (prior knowledge)
- When one of the students comes up with a relevant concept the teacher focuses on this and lets the group see that it might be a relevant avenue for them to explore. (What benefits accrue from the forest? Why is deforestation/exploitation of the forest on the increase? Do the benefits outweigh the need for a forest? If yes, what do we do to arrest the situation? – Enact laws prohibiting felling of trees?)
- The group focuses on this and generates more ideas. Afterwards, the students and teacher discuss what they have learnt and how their observation, interaction, collaboration have led to better understanding.

The teacher's role as you can see is more of a guide.

Benefits of a constructivist approach.

- Learning is fun and enjoyable as learners are active participants in the instructional process.
- It promotes thinking and understanding
- It promotes curiosity in learners
- It encourages students' initiative and personal involvement which ensures lifelong learning
- It promotes social and communication skills through constant collaboration and exchange of ideas between/within groups.

Challenges of a constructivist approach

- Existing school systems and policies – will the existing system which emphasises more on traditionalist approach accept a dynamic and contemporary strategy?
- Existing school culture

- Very demanding – since there may not be any incentive for the dynamic and resourceful teacher, would the teacher not become discouraged in the long run?

SELF ASSESSMENT EXERCISE 4

1. Explain how you would adopt a constructivist approach in teaching a concept in your subject area?
2. Apart from the challenges mentioned in the module, what are the likely constraints you may face in the adoption of a constructivist approach in the classroom?

Instructional games

What game do you enjoy playing most? I am sure you had fun during the game session. A game is a contest in which people or players agree to abide by a set of rules in an attempt to achieve a goal or an objective. Instructional games are based on specific objectives that the learner should achieve. Concepts embedded in games are inherently fun, challenging, interactive and rewarding. Furthermore, games contain guided discovery features. It provides appropriate feedback and ensures an enjoyable instructional session for learners especially if the games are chosen and used with a focus on the learning process. The fun experienced in game endears it to learners as a useful tool of instruction. Simple games include Ludo which can be used to teach addition, multiplication, what can be used to teach shapes. Other more sophisticated instructional games abound. However, you can attempt to develop a simple game to teach a concept in your subject area.

Benefits of game as an instructional method

1. Game enhances comprehension of concepts
2. It ensures interaction thereby encourages peer teaching and learning through the spirit of competitiveness
3. Game can serve as enrichment and can be used for introducing/summarising a concept
4. It fosters a sense of discovery which encourages critical and strategic thinking
5. Game can be particularly utilised in motivational study of perceived difficult topics.

Limitations

1. A gaming session can be time consuming and expensive
2. There is dearth of instructional games for use in meeting specific instructional objectives

3. Most games are of alien cultures which are not easily adaptable to our local setting

4. The class may become rowdy if not properly managed as learners may get carried away by the fun nature of the game

5. Assessment is more complex than in traditional teaching

Simulation

This is described as an abstract or simplification of some real life situations or processes. Simulation is a form of experiential learning where the learners perform roles which enables them interacts with one another. Simulation may contain elements of a game, a role play or an activity. A simulation with elements of a game is referred to as a simulation game. Distinction between a game and a simulation is basically the element of competition present in a game. A typical example of a simulation game includes monopoly. The mock court by law students is an example of a simulation. Similarly, micro teaching is a form of simulation. You might have been involved in micro teaching during your undergraduate days! Micro teaching indicates a simplified form of the actual teaching situation. It makes you have a feel of all the necessary skills you would have as a professional teacher. The goal of the stimulation is not to win but to acquire knowledge and understanding .Simulation promotes concept attainment as students are directly involved in the activity. You can create a simulation for a topic in your subject area. For example, in your mathematics class, the concept of profit and loss can be taught by creating a market scene where some of the learners are the sellers and buyers. During marketing transactions, the concept of profit and loss is illustrated.

Happy marketing.

Advantages

1. Simulation is an enjoyable and motivating activity
2. It promotes critical and evaluative thinking
3. It ensures interaction between participants.

Disadvantages

1. It is time consuming and expensive
2. Assessment may be complex

Computer -Assisted Teaching and Learning (CATL)

Are you computer literate? Information and communication technology (ICT) of which the computer is an integral component has

revolutionalised the world. Computer Assisted Teaching and Learning (CATL) is an embracing term for all activities in which the computer is used as a medium and tool to assist the teaching and learning process. CATL also embraces the wide range of use of computer in education. It also views the interactive potential of the computer in the teaching and learning process. Eight functional modes of delivery and interaction of the CATL which are hierarchically arranged from low to high according to their levels of cognitive / mental thinking and degree of learner computer interaction are shown below:

Level of learner computer interaction and cognitive / mental thinking in the CATL modes

Level of learner / computer interaction

Low ◄─────────────────────────► High

DP	T	IG	S	PS	SSH	WP	DBMP

Low ◄─────────────────────────► High
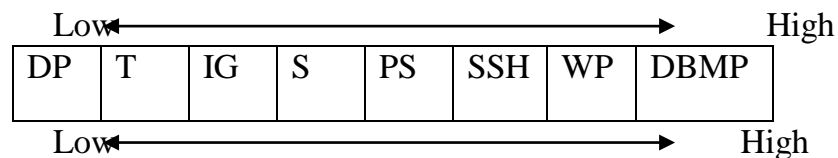
Level of cognitive/mental thinking

CATL Modes: DP- Drill and Practice; T-Tutorial; IG: Instructional Game; S-Simulation:

PS-Problem Solving; SSH-Spreadsheet; WP-Word Processing

DBMP- Date Base Management Processing   (Source: Makrakis, 1988)

More information on the use of computer in education is available in your course on computers in education.

