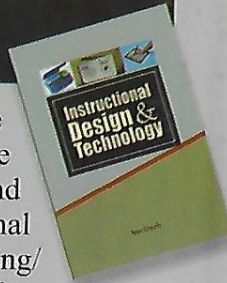


## ABOUT THE BOOK

Instructional design and Technology encompasses the analysis of learning and performance problems, the design development, implementation, evaluation and management of instructional and non-instructional processes as well as the resources to improve teaching/learning and performance in a variety of settings particularly in the institutions of higher learning. The book also prepares individuals for leadership in the design, development, and integration of technology into teaching and learning process by using technology in the classroom or training facility to open up a new career for individual learner.



## ABOUT THE AUTHOR



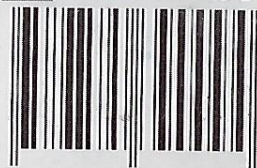
Dr. Ann Umeh is a senior lecturer in the Department of Education Technology, School of Science and Technology Education, Federal University of Technology Minna, Niger State, Nigeria. She is a specialist in the field of Education Technology. Her wealth of experience in the field of Education Technology has helped her author several books published widely in both nationally and internationally recognized journals. She has won several national and international awards

such as strategic institute for National Resources and Human Development Pillar of Nation Building (SRHD). She also belong to several national and international professional associations such as European Centre for Research Association

# Instructional Design & Technology

Ann Umeh

ISBN 978-978-2206-65-2



 Evi-Cole Publishers Ibadan

**INSTRUCTIONAL DESIGN  
AND TECHNOLOGY**

Ann Umeh

**Published By:**  
**Evi-Cole Publishers**  
Opposite SeedTime1, Arulogun Road,  
Ojoo, Ibadan.  
Nigeria

Copyright© by Ann Umeh

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior written permission of the publisher or copyright owners.

ISBN: 978-978-2206-65-2

First Published 2015  
Printed in Nigeria by Emmi Press, Ibadan

## DEDICATION

This book is dedicated to my beloved husband and children

## ACKNOWLEDGEMENTS

I am most grateful to God Almighty for the grace, wisdom, knowledge and strength to carry out this work. May His name be glorified forever (Amen). The motivation to write this book was borne by the encounter I had with 200 level students of Science Education Department, Federal University of Technology, Minna. I therefore appropriate all the students and lecturers of the above mentioned department.

My appreciation also goes to my dear husband, Mr. Alex Umeh and my lovely children for giving me the conducive environment in the family to work on this book. To everyone who in one way or the other involved in production of this book, may God bless you all.

## PREFACE

Instructional Design and Technology is the analysis of learning needs and systematic development of instruction. It is a systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. In other words, it involves the entire process of analysis of learning needs, goals, and the development of delivery system to meet those needs. It also includes development of instructional materials and activities, tryout and evaluation of all instructions as well as learners activities. The systematic application of strategies and techniques derived from behavioural, cognitive and constructivist theories to the solution of instructional problems base on instructional design and technology.

Ann E. Umeh  
2015

## CONTENTS

Dedication	i
Acknowledgements	ii
Preface	iii
Forward	iv
Table of contents	v
CHAPTER ONE	
1.1 Introduction	1
1.2 Instructional development approach to effective teaching and leaning	2
1.3 Instructional development process	3
1.4 Flow diagram showing instructional development process	8
CHAPTER TWO	
2.1 Instructional technology	10
2.2 Instructional teaching programme	10
2.3 Methods of writing programmed instructional technology	11
2.4 Instructional Problems	11
2.5 Solutions to Instructional Problems	14
2.6 Programmed Instructional Technology	15
2.7 The Features of Programmed Instructional Technology	16
CHAPTER THREE	
3.1. Concept of Educational Technology	18
3.2. What is Education?	18
3.3. What is Technology?	19

3.4. Technology in education and technology of education layout	21
3.5. What is Educational Technology?	
3.6. Developmental Stages of Educational Technology in Nigeria	25
3.7. Components of Educational Technology	26
3.8. The four Components of Educational Technology	28
3.9. Characteristics of Educational Technology	29
3.10 Components of Educational Technology	30
CHAPTER FOUR	
4.1. Educational Technology as an Appropriate Solution to Problems of Educational Issues	32
4.2. Application of Educational Technology to Teaching and Learning in Schools	33
4.3. Techniques for Teaching Learning Educational Technology in Schools	35
4.4. Educational Technology in the Institutions of Higher Learning	37
4.5. Contents of Educational Technology in Both Universities and Collages of Education in Nigeria	39
4.6. Different Implementation of Educational Technology in the Nigerian schools	40
4.7. The Roles of Educational Technology in the Teaching and Learning Process	42
CHAPTER FIVE	
5.1. Computer-Assisted Instruction as Part of Educational Technology	45

5.2.	Advantages of Computer Assisted Instruction in Teaching and Learning	48
5.3.	Computer in Educational Technology Setting	49
5.4.	Advantages of Computer in Educational Technology Setting	50
CHAPTER SIX		
6.1.	Instructional Evaluation	52
6.2.	Types of Evaluation	53
6.3.	Rationale for Evaluation	54
6.4.	Importance of Evaluation	55
6.5.	Problems of Evaluation	56
CHAPTER SEVEN		
8.1.	Tasks Analysis	60
8.2.	Types of Task Analysis	60
8.3.	Narrative Tasks Description	61
8.4.	Organization and Management Tasks	63
8.5.	Organization and Management Tasks Chart	67
CHAPTER EIGHT		
9.1.	Assessment Needs	68
9.2.	Need for Assessment	68
9.3.	Advantages of Need Assessment	69
9.4.	Disadvantages of Need Assessment	70
CHAPTER NINE		
10.1.	Preparation of Transparencies	72
10.2.	Hand Drawn	73
10.3.	Diazo Transparencies	76

10.4.	LIFT	77
CHAPTER TEN		
11.1.	Opaque projector	80
11.2.	The advantages of using opaque projector	80
11.3.	Operation of Opaque Projector	81
11.4.	Classroom Utilization of the Opaque Projector	82
11.5.	Maintenance of Opaque Projector	83
11.6.	System Analysis	84
11.7.	Grades	
	Concepts of Grade System in Evaluation	84
11.8.	Feedback	85
CHAPTER ELEVEN		
12.1.	Overhead Projector	86
12.2.	Filmstrips	87
12.3.	Classroom Utilization of Filmstrip	88
12.4.	Slides	89
12.5.	Advantages of slides	89

## **CHAPTER ONE**

### **INSTRUCTIONAL DEVELOPMENT TECHNOLOGY**

#### **Introduction**

Instructional Development Technology can be defined as the application of instructional system approach to the analysis and development of practical solutions to teaching and learning problems (Nduka 2010). Instructional Development Technology is purely a team effort involving teachers, administrators, specialists in subject, curriculum, technology and other areas, though in some cases members of education board. Individual teachers can apply instructional development technology principles in his/her daily work and in some instances carry them out on limited topics. In the process, he can gain valuable experience as well as improved learning results. In instructional development technology, the problem definition or identification step is particularly critical, since everything that follows is based on decisions made; it is the point at which most problems are solved.

Solution attempts in education have gone awry. Experience with successive steps in the instructional development technology process has likewise shown rigorous ground rules which need to be followed if adequate solutions are to be found. Yet, without specialized training, experience and expert assistance in the instructional development approach which relatively few educators have had an opportunity to acquire, a breakdown in one or more steps of the process is almost inevitable.

Instructional development and technology have concentrated for several years on the development of a tested

training programme for teachers, administrators, policy makers, specialist in curriculum, content, and media areas that enable teams of educators within school or school systems to acquire initial competencies in instructional development principles and methods.

### **Instructional Development Technology Approach to Effective Teaching and Learning**

There are two general approaches to the selection and utilization of teaching materials and methods of any kind. They include the following:

1. The first approach which is the most typical of what a good teacher normally does, is to take materials readily at hand, textbooks and reference books. He/she also takes other selected materials such as pictures, graphics, filmstrips in terms of the learners and teacher's own interests and abilities, and does the best with them. This approach is reasonable and, of course, sometimes highly effective. It is probably representative of what most teachers have done for generations.
2. The second approach is systematic approach. Today, there is more promising and systematic approach that relies less on intuition, gives the teachers a much better chance of being highly effective, and most importantly, help assure optimum learning on the part of the students.  
Systematic approach is the instructional development approach which is a highly humanistic system in that it enables the teachers to do those things that can best

accommodate individual differences in students and helps to assure those purposes that the schools exist to achieve or accomplish.

As an individual teacher, you can hardly install an instructional system yourself. A complete system entails intensive, cooperative efforts by administrators, teachers, supervisors, and specialists in instruction, curriculum, technology and other fields. But you can start and in the process not only improve your present teaching but also help pave way for wider adoption of instructional development in your school system.

### **Instructional Development Process**

There are processes involved in the instructional development. They are:

1. **Identification of Problem:** In the instructional development, identification of problem is very important. It involves the assessment of needs not only in terms of what is perceived to be the status quo and what the ideal situation might be, but also in terms of underlying causes of the problem situation, identification of causes of the problem that can be rectified and determination of their relative importance or priority. It should be noted that in the course of defining the problem, information and factors relating to other phases of the instructional development process are also put under consideration by the instructional development team. Thus, the instructional development process is not strictly a linear or 1 - 2 - 3, and so on process, but the several



stages must be dealt with not only consecutively but also simultaneously during the process.

2. **Analyze Setting:** Analysis of the setting deals primarily with the human and functional factors involved in any significant change in the existing system. If a change is to be brought about successfully, we need to be able to recognize and identify the people in the school system early, middle or late adopters of new ideas and whether they go about dealing with problems in creative, defensive or emotional manner and to what degree. Such analysis is essential to planning the approaches or strategies needed to gain support for the changes which may be proposed.
3. **Specify methods:** The moment objectives have been established, they have reached the point of decision. We also reach the point to determine what are likely the best methods and materials to employ under the circumstances in order to attain those objectives with other learners. The range of possible methods and materials is extensive, but not limited. In other words, we have to face what is practicable in terms of available resources, personnel, equipment and facilities.
4. **Organize management:** instructional development requires well-defined organization, management, and scheduling. This is particularly true when a group of people are working together on a significant problem or new programme, though the principle is applied if

a teacher is working on solving a problem by himself. Control must establish that task assignments are carried out, that expert assistance is identified and arranged when needed, and that appropriate communication takes place with others on ideas, problems, and other developments as they occur. In order to assure task completion by an agreed time, time lines must be set up to indicate target dates for finishing each of the elements involved in the process.

5. **Construct prototypes:** this is the design procurement and production phase. Having decided on the kinds of learning experiences and materials most likely to be effective for our purposes, we proceed to spell them out in detail. Specifying the readings tapes, films, exercises, and other activities to be tried. This may involve considerable review and examination of available materials as well as consideration of some varieties of instructional approach. In cases, where no suitable materials exist, it may be necessary to produce them. While this process is going on, a part of the instructional development team should be designing the evaluation to be applied.
6. **Test prototypes:** assuming that the preceding steps are reasonably complete, we are now ready to try out the package we have created. This may be done with a representative group of our own students or with a comparable group from another school. In either case, it is important that we collect evaluation data on what

