NATIONAL OPEN OF UNIVERSITY OF NIGERIA

SCHOOL OF EDUCATION

COURSE CODE: EDT 821

COURSE TITLE: INSTRUCTIONAL TASK ANALYSIS AND PSYCHOLOGICAL BASIS OF INSTRUCTIONAL MEDIA

COURSE GUIDE

EDT 821

INSTRUCTIONAL TASK ANALYSIS AND PSYCHOLOGICA L BASIS OF INSTRUCTIONAL MEDIA

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EDT 821

Instructional Task Analysis and Psychological Basis of Instructional Media

INTRODUC TION

One of the basic tasks of the Teacher is to prepare instruction that would be effective. To be able to do this, the teacher performs Task Analysis. Furthermore, for effective instructional and learning processes, a teacher needs to acquire the skills for selection, usage and application of instructional media. This can only be done if the teacher understands the psychological basis of instructional media. This course therefore is concerned firstly with expounding the principles of task Analysis. The approach it takes in doing this is using principles of instructional system design to design and develop instruction. One of the phases of the instructional system design, which is task analysis is expounded in relation to other phases of the design process.

Secondly, in this course also, it is expected that the learners become familiar with the basic theories of learning, how these theories determine instruction in the class room and also the type of instructional resources that have been developed based on the theories.

COURSE OBJECTIVES

After interacting with this course material, you should be able to:

Explain Educational terms that relate to instructional systems design and development..

Discuss the relationships of the various phases in instructional systems design and development to the process of task analysis.

Explain the teacher s roles in instructional task analysis.

Explain how systems approach can be applied to task analysis and instructional analysis.

Analyse the instructional implications of the basic psychological theories.

List instructional resources that are constituent with the basic psychological theories.

COURSE OUTLINES IN COURSE UNITS

MODULE 1 DEFINITION OF RELATED TERMS USED IN INSTRUCTIONAL TECHNOLOGY, INSTRUCTIONAL SYSTEM DESIGN AND STEPS IN INSTRUCTIONAL SYSTEM DESIGN.

Unit 1: Definition of related terms used in Educational Technology and purposes of Instructional Technology.

Introduction

Objectives

What is educational Technology

Technology in Education

Technology of Education

Instruction

Instructional Technology

Purposes of Instructional Technology

Instructional System design and Educational Technology

Conclusion

Summary

Tutor Marked Assignment

References

Unit 2: Instructional Systems Design

Introduction

Objectives

Instructional Systems Design

What is Instructional System Design?

Instructional Design (ID) Different contexts

ID as a process

ID as a discipline

ID as a science

ID as a reality

ADDIE model and Instructional Systems Design

ADDIE FRAME WORK: FIVE PHASES

Phase 1 Analysis

Phase 2 Design

Phase 3 Development

Phase 4 Implementation

Phase 5 Evaluation

Instructional System Design and Instructional System Development

The importance of development

The benefits of Instructional System Design

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 3: STEPS IN INSTRUCTIONAL SYSTEM DESIGN

Introduction

Objectives

Steps in Instructional System Design

Step 1 Write the instructional goals

Step 2 Goal statements analysis

Step 3 Subordinates skills analysis

Step 4 Identity Entry Behaviour or characteristics

Step 5 Right performance objectives

Step 6 Develop criterion referenced test items

Step 7 Develop instructional strategy

Step 8 Develop instructional materials

Step 9 Conduct formative evaluation

Step 10 Revise

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 4: TASK ANALYSIS AND THE TEACHER 1

Introduction

Unit objectives

What is task analysis?

UNIT 5: TASK ANALYSIS AND THE TEACHER 2

MODULE 2 : SYSTEMS APPROACH AND FUNDAMENTAL OF APPLICATION OF SYSTEMS TO INSTRUCTION

UNIT 1: GENERAL OVERVIEW OF SYSTEMS

introduction

Unit Objectives

General overview of systems

Terminologies related to systems concept

Attributes of systems

Types of systems

Educational system

Instructional system

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 2: SYSTEMS APPROACH

1.0 Introduction

2.0 Unit Objectives

Historical background of systems approach

Steps in systems approach

Mission analysis

Functional Analysis

Evaluation

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

MODULE 3 PSYCHOLOGICAL THEORIES AND THEIR APPLICATIONS TO INSTRUCTION

UNIT1: DEFINITION OF PSYCHOLOGY AND PSYCHOLOGICAL THEORIES OF LEARNING

Introduction

Unit objectives

Concept of psychology

Educational psychology

Importance of educational psychology

Psychological theories of learning

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 2: THE BEHAVIOURIST THEORY AND APPLICATIONS TO INSTRUCTION

Introduction

Unit objectives

Behaviourist theory and application to instruction

Instructional resources and behaviourist theory

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 3: THE CONSTRUCTIVIST IN THEORY AND APPLICATION TO INSTRUCTION

Introduction

Unit objectives

The constructivism theory and application to instruction

Instructional resources and constructivism

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 4: THE COGNITIVIST THEORY AND APPLICATION TO INSTRUCTION

Introduction

Unit objectives

The cognitists theory and application to instruction

Instructional resources and general educational implications of cognitive theories

