POSTGRADUATE DIPLOMA IN EDUCATION (PDE)

MODULE 1

PDE 206: INTRODUCTION TO EDUCATIONAL TECHNOLOGY

UNIT 1: THE CONCEPT OF EDUCATIONAL TECHNOLOGY

INTRODUCTION

When you first heard the term Educational Technology, what first came to your mind? You are likely to have thought of equipment, tools, gadgets, and technical instruments used in teaching and learning. You may not be completely wrong. However, educational technology means more than this.

If you study the subject educational technology, you will find that the problem of having a common definition for educational technology has not been solved. Various attempts have been made from time to time. In this unit, we will explore together the meaning of the term educational technology and come up with a definition.

OBJECTIVES

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

1.   explain at least two reasons why the concept of educational technology has been difficult to define.

2   explain the meaning of educational technology.

3.   distinguish between the three approaches to the definition of educational technology.

4.   identify the common theme among four definitions of educational technology.

5.   distinguish clearly between educational technology and instructional technology.

6.   define in your own words what educational technology is.

THE PROBLEM OF DEFINITION

As already stated above, the concept of educational technology has been difficult to define. Various reasons account for this. Firstly, the terms education and technology from which the term educational technology is derived are subject to many interpretations. Whereas education is seen by some as teaching and learning, it covers a much wider area. There is hardly agreement as to the aims of education and how the aims are to be achieved.

If your class is asked what the aim for primary education should be, it is likely that each of your classmates will give a different aim. If you are requested to give the meaning of the term technology, what will you say? I'm sure you will agree with me that the term technology means different things to different people. For some, it means equipment, gadgets, tools, instruments and products. For others it is a process; it is the application of scientifically gathered knowledge to practical problems. It is necessary to emphasize that the term technology can mean a process, a product, and a mix of process and product.

As a process, it involves the systematic application of knowledge to the solution of problems. It is the way of doing, organizing or implementing programmes.

As a product, it can refer to gadgets, tools, equipment and instruments that result from the

application of technological process. In this module, it is defined as the application of knowledge to practical problems.

Secondly, the problem of definition comes from lack of consensus on the scope of the subject. At one end, educational technology is seen as being concerned with virtually all aspects of education: from a lesson or unit to the national educational system within which it operates. At the other extreme, some restrict it to instructional materials or audio-visual aids.

Thirdly, educational technology spans diverse fields such as education, psychology, telecommunications, information systems, management science and engineering. Writers with backgrounds in these fields tend to see the subject from their own perspective.

Fourthly, educational technology is often wrongly used interchangeably by some with the terms: instructional technology, technology of education, technology in education programmed learning, operant conditioning, computers, information and communication technology, educational media, etc. In our discussion later in this unit, you will find that it is different in meaning from these terms.

Despite these problems of lack of a generally accepted definition of educational technology, it is essential that we have a common vision of what educational technology is. Indeed, there is considerable agreement that educational technology is a field that applies relevant knowledge, processes or products to solve educational problems.

THE CONCEPT OF EDUCATIONAL TECHNOLOGY

As already noted, various attempts have been made to define the term educational technology. The definitions have differed from one scholar to another.

Davies (1978) cited by Agun I. and Imogie I. (1988:13): identifies three concepts of educational technology which represent three different approaches to educational technology. We have educational technology as hardware, as software and as systems approach.

Educational Technology As Hardware

This approach to educational technology characterised the early formative years of the field. It sees educational technology as the devices, equipment, machines, gadgets, tools and instruments used to promote teaching and learning. This is also known as the tools technology approach.

Many writers explicitly or implicitly equate educational technology with objects, apparatus or instrumentation. Thus, a school that has television, radio, films, slide projectors, audio and video recorders, teaching machines, computers may be said to have high educational technology content.

The hardware or product approach was greatly influenced by the physical sciences. It involved a direct application of the physical sciences to the problems of education. It entails the instrumentation, mechanization or automation of education. The goal is to make teaching more efficient by mechanizing or industrializing it.

The hardware approach which became prominent in the 1950s coincided with the era of great industrial development. It led to the mass production of industrial products, many of which

found their way to the classroom. These included drawing instruments, books, boards, charts, models, maps, globes, and mostly mechanical devices. This tools technology in education failed because it concentrated on the production of tools for learning without considering the other important components of instruction. Little regard was given to the needs of learners in schools, the nature of the curriculum contents, the objectives to be achieved, the needs of the teachers, etc. It became clear that these concrete devices could not by themselves solve all educational problems.

Moreover, it is possible to achieve intended outcomes without necessarily using any equipment and learning is not necessarily the only concern of educational technology. While it is necessary to recognise the importance of the preparation, selection and utilization of instructional materials in educational technology, it is necessary to remember that there are many activities carried on in educational technology that do not necessarily call for instructional materials.

Educational Technology as Software

The software approach to educational technology emphasizes careful design of the teaching-learning process using principles of behavioural sciences. It is closely associated with programmed learning and the behavioural objectives movement. It is the behavioural science concept of educational technology. Emphasis is on applying learning principles to the direct and deliberate shaping or modifying of behaviour. It is characterised by detailed task analysis, writing to precise objectives, selection of learning strategies, reinforcement of correct responses and constant evaluation. It gained popularity in the 1960s.

Educational Technology as Systems Approach

The systems approach is also known as the step-by-step plan, systems analysis, systematic approach and systems technology. The systems approach is an attempt to remedy the inherent weakness of the approaches above. It sees educational technology as the systematic application of ideas, resources, people, materials and equipment to the solution of educational problems.

> According, to Gibson (1971) quoted by Unwin D. and McAlesee (1978): educational technology: *encompasses the systematic application of people, ideas, materials and equipment to the solution of educational problems... The process by which the learning materials are selected or produced, by which the modes of communication are designed, and arranged in the learning environment, and the strategies by which human and non-human resources are utilized to improve the efficiency and effectiveness of education is educational technology.*

It entails a holistic approach to problem solving. The educational problem at hand or the entire educational system is analysed within the context in which it is located, operated or with which it interacts. It entails systematic thinking; having a holistic view of the educational system or educational problem at hand. It is concerned with the systematization of the educational process. It implies operating at different levels of complexity and dimensions.

A system may be an object, event, a procedure, a plan, or an organisation of any human enterprise. A system has various parts which work cooperatively together for the survival of the system. For any system to function effectively, all the parts must work harmoniously to attain the desired goal. A system has inputs and outputs. They receive and respond.

The educational system operates within the society (suprasystem) along side other sub-systems such as government, media, health, housing, religion, etc. It receives from society its inputs: students, teachers, materials, funds, policies, etc. The educational system has components (sub-systems) such as the administrative system, examination system, staffing system, etc each of which has her own components. Systemic thinking implies that in solving an educational problem, we are to look at how our planned solution will affect the other components. We are to look at these relationships as a whole. In solving instructional problem, we are to look at it in the context of its suprasystems, co-systems and subsystems. We are to consider the whole and the parts.