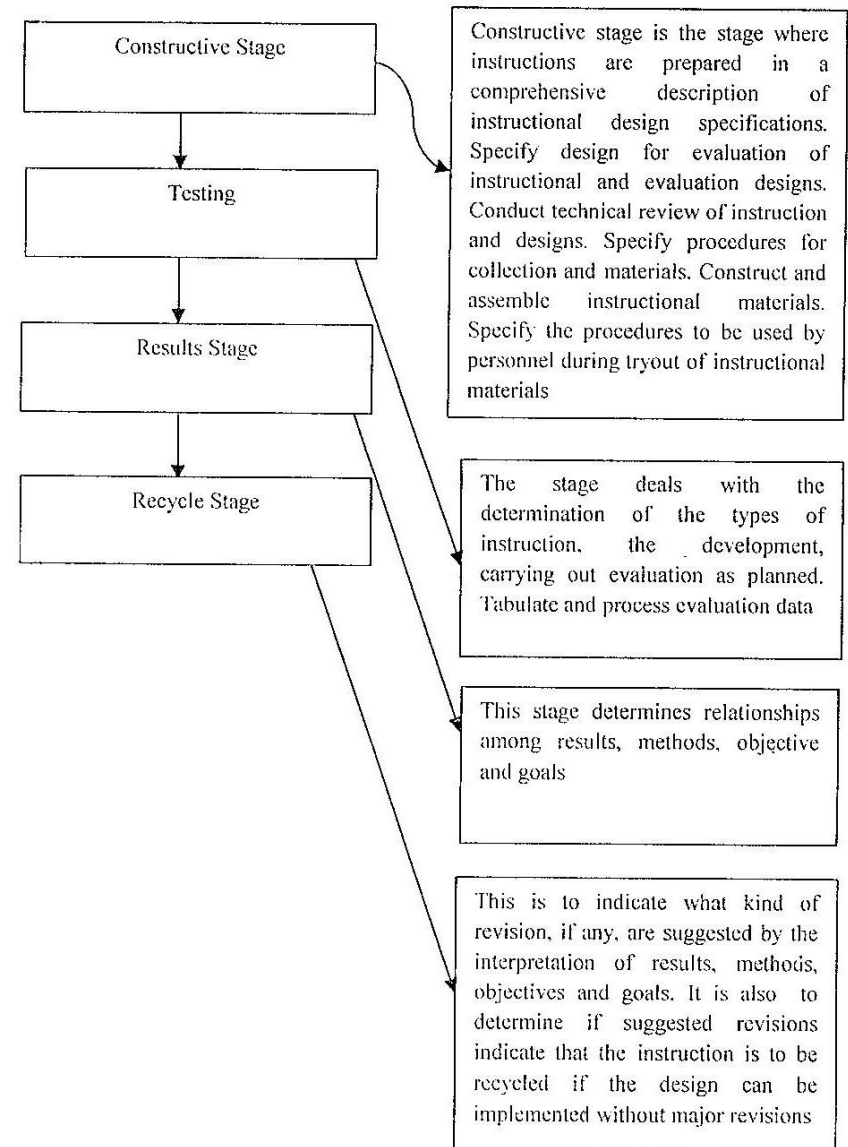
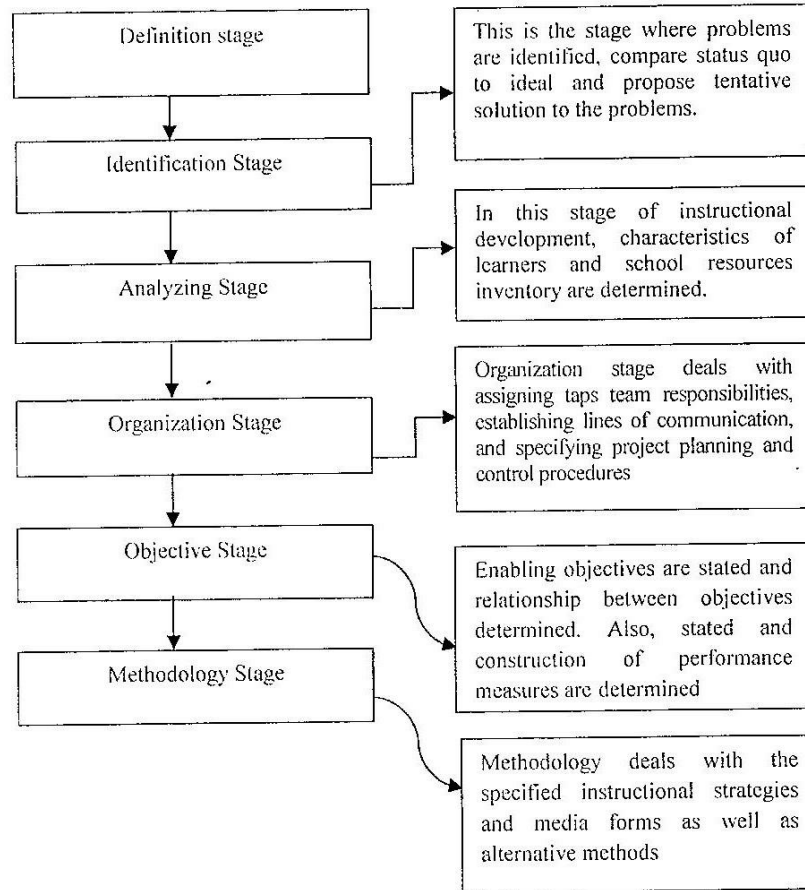
works, what doesn't and why. It is probable that certain revisions will be needed before we try the new system in regular class.

7. **Identify objectives:** as indicated earlier, if objectives are to be useful, they must be spelt out in terms which will permit determination of whether or not they have been met. There are several kinds of objectives, but there are two in particular which are important in the instructional development (ID) process. These are terminal performance objectives (TOs) and enabling objectives (EOs). The enabling objectives are necessary because they are intermediate steps to attainment of the terminal or ultimate objectives. The terminal performance objectives must be spelt out first and then the enabling objectives. Finally, performance measures must be constructed for each objective of each type so that we can know definitely whether or not it has been achieved.
8. **Analyzed results:** Once full-scale tryout is under way, we need to observe all aspects closely and note further adjustment that may be needed either in the instructional design or in the materials used. It is important to test along the way to ascertain how well our enabling objectives are being met and, at the conclusion of the unit, how adequately the terminal objectives have been achieved. Taken together, these several kinds of data provide information on the overall assessment and evaluation by the instructional development team.

9. **Implement or recycle:** On the basis of the results or of a full-scale tryout, we are in a position to decide whether the new system is ready to be put into regular use in our schools. It may be ready, however, it will require certain revisions and retesting before our instructional development (ID) team is satisfied. In any case, provision should be made for continued evaluation and modification even after it goes into regular use.

The above enumerated processes involved in the instructional development provide many techniques teachers have actually used in carrying out the interrelated use of media, materials, and various teaching and learning strategies to create effective learning experience for students.

## Flow Diagram Showing Instructional Development Process



## **CHAPTER TWO**

### **Instructional Technology**

Instructional technology is said to be that component of educational technology which seeks to improve learning by ensuring the installation of effective and efficient instructional objectives, and managing the human and non-human resources optimally (Udogu, 2010).

In another definition by Adiya (2010), instructional technology is the development, design, production, evaluation, utilization of instructional system components, messages, men, materials, devices, techniques, settings and the management of that development, organization and personnel in a systematic manner with the goal of solving instructional problems. Instructional technology is learner-centered, systematic, electric, wholistic, innovative, and a problem-solving approach (Adewoyin, 2010).

### **Instructional Teaching Programme**

Instructional programme is a new strategy of teaching. It is a highly individualized instructional strategy for the modification of individual behaviour and attitudes. Instructional programme is used mainly for purpose, though, it can be employed as a mechanism of feedback device for improving teaching and learning efficiency. The theoretical knowledge of instructional programme is useful for feedback device for the modification of teaching and learning behaviour of both the teachers and students respectively.

### **Methods of Writing Programmed Instructional Technology**

Programmed Instructional Technology is seen as one of the innovations in education involving self-instructional strategy. It is an innovative delivery system in modern education. Programmed instructional technology has emerged as the first valid system of educational and instructional strategy which our schools and society have ever had in the educational system (Udo, 2010).

In programmed instructional technology, the content and organization of a learning material is referred to as programme. However, it is the complete route to the mastery of the subject for which it has been prepared and ordered for learners to follow. Consequently, learners are led through a set of specified behaviour designed and sequenced to make it more probable that he will behave in a given desired way in the future. Programmed instructional technology is usually a series of items, questions or statements which have been arranged in a series of reasonable steps, specifically designed to lead a learner through self-instruction from easy to difficult and more complex skills.

### **Instructional Problems**

It is no longer news that the application of instructional technology in the Nigerian educational system has not yet been fully adopted. Educational technology emphasizes the use of the technological equipment and systematic approach to enhance the effective application of instructional technology in Nigeria. The following are some of the problems of instructional technology:

1. Lack of personnel – The use of instructional technology requires vast knowledge of how it can be operated and used for proper teaching and learning. But due to the fact that most teachers are not adequately trained in some of the critical areas of operation and management of this equipment, they do not comprehend their relevance in educational process. Similarly, technology experts are hardly found in the schools and country in general.
2. Inadequate space – Considering the large number of students in a classroom nowadays, accommodating than for demonstrations and practical becomes difficult.
3. Obsolete facilities/equipment – The great impediment to proper conduct of the practical session is lack of modern equipment. Most of the standardized equipment for instruction is not available in Nigerian educational institution, particularly in primary and secondary schools levels of education. Most of the centers for educational technology do not have modern equipment necessary for students on the job experience.
4. Lack of adequate fund – There is always a problem of fund. Based on this, adequate money is not budgeted or earmarked for the proper teaching and practice of the course.
5. Lukewarm attitude of lecturers – Due to poor salary and condition of service, some lecturers prefer to teach

- only the principle and do not bother themselves with the practical aspect which is more time and energy consuming, but more professionally rewarding.
6. Laziness on the part of students – Students these days do not want to involve themselves in the practical aspect of learning even if the facilities are available. They therefore, prefer doing the theoretical aspect of learning thereby ignoring the practical aspect.
7. Lack of administrative support – There is absolute lack of administrative support to ensure the success and failure of the instructional materials in Nigerian educational system.
8. Another problem of instructional programme is that students do not contribute to the discovery of answers except to follow the instruction already prepared.
9. Programmed instruction is generally designed with the view that learners have no previous background of the subject-matter.
10. Programmed instruction can be very costly in the sense that the preparation of the material requires too much money and is often time consuming.
11. Programmed instruction can be limited to certain areas especially where behaviour is measurable and observable, like in the case of mathematics and sciences.

12. In programmed instruction, the freedom of choice is limited. That is to say that learners at this point have no choice of their own to respond. This means that the creative imagination of the learner is inhibited.
13. There is absence of motivation of programmed instruction due to the fact that learning may become dull and learner experience monotonous and boredom.

### **Solutions to Instructional Problems**

The role of instructional technologies cannot be overemphasized, though there are problems facing the proper administration of instructional technologies which have already been discussed. Solutions to these instructional problems are as follow:

1. There should be adequate and relevant instructional teaching materials: the fields of educational technology can assist in the development of new technological aids and designs. This is possible by establishing flexible instructional strategies.
2. Rote-learning – Rote-learning should not be discouraged, rather there should be instructional materials that will consider the various sense of seeing, smelling, hearing, feeling and tasting so that students can fully learn without difficulty.
3. Adequate instructional equipment – Educational technology can assist in the development and

production of inexpensive, low but high quality technologies in teaching and learning in schools.

4. Adequate and qualified teachers – There should be adequate and qualified teachers to produce and utilize the instructional materials to solve the problem of teaching and learning in schools.
5. Adequate programmes for the training of teachers: Educational technology can assist in developing appropriate competence based teachers' education programmes as well as the utilization of methods and equipment.

### **Programmed Instructional Technology**

The word "programmed" refers to the content and organization of teaching and learning materials. Programmed when planned can be the completed route to the understanding and mastery of the subject for which it has been designed and ordered for learners to adopt. In this case, learners are led through a set of specified behaviour designed and sequenced in order to obtain desirable outcome in future. It usually contains series of items, questions as well as statements which have been arranged in series of reasonable steps.

Programmed instruction in educational technology can be defined as the innovations in education involving self-instructional strategy (Walter 2009). Walter went further to say that, it is an innovative system of delivery in modern educational technology.

Programmed instructional technology is regarded as the first valid system of educational technology and instructional method which our schools and societies at large have ever

had. In programmed instructional technology, teaching machines present the material to the learner through mechanical, electronic and electrical devices. Some of the teaching machines used in programmed instruction are; computer, slide, tape, projector etc. it should be noted that hardware such as machine is the technological equipment that brings the learner into contact with the programmer who designed the materials to be used in teaching and learning process. Therefore, it is a programmed equipment and it does not teach.

### The Features of Programmed Instructional Technology

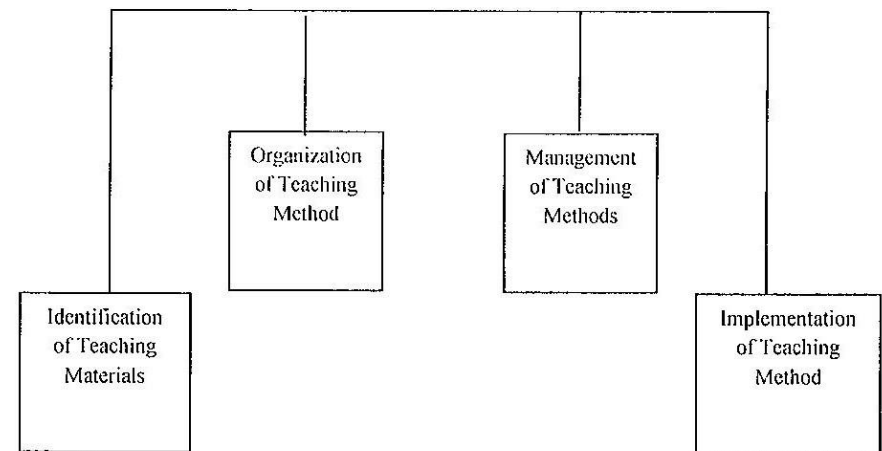
Appropriate programmed instructional technological materials should possess the following features:

1. In programmed Instructional Technology, there should be adequate and comprehensive information for usage. It is this information that would put the learner through since it is self-instructional learning.
2. Instructional content in programmed instructional technology is arranged into small steps in order to form frame. In presentation, one frame is presented one after the other especially with linear programmes.
3. Learners make use of the programmed materials at their own pace.
4. Specification of the instructional objectives in terms of behavioural and measurable term is very important. This will indicate the knowledge, skills, value and

attitude which are to be achieved at the end of the programme instruction.

5. Learner's active responses is another feature of programmed instructional technology. This is because the frame is always followed by questions, and the learners are expected to respond either by printed printing materials, audio-visual materials or audio presentations.

### Organization and Management Tasks Chart



## **CHAPTER THREE**

### **Concept of Educational Technology**

Educational technology sounds new to a lot of people including a large number of teachers because the field of specialization is considered to be a relatively new field in education. Educational Technology is yet to be well-rooted in the Nigerian educational system. However, it is important to note that its newness is in terms of technology, in the redefinition of concepts, in the re-alignment of child learning psychology with behavioural-oriented classroom activities and in the matching together of curriculum and human resources. It is also important to note that elements of educational technology have always been present in educational practices in Nigerian educational system. (Umeh, 2014).

Educational technology like other technologies is a practical discipline that is dynamic and has potential of expansion and domination of lives of men and education. The concept of educational technology can be better explained with the knowledge, education and technology respectively.

### **What is Education?**

The word education is a latin word *educare* or *educare*, meaning "I lead". In other words, education implies showing the way. In principle, education is the process by which a person or group of persons lead in the act of acquiring new knowledge or experience (Horn, 2011). Education entails all the experiences that a person acquired in contact with or undergoes whether with or without the school. In other words,

every experience is education whether deliberately or accidentally. Education comes to the learner from parents, teachers, friends, the church, mosque, and the market place and from every experience or thing in the society and the world at large. However, in this test book, education will be considered as experiences which teaching and learning provide in a school system. In Nigeria today, technology makes problem-solving much more possible for man in all fields of life. Technology as a problem solving technique can be seen in the areas of agriculture, engineering, defence, machine, communication, social life, political and of course, education.