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

MODULE 4 LEARNING PRINCIPLES AND INSTRUCTIONAL MEDIA

UNIT 1: BASIC CONCEPT OF INSTRUCTIONAL MEDIA

Introduction

Unit objectives

What are instructional media?

Classification of instructional media

Why do we use instructional media?

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 2; LEARNING THEORY AND INSTRUCTIONAL MEDIA- MOTIVATION

Introduction

Unit objectives

Motivation

Instructional media that increases students motivation to learn

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 3: LEARNING THEORY AND INSTRUCTIONAL MEDIA 2 KNOWLEDGE OF RESULT

Introduction

Unit objectives

knowledge of result

Instructional media that give knowledge of result

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 4: LEARNING THEORY AND INSTRUCTIONAL MEDIA 3 WHOLE OR PART LEARNING

Introduction

Unit objectives

Whole or part learning

Instructional media that can facilitate whole or part learning

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 5: LEARNING THEORY AND INSTRUCTIONAL MEDIA 4 CLOSURE

Introduction

2.0 Unit objectives

3.1 Closure

3.2 Instructional media that facilitates closure

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 6: LEARNING THEORY AND INSTRUCTIONAL MEDIA 5 LEARNING STYLES 1- VISUAL

Introduction

Unit objectives

Visual learning style

Instructional media that can help visual learners to learn

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 7: LEARNING THEORY AND INSTRUCTIONAL MEDIA 6 LEARNING STYLE 2 AUDITORY

Introduction

Unit objectives

Auditory learning style

Instructional media that can help hearing impaired learners to learn

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

UNIT 8: LEARNING THEORY AND INSTRUCTION MEDIA 7 LEARNING STYLE 3 KINESTHETIC

Introduction

Unit objectives

Kinesthetic learning style

Instructional media that can help kinesthetic learners to learn

4.0 Conclusion

5.0 Summary

6.0 Tutor Marked Assignment

7.0 References

4.0 LENGTH OF TIME

The course is a second semester course designed for 13 to 14 weeks. However, it may take you more time to complete

5.0 TESTING

The course is designed to help you monitor your own progress through self assessment exercise. Each course unit has at least two exercises. Each exercise has an answer kit. At each exercise point pause and think, then carry out the exercise. Resist the temptation to consult the answer kit and only and only refer to it afterwards to check how well you have done the exercise. Note the differences between your performance and the answer kit. If the differences are much go over the material again.

There is one tutor- marked assignment at the end of each unit. National Open University of Nigeria will tell you how many of the assignments you will submit to them.

6.0 SELF CONTAINED

The units are designed to be self contained. However, read as widely as you c an even outside the references that have been made. The more you read, the more you have a store of knowledge for your self and from which you can draw to assist you in your teaching activity.

7.0 STUDY TIME

Work out your own convenient times for study when and where you can concentrate. Try and be consistent. Enjoy your study time.

Good luck.

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MODULE 1 DEFINITION OF RELATED TERMS USED IN INSTRUCTIONAL TECHNOLOGY, INSTRUCTIONAL SYSTEM DESIGN AND STEPS IN INSTRUCTIONAL SYSTEM DESIGN.

UNIT 1 DEFINITION OF RELATED TERMS USED IN EDUCATIONAL TECHNOLOGY AND PURPOSES OF INSTRUCTIONAL TECHNOLOGY

1.0 INTRODUCTION

Technology seldom plays the same natural role in classrooms that it does in other areas of our daily lives. Prominent commentators on education and technology continue to demonstrate that the resources already available in many classrooms are often severely underutilized (Cuban, 2001; Oppenheimer, 2003). The term educational technology is a misunderstood expression. It is often used to describe the machinery of hardware of education or a highly structured approach to teaching, like programmed instruction e.g Computer Assisted Instruction (CAI). You will learn more about Educational Technology in Unit 1. It starts you off by giving you the definition and terms used in Educational Technology, some events that are needed for learning, purpose of instructional technology, instructional system design and Educational Technology.