Agun and Imogie (1988:4), have argued that the three approaches to the definition of educational technology may represent three different stages in the development of the field. They illustrate this point with the diagram below:
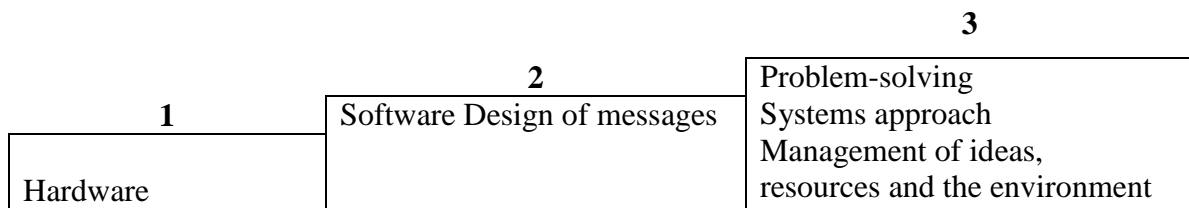
	2	**3**
1	Software Design of messages	Problem-solving Systems approach Management of ideas, resources and the environment
Hardware		

Fig. 1.   *Different stages in the development of educational technology*

The systems approach may be illustrated with the learning system. The learning system according to Imogie and Agun (1988:47) is "an organized combination of people, materials, facilities, equipment, and procedures which interact to achieve a goal". This is illustrated with the diagram below:
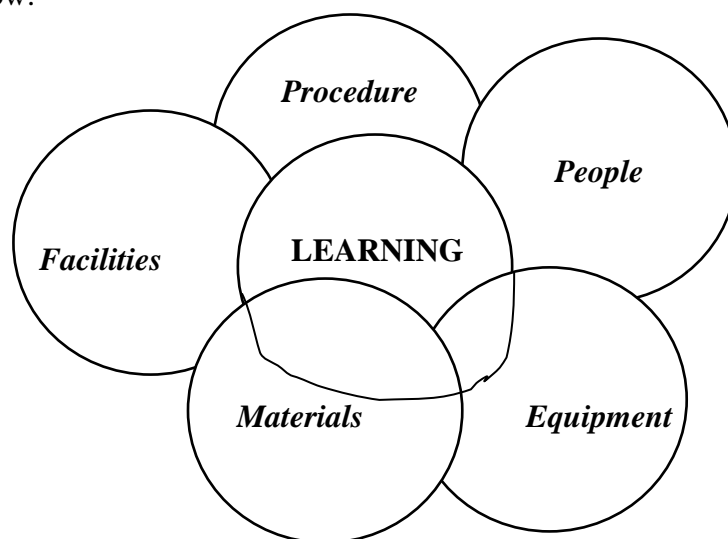

Fig. 2 *Learning system (Source: Agun I. and Imogie I. (1988:47)*

5

ACTIVITY 1

1. Give four reasons why it has been difficult to have one generally acceptable definition of educational technology.

2. Discuss the misconceptions of educational technology

3. Differentiate between the three approaches to the concept of educational technology. Which approach is to be preferred? Discuss.

4. Demonstrate how the development of the field of educational technology has affected its definition.

5. What is the systems approach? What is systemic thinking? What is its implication for educational technology?

DEFINITIONS OF EDUCATIONAL TECHNOLOGY

The discussion above shows that various attempts have been made to define the term educational technology. We will select a few:

(a) **Educational Technology**

> *refers to hardware and software, including television, radio, electronic classroom, instructional devices, still and motion picture projectors, computer-assisted or managed instructional equipment and materials, communications equipment for educational application, and other equipment and materials"... necessary to assist the process of learning.*

Educational Technology Act of US Congress in Grayson, (1972: 883) quoted in Unwin, D. and Mc Aleese (1978).

This definition restricts the meaning of educational technology to instructional media, with emphasis on the gadgets used in learning. The concept of technology in education is seen in terms of physical products.

(b) **Educational Technology is**

> *a systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction.* (Tickton, (1970:21) quoted Agun, I. and Imogie, I. (1988:2).

This definition defines educational technology in terms of the product and process of technology as a way of organizing materials and men.

(c) **Educational Technology is**

> *the development of a set of systematic techniques, and accompanying practical knowledge for designing, testing and operating schools as educational systems .... It draws upon many disciplines, including those which design working*

6

space, like architecture,... equipment, like the physical sciences; social environments, like sociology and anthropology ; ... administrative procedures, like the science of organizations and conditions for effective learning, like psychology. Gagne (1968: 6) quoted in Unwin, D. and McAlesee (1978:313).

This definition draws attention to the various fields that contribute to educational technology.

(d)   Educational Technology

is concerned with designing the system as a whole; identifying aims and objectives, planning the learning environment, exploring and structuring the subject matter, selecting appropriate teaching strategies and learning media, evaluating the effectiveness of the learning system and using the insights gained from evaluation to improve that effectiveness for the future .... (Rowntree, D. (1974: 2).

This definition outlines the various operations that are carried out in the field of educational technology.

The need for standard definitions and terms in the field of educational technology has been the concern of the Association for Educational Communication and Technology in the United States of America (A.E.C.T.). After 14 years of work, the Association came up with the most acceptable and professional definition:

Educational Technology is a complex, integrated process involving people, procedures, ideas, devices, and organization for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems involved in all aspects of learning. In educational technology, the solutions to problems take the form of all the "Learning Resources" that are designed and/or selected as Messages, People, Materials, Devices, Techniques and Settings. The process for analyzing problems and devising, implementing and evaluating solutions and identified by the "Educational Development Functions" of Research - Theory, Design, Production, Evaluation, Selection, Logistics, and Utilization. The processes of directing or coordinating one or more of these functions are identified by the "Educational Management Functions" of Organization, Management and Personnel Management.

From these definitions, we can make the following deductions about educational technology:

(a)   It involves not only devices, equipment, and media but also people, procedures, ideas and organisation.

(b)   Emphasis is on a systematic process of analyzing problems and devising, implementing, evaluating and managing solutions to the identified problems.

(c)   Educational technology employs an integrated, holistic, problem solving approach.

(d)   The kind of problems that concerns educational technology are those problems that pertain   to all aspects of human learning. It is concerned with the total educational environment not only with its components.

(e)   The domains of educational technology in the table below shows the various aspects and elements of educational technology and their relationship.
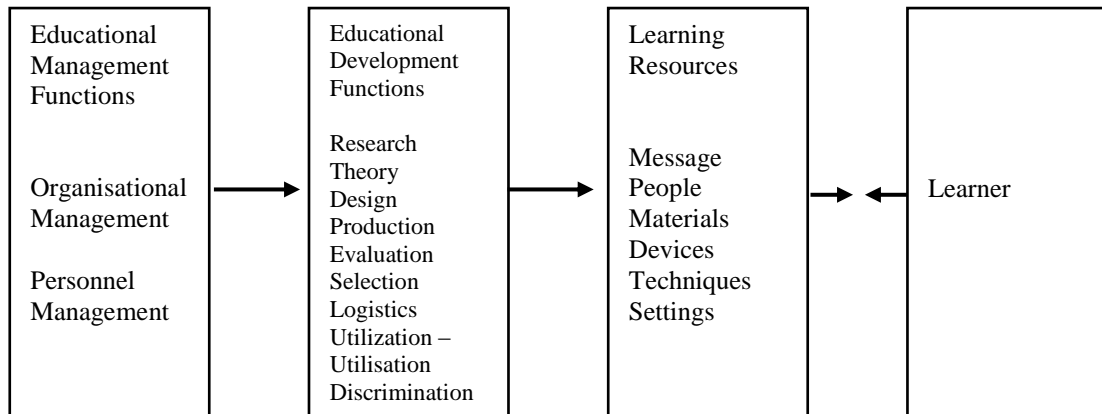

| Educational Management Functions

Organisational Management

Personnel Management | Educational Development Functions

Research Theory Design Production Evaluation Selection Logistics Utilization – Utilisation Discrimination | Learning Resources

Message People Materials Devices Techniques Settings | Learner |

Fig. 3.   *Domains of Educational Technology. Source AECT (1979: 2)*

Rowntree, Derek (1974:12) has identified four phases of educational technology as:

1.   Objectives (involves analyzing aims, specifying objectives and designing criterion tests).

2.   Design of learning

3.   Evaluation

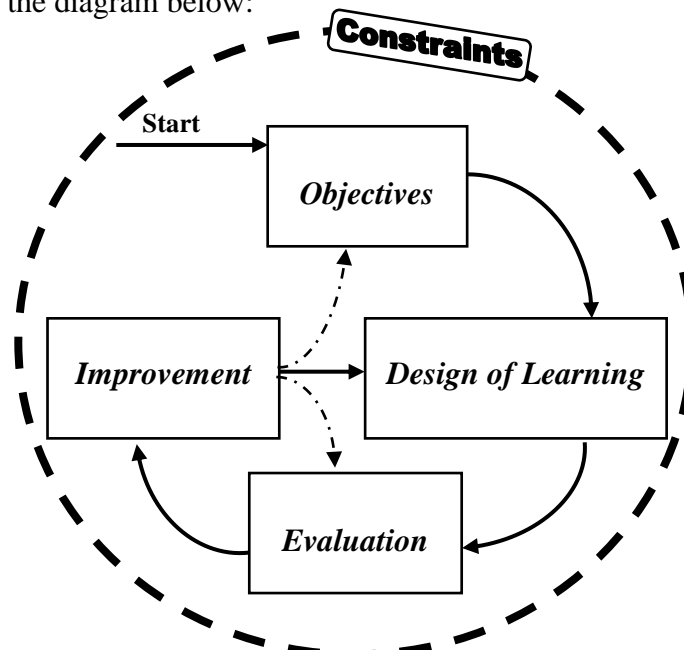4.   Improvement

This is illustrated in the diagram below:

Fig. 4.   *The four phases of educational technology*

8

EDUCATIONAL TECHNOLOGY AND INSTRUCTIONAL TECHNOLOGY

As earlier noted, the two concepts of educational technology and instructional technology may be mistakenly used interchangeably. Although both are interrelated, Educational technology is a wider concept and subsumes instructional technology. In other words, instruction is a sub-set of educational technology.

Whereas 'educational' may include everything from administration, finance, curriculum to sanitation, the term 'instructional' is restricted to teaching and learning.

The Association of Educational Communications and Technology (AECT) in 1979, defined Instructional Technology as follows:

> *Instructional Technology is a complex, integrated process involving people, procedures, ideas, devices and organisation for analyzing problems, and devising, implementing, evaluating, and managing solutions to those problems, institutions in which learning is purposive and controlled* (AECT, 1979 :3).
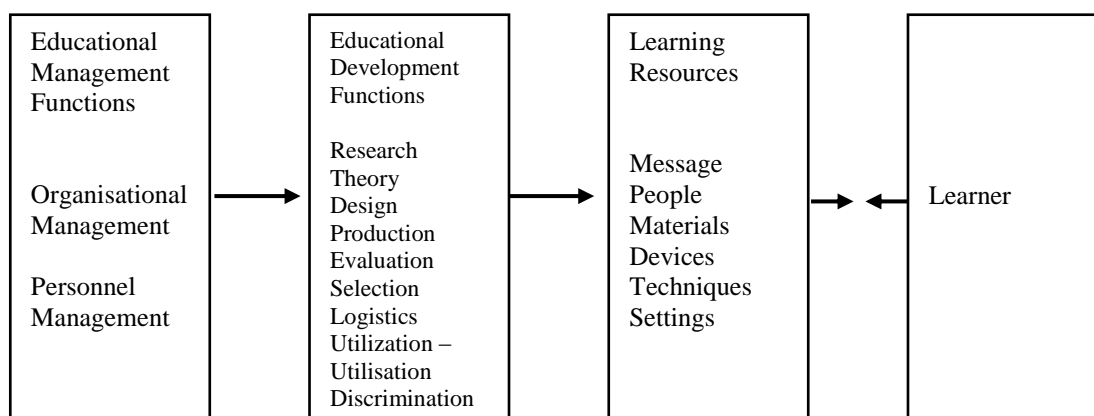
Educational Management Functions Organisational Management Personnel Management	Educational Development Functions Research Theory Design Production Evaluation Selection Logistics Utilization – Utilisation Discrimination	Learning Resources Message People Materials Devices Techniques Settings	Learner

Fig. 5.   *Domains of instructional technology. Source AECT (1979: 3)*

When this definition is compared with the one earlier given by AECT for Educational Technology, what is the difference? Educational Technology is concerned with: those problems involved in all aspects of human learning". Instructional Technology is concerned with: "those problems, institutions in which learning is purposive and controlled". The domains of instructional technology in the table below shows the various aspects and elements of instructional technology and their relationship.

ACTIVITY 2
1.   From the five definitions of educational technology given in this unit, describe the vital attributes of educational technology.
2.   Define the term educational technology and justify your definition.
3.   Is there any difference between educational technology and instructional technology? Give reasons for your answer.
4.   Instructional technology is a subset of educational technology. Discuss

---

SYSTEMS APPROACH TO INSTRUCTION

Instruction refers to the deliberate arrangement of events or experience(s) to help a learner achieve a desirable change in performance. It is a set of events that are deliberately arranged in such a way that learning is facilitated. Instruction is not mere teaching because it is more systematic, specific and objective. The purpose of instruction is to help people learn.

To be effective, instruction must be properly planned and designed in a systematic way. The systems approach to instruction therefore implies careful planning, design, implementation and evaluation of the events that will help a learner achieve the desired learning outcome(s). While a variety of instructional design models, exist, there are three fundamental steps:

1.   identifying the outcomes of instruction;

2.   developing the instruction; and

3.   evaluating the effectiveness of the instruction. (Gagne, Briggs and Wager 1992 : 21)

According to Onyejemezi (1990 : 80), the systems approach to instruction entails carrying out the following:

(a)   identify the educational problem to be solved or the educational activity to be undertaken;

(b)   state the objectives to be achieved in solving the problem or undertaking the educational activity;

(c)   indicate the conditions necessary for the achievement of the objectives;

(d)   map out appropriate methods and material resources to be used in order to achieve the objectives;

(e)   design the way of knowing whether or not the objectives are achieved and determine whether the objectives have been achieved; and

(f)   where the objectives are not achieved or the educational activity is not successfully carried out, we examine a- e above, locate the problem, make necessary changes and tackle the problem again until the objectives are achieved or the educational activity is successfully completed.

In Module 2 Unit 2 we will examine in details the ASSURE model of instructional design.

The systems approach to instruction is an attempt to conceive of the instructional process as an event comprising of several elements (teacher, learner, content, media, method, evaluation and feedback) which work cooperatively together to promote learning efficiency and effectiveness. The systems view entails that all parts of the instructional system must be considered and handled simultaneously, rather than in bits and pieces independently. It is a holistic and dynamic procedure which involves planning, development, implementation, evaluation and modification.

ACTIVITY 3

1.   What is instruction? How is it different from teaching?

2.   What is meant by the systems approach to instruction?

3.   Describe the steps involved in applying the systems approach to the design of instruction.

SUMMARY

- There is general misconception about educational technology. It is wrongly seen as gadgets devices, tools and equipment used for teaching and learning.

- There are three approaches to the definition of educational technology:
    - educational technology as hardware
    - educational technology as software
    - educational technology as systems thinking

- Five definitions were given and deductions made from them.

- Educational technology is different from instructional technology.

- The systems approach to instruction entails careful planning, design; implementation and evaluation of the events that will help the learner achieve the desired learning outcome(s).

REFERENCES

Agun, I & Imogie I. (eds) (1988). **Fundamentals of educational technology**. Ibadan: Y-Books

Adewoyin, J. A. (1991). **Introduction to educational technology.** Lagos: Johns-Lad Publishers

Gagne, R. M. Briggs L. J. and Wager, W. W. (1992). **Principles of instructional design.** California: Wadsworth/Thomson Learning.

Onuebunwa, S. E. (1999**). Educational technology: An introduction**. Owerri: Cape Publishers.

Onyejemezi (1990). Educational technology 1 and 2 in NTI. **Nigeria Certificate in Education by   Distance Learning Course Book on Education Cycle 1 Module 11 and 12**. Kaduna: NTI.

Rowntree, D. (1974). **Educational technology in curriculum development**. London: Harper & Row Publishers

Umar, Abdurrahaman (1991). **What is educational technology? NETC. Proceedings of the National Symposium** at the 2nd National Festival of Instructional Materials at Ilorin April 3 – 5, 1989.