### **What is Technology?**

Technology is defined as the application of science and technological equipment to make the world more efficient, Danca (2011). Technology is seen as the application of scientific knowledge in industrial methods. It can also be defined as the sum of the ways in which a social group provides itself with the materials of civilization and development. In other words, science and technology go hand in hand in the definition of Technology. Science refers to the "know why; while technology refers to the "know-how; therefore, technology is a systematic approach in an integrated process to achieve practical purpose or achieve an end product". (Dancah, 2013).

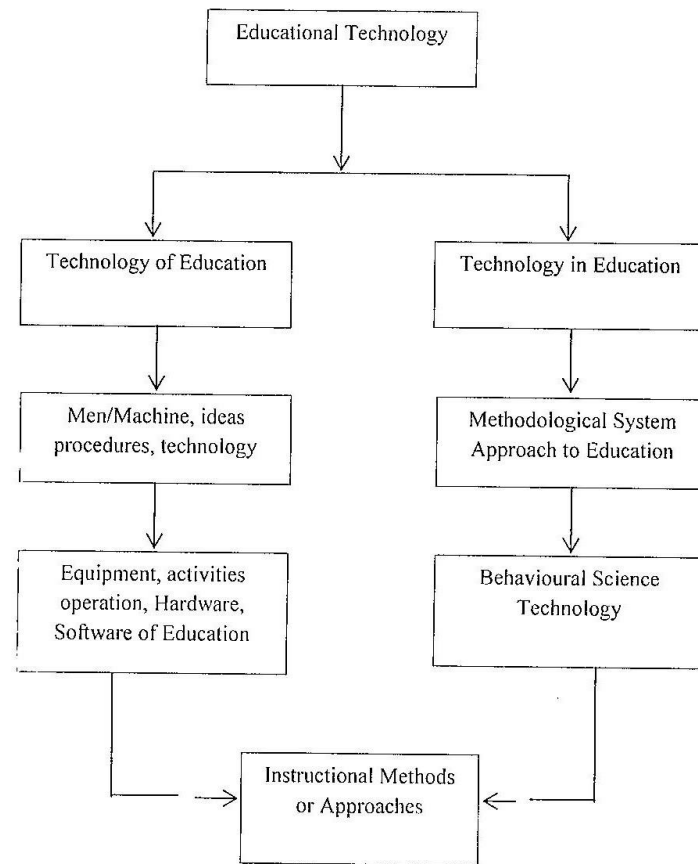
Technology entails solving human problem technologically, scientifically and systematically. All the definitions of educational technology above are very essential because they all point at one common goal. But that notwithstanding, there is the need to examine educational technology in a simpler, popular and generally acceptable way



as it applies in this book, Instructional Design and Technology. Therefore, educational technology is a systematic way of designing, carrying out and evaluating the total process of teaching and learning in terms of specific objectives based on research on human and non-human resources to bring about more effective instruction (Umeh 2013). This definition implies an analytical procedure that is characterized by the identification of an instructional problem. Setting of objectives, designing of learning experiences, selection of the needed resources which include people, materials and facilities, implantation of the designed learning experiences and the evaluation of instructional learning.

There are two levels of functions of education technology. These functions can result in instructional system which is referred to as technology in education and technology of education. This is further shown in the diagram below.

### Technology in education and technology of education layout



From the diagram, it is clearly seen that technology in education encompasses the physical science that involves the use of hardware and software devices and these software and hardware are gadgets or machines or equipment which promote effective teaching and learning both in school and outside the school situation. Technology of education is also the behavioral science concept which is based on psychological principle and education to solve problems that are associated with teaching and learning processes.

Educational technology has three levels of approaches which are hardware, software and system approaches. Hardware approach sees educational technology as a means of mechanizing or automating the process of teaching and learning with devices that can transmit, distribute, promote, record and, of course, reproduce stimulus materials for effective teaching and learning (Elvis 2013). Educational technology has also a link with checlio- visual equipment and gadgets. It can be a direct application of the physical sciences to the problem-solving of education.

The second level of educational technology which is the software approach is closely associated with modern principles programmed instruction. This approach is the application of learning principles to the direct and deliberate shaping of learner behaviour. It is characterized by detailed task analysis, selection learning methods, writing concise objectives, reinforcement and evaluation. Software approach is influenced by the application of behavioural science to education for positive results.

The third approach which is systems approach to education makes educational technology a more comprehensive conceptualization. Educational technology considers not only the constituent part of the system, but also

the environment in which these parts operate. This system approach focuses more on the process and the products of teaching and learning processes. The important concern of this approach is on the quality and effectiveness of the overall learning experience. In other words, educational technology is considered to be a systematic process of organizing, managing people, facilities, hardware, software as well as environment in identifying and solving educational problems among the learners (Oliver, 2013).

### **What is Educational Technology?**

The combination of education and technology can simply refers to the application and organization of people, methods, techniques, devices, equipment and materials systematically and scientifically in order to solve problems that are involved in teaching and learning process as well as improve the educational system for national development.

Educational Technology in its elusive nature is relatively new in the field of education and so has different meanings to different people. A lot of people scholars, experts and professionals at various levels and stages of educational technology have identified several interpretations and definitions. The reasons for these different interpretations are due to the successes which educational technology has attained within the short time of its evolution in the country which promotes people of different backgrounds, trains people in different fields of work, and provides experiences and ideas about technology and education respectively. This is also due to the nature, stage and scope of educational technology itself.

Base on the above reasons for different interpretations of Educational Technology, we shall look at various definitions



From the diagram above, we can deduce that educational technology involves innovations and adopts organized programmed concepts; programmed instruction and integration of hardware and software instructional technology in solving educational problem. In other words, it improves and promotes the efficiency and effectiveness of instructional technology for good results. Instructional technology is the component of educational technology which seeks to improve learning by ensuring the installation of hardware and software instructional objectives. It also involves effective and efficient management of human and non-human resources.

In Nigeria today, educational technology covers instructional technology and all its components to solve educational problems. Instructional technology is the development, design, research, production, evaluation, support, supply and utilization of instructional support, supply and utilization of instructional components such as messages, materials, devices, techniques and men in a systematic manner with the aim of solving educational problems. Although, the only difference that exist between educational technology and instructional technology is the scope of each of them. Instructional technology is a sub-set of or a component of educational technology whereas educational technology is the sum total of instructional technology (Adeche 2013). Educational Technology is a convergence of other technologies and it is eclectic in orientation.

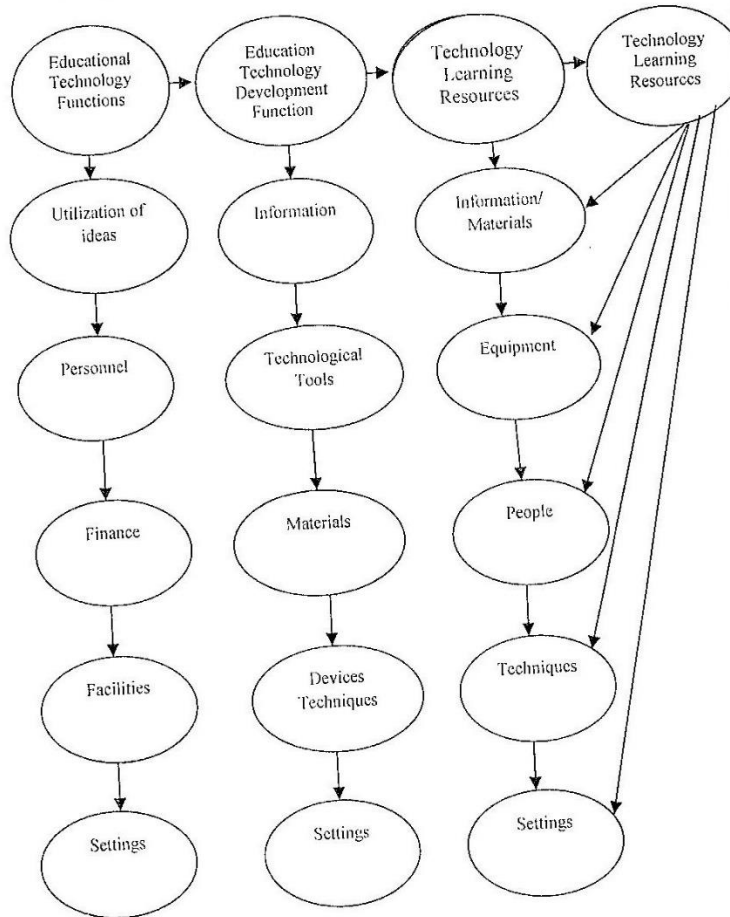
### **Components of Educational Technology**

Educational technology as earlier discussed in the previous chapter involves innovations and adopts an organized systematic and integrated means in solving educational problems in order to promote the efficiency and

effectiveness of instruction. Educational technology has four components which involve a complex integrated process, people, procedure, idea, devices, organization and analyses of problems in order to devise, implement a solution to those problems in all aspects of human learning.



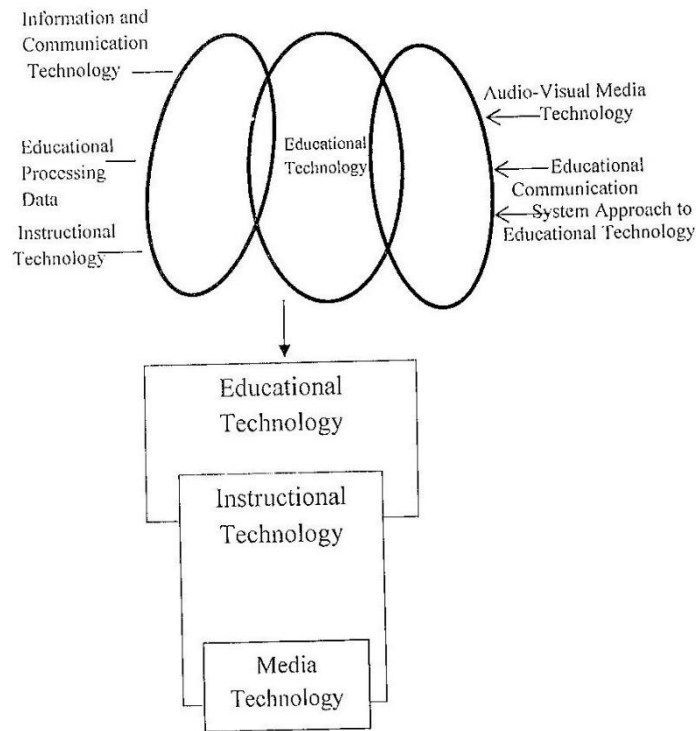
### The four Components of Educational Technology



### Characteristics of Educational Technology

The characteristic of educational technology can best be explained with diagram as both the students, teachers, educators, people in the society no matter their economic and academic status have misconceptions about educational technology. Some of the areas of misconception about the field are, teaching aids, apparatus, and audio-visual aids. These are referred to as educational media, educational resources or instructional materials because they are just an aspect of educational technology and not really educational technology. This is further shown in the diagram below:

## Components of Educational Technology



The above diagram indicates that educational technology encompasses other aspects of instructional technology, audiovisual materials, Educational communication information, communication technology, instructional technology and educational processing data. Other sub-sets of educational technology include photography, cartography, educational broadcasting, distance education, mass communication, programmed instruction, computer-assisted instruction, micro-teaching and teaching equipment and many others.

Educational technology also incorporates learning technology, learning of technical or technology education. This is due to the fact that educational technology uses the products technology in form of equipment or gadgets (hardware) for teaching and learning. The scope of educational technology is very wide and some individuals have the impression that partial application of it can lead them to nowhere. This is not true because since the country is still developing technologically, the few teaching and learning facilities or equipment that are at our disposal may be effectively utilized to develop our educational system.

## CHAPTER FOUR

### **Educational Technology as an Appropriate Solution to Problems of Educational Issues**

Educational Technology may be seen as an appropriate channel or solution to tackle educational issues. The following are some of the educational problems that may be solved through the use of educational technological materials.

- Irrelevant and non-appropriate curriculum design: Educational technology can assist in the development of appropriate and relevant curriculum designs. This can be achieved by establishing simple instructional strategies including modules and programmed materials in a textual form.
- problem of rote-learning: Educational Technology tends to evoke the various senses of seeing, hearing, feeling, tasting and smelling by instructional materials into the classroom.

This will promote students' learning and understanding of the content more meaningfully, thereby discouraging rote-learning.

- Insufficient equipment, materials and facilities: the development and production of inexpensive and cheap technological materials can help to determine the alternative strategies to cater for unavailable equipment.
- Inadequate programmes for the training of teachers: this can be tackled by developing appropriate competence based on teacher education programmes.

Also the utilization of micro-teaching methods and facilities can be achieved through the assistance of educational technology.

- Inadequate qualified teachers: Educational technology can help teachers to handle some of the technological equipment in teaching and learning, such as audio tapes and video tapes which could be reproduced and utilized extensively for different groups of people irrespective of their location and population. This will make teaching and learning to be effective.

### **Application of Educational Technology to Teaching and Learning in Schools**

Educational Technology is an important discipline in the field of education. It is placed under educational service in the National Policy on Education. The joint consultative committee (J.C.C) is one of the important Federal government organs that is responsible for the formulation and implementation of educational technology principles and practices and they have rated the field very high in the educational system. The roles of educational technology in the three tiers of the educational system, i.e. primary, secondary schools, technical/vocational colleges and tertiary institutions cannot be over emphasized. However, these roles can further be examined as applied to the three tiers of educational system.