2.0 OBJECTIVES

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

(a) Define the following terms
(b) Educational Technology
(c) Technology of Education
(d) Technology in Education
(e) Instruction
(f) Instructional Technology
(g) List the roles of Educational Technology in Education.
(h) Enumerate the benefits of Educational Technology in teaching-learning process.
(i) State the nine events needed for effective instruction in the classroom.

3.1 WHAT IS Educational Technology?

Educational Technology is a complicated, integrated process involving people, procedures, ideas, devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning. It is the application of scientific knowledge about learning and condition of learning, to improve the effectiveness and efficiency of teaching, training and learning (AECT task force, 1977).

It is a systematic approach (step-by-step process) to planning, designing, implementing and evaluating any educational task, using all the relevant human and non-human resources within the immediate environment of the learners, to achieve the pre-determined objective(s) of the programme.

Educational Technology involves Technology in Education and Technology of Education

3.1.1 Technology in Education

Technology in education is not the same as educational technology. It is the application of technology to any of those processes involved in operating the institutions which house the educational enterprise. It includes the application of technology to teaching, learning. of food, health, finance, scheduling, grade reporting, and other process which support education within institutions. It implies the application of the products of other technologies (notably electronics) to education.

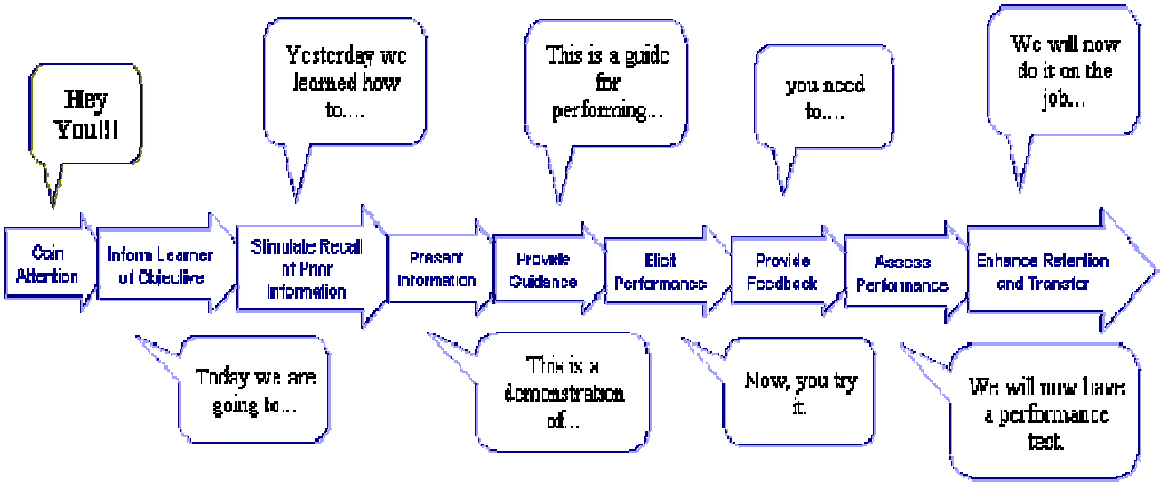
3.1.2Technology of education

This is the application of behavioural sciences to create a technology of learning. It is the application of knowledge and the processes of technology to the systematic design of education. It is called the software approach. It is the study of sciences applicable in the field of education. It is the use of the findings from learning research and other forms of knowledge. It is the specific process used to design a specific type of reliable and validated instructional product/instructional system component (e.g. the process used to develop programmed instructional materials).

3.2 INSTRUCTION

Instruction is an activity which is designed to help people to learn. Effects of instruction on learning are usually beneficial and easy to observe as a properly designed instruction focuses on its pre-determined objectives.

According to Robert Gagne (1985), there are nine events that are needed for effective learning, thus they include a sequence of events similar to the following:



(1) Gain attention. Present a problem or a new situation. Use an "interest device" that grabs the learner's attention. This can be thought of as a *teaser* -- the short segment shown in a TV show right before the opening credits that is designed to keep you watching and listening). The idea is to grab the learners' attention so that they will watch and listen, while you present the learning point. You can use such devices as:

- Storytelling
- Demonstrations
- Presenting a problem to be solved
- Doing something the wrong way (the instruction would then show how to do it the right way)

(2) **Inform learner of Objective.** This allows the learners to organize their thoughts around what they are about to see, hear, and/or do. There is a saying in the training field to 1) tell them what you're going to tell them, 2) tell them, and 3) tell them what you told them. These cues them and then provide a review which has proven to be effective. e.g. describe the goal of a lesson, state what the learners will be able to accomplish and how they will be able to use the knowledge.