Unwin, D. and Mc Alesee (Eds) (1978). **Encyclopaedia of educational media and communications technology**.

UNIT 2: EDUCATIONAL TECHNOLOGY IN NIGERIA

INTRODUCTION

Every fresh student of a course would be eager to know how the field came into existence. It is often said that we need to know about the past so as to be able to understand the present and from that understanding predict the future. In order to appreciate the present status of educational technology and the emerging trends for the future, we need to trace how educational technology evolved as a field and how it has developed in Nigeria.

This unit will trace the history of educational technology, the evolution of educational technology in Nigeria, its present status, problems facing it, and the future trends.

OBJECTIVES

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

1. Describe how philosophers and technological inventions contributed to the development of educational technology

2. Trace the development of modern educational technology from the visual instruction movement to the behavioural science concept of educational technology.

3. Give at least four contributions that the behavioural science concept of educational technology has made to the development of the field.

4. Identify the milestones in the development of educational technology in Nigeria from the colonial era to the present day.

5. Discuss the contributions of the following to the evolution of modern educational technology in Nigeria: (a) international organizations (b) Nigerian Universities (c) Broadcasting Organisations

6. Explain how the National Educational Technology Centre evolved.

7. List any five of the functions of the National Educational Technology Centre.

8. Give any five of the objectives of Educational Technology as specified by the National Policy on Education.

9. Discuss the functions of educational technology in formal and non-formal settings.

10. Give any five constraints militating against the development of educational technology and suggest ways of overcoming each of the problems.

HISTORICAL DEVELOPMENT OF EDUCATIONAL TECHNOLOGY

The history of educational technology is as old as the history of education. As education developed, more effective and efficient means of instruction was developed. Right from the Stone Age, man has sought ways of improving the educational enterprise. The use of visual materials dates back to the stone age period when visual aids such as stones, pebbles, sticks and cowries were used to enhance effective communication and learning. The Egyptian

hieroglyphics (visuals) marked the beginning of writing.

The Sophists who lived in Athens in about the last half of the 5th Century BC were probably the first educational technologists. It is believed that their lectures were carefully prepared and delivered in a systematic manner. They were also believed to be the first people to develop techniques of analysis in teaching.

Philosophers like Socrates (479 - 399BC), Plato (428 - 349BC), St. Thomas Acquinas and Aristotle dealt with issues relating to the right methods of instruction, the sequence to be followed and the evaluation to be adopted. The Socratic method of carefully structuring questions and answers is well known. It included short organized units of instruction directed toward specific objectives and tailored toward an individual student's interests and abilities. Aristotle considered note taking as an essential part of the learning process. Both viewed learning as an active and individual process based on objectives and a structured learning environment.

A significant turning point in the history of educational technology came in the year 1450 AD when a German, John Guttenberg, invented a printing press. His invention gave birth to the age of books, revolutionized the communication process and increased accessibility to recorded information.

Several other inventions have contributed to the evolution of educational technology. In the 19th Century, we had: the telegraph (1837), typewriter (1867), telephone (1876), transparent film (1878), incandescent lamp (1879), record cylinder (1887), record disc, AC Motor (1892), photographic paper (1898) and wireless telephone (1899). In the 20th Century, there were: radio tube and amplifier (1907), mass production techniques (1909), heterodyne radio (1913), television (1927), talking movies, FM radio (1935), Xerography (1938), computer memory (1945), electric digital computer (1946), transistor (1947), cybernetic theory (1948), information theory, Skinner's *The science of learning and the art of teaching* (1954), communications satellite (1962), Open University in Britain (1972), extremely high speed computer printing (1978), low-cost personal computer (1981) (source: Knirk F. G. & Gustafson, K. L. (1986).

Imogie (2002: 34) identifies the following trends in the history of modern educational technology:

- Visual Instruction movement which emphasized the use of visual materials to make more concrete the abstract ideas being taught; classified the types of visual aids and emphasized the need to integrate visual materials with instruction.

- From Visual Instruction to Audio Visual Instruction: - had impetus from the coming of sound recording motion pictures. Both visual and audio visual instruction movements emphasized "things, sense and concreteness".

- From Audio Visual Instruction to Communications - emphasis began to shift from devices (equipment) and materials to the process of communicating information from source (teacher) to the receiver (learner).

- From Audio Visual Instruction to Early Systems Concepts - the systems concept of

educational technology revolutionized the field with its emphasis on the identification and integration of components of a system with a view to increasing system efficiency. Audio-Visual materials were now seen as products to be arranged and integrated in such a way as to solve identified instructional problems and achieve specified objectives.

- The communication and system concepts above were the two dominant features and characteristics in the field in the early 1960s.

- Audio Visual Communication: Synthesizing communications and early systems concepts: The planning, production, selection, management and utilization of the components of the entire instructional system was now emphasized. The learning process received more attention. Emphasis was now on synthesizing the concepts of communications, systems, elements or components of a system and design of a system and the concept of learning theory.

- Behavioural Science Concepts of Educational Technology: It started in the middle of the 19th Century and drew its ideas from the behavioural science particularly anthropology, sociology and psychology. Specifically, it is necessary to note the influences of two notable learning theorists (E. L. Thorndike's classical conditioning and B. F. Skinner's Operant conditioning theories) and the emergence of the systems approach in the late 1950s and early 1960s. Both Thorndike and Skinner studied the laboratory behaviour of animals and then postulated theories of human learning. Thorndike postulated the laws of cause and effects, law of exercise, and law of readiness. Skinner gave the theory of operant conditioning which emphasized that behaviour is strengthened via reinforcement.

- The systems approach, which has its origin in the United States of America Airforce, is a sophisticated engineering concept used for the development of weapon system. The systems approach requires that a problem be identified and clearly specified, broken down into its components, examined to see the inter-relationships of the elements, before proffering solutions. It requires a holistic view of the problem.

The behavioural science concept of educational technology, according to Agun and Imogie (1988: 9) has had the following positive influence:

1. It shifted emphasis from products (concrete things as aids to instruction) to the process of instruction.

2. It encouraged the application of research results to the design of instruction.

3. It encouraged a holistic approach to educational problems by re-emphasizing the view of the educational enterprise as a system with sub-systems that are intrinsically related.

4. It encouraged the development of procedures and methods for identifying and analyzing educational problems and for finding solutions to them.

5. It encouraged the development of procedures and strategies for effective and efficient utilization of ideas and resources to improve the quality of education.

ACTIVITY 1

1.   "The history of educational technology is as old as the history of education." Do you agree? Justify your answer.

2.   Discuss the contributions of philosophers, technological inventions and psychologists to the development of educational technology.

3.   Explain any five influences of the behavioural science concepts of educational technology.

4   Discuss the contribution of John Guttenberg to the history of educational technology.

5.   Trace the historical development of educational technology from the stone age to the present time.

HISTORY OF EDUCATIONAL TECHNOLOGY IN NIGERIA

The early beginnings of educational technology in Nigeria can be traced to the colonial era when the managers of voluntary agency schools emphasized the production and use of simple learning materials commonly known as teaching aids. Trainee teachers and practising teachers were expected to produce and use both representational materials such as pictures, maps, models as well as real objects such as local seeds, plants, scenes, etc. The colonial government in 1930 promulgated the first Education Ordinance which provided that schools should have adequate teaching apparatus. Thus, resource aspect of educational technology (or the hardware approach) permeated the educational system and evolved with it.

In addition to the use of low cost materials in the schools, the British Broadcasting Corperation, London, in 1933 transmitted the first educational programme in its West African Overseas Service. These were for English Language and were once a week. The Nigerian Broadcasting Service (NBS) was established in 1951. It inherited this limited educational programme from the BBC. Similarly, towards the end of the 1950s, the regional governments established Schools Broadcasting Units in their regional headquarters utilizing the broadcasting facilities of the NBS stations. By 1961, each of the three Regional Governments had a Radio-Television Station of its own which transmitted programmes on various subjects such as English, Teaching Methodology, Civics, Geography and History to schools.