We had earlier stated in the definition of educational technology, that it is a systematic approach to solving educational problems. The question is how does it solve educational problems? Nigeria as a country is faced with a lot of educational problems



The solution to these problems becomes easy if we examine the roles of educational technology in the teaching and learning process. One of the roles played by educational technology is that it can help in a serious way in catering for individual's academic needs and abilities through the use of modern instructional technology. Educational technology through the use of computer-assisted instruction (CAI) as well as programmed instruction (PI) enable individual learners' to progress with their study at their own pace and convenience. Again, instruction becomes more effective as a result of the application of technological materials or tools. The use of technological equipment in the classroom makes teaching and learning more interesting and meaningful.

Learners are given the opportunity to come in contact with what they are being taught, so that the lesson becomes more lively. The use of technological equipment enhances students' effective participation, makes teaching and learning more scientific. By using system approach method, teaching and learning tend to be more scientific making it possible to achieve classroom efficiency and effectiveness. Furthermore, educational technology provides equal opportunities for learners. This is done through the utilization of instructional radio television and newspaper. Most people benefit from these instructional technologies especially people who are physically separated. They now have the opportunity of enriching their knowledge irrespective of their socio-economic status. Educational technology brings about immediacy in teaching and learning process. Base on this, students learn on the spot by adopting the use of already prepared and produced instructional materials such as audio cassettes, slides, radio as well as books.

## **Techniques for Teaching Learning Educational Technology in Schools**

The fact that educational technology is an eclectic field that borrows ideas from all other fields, it has some appropriate techniques for teaching and learning the course in schools. One of the areas of educational technology is the field of utilization of technological tools in teaching and learning. It is in this specialization that we can locate the techniques that guide the implementation, evaluation and modification of an effective instructional technology. All teaching activities are directed towards learning. Before any teaching activity becomes productive, learning must have taken place. In essence, the ultimate goal of all teaching activities is learning. Learning has received more attention than any other aspect of knowledge. In fact, greater number of experiments had been conducted on the effective techniques of teaching and learning educational technology in our schools. Most educational technologists agreed that teaching and learning is a relatively permanent change in behaviours arising from experience. Learning results in persistent or permanent change in the behaviour of the learner as a result of his or her newly acquired skills and knowledge from the teacher.

The following are some techniques for teaching and learning educational technology in schools:

1. Connectionist Technique: these techniques involve the interpretation of human behaviour as connections between stimuli and response called, the stimulus-response. In these learning techniques, information is transmitted to the learners either by the utilization of technological tools or communication process which is retrieved as stimulus.

Other techniques may also include spoken and written words, pictures and instructional materials. The response is the new performance which the teacher expects the learner to acquire. This is already a part of teaching and learning technique resulting from the learner's behaviour.

2. Contiguity: this is another technique for teaching and learning educational technology in schools. In this technique, the activities involving the use of technological tools have to be repeated so that correct and effective learning becomes gradually shaped and planted.
3. Gestalt's Techniques: this technique involves both generalization and identical elements fused together. The technique has it that if a learner master general methods or principles which govern instructional technology he will be able to transfer the learning from one situation to another. Therefore, it is believed that learning in schools should be able to proceed from specific to general and techniques should be used in each teaching and learning. This technique recommended that in order to ensure effective and transfer of learning process, there should be adequate practice on the use of technological tools by the learner.
4. Social Learning Technique: this technique declared that attention should be given to personality factors and the interactions among learners. Whether the learner learns from direct experience or indirect experience with technological tools, it is believed that one cannot learn alone. Learning involves other things such as people or equipment in a social learning technique. Social learning

technique examines the basis of a meaningful and effective utilization of instructional technology. This learning technique also plays significant roles in the design and implementation of learning task, instructional materials, instructional designing, instructional process as well as evaluation techniques.

5. Psychological Learning Technique: learning is such a crucial thing in human behaviour. Learning affects and is also affected by a number of direct and indirect factors. Of great importance to the teacher are the psychological learning techniques such as motivation, attention, emotion, technique such as motivation, attention, emotion, perception, and so on.

### **Educational Technology in the Institutions of Higher Learning**

Educational technology is a new field in the Nigerian educational system and especially in all the institutions of higher learning. Educational technology as earlier explained in the previous chapter of this book, is the application and implementation of technological materials especially in the institutions of higher learning. Educational technology is the application and organization of people, methods, techniques, devices, equipment and materials systematically and scientifically to solve teaching and learning problems, as well as improve the educational system. Based on the above definition, educational technology is considered to be an important discipline in the field of education, it is however unfortunate that the course is not offered in all the institutions

of higher learning. It is only offered in few higher institutions in Nigeria.

In the higher institutions, especially universities they are offered in faculty of education where students are required to offer and pass at least one compulsory course in educational technology before they are qualified for the award of either Bachelor of science (B.Sc), Bachelor of Arts (B.A) or Bachelor of Education (B.Ed) certificates. Unfortunately, only four universities offer educational technology at the undergraduate level in Nigeria according to Joint Admission and Matriculations Board Brochure (JAMB). Some of these universities are University of Ilorin, Port Harcourt, Abubakar Tafawa Belewa and Federal University of Technology, Minna. These Universities are awarding degree certificate in the field. In University of Ilorin, the course is actually combined with one teaching subject. In University of Port Harcourt, the designed programme is in such a way that the curriculum studies and educational technology are combined as one discipline in addition to courses such as English, French language, History, Economic, Political science, Biology, Physics, Chemistry, Mathematics, geography and so on. The programme in the university is designed in a way that those admitted through the University Matriculation Examination (UME) will spend four years and three years for direct entry students. Some other universities also offer the course as a field of specialization at post graduate level. Such universities are Obafemi Awolowo University, University of Ibadan, University of Ilorin, University of Nigeria, University of Jos and Federal University of Technology, Minna. Presently however, many universities in Nigeria offer the course. They designed the course to help students acquire some skills in instructional materials production and

utilization before embarking on compulsory teaching practice exercise.

Furthermore, Nigeria Certificate in Education is designed for three years duration during which students are allowed to specialize in two teaching subjects. For instance, Government, Social Studies, Biology/Chemistry, Geography/Mathematics, Economic/Social Studies and so on. It may also be double major course such as Integrated Science, Agricultural Science, Home Management etc, in addition to some education courses which are compulsory or elective. Educational Technology is one of the compulsory courses which a student is expected to offer before the end of his/her programme. The course has different codes in different institutions of higher learning such as EDT 312, EDU-224 ETD 311 and so on.

### **Contents of Educational Technology in Both Universities and Collages of Education in Nigeria**

The field of Educational Technology cuts across all teaching subjects in universities and programme like adult education, physical and Health education, early childhood education and guidance and counseling programme. The contents of educational technology in Nigerian colleges of education include the concept of educational technology, the roles of teaching and learning process. The content also deals with categories and designing of educational technology, selection and utilization of educational media. It also stressed the effectiveness of instructional objectives, community resources, mass media, educational technology centers, operation, management and maintenance of media equipment. All these topics are taught in first and second semesters.

It is the duty of the teacher to teach the students to become proficient in operating some of the educational technology equipment such as projectors (Opeque, overhead), tape recorders, television, video, Radio as well as photographic equipment. In some colleges of education, designing and production of graphic materials are taught using the modern teaching and learning method and equipment. In career guidance, the use of television, films, tape recorders and other technological materials are probably more reliable, because they bring the world of work right into the classroom (Kelq 2011). Career films are also very useful tools because of their stimulant effects on the learner.

The importance of educational technology cannot be overemphasized especially in the use of printed materials and graphic materials in teaching and learning process.

### **Difference in Implementation of Educational Technology in Nigerian schools**

The roles of educational technology in the Nigerian schools are of no little value. It is important, in various areas of education be it continuing education, vocational education, cultural and civil education, educational technology. The teacher can produce some these educational technology materials such as audio and video tape to be watched by the learner as well as posters, charts, internet and printed materials which will promote teaching and learning process. The implementation of education technology in schools becomes difficult due to the following reasons:

1. Non-uniformity of content: the content of educational technology across the various institutions in Nigeria is

not the same. Every institution of higher learning designed its own programme to suit its own students thereby making the implementation in higher institution difficult.

2. Inadequate Personnel: Only few institutions offer educational technology personnel that will manage the equipment for teaching and learning of the discipline. Qualified personnel, like graphic artists, media personnel, media technicians to enhance the teaching and learning of the discipline is inadequate.
3. The use of out-dated equipment: modern method of conducting practical is lacking due to the modern equipment used in teaching and learning process. Most of the educational technology centres do not have the modern equipment necessary for students on the job experience and learning respectively.
4. Inadequate conducive environment: considering the number of students in our institutions of learning, there is always a problem of where and how to accommodate them when it comes to practical and demonstrations period. The classroom and environment is not conducive enough for effective teaching and learning.
5. Lukewarm attitude of the teachers towards the use of technological materials: most teachers prefer to teach only the principle and do not bother themselves with the practice which is more time and energy consuming, but more professionally rewarding. The

lukewarm attitude may be attributed to poor conditions of service from the government.

6. Lack of capital: it is believed that enough fund is not always budgeted for the proper teaching and practical aspect of this course in the institutions of higher learning and as such limits the proper functioning of the course. Problem of money reduces adequate teaching and learning of the course both for students and teachers themselves.
7. Students' nonchalant attitude towards the use of technological equipment: most students today hate practical aspect of any course and as such do not want to involve themselves in the practical aspect of the course even if the equipment for teaching and learning are available. They prefer involving themselves in the theoretical aspect of the course thereby ignoring the practical aspect. Both the theoretical and practical aspects of the course are very important if effective teaching and learning must take place.

### **The Roles of Educational Technology in the Teaching and Learning Process**

We had earlier mentioned that educational technology is a systematic approach to problem-solving in education. Nigerian system of education is falling day by day due to a lot of problems facing the sector. These problems may be with the application of educational technology. Some of these problems are.

1. the application of education technology equipment such as, power point projector, overhead projector can be used to teach large class thereby reducing the challenge of overcrowded classroom. Furthermore, application of computer-assisted instructional technology can also reduce overcrowding of students in the classroom.
2. Inadequate qualified teachers: most schools still lack qualified teachers to teach this course in their schools due to the limited number of teachers that actually studied the course. The introduction of computer-assisted instructional technology can fill that gap as well as e-learning programme.
3. Inefficient teaching strategies: in the past, traditional teaching method (chalk and talk) was mostly the method every teacher knew, but today the reverse is the case. Educational technology has bridged that gap by introducing different application to teaching and learning such as, the use of television, radio, film trips, opaque projector, overhead projector etc. in teaching and learning process.
4. Inadequate funding: the introduction and the application of educational technology in the educational system has helped to solve the problem of inadequate funding in our schools. The teacher can now use some technological and graphic materials to bring the world into the classroom situation for effective teaching and learning.

5. Rote-Learning: the introduction of educational technology in our school has helped to solve the problem of rote-learning for the students. Students can now learn at their own pace with the help of computer-assisted instruction, internet connections video tape recorder and so on. Individualized learning method is also important as it promotes individual learning especially in distance learning programme.

## **CHAPTER FIVE**

### **Computer-Assisted Instruction as Part of Educational Technology**

A computer is a power-driven machine equipped with keyboard, electronic circuits, storage, compartment and recording device for high speed performance of mathematical operations (Karl 2010). This definition implies that a computer in simple terms, is a glorified calculator with the added capacity of storing or memorizing large amount of information, that can be produced or retrieved when the need arises. A typical calculator of course does not have this memory but a tape recorder does. However, the way information is stored on a video tape for later retrieval is similar in principle to the way the computer stores its information.

The most important factor to keep in mind as we consider possible computer-assisted instruction as part of educational technology is the fact that a large number of educational systems already use computer instruction for a variety of purposes, business and industrial purposes. These are varieties of computer-assisted instructional application to teaching and learning. They can be conveniently classified into four groups as part of educational technology. They are:

1. Drill and practice.
2. Tutorial and dialogue
3. Simulation and gaming
4. Information handling.

5. We shall examine the listed application one after the other.

Drill and Practice: The fact that the computer goes on to a new problem tells the student that he has answered correctly. In this drill and practice application, the students' responses are underlined. The following are the examples of drill and practice; please type your name:

Ann Umeh

Drill number-500334

$(43+82)\underline{6} = (4316=82/6)$

$48-38 = 38 - 48$

Wrong

$48-38=4$

Wrong, the answer is 28

$(90/10)\underline{3}=90\ (10*3)$

Time is up

$60-(19-12) = (60-19) + 12$

$(63\backslash 7)+ (56\backslash 7) = (63+1)\backslash 7$

Wrong

End of Drill Number 500334.

The above lesson is an example of using computer instruction as you can see from the example above. The availability of such drill and practice exercises on a computer terminology could materially relieve the teacher of having to administer such work himself. More importantly, it would take unnecessary routine paper marking and record keeping, since the computer keeps track of each student's performance and can read back to the teacher a summation of each student's work whenever he wants it. As you also noted, whenever the student makes an error, the computer

immediately calls to his attention, the student knows that he should try again.

*Tutorial and Dialogue:* Tutorial programmes differ from drill and practice programmes in that the subject content is literally taught by the computer programme. Information may be presented much as it would be in a programmed instruction text. In fact, in designing computer programmes, the same precise analysis of the learning task and specification of objectives must be used as is used in designing programmed instruction lessons. Computer instruction however may provide various options not usually present in programmed text. For instance, explanations may be given orally via audiotape and needed visuals presented on a cathode ray tube (CRT). The student may respond to questions on a typewriter keyboard or by pointing or drawing with a light pen on an electronic screen or CRT in his study.