(3) **Stimulate recall of prior knowledge.** This allows the learners to build on their previous knowledge or skills. Although we are capable of having our "creative" minutes, it is much easier to build on what we already know. e.g. remind the learners of prior knowledge relevant to the current lesson, provide the learners with a framework that helps learning and remembering.

(4) **Present the material.** Chunk the information to avoid memory overload. Blend the information to aid in information recall. This is directly related to Skinner's "sequenced learning events." This allows learners to receive feedback on individualized tasks, thereby correcting isolated problems rather than having little idea of where the root of the learning challenge lies. Bloom's Taxonomy and Learning Strategies can be used to help sequence the lesson by helping you chunk them into levels of difficulty.

(5) **Provide guidance for learning.** This is not the presentation of content, but is instructions on how to learn. This is normally simpler and easier than the subject matter or content. It uses a different channel or media to avoid mixing it with the subject matter. The rate of learning increases because learners are less likely to lose time or become frustrated by basing performance on incorrect facts or poorly understood concepts.

(6) **Elicit performance.** Practice by letting the learner do something with the newly acquired behaviour, skills, or knowledge .

(7) **Provide feedback**. Show correctness of the learner's response, analyze learner's behaviour. This can be a test, quiz, or verbal comments. The feedback needs to be specific, not, "you are doing a good job" Tell them "why" they are doing a good job or provide specific guidance.

(8) **Assess performance.** Test to determine if the lesson has been learned. You can also give general progress information

(9) **Enhance retention and transfer.** Inform the learner about similar problem situations, provide additional practice, put the learner in a transfer situation and review the lesson.

Instruction is a goal-directed process, which has been pre-planned and tested. It is the arrangement of the external conditions of learning in ways which will optimally interact with the internal capabilities. The function of instruction then, is the control of the external conditions of learning situation. To be effective as a teacher is to be able to achieve the events of instruction. One way by which this can be done is to apply strategies and techniques derived from behavioral, cognitive, and constructivist theories to the instructional design processes. The later is termed instructional technology.

Instructional technology promises solutions to many educational problems, resistance from teachers to the use of technology in the classroom is not unusual. This reaction can arise from the belief - or fear - that the ultimate aim of instructional technology is to reduce or even remove the human element of instruction. However, most instructional technologists would counter that education will always require human intervention from instructors or facilitators.

3.3 INSTRUCTIONAL TECHNOLOGY

Instructional technology is the systemic and systematic application of strategies and techniques derived from behavioral, cognitive, and constructivist theories to the solution of instructional problems. It is the systematic application of theory and other organized knowledge to the task of instructional design and development.

Instructional Technology = Instructional Design + Instructional Development

While Instructional design involves designing content/subject matter and delivery strategies including materials and assessment techniques, Instructional development is the process of implementing the design plans

Instructional Technology is often confused with instructional technology. It is a sub-set of educational technology, based on the concept that instruction is sub-set of education. It is the development (research, design, production, evaluation, support-supply, 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.

The Commission on Instructional Technology(1970) defines instructional technology as:-

> The media born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook and blackboard and
>
> a systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communications, and employing a combination of human and non-human resources to bring out more effective instruction .

There are many ways to explain Instructional Technology. The current AECT definition is:

> Instructional Technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning. (Seels & Richey, 1994)

Instructional Design seeks to teach how to plan, develop, evaluate and manage the instructional process effectively to ensure improved performance by learners.

Instructional Technology's goal is to understand how people learn and how to best design instructional systems and instructional materials to facilitate that learning. We also use appropriate technology to aid us in the design and delivery of the instruction.

Instructional Technologists are today's problem solvers. They look to understand performance problems and design solutions to those problems. Sometimes the solution is instructional; other times the situation requires a non-instructional solution. (Reiser & Dempsey, 2002).

3.4 PURPOSES OF INSTRUCTIONAL TECHNOLOGY

The purpose of instructional technology is to make education more productive and more individual, to give instruction a more scientific base, and to make instruction more powerful, learning more immediate and access more equal (Tickson, 1971). According to Armsey and Dahl (1973), it is appropriate to say that instructional technology is made up of the things of learning, the devices and the materials which are used in the process of learning and

teaching . Furthermore, it may be said that instructional technology is an effort with or without machines, available or utilized, to manipulate the environment of individuals in the hopes of generating a change in behavior or other learning outcome. (knezevich and Eye, 1970).