Between 1959 and 1962, Audio-Visual Centres were established by the United States Agency for International Development (USAID) in the former regions of Nigeria. (Imogie 1984 : 28). It was these Audio-Visual Centres that eventually formed the nucleus of the present Educational Resources Centres in the different states. These centres were established as units in the Ministry of Education.

The founding of modern educational technology in Nigeria may be traced to the contributions, support and expert advice from such international organizations as United Nations Educational Scientific and Cultural Organization (UNESCO), Centre for Educational Development Overseas (CEDO) in Britain, United States Agency for International Development (USAID), the Ford Foundation, Carnegie Corporation, and the Canadian

Universities Overseas. These bodies assisted the Ministries of Education in the three regions in establishing audio-visual units and the schools broadcasting units.

They also assisted the universities and some other institutions of higher learning in establishing their audio-visual units e.g. the Audio-Visual Aids Unit of the Institute of Education, University of Ibadan (1962), the Comparative Education Studies and Adoption Centre (CESAC), the Curriculum Development and Instructional Materials Centre (CUDIMAC) of University of Nigeria, Nsukka, the audio-visual units of the Colleges of Education at Abraka and Lagos, the micro-teaching programme at the Alvan Ikoku College of Education, Owerri. Not only did these international organisations give materials, financial and expert support, they also infused into the educational system the idea of proper identification of educational problems, the statement of objectives, logical sequencing and integration, evaluation and research. They contributed greatly to the introduction of programmed learning methods and applications.

EMERGENCE OF THE NATIONAL EDUCATIONAL TECHNOLOGY CENTRE

As already noted, the three regional governments had Schools Broadcasting Units which produced and transmitted radio and television programmes for schools throughout Nigeria. Of the three, the most stable and active was the Northern Schools Broadcast Unit. Its broadcasts were received and used throughout Nigeria. Following the creation of states in 1967 and the break up of the Northern Region into six states, the Northern Schools Broadcast Unit was taken over in April 1, 1969 by the Federal Government and re-named Federal Schools Broadcast Unit, Kaduna. On 1st April 1975, the Federal Schools Broadcast Unit was merged with the National Resources Centre, Lagos and Audio-Visual Aids Development Centre, Kaduna. On 1st April 1977, this centre was changed to the National Educational Technology Centre, Kaduna with the following objectives:

1. The development and production of Educational Radio and Television programmes for schools (Primary, Secondary and Teacher Training Colleges).

2. The development and production of instructional teaching aids for use in schools, using local materials.

3. The training of specialists in the field of educational broadcasting (Radio and Television, Audio-Visual Aids).

4. The conduction of seminar/conferences to teachers and teacher trainers on the application of educational technology to class teaching.

5. Provision of consultancy services to the Federal and State Governments in the fields of the Broadcast Media, Audio Visual Aids and Instructional System Technologies.

6. Establishment of National Educational Resource Library of Equipment and materials for dissemination throughout the country.

7. Documentation and collation of statistical data on the Broadcast and Audio Visual Aids Services in the country.

8. Training of Educational Technologists and cinematographers for services in Federal

and State Government Establishments.

9.   Assessment, evaluation and classification of imported instructional aids, materials and equipment marketed in the country (Nwamadi in Ogunranti (ed) (1982 : 257).

NATIONAL POLICY AND EDUCATIONAL TECHNOLOGY

Thus, the activities that set the stage for the use of educational technology was concluded with the emergence of the National Educational Technology Centre in 1977 side by side with the National Policy on Education. The policy was first published in 1977 and revised in 1981 and devoted section 10, pp 42 - 43 to the educational technology under the heading "Educational Services".

According to the National Policy on Education, the objectives of Educational Technology are to:

(i)   to develop, assess and improve educational programmes;

(ii)   to enhance teaching and improve competence of teachers;

(iii)   to make learning more meaningful for children

(iv)   to reduce educational costs;

(v)   to promote in-service education;

(vi)   to develop and promote an effective use of innovative materials in schools.

To achieve these objectives, the National Policy on Education planned the following measures:

-        to establish Teachers Resource Centres in all the states

-        to establish Curriculum Development Centres

-        to provide more fund to the NERDC and the universities by both Federal and State governments

-        to established language centres, educational resources centres, science and mathematics centres, workshops, libraries as well as guidance and counselling centres.

THE NATIONAL TEACHERS' INSTITUTE

Apart from the NETC, Kaduna, the National Teachers Institute, Kaduna was established in 1976 to train under-qualified and untrained teachers using the distance learning system. So far, the Institute has run the following programmes by the distance learning system: TC II, NCE, PTTP and Advanced Diploma and Post graduate programmes. The media of instruction include self-instructional texts, recorded audio and video cassettes and face-to-face contacts.

The Institute can boast of the following facilities: well equipped computer centre, Internet café with 10 work stations; a virtual library, printing press, media resource centre, audio-visual section with studio and graphic art and illustration, 50 watts FM stereo transmitter for radio NTI and V-sat to link the NTI headquarters with the Zonal and State Offices.

CHANGING TERMINOLOGIES OF EDUCATIONAL TECHNOLOGY

The evolution of educational technology in Nigeria can be illustrated with its changing terminology. The National Policy on Education used such terms as educational services, Media Resource Centres, Audio Visual Aids Centres, before the term Educational Technology was used in 1977. Earlier emphasis was on the use of teaching aids or audio-visual materials in the teaching/learning process. Up to the middle of 1960, we had the Teaching Aids Centre in the Institute of Education, University College, Ibadan; Audio-Visual Aids Centres in the Regional Ministries and Federal Ministry of Education; and of course the name of the first professional association established in 1957 was the "Nigeria Audio-Visual Association" (NAVA) up till 1985 before it was changed to "Nigeria Association for Educational Media and Technology" (NAEMT).

ACTIVITY 2

1. Briefly review the history of educational technology in Nigeria.

2. Assess the contributions of the following to the development of educational technology in Nigeria. (a) Government (b) International organizations (c) Professional association, (d) National Policy on Education.

3. Trace the history of the National Educational Technology Centre and state any five of its functions.

4. How has the evolution of educational technology in Nigeria been reflected in its changing terminologies?

5. Discuss the National Policy on Education with regards to the objectives of educational technology. What are the measures the policy plans to use in achieving them?

FUNCTIONS OF EDUCATIONAL TECHNOLOGY IN FORMAL AND NON FORMAL SETTINGS

Educational technology, when wisely and judiciously applied can perform the following functions:

1. It makes learning to become more concrete, real, immediate and permanent. For example, videos, films, pictures, television and the radio can bring to learners different animals, places, people and events in their physical, natural context from the real world outside into the classroom.

2. It makes instruction more scientific and systematic. Teaching and learning are targeted at measurable objectives and based on well researched learning theories.

3. It makes education to become more productive. Learners can learn with speed and accuracy. Teachers can do more creative work by allowing technology to handle routine jobs of information transmission and heavy burden of administrative tasks such as marking, recording, etc.

4. It helps to individualize instruction as the different learning needs of students can be

met and catered for. Each learners can go at his own pace and time.

5.   Similarly, it gives equal access to education. With the internet, for example, it is easy to gain access to the best libraries in the world.

6.   It provides the teachers with the means of arousing and sustaining the interest of learners as well as promoting positive attitude to learning. The teacher is able to vary his mode of instruction using various devices. Use of instructional media helps to generate interest.

7.   It promotes self-instruction. This course text is self-instructional. It is a product of educational technology.

8.   It promotes retention as the object being learnt can be seen, smelt, tasted, touched, felt or heard by the learner. A learner, for example, that engages in the dissection of a specimen is more likely to retain and recall the essential internal features of the specimen then one who simply listened to the lecture.