*Simulation and Gaming:* Computer-assisted instruction are useful in simulation and gaming learning exercise. Simulation and games are part of educational technology that constitute a broad area of instructional method. (Carly's 2010).simulations are representations of real-life situations with some of the real elements removal for such reasons as safety driver or pilot training (Boncas 2011). Games are employed in many simulated exercises in order to introduce an element of competition for teams or individuals. Therefore, it is not surprising that computer-assisted instructional technology has not only been introduced in the higher institution of learning, but also in secondary and technical schools. Department of computer or information technology has developed rapidly in our universities in this present time. Students can now major

in the field and others make use of the application to be able to apply them in their own fields of work.

*Information Handling:* In computer-assisted instructional technology, the handling and processing of information is so crucial that it can be called upon by the teacher, learner, counselor or researcher as required.

### **Advantages of Computer Assisted Instruction in Teaching and Learning**

As the world is gradually advancing technologically, new technologies must be applied to education. It's important that the teachers assist the learners to develop their collaborative learning skills, critical thinking skill and moral character by adaptation and utilization of computer-assisted instruction and other technological tools. In Nigeria today, educational reform movement attempts to bring successful instructional models into our schools and this will positively enhance the development of instruction in teaching and learning. The student learns through computer-assisted instruction and demonstrates their mastery of their learning individually or as a group. Computer-assisted instruction in teaching and learning has a lot of advantages. Among the advantages are:

- It provides the students with the opportunity of learning at their own pace and have control over the rate of the sequence of their learning.
- Computer-assisted instruction in teaching and learning provides more vital information in the hands of teachers giving them stress-free teaching.
- Computer assisted instruction provides the students with the opportunity of drill learning method since

they can have the time to repeatedly learn one thing at their own time and pace without the teacher.

- It provides a significant time-saving over certain educational clarification and conventional classroom instruction.
- Computer-assisted instruction helps students to have the right information and sequence of their learning styles.
- It provides opportunity for adequate feedback for both students and teachers.
- Individualized method of instruction is promoted through personalized learning action which enhance high rate of reinforcement.
- Computer-assisted instruction in teaching and learning provides favourable condition for slow learners.
- Computer-assisted instruction in learning raises students motivation in learning because students will have different methods of learning like using computer games, using television instructional technology and so on.
- Computer-assisted instruction direct instruction to learners regardless of the teacher's teaching method.
- It provides a reliable instruction from learner to learner and from time to time even day to day and place to place.

### **Computer in Educational Technology Setting**

Computer as subject of instruction has expanded so much that its influence is on virtually all walks of life. It is not surprising that computer in Educational Technology setting has become an important part of the curriculum, not only in higher institution of learning but also in secondary and



technical schools. Department of computer or information sciences have developed rapidly in our universities during the past decades. Students can major in the field, but large number from other departments study computer languages and applications so that they can make use of them in their own fields of work. Tally (2011) stated that in junior colleges, technical schools, vocational institutions and many higher institutions, the field of data processing by computer is proving an attractive occupational opportunity for students.

### **Advantages of Computer in Educational Technology Setting**

Computer instructional technology has contributed immensely to the problems of teaching and learning. Some of the advantages are as follow:

1. One of the advantages of computer instructional technology is that it can be used to accomplish hereto impossible versatility in branching and individualizing instruction, that true natural instructional dialogue is possible, and that computer instruction will virtually perform miracles in processing performance data.
2. Computer instruction provides programmed control of several media such as films, slides, and television as well as demonstration equipment.
3. It gives teachers or students an extremely convenient technique for designing course of instruction.

4. It provides a dynamic interaction between students and instructional programme which is not always possible with most of other media technologies.
5. Computer instructional technology is distinct from other media instructional technology in that it is a potential means of making instruction a truly individualized process through the use of a variety of media to support a system of instruction.
6. Computer instructional technology is appropriate in securing, storing and processing information prior to and during instruction to determine subsequent activities in the teaching and learning situation.

## CHAPTER SIX

### Instructional Evaluation

Instructional evaluation is a systematic determination of the merit, worth, and significance of instrument or equipment using criteria as a set of standards (Umeh, 2014). Evaluation is used to characterize and appraise subjects of interest in a wide-range of human enterprises. Instruction evaluation according to Williams (2014) is the systematic collection, judgment and interpretation of value with a view to perform an action. He went further to identify four elements in the definition of instructional evaluation as:

- Systematic collective of evidence
- Interpretation of the evidence
- Value judgment
- Action view

Systematic collection of evidence in instructional evaluation implies that instructional materials gathered should acquire a systematic plan in a degree of precision. Interpretation of the evidence is a critical aspect of instructional evaluation process. The mere collection of evidence does not constitute evaluation work itself. The instructional materials (equipment) gathered for the evaluation of an educational programme must be carefully interpreted, since interpreted instructional materials indicates the presence or absence of quality in the educational process.

The third element which is the value judgment is the description of what is happening in an education programme, but requires judgments about the worth of an educational endeavour. Instructional evaluation does not only involve gathering and interpreting information about how well or

good an equipment is succeeding in reaching its goals, but judgments about the goals themselves. It also involves questions and answers about how well good equipment helps in meeting large educational objectives.

Action view is the last element in the instructional evaluation. It involves a view to action. Action view introduces the distinction between an undertaking that results in a judgment of value with no specific reference to action. Instructional evaluation is clearly decision-oriented with intention that some action will take place as a result.

### Types of Evaluation

Evaluation means the assessment of examination achievement or effects of instructional materials (Malic, 2012). However, the concept of evaluation covers a wide scope such as scientific reporting procedures based on sampling techniques, questionnaire, forms and statistical interpretation. Evaluation should be considered as a form of continuous monitoring and assessment, findings of which are taken as feedback for modifying and improving the instructional materials and methods. There are three main types of evaluation. They include:

1. Planning Evaluation: Planning evaluation involves the collection of data on the instructional material before it can be implemented and often before a decision is reached. The planners of instructional materials usually collect the relevant information regarding age, method, achievement levels of students as well as the view of teachers and students towards the instructional material. Teachers and students' attitude towards instructional material must be understood and training

opportunities be planned to equip teachers and students properly for the utilization of the material.

2. Formative Evaluation – This is the system of data collection during the development and production of instruction in order for modification to take place. Modification allows for promotion and proper functioning of the material. Formative evaluation is always used to collect background information about the target audience, profit needs of the students as well as the condition to diagnose the problems. It also involves taking collective steps in the production and implementation of instructional materials.
3. Summative Evaluation – This involves the collection of data that will be used to provide adequate information and how instructional material can succeed or fail in reaching its objectives. Summative evaluation helps the planners as well as policy makers to take long term decision and formulate plans for production of instructional materials over a long-time and with specific objectives. Summative evaluation is required to assess the effectiveness of instructional material especially in teaching and learning situation. In teaching and learning process, there is need for immediate information guide; summative evaluation takes such decisions and justifies the decision taken.

### **Rationale for Evaluation**

Programme evaluation is an equal and powerful component in conflict resolution education. It is a systematic method for collecting, analyzing and using information to

answer basic questions and to assess the worth of the programme. Programme evaluation can reveal strengths and weaknesses and provide important feedback to the administration and to the participants. It also provides guidance and standards regarding the effects of local variables and contexts.

Evaluations are the first step in assisting students to learn and progress in school. Thus, evaluation tells the teachers what student needs to learn and how he may learn (Elvis, 2013). Evaluation is inevitable in classroom teaching as it is in all fields of activity when judgment needs to be made.

In school system, teachers and principals as well as other personnel make many decisions about students and at the same time help them to take many decisions for themselves. Effective decision making process involves evaluation. For instance, when students are divided into various categories or ranks within the total group, involvements in measurement of their achievement and interpretation are evaluated. The importance of evaluation especially in teaching and learning is so intrinsic that even hasty consideration seems to indicate the advantages of a systematic use of planned evaluation. Evaluation assists the teacher to make good judgment in teaching and learning process.

### **Importance of Evaluation**

Evaluation result collected during the design, development stages, teaching and learning form the basis for revision of instructional strategies and instructional materials prior to implementation of the instructional method. Evaluation initiates, permeates and concludes the instructional design, development and utilization in teaching and learning process.

of educating the students. But this becomes impossible when the physical teaching material within the schools are not adequate and even in most cases not there at all for the educational venture and welfare of the students, therefore, evaluation becomes a problem.

4. Inadequate skillful teachers – Most schools lack qualified and skillful teacher who will handle the resources or facilities in the schools like laboratory, audio-visual aids, etc. properly. Evaluation of the students using these learning materials can only be effective through qualified teachers who have been trained on the use of the technological materials in teaching and learning. Therefore, there is need for educational planning of all the teaching resources of men, materials and physical facilities so that adequate evaluation can take place.
5. Lack of continuity in evaluation – Evaluation is a continual and natural process which goes on all the time in school. It could be formal and informal evaluation, therefore, gathering and analyzing data relating to specific questions should be promoted so that evaluation can take place. As an important component in the teaching and learning process, evaluation is essentially the responsibility of the teacher and should be a continuous process for all students.
6. The evaluation instrument – The context to which an evaluation takes place and the instruments that are used will significantly influence the nature of

responses. Evaluation should be a continuous process throughout the development and delivery of course, from situational needs analysis to institutional. The use of variety of techniques and instrument provides the best possibility of gaining accurate and comprehensive data on the quality of programmes which affect evaluation.

7. Method of evaluation – The use of different methods in evaluation affects the quality of evaluation, in this; there can be marked difference in response rates according to the method of the evaluation used and the stated purposes of the evaluation.
8. Influence of personal decision – Evaluation is best when it is separated from personal decisions and it is encouraged as a means to improve teaching and learning outcomes. Therefore, systematic evaluation becomes more acceptable in teaching and learning process.

## **CHAPTER SEVEN**

### **Tasks Analysis**

Task analysis according to Tikath (2012) is the ability to analyze the task to be performed by both the teacher and students. The ability of the teacher to analyze the task to be performed is very useful in developing the understanding and skills for teaching and training. Task analysis has taken over the theories of learning, because those theories of learning could not provide substantial solution to the problems of classroom teaching and learning at the same time.

Adequate and effective teaching and learning can only be organized by analyzing the content to be taught. Task analysis is educational and intellectual in nature due to its synthesis; task analysis has potentials in the basis for selecting appropriate teaching strategies and formulation of teaching and learning objectives.

In task analysis, there is also need for description of learning activities, problem identification especially the desired behaviour, identification of appropriate measure and techniques of motivation, also developing test methods for measuring the desired behavioural change. Task analysis provides essential basis for selecting important teaching methods as well as formulating the objectives.

### **Types of Task Analysis**

There are basically three (3) categories of task analysis and they serve different purposes. They are:

1. Curriculum analysis (Content/topic analysis).
2. Job description analysis.

### **3. Skill acquisition analysis.**

Let us discuss them one by one. The first one is curriculum analysis. In this type of task analysis, the content is analyzed into sub-topics which is further analyzed into elements and then arranged into a logical sequence. This type of analysis is mainly intellectual activity in nature, for instance, slide in educational technology, in computer education and so on. This type of task analysis is mostly concerned with cognitive aspect of a teacher.

Job description analysis: this is the second type of task analysis which is concerned with psychomotor aspect of teaching and learning. It is also related to some professional and social aspect of teaching and learning for both the teacher and students.

Skill acquisition analysis is the third category. It is related to psychomotor aspect of activities just as in job description. It also deals with the most specific skills. The skill analysis is also related to or concerned with job analysis.

### **Narrative Tasks Description**

Many innovations in Instructional Development occur under the impetus of individual teacher and are therefore rather modest in nature. There are illustrations of much more comprehensive development. The development and the use of this programme have involved the long-range participation of hundreds of the state's educational administrators, teachers, trainers, curriculum supervisors, teachers and parents.

As the programme progresses into higher schools, the target is the participation of all learners. The programme itself is administered under the direction of the curriculum development and technological branch of education department.

Narrative tasks description is to design the entire programme of instruction. Designing the programme of instruction for effective teaching and learning process, it began with defining goals. As teaching proceeded, many teaching materials were created and put to use in the hands of real teachers and students in the classroom. The task is a continuum of creative media learning experiences from the lower level of education to the higher level. The instructional materials as a whole provide learners with highly individualized experience on skill acquisition and system management. However, because the entire programme is so comprehensive, the description here is limited to the students. Though detail plans were made for the training of the teachers who are actually evaluators of instructional materials and equipment in connection with the use of newly developed teaching strategies in classroom situation.

The narrative tasks description represents a current plan which has been brought to a remarkable stage of sophistication, as shown in the innovative teaching and students', response. The following are some the narrative tasks description in the instructional development:

- Enabling objectives – This describes how each student may progress from his entry level towards attainment of his/her terminal objectives by means of responding to sequences of independent learning experiences in the subject. At this point, it assumes that the student is the decision maker and that once he/she has decided on his course, someone or something in his immediate environment, either the teacher or the appropriate media, learning experiences will be available to respond to his decision. The enabling objectives

assume that students differ in interests, styles of learning, pace of learning, aptitude, thresholds of boredom, educational needs and above all, that they differ in need for success through mastering of tasks.

- Specific objectives – These have been clearly stated which include: to learn in order to distinguish between the basic sounds as apply to reading speaking tasks, to develop interest in learning, to develop interest in reading comprehensively and many other sub-skills. However, all these are used in the classroom; they are closely interrelated and thus become part of a total experience which carries each child towards accomplishing desired tasks.