3.5 INSTRUCTIONAL SYSTEM DESIGN AND EDUCATIONAL TECHNOLOGY

The Instructional Systems Design (ISD) process was developed to take the guesswork out of instruction. Rather than rely on assumptions or tradition about what needs to be taught and how best to present it, ISD takes a "systems" look at teaching. Among other things, it takes into account the environment in which learners are expected to eventually perform, characteristics of the learners, and aspects of the learning environment that could impact the effectiveness of the instruction. ISD is also a systematic process, one that suggests a series of steps that probe for the appropriate purpose and approach to the instruction and help guarantee effectiveness through intermediate evaluation and careful implementation. In these ways, the ISD method helps ensure that the instruction will actually be able to solve an identified problem or achieve a desired goal. However, there is growing tendency to relate educational technology to the process of planning by which an instructional system design is developed, implemented, controlled, and evaluated. According to Davies & Hartly (1972), the procedures to describe for planning instructional systems design are consistent with the meaning of educational technology.

In providing a historical framework for educational technology, Davies (1971) points out that it is an outgrowth of a number of converging influences upon present concepts and practices in instructional design. According to Lumsdaine (1964), these earlier influences include the following developments: (a) interest in individual differences in learning, as seen in educational and military research and development programmes, in self-instructional devices such as those of Pressey (1950) and Briggs (1960) and the branching programmes of Crowder (1959), and in computer applications to instruction; (b) behavioural science and learning theory, as seen in Skinner s(1968) emphasis upon contingencies of reinforcement and in his teaching machines , and in other learning theories; and (c) physical science technology, as represented in motion-picture, television and video-tape instruction; and in audio-visual devices to supplement printed media. All of these streams of development, along with the conceptions of learning outcomes categories and their associated instructional events can be harmoniously utilized in the design of instructional systems which give primary attention to the individual learner s activities and to the testing of their outcomes.

4.0 Conclusion

In education, instructional technology is the theory and practice of design, development, utilization, management and evaluation of processes and resources for learning. Instructional technology is often referred to as a part of educational technology. While instructional

technology covers the processes and systems of learning and instruction, educational technology includes other systems used in the process of developing human learning.

5.0 Summary

Instructional technology is a subset of Educational technology . Instructional technology can be divided into 2 parts. One is teaching technology and another is learning technology. In the education industry, the term "instructional technology" is frequently used interchangeably with "educational technology."This is not a good practice. Instructional technology is a growing field of study which uses technology as a means to solve instructional challenges in the classroom whereas educational technology is the technology that prescribes the design of instructional processes and materials and then structures learning interactions for maximum benefit.

6.0 Tutor-Marked Assignment

1. Define the following terms

   Educational Technology
   Technology of Education
   Technology in Education
   Instructional Technology

2. Differentiate between Technology in education and Technology of Education.

3. Differentiate between Educational Technology and Instructional Technology.

4. State and explain the nine events of instruction.

5. What is the purpose of instructional technology in the teaching-learning process?

7.0 References/Further Readings.

AECT,(1977) Task Force. Educational Technology: Definition and Glossary of Terms. Washinton, D.C.: Association for Educational Communication and Technology,.

Briggs, L. J. (1960). Teaching machines. In G. Finch (ed.), Educational and Training Media: A Symposium. Washington, D. C.: National Academy and Sciences-National Research Council. (Publication 789), Pp. 150-195.

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UNIT 2 INSTRUCTIONAL SYSTEMS DESIGN

1.0 INTRODUCTION

Instructional design is the systematic process of designing, developing ,managing and evaluating the entire instructional process to ensure effective and efficient learning. It is based on what we know about instructional and learning theories, systems design, information systems and management (Morrison, Kemp & Ross, 2001). The basic elements of instructional design include:

- Analyze learner and organization needs
- Determine instructional goals and objective
- Construct a method for evaluating learner achievement
- Design and select instructional strategies
- Implement the training
- Evaluate the training

2.0 OBJECTIVES

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

(a) Define Instructional System Design
(b) Identify the basic components of the analysis phase
(c) Identify the basic components of the design phase
(d) Identify the basic components of the development phase
(e) Identify the basic components of the implementation phase
(f) Identify the basic components of the evaluation phase
(g) Differentiate between Instructional System Development and Instructional System Design.

3.1 INSTRUCTIONAL SYSTEMS DESIGN

3.1.1What is Instructional System Design?

Instructional System Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities.

Instructional System Design is a field that prescribes specific instructional actions to achieve desired instructional outcomes; the process decides the best methods of instruction for enacting desired changes in knowledge and skills for a specific course content and learner

population. Instructional System design is usually the initial stage of preceding systematic instruction, for which there are dozens of models.