Imogie (1985) quoting Armsey and Dahl (1973) summarized the functions of educational technology as follows:

- to improve instruction (qualitative)

- to educate more people (qualitative)

- to learn about learning (research)

- to reform the curriculum (substance)

- to improve the process (method) and

- to articulate the system (structure).

The functions of educational technology described above are performed in the formal and non-formal systems of education.

Non-formal education is education organised outside the formal school system. The formal school in Nigeria runs the 6 - 3 - 3 - 4 system, that is, 6 years primary, 3 years junior secondary, 3 years senior secondary and 4 years tertiary.

Non-formal education include courses designed to provide learners with knowledge and skills that will improve the quality of their daily life. Topics are chosen from their expressed needs. They are mostly basic functional education. Examples included adult literacy campaigns that target illiterates especially in rural areas, and using local language as medium of instruction. Topics covered may include population education, health care, environmental sanitation, agriculture, livestock management, child care, dress making, first aid, knitting, vegetable growing, etc.

Educational technology has been particularly useful in non-formal education. Various radio and television programmes have been designed to provide this form of education. Self-instructional print materials such as booklets, handouts, manuals, pictures, flip charts, etc have been used as supplementary materials. Audio materials, whether pre-recorded or

broadcast, have also been used. Study groups of 10 to 20 men and women gather in a village at a regular time each week to learn from these media.

CONSTRAINTS MILITATING AGAINST EFFECTIVE PRACTICE OF EDUCATIONAL TECHNOLOGY IN NIGERIA

Educational Technology is an educational innovation. Its practice is therefore faced with a number of problems.

Firstly, there is the problem of ignorance and misconception of what educational technology is. As already discussed in Unit 1, some see educational technology in terms of teaching aids and or the use of gadgets, tools and devices like projectors, films, radio, television, computer, etc. The tendency of such a narrow view is to focus on only the tools aspect of education, overemphasize gadgets in schools and neglect the process of instruction and other important aspects. In Nigeria for example, so much money was spent in importing tools for Introductory Technology, with much of the gadgets lying idle for several years due to so many factors. A correct conception of educational technology would have suggested a more careful and holistic planning, implementation and evaluation of the project.

Another serious factor militating against the effective practice of Educational Technology in Nigeria is what Imogie (1984 : 34) calls "lack of institutional readiness for Educational Technology". These are "factors related to the adoption and diffusion of Educational Technology as an educational innovation". The factors include:

(a)   bureaucratic bottlenecks and rigid organisational structure that oppose innovation and insist on maintaining the status quo.

(b)   poor reward system that does not recognise or promote the use of innovative techniques of Educational Technology.

(c)   lack of professionally or academically trained personnel in Educational Technology limits the practice of the field.

(d)   poor funding and allocation for Educational Technology at the various levels of the educational system (primary, secondary and tertiary) leads to inadequate supply of facilities, equipment and materials. No wonder, most of our schools are ill-equipped, if at all.

(e)   closely related to poor financial allocation or provision for educational technology is the issue of lack of space and instructional resources in Nigerian schools and colleges. Most classrooms, lecture halls and auditoria are not designed or adapted to accommodate audio-visual devices.

Educational Technology Centres are non-existent in most schools and colleges, higher institutions and at the national, state and local government levels.

(a)   irregular power supply.

(b)   teaching load that leaves the teacher with little or no time to adopt and use educational technology tools and techniques.

(c)   lack of relevant educational media in majority of subject areas.

(d)   the Nigerian educational system places much emphasis on examinations and certification thereby limiting the extent to which Educational Technology tools and techniques can be used in the instructional process.

(e)   lack of professionalisation of educational technology in Nigeria is a major constraint.

(f)   maintenance problems exist. Also, there is lack of spare parts.

RECOMMENDATIONS

Educational Technology has been shown to be a field that can bring about rapid improvements in the Nigerian educational system if well implemented. Having identified some of the constraints, it is necessary for us to suggest ways of overcoming these problems. These include:

1.   The misconceptions about what Educational Technology should be corrected through regular and intensive workshops, seminars, conferences, publications and publicity of what the correct concept is.

2.   Individual institutions that provide and/or utilize educational technology services should find comprehensive solutions to those institutional readiness factors described earlier.

3.   Staff with sufficient academic or technical training in Educational Technology should be engaged. Training institutions will have to design and provide short-and-long term academic programmes for the training of educational technologists that will fill existing vacancies.

4.   A conducive environment for practising Educational Technology should be created by government and proprietors of the educational institutions. Regular power supply, provision of infrastructural facilities, and other essential services are necessary prerequisites for the development of Educational Technology in Nigeria.

5.   Practitioners of Educational Technology will have to work cooperatively towards professionalizing the field. Such professional associations as the Nigeria Association for Educational Media and Technology (NAEMT) need to play a leadership role by popularizing the profession through educational technology seminars, publications, workshops, conventions, exhibitions and other media related activities.

6.   The workload of teachers should be at the optimal level that will give them time and room for creativity and effective practice of educational technology.

7.   Teachers which practice educational technology should be rewarded or compensated properly.

Although educational technology is not a panacea to all educational problems, it is agreed that it has numerous benefits. However, many constraints are preventing these benefits from being realised. The challenge before practitioners, proprietors, governments and other interested bodies is to identify these problems and solve them in a creative, systematic and comprehensive manner.

ACTIVITY 3

1.   List and describe any five functions that educational technology can perform

2.   Explain any five problems militating against the effective practice of educational technology in Nigeria.

3.   Discuss any five ways for overcoming the constraints.

SUMMARY

- Educational Technology is as old as education.

- Philosophers contributed to the development of educational technology by pointing the way   to the use of right methods of instruction, the sequence to be followed and evaluation to be adopted.

- Technological inventions such as the printing press, telephone, radio/television, computer, etc. contributed greatly to the development of educational technology.

- The development of educational technology began with emphasis on use of visual material, through audio-visual devices and communication to modern systems concept.

- The behavioural science concept of educational technology has very positive influence on the field.

- The history of educational technology in Nigeria can be traced to the colonial era when trainee teachers and practising teachers were expected to produce and used visual materials in teaching.

- International organizations contributed greatly to the emergence of modern educational technology in Nigeria.

- Broadcasting organizations also had positive influence on the development of the field

- The National Educational Technology Centre emerged in 1977.

REFERENCES

Adewoyin, J. A. (1991).**Introduction to educational technology**. Lagos: Johns-Lad Publishers

Agun, I & Imogie I. (eds) (1988). **Fundamentals of educational technology**. Ibadan: Y-Books

Federal Republic of Nigeria (1981). **National Policy on Educatio*n*.** Lagos: Federal Government Press

Imogie, A, I. (2002). **Improving teaching and learning: An introduction to instructional**

technology. Benin: Joe Seg Assoc.

Knirk, Frederick G. & Gustafson, Kent L. (1986**). Instructional technology: A systematic approach to education.** New York: Holt, Rinehart and Winston

Ogunranti, A. (1988**). Problems and prospects of educational technology in Nigeria. Ibadan:** Heinemann.

Onyejemezi (1990). Educational technology 1 and 2 in NTI. **Nigeria Certificate in Education by Distance Learning Course Book on Education cycle 1 Module 11 and 12**. Kaduna: NTI.

UNIT 3: OBJECTIVES AS CORNERSTONE OF EDUCATIONAL TECHNOLOGY

INTRODUCTION

Educational technology is objectives oriented. It starts with objectives and ends with objectives. You will not be doing the Post Graduate Diploma programme without an aim or goal. Your goal may be to get promotion in your place of work. It may be to gain relevant knowledge, skills and abilities. These broad aims led you into this programme. Now that you have enrolled into the programme, you have to work towards achieving the specific objectives specified for the courses.

In this unit, you will learn about the various levels of instructional objectives and the benefits of writing specific learning objectives.

OBJECTIVES

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

1.   Distinguish between aims, goals, and objectives.

2.   Relate any of the goals of teacher education in the National Policy on Education to the Post Graduate Diploma Programme of the National Teachers' Institute.