### **Organization and Management Tasks**

Organization and management tasks are the process involving the planning and execution of teaching and learning. In this way, what is planned at the first stage is organized at the second stage. In other words, the execution and functioning stage are attempts made to organize the available teaching and learning materials for the proper accomplishment of the aims and objectives.

Organizational task is the step next to planning in the management of teaching and learning process where attempts are made to arrange, relate and arrange all the available teaching and learning materials for the realization of the stated teaching and learning objectives.

For proper organization and management task to be affective, the type of teaching and learning materials should be generally available to a teacher in a teaching and learning process. These materials may be roughly classified as the

human and the material resources. The organizational task requires the arrangement, organization and execution of the materials in such a way that will result in the effective and efficient realization of the set goals and objectives.

In organization and management tasks, the teacher and the students are said to be the main human resources in teaching and learning process. Although, the administrative personnel, the parents and people in the entire community are also indirectly involved but still the whole responsibility falls on the shoulders of the teacher.

In the organization and management task, teachers' activities are so many and are classified as:

- Employing the cooperation and participation of the parents and community in teaching and learning process.
- Employing the cooperation and participation of the students in the teaching and learning situation.
- Employing the cooperation of the administrative personnel in the institution, the district education officer, and the managing body of the institution of learning.
- Using appropriate strategies and adequate teaching materials to teach students to make them capable and competent in acquiring knowledge.

Moreover, human resources, the physical resources as well as teaching materials available in a particular teaching and learning situation have a wider significance for the good of the organization and effective results in the teaching and learning process. An intelligent teacher always pays proper

attention for their effective organization, and such organizational task involves some aspects such as:

- Organization and arrangement concerning proper size involving number of students and practical class.
- The physical arrangement and facilities in the classroom
- Making selection and utilization of appropriate teaching materials as well as communication methods.
- Organizational caring and utilization of the resources like laboratory, museum, and library.

In view of the above organizational task, we can observe that the responsibilities of a teacher regarding the organization and proper utilization of the available human and material resources are quite different and technical in nature. It actually needs sincere efforts for the desirable teaching and learning outcome. As a teacher who has possessed training skills, you need to be quite aware about the proper organization of such human and material resources and as such there is a need for elaborate discussion on the aspect.

The organization and management of teachers' tasks can be divided into three main groups:

1. The selection and management of appropriate teaching and learning methods and tactics.
2. The selection and utilization of proper teaching and learning materials.
3. The selection and management of appropriate communication method.

The selection and management of appropriate teaching and learning method tactics signifies that a teacher in the

classroom needs to adopt a suitable and appropriate method or a number of strategies in combination depending on the available teaching and learning situation as well as the realization of the set teaching and learning objectives.

In this case, the success and failure of a particular teaching and learning method depend upon the selection and management of proper teaching tactics which is the central part in its implementation. A teaching and learning strategy can always be implemented by employing suitable teaching strategy. In other words, it is an adequate teaching method that can always be implemented with the components or basic units of teaching behaviour through the teacher, the students as well as the subject matter interaction.

There are a number of teaching methods such as, lecture method, demonstration method, problem-solving, discovering, question and answer, project and drill work, drill and practices, field trip, group discussion, individualized method and so on. The teacher has to select a particular method or a combination of the methods he wants to employ in a particular teaching and learning situation for effective and efficient teaching and learning.

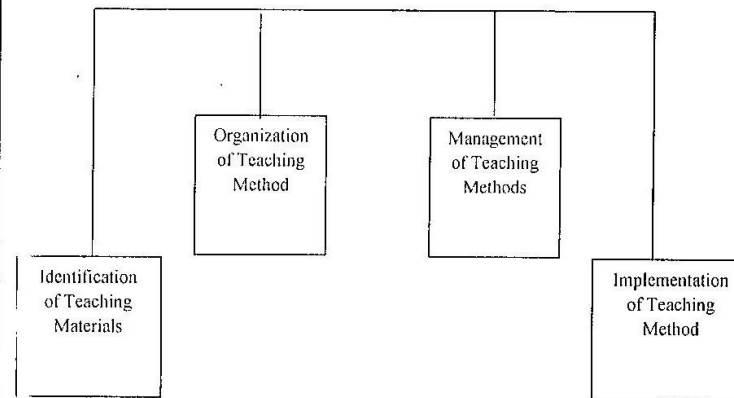
The selection and utilization of proper teaching and learning materials involve the realization of the set teaching objectives. However, a teacher is bound to select a particular teaching method or even combination of teaching methods useful in a particular teaching and learning situation.

The use of appropriate teaching tactics employed in the development, organization, and management of the selected teaching method is necessary at this stage of teaching and learning situation.

The selection and management of appropriate communication method involves teaching tactics which is in

form of teaching behaviours (verbal and non-verbal) which a teacher selects to make a healthy triangular interaction among the student and the subject-matter. These tactics will create an appropriate structure that will aim at achieving the set teaching learning objectives.

### Organization and Management Tasks Chart





## CHAPTER EIGHT

### Assessment Needs

Assessment has become widely used in educational settings as a way to examine and measure progress, by documenting the process of learning or change as it occurs. However, assessment extends beyond test scores to include substantive descriptions or examples of what the student is doing and experiencing.

Assessment of need is systematic because the observations that are noted and the student product are, included to relate major instructional goals. For instance, this can reflect in a log book that are kept by students over the years to serve as a reflection of the degree to which students are building positive attitudes and habits with respect to teaching.

### Need for Assessment

The following are some of the reasons for assessment of need. Assessment of need is useful in the evaluation of programme that have very flexible or individualized goals or results. This is because some individuals or students may need to become less aggressive while others may need to become more assertive in nature.

- Assessment of need becomes necessary because student is geared towards individual needs, goals and objectives, expecting positive outcome.
- Assessment of need allows every individual in the school to be involved in his or her own change and decision to programme instruction.

- It provides adequate information that gives meaningful insight into individual behaviour and related change.
- Assessment need provides important tool that can ensure profitable communication and proper accountability to a range of audience, participants, their entire families, funders, and the members of the community at large.

This group of people may not have much sophistication in interpreting statistical data and can often appreciate more visual experimental evidence of success. Assessment of need allows for the possibility of assessing some of the more difficult and necessary aspects of constructs rather than just the ones that are flexible to measure.

### Advantages of Need Assessment

The following are some of the advantages of need assessment:

1. Need assessment allows the teacher to see the individual student group or cooperative group as a unique entity with its own characteristics, need and strengths.
2. It serves as a cross section lens, providing future analysis and planning ahead. This is done by knowing the total pattern of the student in both individual, group or groups and weaknesses as well as identifying and ratifying the barriers of strengths.
3. Need assessment serves as a strong vehicle for information and communication as it provides ongoing information as well as exchange of communication among the parties involved.

4. It also promotes a shift in ownership. This is done by taking an active role in examining where they have been and where they want to go. It will involve active participation and evaluation.
5. Need assessment covers a wide scope of knowledge as well as information from different people both teachers, students and parents in different contents.
6. Need Assessment offers the possibility of solving some of the traditional assessment. This can mostly be seen in more complex aspects of teaching and learning.

#### **Disadvantages of Need Assessment**

The following are some of the disadvantages of need assessment. They include:

1. Need Assessment may be seen as not reliable or fair because quantitative evaluations like test scores may not be properly recorded.
2. Need assessment may be seen as time consuming on the part of the teacher and the programme in that the staff to organize and evaluate the contents, testing and grading must be up and doing.
3. In need assessment, development of the individualized criteria can be difficult or unfamiliar at the first time.
4. Need assessment needs clear goals and objectives, in the absence of this, miscellaneous collection of

information may occur which can lead to inadequate pattern of growth or achievement.

5. Need assessment may be difficult to analyze or aggregate to show change as it involves series of data collection.

## CHAPTER NINE

### Preparation of Transparencies

The transparency is the basic message material used with the overhead system. These transparencies can be produced locally using a variety of techniques. The cut out can be either positive or negative. The traced transparencies that use standard acetate can be traced with grease pencils, India ink, felt pens, pressure sensitive tapes, and even ball point pens. Mongol colour pencils can be used with frosted or matte acetates. The thermal and diazo transparencies are examples of the machine-made transparencies lifts and can be produced using either pressure sensitive or heat lamination materials. Each of these production techniques and media has different characteristics. Presentation strategies can also vary. The basic strategy is to mount the transparency into a cardboard mask. Overlays to add or subtract information can be hinged from each of the four sides for variable presentations or hinged from the same side for sequential presentations.

Opaque mask, usually of cardboard or old file folders, can be used to reveal information on a portion at a time. These are hinged with masking tape to the cardboard masks. The process is known as disclosure which allows an opaque material to slide down and slowly reveal information as the class needs it and as the teacher determines that it is required. Spotlight cutouts and traced or lifted transparencies are used for special effects. The following are some of the transparencies a teacher prepares for effective teaching and learning.

1. Hand drawn

2. Heat transfer
3. Diazo
4. Lift
5. Overhead projection
6. Opaque
7. Mounted materials
8. Projected still pictures
9. Slides
10. Filmstrips

### Hand Drawn

Hand drawn slides are produced non-photographically since the 35mm slide is nothing more than a transparent image mounted on a cardboard frame, we can use all of the techniques we used to produce overhead transparencies. The only real difference in these two processes is the size of the image that we will be working with. The image area of the transparency is 7 1/2 "X 9" while the image area of the 35 mm slide is 7/8 "X 1 1/4". This means that we will be working with smaller images and that they will suffer, to some extent, through enlargement. But even so you can produce acceptable hand drawn 35mm slides using cutout, tracing, lifting, thermal and diazo techniques. The cardboard mask will establish the size of the image exactly. These masks are available from any good photographic store. When a transparent image is inserted into the smaller shaded area on the left, it can be tacked in place with the tip of a hot iron. The mask is then folded along the dotted line and the edges sealed by applying heat around the edge. Sheets of plain or fasted acetate, thermal or diazo film, or small pressure or heat lift can be mounted as slides in this fashion.

Our next concern is the imaging of the materials; sheets of clear acetate can be marked with the outside dimension of the slide and the inside or image area. These can then be placed over images and traced using a variety of media. It is suggested that you trace the outline of images using a fine tip pen with India ink for best results. Colour can be added using felt pens or grease pencils. It might be wise to add the colour on the slide opposite the line image to avoid damaging. Heat sensitive transfer is a material that used a heat process to transfer the image from a magazine page to a sheet of acetate. This will provide an overhead transparency which is exactly like the original that was printed in the magazine. There are a number of heat sensitive materials that can be used in this process.

The process begins by identifying the visual you want to lift and determining if it is printed on clay coated-paper. Only those materials printed on paper with a clay coating can be lifted. The method for determining whether the paper is clay coated is quite simple. Moisten the tip of your finger and gently rub a white area of the page (margins are best). If the tip of your finger shows a deposit of clay, then the paper is clay-coated and you can proceed to lift the visual. While any visual printed on clay coated-paper can be lifted, you will get better lifts from visuals that have not been wrinkled or creased and from visuals that do not have a large amount of black. The next step in the process is lamination.

- Select a sheet of lamination film that is slightly larger than the entire tear sheet.
- Note that we will laminate the entire sheet and not just the visual area.

- Make sure that the surface of the visual is free from lint and dust and apply the sealamin with the dull side (the adhesive side) down toward the visual to be lifted.
- Place the lamination film tear-sheet sandwich into an envelope of new print. This will not only protect the tear-sheet during lamination, it will also keep the exposed surface of the lamination film from sticking to the dry mount press.
- Place the envelope on a sheet of Masonite (smooth side up) and place the entire unit into a dry mount press that has been preheated to around 270 degrees.
- Close the press and cook for approximately three minutes. Both the time and temperature may vary due to climatic conditions.
- Remove the laminated tear-sheet and inspect it. If the lamination is complete, you can move on to the next phase, if it is not complete, replace the materials in the press and reheat.
- Once the lamination has successfully laminated the tear-sheet, separate it from the newsprint envelope and place it in a container of water. The water will dissolve the clay and separate the paper from the ink that is embedded in the laminating film.
- A small amount of liquid soap will speed this soaking process.
- Do not try to rush this process.
- Place the lift on a smooth surface and with a soft rag or cotton and with running water wash off the remaining clay from the image side of the lamination.
- Once you are sure all the clay is off, let the lift dry and check it on the overhead.

- Any remaining clay will show up as dark area of streaks.
- Tape the lift onto a surface that will not be damaged by clear plastic spray (e.g. cardboard) and apply a smooth even coat of the spray to the image side of the lift.
- Allow to dry and project your lifted transparency.

### **Diazo Transparencies**

Diazo transparencies are type of transparencies that are noted for brilliant colours and professional appearance that they give on the screen. Let us examine the process of making diazo transparency. The following are some of the processes of making Diazo transparency:

- The first stage is exposure. The master is placed over the Diazo film and exposed to ultraviolet light. The latent image that is thus created on Diazo film is then developed in an ammonia atmosphere and results in a highly professional and colourful transparency. The Diazo master has two major characteristics. First, the image must be made from opaque materials and second, the opaque materials must be mounted to or drawn on a translucent or a transparent base. Since the exposure consists of exposing the master and the film to ultraviolet light, the opaque portions of the master images will serve as umbrellas to keep the light from those portions of the Diazo film that are under them. In the areas where there is no opaque image, the ultraviolet light penetrates the translucent or transparent backing and destroys the colour. These masters can be produced in number of ways. Ink lines

and even heavy pencil lines are opaque. These can be used to create any line elements in the desired visual. Where areas of colour are desired, construction can be used. Note that you have to make a separate master for each colour that you desire.