Gropper (1977) has provided an analysis of instructional system design models used in higher education environments. Extending Gropper s list, Andrews and Goodson (1980) analysed 40 models and concluded that instructional design models can serve the following purposes:

Improving learning and instruction by following a systematic approach

Improving management of instructional design and development procedures by

monitoring and controlling the functions of the systematic approach

Improving evaluation processes (including learner performance)

Testing or building learning or instructional theory by means of theory-based design within a systematic instructional model

Despite the vast number of different models recorded in the literature, there are some basic elements reflected in most of the various approaches. These basic elements include the following actions:

Determining the needs of the learners and examining the learning context and environment

Determining the outcomes of the learning programme or course and formulating the learning objectives

Developing appropriate and meaningful assessment criteria and procedures

Establishing the most effective approach(es) to delivering the instruction

Testing and evaluating the effectiveness of the instructional system (both the instruction itself and the performance of the learner)

Implementing, adjusting and maintaining the instructional system

3.1.2 Instructional Design-different contexts:

a) Instructional Design as a Process:

Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction. It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those

needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities.

b) Instructional Design as a Discipline:

Instructional Design is that branch of knowledge concerned with research and theory about instructional strategies and the process for developing and implementing those strategies.

c) Instructional Design as a Science:

Instructional Design is the science of creating detailed specifications for the development, implementation, evaluation, and maintenance of situations that facilitate the learning of both large and small units of subject matter at all levels of complexity.

d) Instructional Design as Reality:

Instructional Design can start at any point in the design process. Often a glimmer of an idea is developed to give the core of an instruction situation. By the time the entire process is done the designer looks back and she or he checks to see that all parts of the "science" have been taken into account. Then the entire process is written up as if it occurred in a systematic fashion.

3.2 ADDIE MODEL AND INSTRUCTIONAL SYSTEMS DESIGN (ISD)

Instructional System Design is a series of steps leading to the production of a successful training programme ISD has numerous approaches and theories available for use by designers and instructors. One model was particularly effective in providing developers with a generic, systematic framework that was easy to use and applicable to a variety of settings. The ADDIE model (i.e., Analysis, Design, Development, Implementation, and Evaluation) presented users with an approach to **instructional system design** that incorporated an iterative process complete with essential steps for the development of an effective course development and implementation) are generally sequential; the outputs of one programme Most ISD approaches contain five major phases (see Figure 1). The first four phases (analysis, design phase are the inputs to the next. The fifth phase, evaluation, involves feedback that applies throughout the model.

Employing the ADDIE model in the development of a programme or course can assist developers in instituting a learner-centered approach rather than a teacher-centered approach, making the program more applicable and meaningful for learners. This unit looks at these phases and describes their purpose, relationships, and results

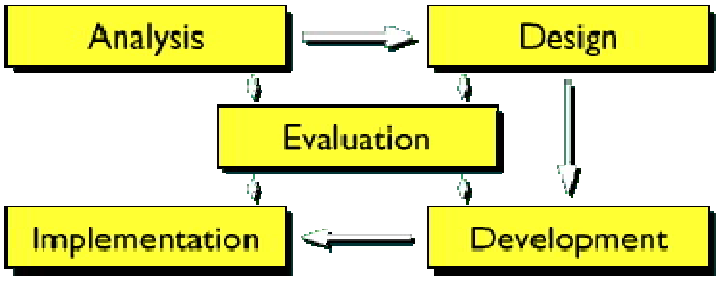

Figure 1. The phases of the Instructional Systems Development (ISD) model

SOURCE: http://www.au.af.mil/au/awc/awcgate/doe/isd/isd_1.htm

3.3 THE ADDIE FRAMEWORK: FIVE PHASES

The ADDIE framework is a cyclical process that evolves over time and continues

throughout the **instructional** planning and implementation process. Five stages comprise the framework, each with its own distinct purpose and function in the progression of **instructional design**.

3.3.1 Phase 1: **Analysis**

In the **analysis** phase, the designers' main consideration is the target audience. First, a needs **analysis** is conducted to determine the needs of the audience by distinguishing between what students already know and what they need to know at the conclusion of the course. During the needs **analysis**, instructors or designers examine standards and competencies to establish a foundation when determining what students need by the completion of the course. Information may also be available from previous course evaluations if the course has already been taught. Subsequently, a **task analysis** is also necessary to identify the **instructional** content or the specific skills related to the course. The content of the course or programme can be analyzed with the aid of course texts and sample syllabi, with a similar focus. With the advent of the Internet, many courses are easily accessible online and can provide a framework or workable template for instructors that are developing a course or teaching a course for the first time. Lastly, an **instructional analysis** is performed to establish what must be learned (Seels & Glasgow, 1998). The designer determines the amount of instruction that is needed in relation to the needs and **task analysis**. "If there is great variability among the members of the target audience, some students will need more and different instruction than others to reach the same goal" (Seels & Glasgow, 1998). The standards and competencies reviewed beforehand will assist in this process.