3.   Distinguish clearly between three domains of educational objectives.

4.   List and describe at least five benefits of clearly stated behavioural objectives.

5.   Write objectives following the ABCD format.

6.   Discuss the role of objectives in selecting contents, instructional media and methods, and assessment of instruction.

AIMS, GOALS AND OBJECTIVES

Every human activity and behaviour is oriented towards achieving a purpose or attaining a target. This may be stated (or implied) as an aim, a goal, an intention, a goal, an expected outcome, an objective, a criterion or a standard.

Thus, there are several different levels of stating our purpose for doing things. Whereas aims are the most abstract level, objectives are more precise. Aims are too vague and ambiguous to be of much help in planning actual learning experiences.

Aims often talk in broad terms such as transmitting culture, promoting intellectual and emotional development, encouraging aesthetic expression, promoting the spirit of inquiry, creating self-awareness, preparation for adult life, etc. For example, the goals of teacher education as stated by the National Policy on Education (1998 : 33) shall be to:

(a)   produce highly motivated, conscientious and efficient classroom teachers for all levels of our educational system;

(b)   encourage further the spirit of enquiry and creativity in teachers;

(c)   help teachers to fit into social life of community and the society at large and enhance their commitment to national goals;

(d)   provide teachers with the intellectual and professional background adequate for their assignment and make them adaptable to changing situations;

(e)   enhance teachers commitment to the teaching profession.

The National Teachers' Institute is one of the institutions approved by the National Policy to give the required professional training to teachers. To this end, the Institute is running this Post Graduate Diploma in Education. The general objectives of the programme are on page 45 of the NTI Information and Study Guide for Students of Advanced and Post Graduate Diploma Programmes.

To achieve these general objectives, various courses have been designed one of which is Educational Technology. This unit titled "Objectives as cornerstone of Educational Technology" is one of the units. And the specific objectives of this unit are stated at the beginning of this Unit.

Thus, from the most abstract national goals of teacher education, we have come through the general objectives of the PGDE programme, to the course objectives of Educational Technology to the very specific unit objectives. Objectives, on the other hand are more precise. They emphasize what learners are to do or learn.

Yet, aims have their place! They give the 'big picture'. They help us to judge the worthwhileness of the specific objectives. However, to be more useful and practical, aims must be translated to objectives.

TYPES OF OBJECTIVES

Various terms have been used to refer to the purpose or intent or outcome of instruction. We have: aims, goals, objectives (terminal or enabling) etc. Generally speaking, we can compress them to two: aims (i.e. general or terminal objectives) at one end, and objectives (instructional, behavioural, specific or enabling) at the other end. At the level of national policy, curriculum, syllabus, course, etc objectives are often stated in very broad terms. However, at the level of a lesson, a unit, or a module, objectives are stated in measurable, achievable, observable, and behavioural terms.

Various types of objectives exist. Some writers like Benjamin Bloom (1956), Davids R Krathwohl et. al. (1964), Elizabeth Simpson (1971) have taken time to classify or categorise objectives.

Generally speaking, there are three classes or domains of educational objectives: cognitive, affective and psychomotor. Each of the three classes or domains is further broken down into smaller types of behaviour. It is necessary to emphasize that the three domains tend to overlap. Many objectives contain elements from two or even all three classes. For example, in studying this unit, you are likely to exhibit the three domains - you pay attention, show interest, think on what you have read, write down important points, and assess your

understanding from time to time.

Not only have these writers classified the various kinds of behaviour, they have attempted to order them according to their level of complexity: from simple to complex, from lower order to higher order. Some skills or abilities are more difficult to attain than others. To attain some of the abilities, there is the need to first master some lower level abilities, or 'enabling objectives'. This classification according to level of complexity is also called taxonomy. It entails a hierarchical listing of objectives.

Cognitive Domain

The cognitive domain covers the thinking process such as remembering, evaluating and problem solving. In the cognitive domain, Bloom (1956) identified six levels of objectives, with 'knowledge' as the lowest level and 'evaluation' as the highest:

1.0   Knowledge

1.1   knowledge of specifics

1.2   knowledge of ways and means of dealing with specifics

1.3   knowledge of the universals and abstractions in a field.

2.0   Comprehension

2.1   Translation

2.2   Interpretation

2.3   Extrapolation

3.0   Application

4.0   Analysis

4.1   Analysis of elements

4.2   Analysis of relationships

4.3   Analysis of organizational principles

5.0   Synthesis

5.1   Production of unique communication

5.2   Production of a plan or a proposed set of operations.

5.3   Derivation of a set of abstract relations

6.0   Evaluation

6.1   Judgements in terms of internal evidence

6.2   Judgement in terms of external criteria.

Affective Domain

The affective domain taxonomy was developed by David R. Krathwohl *et.al* (1964). The

domain concerns the learner's feelings, attitude, interests, etc.

The major sub classifications in Krathwohl's taxonomy of affective objectives are:

1.0   Receiving (attending)

1.1   Awareness

1.2   Willingness to receive

1.3   Controlled or selected attention

2.0   Responding

2.1   Acquiescence in responding
2.2   Willingness to respond

2.3   Satisfaction in response

3.0   Valuing

3.1   Acceptance of a value

3.2   Preference for a value

3.3   Commitment

4.0   Organization

4.1   Conceptualization of a value

4.2   Organization of a value system

5.0   Characteristics of a value or value complex

5.1   Generalized set

5.2   Characterization

These objectives deal with the social behaviour of learners. It has been found that the positive behaviours such as attending to instruction, being task-oriented, participation in class activities, for example, relate directly to school success. So, teachers cannot afford to ignore the affective objectives in designing, implementing and evaluating instruction.

Psychomotor Domain

Finally, we have the psychomotor domain. This domain focuses on objectives that involve the learner in some kind of muscular activity. These objectives are often taught in physical education, science practicals, home economics, classes, introductory technology classes, etc. The most widely used psychomotor objectives taxonomy was developed by Elizabeth Simpson (1971). Her taxonomy is presented below:

1.0   Perception (awareness of objects and qualities)
1.1   Sensory stimulation

1.2   Cue selection

1.3   Translation (relating perception to action)

2.0   Set (preparatory adjustment for a particular action)

2.1   Mental set (knowledge of steps to take in performing a test)

2.2   Physical set (placing body in position to perform an act).

2.3   Emotional set (desire to use a tool to perform an act).

3.0   Guided response (behaviour exhibited under instructor guidance)

3.1   Imitation (performance of an act as previously demonstrated)

3.2   Trial and error (responding until correct behaviour is achieved)

4.0   Mechanism (learned behaviour is habitual).

5.0   Complex overt response (behaviour is skilled, smooth, efficient, with minimum time and effort).

5.1   Resolution of uncertainty (performance without hesitation).

5.2   Automatic performance (coordinated motor skill with ease and muscle control)

6.0   Adapting and originating (modifies performance as conditions change).

Several other taxonomies have been developed. For example, Robert Gagne (1985) presents five major categories of human performance or capabilities of the learner as:

1.   Intellectual skills

2.   Verbal information

3.   Cognitive strategies

4.   Motor skills

5.   Attitude

ACTIVITY 1

1.   Distinguish clearly between aims and objectives.

2.   What is the difference between the way goals of teacher education are stated in the national policy on education and the way objectives are stated in this unit?

3.   What is meant by the domains of educational objectives?

BENEFITS OF OBJECTIVES

Objectives that are clearly stated in behavioural terms have many benefits.

1.   Objectives enable the instructor to communicate the intended outcomes of instruction to students, teachers, and parents.

2.   Precise objectives help students to learn better and faster. They know the objectives of a course and are given appropriate references and resource materials to work towards those objectives.

3. Objectives serve as a good source for assessment and evaluation. Well specified objectives help the teacher to select appropriate ways of checking or testing to find out whether the students have acquired the specified knowledge, skills and attitudes or can perform the actions indicated in the objectives. An objective can often be converted into a test question, with the verb determining what type of test item to construct.