- The next stage is the production of the masters in the selection of the Diazo film. The film is available in a wide range of colours. Each sheet will produce one colour. Before we expose the film to ultraviolet light, we must place it in contact with the master. The material should be arranged in an orderly manner: On the bottom is rigid backing board to hold everything flat. On the top of this is the Diazo film, emulsion side up that is, the notch should be in the upper right hand corner. The next is the master to keep the materials together during the exposure. Exposure can be done using the ultraviolet lamp or the sunlight.
- After the film has been exposed, it is placed in an ammonia atmosphere for development. A pickle jar with a few drops of household ammonia in a sponge will do the job. The exposed film is placed inside the jar develops. When the colour reaches the right intensity, it is removed from the jar.
- The last stage in the process is to assemble and register all the prints and mount them in appropriate masks. The resulting transparency will be rather expensive.

### **LIFT**

The term lift refers to the process of literally transferring the ink from a magazine page to a transparent surface. There are different processes that result in lifting the image from one

surface to another but they all require that the original visual has certain characteristics. The following are some of the characteristics:

1. The original visual must be printed on clay-based paper.
2. Clay-based or clay-coated paper cannot be identified by just looking at it, it must be tested.
3. A drop of water on the tip of your finger should be rubbed lightly on a white area of the desired visual.
4. If a deposit of clay ends on your finger tip, you have clay-coated paper and can be the lifting process.

There are other characteristics that can decrease the quality of the lift. They are:

- i. The amount of black ink in the picture you are lifting and any wrinkles or creases in the paper can decrease the quality of the lift.
- ii. Black is a more difficult lift and creases will show up as flaws in the pictures where by decreasing the quality of the lift.
- iii. Naturally, the picture to be lifted must fit within the transparency mask or frame and when this is lacking will decrease the quality of the lift.
- iv. Once the visual is selected, the next step in the process is lamination. There are many lamination materials available but we will focus on pressure sensitive lamination film. The pressure sensitive is also called contact which is also available in a transparent format and makes an excellent pressure sensitive to laminating material. In the process of

laminating, the following points should be observed.

- v. Select a sheet of lamination film that is slightly larger than the entire tear-sheet.
- vi. Note that we will laminate the entire sheet and not just the visual area.
- vii. Make sure that the surface of the visual is free from lint and dust and apply the sealamin with the dull side down toward the visual to be lifted.
- viii. Place the lamination film tear-sheet during lamination. It will also keep the exposed surfaces of the lamination film from sticking to the dry mount press.
- ix. Place the envelop on a sheet of Masonite (the smooth side up) and place the entire unit into a dry amount press that has been preheated to round 270 degrees.

## CHAPTER TEN

### Opaque projector

Opaque projector is the simplest and least expensive of all the various devices for projection purposes. It is designed to project any kind of non-transparent flat surface matter such as picture, photographs, cartoon, drawings, magazine, illustrations or other small objects. The machine operates with reflected light, the lamp illustrates the material and the image is reflected by a mirror through the lens to the screen. Its effectiveness is based on the reflective power of a mirror. A considerable amount of light is lost through the reflection process, and therefore the rooms in which opaque objects are projected should be as clear as possible although, we may use the equipment without complete darkness.

### The advantages of using opaque projector

1. It can be used in teaching all schools subjects involving printed tables, diagrams, charts, pictures etc. All these things may be projected in their natural colour just as they appear to the eye, greatly enlarged.
2. Solid objects like watches, coins, specimen etc. may be projected thereby becoming larger.
3. It is suitable for instructional purposes because it is still projection and provides opportunity for close observation and discussion.

4. It stimulates attention, arouse interest, clarify information and helps learners retain knowledge for a longer period of time. It saves laborious hours of chalkboard writing and sketching.
5. It can be used to introduce subject/topics, present specific information, test knowledge and ability, as well as a review of instructional problems.

### Operation of Opaque Projector

The opaque projector is simple to operate to the extent that the teacher and learners will find no difficulty in learning its operation. The following steps should be strictly followed in the operation of opaque projector:

1. Place the projector on a stand and connect the power cord. This involves inserting the plug in the electric outlet.
2. Place the material to be shown on the platen, face up with the bottom of the material toward the screen.
3. Turn on motor and lamp for cooling system.
4. Adjust the front legs; tilt and level
5. Focus the image on the screen, move the projector away from the screen to obtain a satisfactory picture size. Adjust the focus for a sharp image.
6. For maximum illumination on the screen, locate the projector close to the screen as soon as possible.
7. Place the material carefully on the metal tray or platen. It enables the use of heat resisting glass plate magnets or metal masks to hold the material flat.
8. If pictures are post-card size or smaller, use the card holder which is in the flat under the metal tray; if it is

a newspaper, magazine or textbook, or actual objects, adjust the lens for each. Then turn to full speed.

9. Use an optical pointer, if available, that projects an image or moving arrow on the screen to guide viewers. Use the opaque projector as an enlarger to trace a picture on sheet of paper, complete a tracing in one session, reposition to picture in the exact place desired.
10. After showing material, turn off the projector lamp, but allow the fan to continue to run for few minutes so as to cool the lamp.
11. Detach the power cord, roll up the extension cord, cover projector with a dust cover, and return the machine.

### **Classroom Utilization of the Opaque Projector**

First of all, you need to prepare the material to be used in the classroom ahead of time. A section of newspaper, a photograph, a textbook, an actual three dimensional objects as well as any other opaque material may be projected without special preparation. This should be arranged in the proper showing order. The pictures are to be placed on the right hand side of the machine, face up and inverted. Secondly, you need to arrange the classroom environment. Get the projection screen and set it up in front of the classroom. Place the projector on a suitable stand facing the screen.

- Arrange the classroom seat for proper viewing of the projected information.
- Ensure that there is electric power supply for operating the machine.

- Block out unwanted daylight to ensure good projection. You also need to darken the room.

Thirdly, test the equipment and review information.

- Connect the equipment to the source of the electric supply.
- Prevent rays of light from falling directly on the screen.
- Sacrifice darkness for sufficient ventilation.
- It is difficult for learning to take in a hot, stuffy room.
- Just before class time, turn on the projector.
- Insert your first picture and focus lens.
- Turn off projector and have everything in readiness.
- When the time comes to exhibit the picture, turn off room light and flash image on the screen.

Following this is the presentation of the subject matter; when the learners are seated, you have to inform them on how they will benefit from the instruction, what to look for in the illustration and what knowledge will be tested at the completion of the show. Present each picture in proper sequence and briefly tell and show the important point in each illustration. Stand by the screen and use a pointer for illustration. Finally, you need to carry out evaluation. The learners should be able to explain each step. The result obtained will be used to correct errors, objective or essay type questions may need to reshoot those that are pertinent.

### **Maintenance of Opaque Projector**

- Use the opaque projector for only the purpose for which it is designed.
- Check all operational procedures



- Adjust the knobs or screws properly.
- Service the equipment regularly.
- Always keep the equipment covered when not in use.
- You may make simple repairs or adjustments during emergencies.
- Recheck simple procedures before calling for help.
- Take good care of the lamp.
- Clean the lens when necessary.

### **System Analysis**

System analysis is basically concerned with the task of analyzing a system in the form of identifying its elements, their arrangement, organization, function or performance individually or as a whole in order to determine the need to make adjustment to ensure the achievement of system such as inputs, outputs, constraints process as well as environment (Alison, 2010). System analysis provides the designer with the knowledge of identification of the constraints that interfere in the attainment of system objectives.

### **Grades**

#### **Concepts of Grade System in Evaluation**

Grade system in education can be defined as a teacher standardized evaluation of a student's academic work. In most cases, evaluation can be expressed quantifiably, and calculated into a numeric grade point average (GPA) which is also used as a metric by the teachers and other categories of people to assess and compare students. Furthermore, a cumulative grade point average (CPGA) is the mean GPA from all terms, and GPA may only refer to a single term. Grading system according to Joel (2010), every country's

university has its grading systems which is unique to its school. However, many international standards for grading have recently formulated system for grading. For instance, the grading system of countries varies from one country to the other as in the case of Nigeria. The most recent form of grading is the percentage system of grading. An examination consists of a number of questions each of which gives credit, and the sum of credits for all questions generally count up to make 100. Therefore, the grade awarded to a student is the percentage obtained in the examination. In this case, the percentage is the grade that is awarded at the end of the year.

There are several universities and recognized schools boards in Nigeria that still make an objective comparison of percentage grades awarded by one examination or another at the same level. The percentage of 90 and above are 80 – 90 excellent but at the university level of education, percentage of 70 – 80 are considered excellent and are quite difficult to obtain. It should be noted that the percentage of marks at university level of education varies from one university to another.

### **Feedback**

Communication flows effectively if it continues to receive the desired feedback from the receiver and decoder respectively. Feedback is very important in the classroom. If a teacher gets the desired feedback from his/her students in terms of the quality of his teaching efforts, feedback will definitely boost the quality of teaching and learning because, it will direct the effort of both the teachers and students.

## CHAPTER ELEVEN

### Overhead Projector

The overhead projector is one of the most popular media in the schools today. One reason for its popularity is the number of teaching and learning strategies that are appropriate for this medium. Due to enlarged image, this system is ideal for the presentation of information to large groups of learners. Since it is used in a fully lit room, and from the room, it is also ideal for the presentation of stimuli that can generate an interaction between students. Overhead projection system can be used to provide drill and practice to groups of learners. Not only is a variety of teaching and learning strategy. It is also a plus for the overhead system. Overhead projector has some unique characteristics that makes it an available asset for the teacher.

The following are some of the characteristics of overhead projector:

1. It can be used in a fully lit room.
2. It does not require light control.
3. Overhead projector can be projected from the front of the classroom, so that it can allow the students to view clearly.
4. It allows the teacher to face the class with the image projected on a screen behind him.
5. Overhead projector allows the teacher to maintain eye contact with the class and to respond to any verbal or non-verbal cues that are generated by the audience during the presentation.
6. The cost of the projection system is another factor in its favour.

7. Overhead projector is quite inexpensive in comparison to other media.
8. Overhead projector has an open stage and this allows the presenter to manipulate the images he is utilizing.
9. Overhead projector involves the addition and subtraction of information as well as its physical rearrangement.

### Filmstrips

The filmstrip is a strip of 35mm film that contains a series of images in sequential order. Filmstrips are the materials that are displayed from the filmstrip projection system. Basically, filmstrip is a series of images that are printed sequentially onto a strip of 35mm film. This is the same film size that is used in the production of 35mm slides. However, the image size of the filmstrip is approximately half the size of the image on a 35mm slide. Filmstrip projectors come in many brands and models and can be pulled through the projector by a series of sprocket holes. There are many variations in filmstrip projectors. Some projectors display only filmstrips while others are combination projectors for both slides and filmstrips. In addition, there are projectors for both sound and silent filmstrip. Sound filmstrip may use any projector and cassette playback unit or a record player, there are special system designed for sound filmstrips that are combination of projectors and record players or tape recorder. This allows for the presentation of sound filmstrips that have an audible pulse built into the sound track to advance the filmstrips. Other variations in the display system include viewers for filmstrips. Viewers are designed for the use of individuals rather than group. The image is displayed on a small screen rather than projected onto a larger screen. These can also be designed for

either sound or silent filmstrips. The filmstrip projector is commonly available in schools and can be easily operated by either teachers or students. Filmstrips, with the appropriate delivery system can be effectively used for large group presentations, as stimulus for interaction, for independent study and even for drill and practice activities.

### Classroom Utilization of Filmstrip

1. At first, you should note the specific topic that could be clarified by the use of filmstrip, then check all physical features in terms of the classroom seating arrangement and projection.
2. Provide sufficient ventilation in the classroom.
3. Remove unrelated visual materials from the classroom and allow electrical outlet to be in proper working condition.
4. Ensure that there is no glaring light that may cause poor visibility.
5. Avoid overcrowding, learners should sit between the projector and the screen, and all chairs should be kept as close as possible to the light beam.
6. The room should be darkened
7. The screen should be placed in a position where direct rays of outside light will not interfere

### Slides

Slides are the message materials that are delivered through the media of slide projector. There are different types of slides:

1. The 2X2 slide: This slide format is the most common in schools.
2. The 3 ¼ "X4" lantern slides, through outdated now.

The 2X2 slide refers to the fact that the outside dimension of the slide is 2"X2". This means the standard format for the classroom use. Publication from the educators' progress service indicates a large number of businesses that have free sets of slides available to classroom teachers. The utilization of slides is really a function more of the projection equipment than the slides themselves. The teacher can use 2X2 slide projector to present information to large groups of learners simultaneously. The same system can be used to provide slides as stimuli for an interaction. Drill and practice is a suitable utilization strategy for slides.

### Advantages of slides

- The number of commercial and free slides that are suitable for use in the classroom are increasing.
- The local production of slides is relatively simple and very popular hobby.
- It is quite simple to update a slide show by adding additional slides, replacing existing slides, or changing the order and sequence of the slide.

- The use of slides is becoming increasingly popular because they can be used as a multimedia presentation with two or more projectors filling the screen with a montage of projected images.
- Slides are commonly used in schools especially the 2X2 slide format.