3.3.2 Phase 2: **Design**

The design process consists of several key facets. Primarily the designer is conducting research and planning throughout this stage. The planning includes the identification of

objectives, determining how the objectives will be met, and the instructional strategies that will be employed to achieve the objectives, and the media and methods that will be most effective in the delivery of the objectives (Seels & Glasgow, 1998). During the design phase, the designer or instructor must consider the information or data from the analysis phase. If a thorough analysis is not conducted instructors or designers may find that they are replicating their efforts during the implementation stage. Thorough planning is necessary in the first two stages and will decrease the need for further research or planning later in the program. Another facet during the design process is assessment. As a vital component of the instructional plan, designers determine how objectives will be assessed and what forms of assessment will be used prior to implementation. The objectives and assessments should align and be meaningful.

When aligning goals and objectives with assessments, designers refer to the analysis phase for data that provides requisite information about the learners' characteristics, prior knowledge, and needs. These details can assist instructors and designers in the selection of appropriate assessment methods or strategies. Following these steps as a guide in developing and selecting assessment methods can decrease the likelihood assessment is occurring for the sake of assessment. If goals, objectives, and assessments do not align, learners may find themselves losing interest in the course or program furthermore, influencing perceptions of the instructional quality. Ultimately, this can affect the long-term retention of participants in the program. Designers who refer to analysis findings and carefully select assessment methods that include a variety of techniques, may find that learners are more likely to become actively engaged in the course content. Students' overt and covert participation can contribute to their overall satisfaction and can determine whether students continue in a program or course (Murphy, 1999).

3.3.3 Phase 3: **Development**

The development phase translates design decisions into training materials. This is where the real work of course development is done. Using the objectives, instructional approach, and media selections from the design phase, development produces course materials for the students and evaluation instruments.

Designers in this stage, develop or select materials and media and conduct formative evaluations (Seels & Glasgow, 1998). Evaluations during the development stage contain a different focus than the actual evaluation format that occurs during stage 5 of the ADDIE process. Encompassing a formative approach, evaluation during the development phase calls attention to the product and the quality standards of the product. Designers are to determine if the students or audience will learn from the product and how it can be improved before implementation.

3.3.4 Phase 4: **Implementation**

In the implementation phase, designers must take an active role rather than a passive role. The designer or instructor's role intensifies with the advent of this phase. In order for the product to be delivered effectively, developers must continue to analyze, redesign, and enhance the product. It can be counterproductive to the implementation of the program if the product or course is left to function in its natural state. No product, course, or program can be effective without conducting an evaluation and necessary revisions throughout the implementation phase. When the learners and instructor are active contributors in the implementation, modifications can be made instantaneously to the course or program to ensure effectiveness.

3.3.5 Phase 5: **Evaluation**

The evaluation phase is an essential component of the ADDIE process and is multidimensional. The evaluation phase can occur during the development stage in the form of formative evaluations, throughout the implementation phase with the aid of the students and the instructor, and at the end of the implementation of a course or programme in the form of a summative evaluation for instructional improvement. Throughout the evaluation phase, the designer must determine if the problem has been solved (relevant to training programs), if the objectives have been met, the impact of the product or course, and the changes that are necessary in the future delivery of the programme or course. The evaluation phase should be an integral part in the continuation of analysis and effective implementation of future courses and programmes.

3.4 INSTRUCTIONAL SYTEM DESIGN AND INSTRUCTIONAL SYSTEM DEVELOPMENT

In some literature, instructional system development is often used to mean the same thing as instructional system design. It is important to consider the two terms with a view of making a clearer perception and understanding of the two terms.

Instructional System Development is much more encompassing than Instructional System Design but the two terms go together. The situation is such that one leads to another. Preceding any instructional system development is instructional system design. The design must be carefully worked out in form of a master plan which must be implemented before one could actually say it is workable or not.

The total process of designing, producing, evaluating and managing of instructions is what is known as Instructional System Development (ISD). An instructional system development could be regarded as a systematic approach to design, production, evaluation and utilization of complete systems of instruction, including all appropriate components and a management pattern for using them. It is larger than instructional product development, which is concerned with only isolated products, and is larger than instructional design, which is only one phase of instructional development. It is evident that instructional system design is just

an aspect of an instructional system development but a very important aspect for that matter. Its importance lies on the fact that any mistakes made at this stage would be reflected in the entire process.