4. Objectives help the teacher (and even learner) to select and structure the content of teaching. Objectives highlight and suggest important topic areas of a course and even the way to go about attaining it.

5. Objectives can help the teacher decide on appropriate learning activities and teaching media. Well stated objectives will help the teacher decide on what experiences they should pass through.

6. Objectives help to translate the broad aims into more attainable learning outcomes, specific content and learning experiences.

7. Specifying objectives enables the teacher to concentrate on the learners' needs.

8. It provides focus for curriculum planners, teachers and educational administrators.

As beneficial as objectives are, some problems need to be tackled. Stating precise objectives is not easy. It demands more mental effort and research from teachers. If care is not taken, it may result in emphasizing trivial facts and low level learning outcomes.

Also, originality and creativity may not be easily accommodated. It may be difficult to state certain objectives precisely e.g. appreciation of a poem. It may be difficult to exhaustively list the several behavioural objectives that exist in all the areas of study. Some argue that specifying what learners will be able to learn is a case of one human being manipulating (controlling) another.

WRITING OBJECTIVES

As already hinted, objectives come from aims (educational goals, general or terminal objectives). Aims come from the views we (teachers, students, parents, employers and other stake holders) hold about the future needs of people in society and about the skills needed by individual students. They come from the subject matter that can facilitate the acquisition of these skills. It is therefore important that we put at the back of our mind the broad aims (goals) as we develop specific, instructional, behavioural, performance, enabling, or learning objectives.

A specific objective is a precise statement of the behaviour, action, ability, skill or competency that a learner must posses as a result of the instruction. It is a statement of what the learners should be able to do after the instruction, which they couldn't do before.

Objectives for a lesson, a module, a unit, or an instruction ultimately come from the national policy, syllabus, and scheme of work, text books, curriculum guides, or sequencing charts. The objectives in these materials may still be general and may need further precision.

The following ABCD format may be useful as you write the objectives:

A = Audience that will perform the objectives.

B = Behaviour expected of the performer.

C = Conditions under which the audience will perform when assessed.

D = Degree of measurement used to determine acceptable performance.

A.   Audience

The audience refers to the learner, the person(s) expected to do the learning. We must consider the entry level of the learner expected to perform the objectives. The objectives must specify precisely who is the target of the instruction. Hence, most objectives contain the phrase: "the learner will be able to ......", "the student will be able to ....", "pupils should be able to .....", "the pupil in class IV will be able to ......".

B.   Behaviour

Objectives should state in precise terms what will be the observable action or product of the action of the learner. It should indicate what learners will be able to do as proof of having attained the objectives. To ensure that the objective is behaviourally measurable and observable, we should use verbs that indicate actions, i.e. action verbs. Words to be used may vary from one domain to another. Below are examples:

ACTION WORDS FOR DOMAINS AND LEVELS OF LEARNING

	Knowledge level		Application level		Problem solving level	
Cognitive Domain	arrange cite classify convert copy define describe discuss distinguish explain express give example identify indicate label list locate match	name order outline recall recite record relate reproduce repeat report restate review rewrite specify summarize tell translate underline	apply assemble calculate change choose compute defend demonstrate discover draft dramatise draw employ estimate explain	illustrate infer interpret modify operate practise predict prepare produce relate schedule select show sketch use	analyse appraise argue arrange assemble assess categorise choose combine compare compose conclude construct contrast convert create criticise debate defend devise differentiate discriminate distinguish estimate evaluate examine	experiment explain formulate illustrate infer inspect judge justify manage modify organize plan predict prepare propose question rate relate recognize score select solve support test value write
Affective Domain	accept accumulate ask describe follow give	locate name point to respond to select sensitise to	Affirm approve assist choose complete conform describe	join justify perform practise propose select share	act adapt change defend display influence	integrate mediate organise revise solve verify

31

		Knowledge level		Application level		Problem solving level	
	identify	use	discuss follow initiate invite	study subscribe to work			
Psychomot or Domain	complete demonstrate distinguish hear identify locate manipulate move pick up point to practise	press pull push see select set up show sort specify touch transport	activate adjust assemble build construct copy demonstrate disassemble disconnect draw duplicate execute load	locate loosen manipulate measure open operate perform remove replace rotate select set slide	adapt combine compose construct convert create design devise	fix generate illustrate modify organise plan repair service

Source: *COL/ADB (1999: 5-8)* ***Designing materials for open and distance learning*** *(Training Toolkit)*

C.   Condition

Objectives should state the conditions under which the learner will exhibit the specified behaviour . They should describe the circumstances under which the task is performed. This includes whether the learner will be given paper and pencil, map, chart, instrument or any other thing to manipulate so as to facilitate the attainment of the instructional objectives. It should be stated under what situation the learning will take place-space, team or group work, instructional materials that will be used, time duration, vital information to be given e.g. formulas, checklists, charts, etc.

D.   Degree

The objectives should specify the extent, standard or level of performance expected. It should state how well, how completely, how accurate, the rate, the degree of quality, the time limit, the number, etc.

Example:

"During a ten-minute microteaching session, the trainee-teacher will demonstrate at least four identified teaching skills".

Audience	=	trainee-teacher
Behaviour	=	demonstrate
Condition	=	during a 10-minute microteaching session.
D	=	at least four identified teaching skills.

It is necessary to state that not all objectives may be stated in the ABCD format. The ABCD format is more for the benefit of the instructor who needs it for the design, development and evaluation of instruction. For the learner, he may as well be satisfied with the behaviour statement.

As earlier noted, objectives play a vital role in assessment and evaluation. An objective can often be converted into a test question with the verb determining what type of test item to construct. For examples:

S/N	OBJECTIVE	TEST ITEM
1.	The pupils should be able to count 1 to 10	Count 1 to 10
2.	The pupils should be able to write simple correct sentences in English using the following words: father, mother, son, daughter	Use the following words to make simple sentence: father, mother, son, daughter
3.	The pupils will be able to recite the National Anthem	Recite the National Anthem

Objectives also suggest the instructional methods to use. For example, if the objective is to require the pupil to "discriminate", it implies that the teacher has to provide opportunities to make discriminations rather than defining terms, or recalling information.

From the forgoing it can be seen that behavioural objectives specify the content and the methods of instruction as well as the test format. This means that objectives play a crucial role in all aspect of educational technology. It is no wondered therefore that objectives form the cornerstone of educational technology.

ACTIVITY 2

1. List and explain any five benefits of instructional objectives? What are the limitations?

2. Using the ABCD format, write four objectives in your teaching subject area.

3. "At the end of the unit, the learner should be able to identify at least four benefits of instructional media". Write out the audience, behaviour, condition and degree in this objective.

SUMMARY

• Educational technology is objectives oriented.

• Educational outcomes may be stated in broad terms as aims or in behavioural terms. Specific objectives are more useful as guide for instruction.

• There are three classes or domains of educational objectives: cognitive, affective and psychomotor.

• Objectives that are clearly stated in behavioural terms have many benefits although there are a few limitations.

• The ABCD format for stating objectives is recommended. This requires that objectives should state clearly the audience, behaviour, condition and degree.

REFERENCES

COL/ADB (1999) Training Toolkit. **Designing materials for open and distance learning**. Vancouver: COL/ADB

Federal Republic of Nigeria (1981**). National Policy on Education.** Lagos: Federal Government Press.

Heinich, R., Molenda M. & Russel, J. D. (1982). **Instructional media and the new technologies of instruction**. New York: John Wiley and Sons.

Knirk, Frederick G. & Gustafson, Kent L. (1986). **Instructional technology: A systematic approach to educatio***n.* New York: Holt, Rinehart and Winston.

National Teachers Institute (2004). **Information and study guide for students of advanced and post graduate diploma programmes**. Kaduna; NTI.