Internet

Do you have an e-mail? Using an e-mail is facilitated by the internet. The internet is a system of international or worldwide assemblage of interconnected computer networks for information interchange. It is the use of the internet that has actually made the world a global village. The use of internet and other digital technologies to create experiences is collectively termed electronics learning (e-learning). E-learning facilitates distance learning through the use of the wide area networks (WAN). E-learning enables you to learn anywhere and at anytime (just in time learning) as long as one's computer is properly configured. You do know that your programme in NOUN is partly facilitated through e-learning. With e-learning, collaboration with your facilitators and other

course mates are ensured. Using internet reduces expenses of travelling you save cost as you can access information relating to your academics right from where you are you can still continue on your job without the stress of weekend travelling. I will refer you back to unit 2, module 2 for you to see the various ways by which distance education is facilitated by new teaching technologies (NTTs).

Benefits of computer – ICT in the   classroom

1.   It makes learning concrete with realistic experiences.
2.   It ensures activity based instruction which is most effective in communicating instruction.
3.   Computer usage facilitates a guided discovery learning system through its manipulation by learners.
4.   Learners can collaborate with peers in other schools to share data, reports or find project partner.
5.   From the internet, learners and teachers alike can access learning materials not available in schools.
6.   It facilitates the use of e-mail which enhances a high degree of interaction.

Limitations in the use of computer/ICT for instruction

1.   Lack of technical skills in using computer for instruction
2.   There may be difficulty in the selection of appropriate software that will meet lesson objectives
3.   Erratic supply of electricity constitutes a barrier to its usage in schools
4.   Constant breakdown and inadequate supply of maintenance crew and facilities
5.   The initial cost of acquiring and maintaining the computer in education is prohibitive

Instructional Video Lessons in the Classroom

Infusing video during instruction provides an entertaining way of introducing concepts and raising issues. It is designed for enrichment purposes. It provides a sharp focus and helps in clarifying concepts. It can be used in introducing a concept or as a summary for consolidating what has been learnt.

Prior to the usage of a video based lesson in the classroom, teacher preparation is important. This involves the following:

a)   Considering the learning objectives
b)   Selecting appropriate programme related to the objectives

c)   Reviewing the programme
d)   Considering post viewing activities.

After these, teacher prepares students by:

a)   Asking thought provoking questions
b)   Explaining why the video is being used
c)   Preparing students for important visual images
d)   Discussing major points that will be covered by the programme
e)   Providing focus activities or viewing direction for students
f)   Reviewing materials necessary for understanding programme content
g)   Listing key concepts on the chalk board.

During the viewing of the video

a)   Engage student's viewing attention by having them watch or listen for specific information
b)   You can pause to check   students comprehension by asking questions
c)   Give students a task to be completed during or after the video show
d)   Check to see if students completed the task successfully
e)   Have students record information and analyze what they have seen
f)   Examine a chart, formula or image on the screen more closely

Post viewing activities

These include:

a)   Discussing the programme
b)   Helping students relate the programme to their own feelings and experiences
c)   Connecting the programme to prior or anticipated class work
d)   Introducing extension activities such as creative writing, long term projects, role -playing etc.

Using this method stimulates discussion and is suitable for very large groups.

Disadvantages

1.   It may be difficult to locate a video that will serve lesson objective
2.   It requires equipment
3.   If not properly managed, discussion raised may not be focused

4.0   CONCLUSION

Emphasis of teachers should be on critical thinking, problem solving analysis and other learning skills that will make learning a lifelong activity. Teachers need to design learning environment such that learners are encouraged to be active and collaborate with other students. Your ability in the adoption of an instructional method depends on your dynamism, competency, mastery of the subject matter and commitment to effective teaching. Remember, no one strategy /method can claim superiority over another, rather a combination of more than one ensures a fulfilled and enriched instructional process. However for effectiveness, it is important to plan ahead, practice, be enthusiastic and choose methods that suit your class!

8.0   SUMMARY

In this unit, you have learnt about some contemporary instructional strategies and methods. You have also learnt the distinctions and interrelationship between the strategies and methods. Similarly, a learner oriented instructional strategy has been advocated as this promotes critical thinking in learners, creates a democratic classroom atmosphere and sustains learner's interest in the subject matter. Those factors which will guide you in your choice of strategy and method were also enumerated. It is important for us to remember that learning is a social activity. Teachers must ensure that students have multiple opportunities to interact with other students and to develop strong relationships with peers and teachers alike.

6.0   TUTOR-MARKED ASSIGNMENT

1.   State five factors which determines one's choice of a particular instructional strategy
2.   In your subject area, identify a topic and describe an activity based instructional method you would use in teaching this topic.
3.   State five differences between a constructivist classroom and a traditional classroom

7.0   REFERENCES/FURTHER READING

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