## References

- Adebe, M.C. (2013). Classroom Utilization of Instructional Technology and Graphic Materials. *Journal of Computer and Technology Research* 1(3), 91 – 102.
- Adewoyin, A. (2010). Instructional Evaluation for Effective Teaching, Ogun international publishers limited.
- Adeyomi, C.O (2010). Curriculum Theory and Instructional Design. Ibadan, Johns-lad publishers.
- Aliya, M.D. (2010). Designing and Production Instructional Materials for effective Teaching and Learning, Knitte Publishing int. Ltd, pp. 126 – 145.
- Aliya, M.D. (2011). Effectiveness of Instructional Technology in teaching and learning process. Knitte publishing int. Ltd, pp, 62 – 71.
- Mison, C.L. (2012). Educational Technology Transforming Education. A Regional Guide. Paris: UNESCO. Retrieved from <http://unesdoc.unesco.org/images/0016/00189226fpdf>.
- Mison, J.C. (2010). Trends and Research in instructional Development, C.J, Books Ibadan, pp, 71 – 82.
- Mison, T.C. (2014). Grading in Educational System, New York, University of Alabama press.
- Anderson, R.O. (2008). What is Instructional Technology? Zaria: Ahmadu Bello University Press.
- Bipetts C.O. (2000). Computation of grades Sterling Publishers Ltd, New Delhi 2008.
- Bloom, C. (2011). Planning and Production of Audiovisual materials. New York: Thomas Y, Crowell Company Ltd.
- Boncas, V.C. (2011). Applying the Technological Tools to VR with people who are favourable to its use.

- Journal of Cyber Therapy and Rehabilitation, (3), 102 – 115.
- Brown, J.C. (2005). Towards effective Utilization of Instructional Technologies in Schools. Educational Technology Media Akwa-Ibom, Nuel Centi (Nig) publishers.
- Carlys, C.F. (2010). Systematic Approach to Instructional Design and Technology Florida, USA: Brown Walker Press P. 102.
- Celda, C. (2009). Importance of Student Evaluation in the Classroom Situation. London, UK: Croom Helm, 2009.
- Damatt, C. (2009). Quality of Evaluation in Teaching and Learning. London, UK: Konga
- Elvis, P.C. (2013). Problems Associated with Instructional Development, New York, Harper and Row publishers.
- George, C.K. (2009). Teaching Learning and Assessment Edinburgh University Staff Development Agency, Sheffield, UK 2009.
- Godic, C.O. (1982) in Umeh, A.E. (2012). Building the Virtual State Instructional Technology and Instructional Change. Washington, D.C. Brookings Institution Press.
- Instructional system Approach to teaching and learning. A paper presented at the second Annual conference of Nigeria Educational Technology, Oyo State Branch.
- Joel, C.O. (2010). Importance of Continuous in the Educational System. Siegler inc. Feanon publishers.
- Johnson, C.P. (2011). The efficacy of Instructional Technology. *Journal of Educational Computing Research*, 10 (2) 210 – 221.
- Jonas. C.A. (1998) in Umeh, A.E. (2012). Utilization of Instructional Design Technology for Education in Africa. *Journal of Information and Knowledge Management*. (5). 141 – 151.
- Josy, J. (2014). Development of Instructional Programme, Retrieved from <http://tip.psychology.org>.
- Kauf, C.O. (2010). Diffusion of Instructional Innovation (4<sup>th</sup> edition) New York: The Free Press.
- Kela, P.F. (2011). Social Network Sites: Definition of Educational Technology, and Instructional Technology. *Journal of Computer-Mediate Communication*, 14 (2).
- Kongath, F. (2012). Instructional Media and the New Technologies of Instruction, New York, John Willey and Sons.
- Letty, P.C. (2001). Educational Measurement and Evaluation. New York MC. Graw Hill Book Company Ltd.
- Malic, C.E. (2012). Principles of using Programme Instruction in Basic Technology. *Journal of Research in Technology Education* 25(3), 128 – 137.
- Mulu, K.C. (2011). Problems in the Integration of Educational Technology in Secondary Schools. *Journal of Worldwide Educational Assessment* (2). 121 – 132.
- Muluka, O.C. (2010). Integrating technology into teaching and learning concepts and implementation.
- Okwudo, C.J. (2010). Utilization of Media Technology in Nigerian Schools. *Journal of Science Teachers Association of Nigeria*, 21(2), 56 – 68.
- Oliver, C.H. (2013). Instructional Design Technology: Ade Ola Publishing Company limited.
- Ronald, C. (2009). Theory and Practice of Psychological Testing. New Delhi, Oxford Publishing Co.

- Tally, J.C. (2011). *Tactics and Knowledge of Teaching with Technological Materials*. Alberta Canada: Athabasca University.
- Tate, M.V. (2011). *Evaluation method and Approach*. Worthen, B, C.R Publishers.
- The Analysis and Application of media Technology. Robert M.W. Travers, Chicago: Rand MC Nally.
- Tikath, P.C. (2012). *Social Media Technology and Learning Methods, Shifting Perspective on the Locus of Control in Education Social-Media-Learning Methods Shifting*.
- Udeogu, O. (2010). *Contributions of Instructional Technologies to Social Studies Education in Schools*. Ibadan Biks publishers.
- Udo, J.P. (2010). *Introduction to Instructional Technology*. Journal of Research in Curriculum and Teaching (JRCE) 1 (2), 141 – 152.
- Udua, O.C. (2010). *Learning with Technological Tools*. Journal of Research in Curriculum and Teaching (JRCE) 1 (2), 141 – 152.
- Umeh, A.E. (2013). *The Role of Computer Education in the higher institution of learning*. *Journal of Science and Technology*. 5(4), 112-120.
- Umeh, A.E. (2014). *(Use of my journals)*
- Walter, E.Z. (2009). *Preparation and Utilization of visual Instructional Technology*, U.S.A Prentice Hall Inc Englewood.
- Williams, C.J. (2014). *Techniques in the production and utilization of instructional materials*. New York MC Graw Hill Book Company.

## INDEX

- Abubakar Tafawa Belewa, 40
- acquired skills, 37
- administrators,, 1, 2, 3, 66
- Advantages of Computer Assisted Instruction, 51
- Advantages of Computer in Educational Technology, 54
- Advantages of Need Assessment, 73
- Advantages of slides, 94
- agriculture, 21
- Analysis of the setting deals, 5
- Analyzed results, 7
- and examination of available materials evaluation, 6
- and that appropriate communication takes place, 6
- application of instructional system, 1
- application of instructional technology, 13
- approach to the analysis and development, 1
- rote-learning, 34
- Assessment Needs, 72
- attitudes, 27
- available resources, 5
- Bachelor of Arts, 40
- Bachelor of Education, 40
- Bachelor of science, 40
- Behavioural science, 25
- Cardboard frame, 77
- Career films, 43
- career guidance, 43
- causes of the problem that can, 4
- Characteristics of Educational Technology, 31
- child learning psychology, 20
- Classroom Utilization of Filmstrip, 93
- Classroom Utilization of the Opaque Projector, 86
- communication revolution, 26
- communication,, 21, 33
- component of educational technology, 11, 28, 29
- comprehensive conceptualization, 25
- computer keyboard
- electronic circuits storage, 17, 33, 36, 46, 47, 48, 49, 50, 51, 52, 53, 54, 65
- Computer-Assisted Instruction as Part, 48
- Concept of Educational Technology, 20
- Concepts of Grade System in Evaluation, 88
- Connectionist Technique, 38
- Construct prototypes, 6
- Contiguity, 38
- courses
- English
- French
- History
- Economic
- Mathematics

Chemistry, 41, 42  
 curriculum,, 1, 2, 3, 53  
 decision-oriented, 57  
 defence,, 21  
 definition, 11, 21, 22, 26, 36, 40, 48, 56  
 Design and Technology, 22  
 design procurement and production, 6  
 designing the evaluation, 6  
 Development, 1, 2, 4, 9, 65, 96, 97, 98  
 Developmental Stages of Educational Technology programming concept  
   programme insruction hardware software, 27  
 Diazo Transparencies, 80  
 Difference in Implementation of Educational, 43  
 Disadvantages of Need Assessment, 74  
 effective and transfer of learning process, 39  
 effective participation, 36  
 Electronic screen, 50  
 Engineering, 21  
 Equipment and facilities, 5  
 Equipment in the classroom, 36  
 Evaluation, 37  
 Evaluation instrument, 63  
 Examination graddes  
   percentage, 6, 57, 89  
 experience and expert assistance in, 2  
 experiments, 37  
 Features of Programmed Instructional learners active response, 18  
 Federal University of Technology, 40  
 Feedback receiver  
   decoder, 89  
 Filmstrips, 77, 92  
 Flow Diagram, 9  
 Gestalt's Techniques, 38  
 generalization and identical elements, 38  
 Hand Drawn, 77  
 higher institutions Universities, 40, 54  
 Idea, 27  
 Identification of problem is, 4  
 Identify objectives, 7  
 Implement or recycle, 8  
 Importance of Evaluation, 59  
 improve your present teaching, 3  
 Inadequate conducive environment, 44  
 Inadequate Personnel, 44  
 Inadequate space, 13  
 individual behaviour and attitudes  
 Mechanism of feedback  
 Teaching and learning efficiency, 12  
 Individualized method, 52  
 Influence of personal decision, 63  
 Institutions, 39

Instructional, 1, 2, 4, 9, 11, 12, 13, 15, 17, 18, 22, 28, 56, 57, 65, 96, 97, 98, 99, 100  
 Instructional design, 7, 60  
 Instructional development principles and methods., 2  
 Instruction evaluation, 56  
 Instructional development process are, 4  
 Instructional development Technology principles, 1  
 Instructional technology development  
   -design  
   -production  
   -evaluation  
   -utilization of instruction system components, 11  
   design:, 11  
 Interpretation of value, 56  
 Interpreting statistical data, 73  
 Introduction of new programme, 61  
 Joint Admission and Matriculations Board Brochure, 40  
 Knowledge, 27  
 Lack of adequate fund, 14  
 Lack of administrative support, 14  
 Lack of capital, 45  
 Lack of personnel, 13  
 lamination., 78, 79, 82, 83  
 languages and applications, 53  
 Laziness, 14  
 LIFT, 81  
 linear or 1 - 2 - 3, 4  
 Lukewarm attitude, 14, 44  
 machine,, 21, 86  
 Maintenance of Opaque Projector, 87  
 Mastery, 12, 17, 52  
 Mechanizing or automating, 24  
 Media equipment, 42  
 Members of education board., 1  
 Method of evaluation, 63  
 Methods of Writing Programmed Instructional innovative delivery system, 12  
 Narrative Tasks Description, 65  
 national development., 25  
 National Policy on Education. Joint Consultative Committee formulation implementation, 35  
 Need for Assessment, 72  
 Newspaper, 36  
 Nigeria Certificate in Education, 41  
 Nigerian educational system., 15, 20  
 Non-uniformity of content, 43  
 Obafemi Awolowo University,, 41  
 Obsolete facilities/equipment, 14  
 Opaque mask, 76  
 Opaque projector, 84  
 Operation of Opaque Projector, 85  
 optimum learning, 3  
 or diazo film, 78  
 Organization and management task, 68  
 Organization and Management tasks, 19, 67, 71

Organization and Management  
Tasks Chart, 19, 71  
Organize management  
Organisation  
    management, 5  
Over emphasized, 35  
Overhead Projector, 91  
Personnel, 5, 11, 13, 44, 59, 68,  
    69  
Photographic equipment, 42  
Pilot training, 51  
political, 21  
Port Harcourt, 40  
practical solutions to teaching  
    and learning problems, 1  
practice application, 49  
Preparation of Transparencies,  
    76  
Problem definition, 1  
Problems of Evaluation, 61  
Projectors, 42, 92, 95  
Promising and systematic  
    approach, 3  
Psychological Learning  
    Technique, 39  
radio television, 36  
Rationale for Evaluation, 59  
Reinforcement., 53  
Rote-learning, 16  
Scholars, experts and  
    professionals, 26  
School systems, 2  
Schools exist to achieve or  
    accomplish., 3  
skills., 27  
Slides, 77, 94, 95  
Social Learning, 39  
social life., 21  
Solution attempts in education,  
    1

Solutions to, 15  
Specialists in subject, 1  
Specify methods, 5  
Steps in the instructional  
    development, 2  
stimulus materials, 24  
Students' nonchalant attitude,  
    45  
System Analysis, 88  
systematic approach, 3, 13, 21,  
    36, 45  
tape recorders, 42  
task completion, 6  
Tasks Analysis, 64  
Teachers, 1, 2, 3, 21, 31, 66, 74  
technology  
    learner-centered  
        systematic  
            electric  
                wholistic  
                    innovative., 11  
Technology, 1, 2, 11, 12, 17,  
    18, 20, 21, 22, 23, 24, 25, 26,  
    27, 29, 30, 31, 32, 34, 35, 37,  
    39, 40, 42, 43, 45, 48, 53, 54,  
    96, 97, 98, 99, 100  
Technology of education  
    layout, 23  
Technology education  
    Men/machine  
        ideas  
            procedures  
                equipment  
                    hardware, 23  
Terminal performance  
    objectives, 7  
Test prototypes  
    package, 6

Textbooks and reference  
    books., 2  
The advantages of using opaque  
    projector, 84  
The field of Educational  
    Technology, 42  
The four Components of  
    Educational Technology  
educational technology  
    functions  
        educational technology  
            development function,  
                30  
The instructional development  
    approach, 2, 3  
The instructional development  
    team., 4, 8  
The use of out-dated  
    equipment, 44

Thermal and diazo  
    transparencies, 76  
Types of Evaluation  
    planning  
        formative  
            summative, 57  
Types of Task Analysis, 65  
undergraduate level, 40  
University of Ibadan., 41  
University of Ilorin, 40  
utilization of teaching materials  
    and methods, 2  
validity of instructional  
    programme, 61  
valuable experience, 1  
values., 27  
Verbal and non-verbal, 71  
Vocational education, 43  
What is Education, 20



---

### List of Figures Pages

Flow Diagram showing Instructional Development Process	8
Organisational and Management Tasks Charts	17
Technology in Education and Technology of Education layout	21
Development Stages of Educational Technology in Nigeria	25
The Four Components of Educational Technology	28
Components of Educational Technology	30
Organization and Management Task Chart	67