3.5 THE IMPORTANCE OF INSTRUCTIONAL SYSTEM DESIGN AND INSTRUCTIONAL SYSTEM DEVELOPMENT

Any teacher, any school, any institution interested in improving learning and/or performance, interested in moving from good to great, in meeting quality and productivity goals needs Instructional System Design and Development.

Instructional system design and development have been proved to be useful in that all variables whether external or internal that can hinder learning are always taken into consideration with a view to maximizing gains of instruction.

Instructional system design and development pave way for a rather scientifically based instruction. Instruction is thereby designed in a step by step approach that would lead to the achievement of instructional objective. By designing and developing instructional packages the whole subject matter is presented in a logical and meaningful order in such a way that learning can be guaranteed.

Since instructional system design and development use systematic approach, immediate feedback is guaranteed and revision of instructional procedures is equally assumed.

3.6 THE BENEFITS OF INSTRUCTIONAL SYSTEM DESIGN

The main advantage of instructional systems design (ISD) is that it is a systematic decision-making process of finding a solution to an instructional problem. The ISD approach brings about innovations that can translate learning problems into instructional plans so that the quality of the instruction is assured. ISD focuses on achieving set learning outcomes and, therefore, the instructional objectives show all stakeholders (e.g., learners, learning facilitators, administrators, employers and parents) what the intentions of the learning materials are. Performance standards and assessment criteria provide a means of determining whether or not those outcomes have been met. Clients and users can thus trust the effectiveness of the instruction, because all aspects that would influence the design are considered and the final version of the learning materials has been revised and tried out until the learning outcomes are met.

4.0 Conclusion

It is clear that designing and developing instructional systems and process is a thorough and complex process aimed at solving particular instructional and learning problems.

Instructional designers address three fundamental concerns, namely:

Goals: What are the goals of the instruction? (*Where are we going?*)

Instructional strategy: What is the instructional strategy and the instructional medium? (*How will we get there?*)

Evaluation: How will we evaluate and revise the instructional materials for future improvement? (*How will we know when we have arrived?*) (Smith and Ragan, 1999)

5.0 Summary

In this unit, we have considered instructional system design, which is an arrangement of resources and procedures to promote learning. It is also the systematic process of developing instructional systems while instructional development is the process of implementing the system or plan.

The acronym "ADDIE" represents each phase of the ISD process: Analysis, design, development, implementation, and evaluation: these are the production steps of training. The strengths of the ISD approach are its simplicity, reliability, self-adjusting mechanism, and applicability to a broad range of training and educational needs. Attempt was made to differentiate between instructional system development and instructional system design.

6.0 Tutor-Marked Assignment

1. What is instructional system design?
2. What is instructional system development?
3. Explain the phases of instructional system design(ISD).
4. What are the benefits of ISD?
5. What are the benefits of instructional system design and instructional system development.

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UNIT 3 STEPS IN INSTRUCTIONAL SYSTEM DESIGN

1.0 Introduction

Instructors should have an appreciation of the fundamentals of instructional design. You might find yourself in a position where the instructional materials that you have been provided are not as well suited to your learners or you might find yourself in a position where you need to modify the materials to fit a specific audience. This unit will give you a basic knowledge of instructional design, and enable you to recognize and apply basic, effective instructional design methods.

2.0 Objectives

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

(a) List the stages of instructional systems design.
(b) State the goal of Instructional System Design.
(c) Discuss each of the stages of instructional systems design

3.1 Steps of Instructional System Design

Instructional System Analysis provides a means for sound decision making to determine the who, what, when, where, why, and how of training. The concept of a system approach to training is based on obtaining an overall view of the training process. It is characterized by an orderly process for gathering and analyzing collective and individual performance requirements, and by the ability to respond to identified training needs. The application of a systems approach to training insures that training programmes and the required support materials are continually developed in an effective and efficient manner to match the variety of needs in an ever rapidly changing environment.

Instructional systems design is considered to be both a science and an art. A science because it is rooted in learning theories. and an art because the designing of instructional materials is a highly creative process. (Moore, Bates & Grundling, 2002). ISD synthesizes instructional practice, research, and theory into a methodology for learning development that is systematic (inputs produce outputs which, in turn, become inputs) and systemic since the components have a symbiotic relationship (Edmonds, Branch, and Mukherjee, 1994).

The goal of instructional design is to create successful learning experiences and to engender transfer of training. ISD provides a road map to guide designers and instructors through analysis, design, development, implementation, and evaluation of the goal. The ISD road map (the science) provides a route to many different destinations depending on the turns (the art) one chooses to take. At its most basic level, instructional design focuses on three fundamental concerns: identifying the goals; selecting the strategy; and, evaluating success. (Moore, Bates & Grundling, 2002).

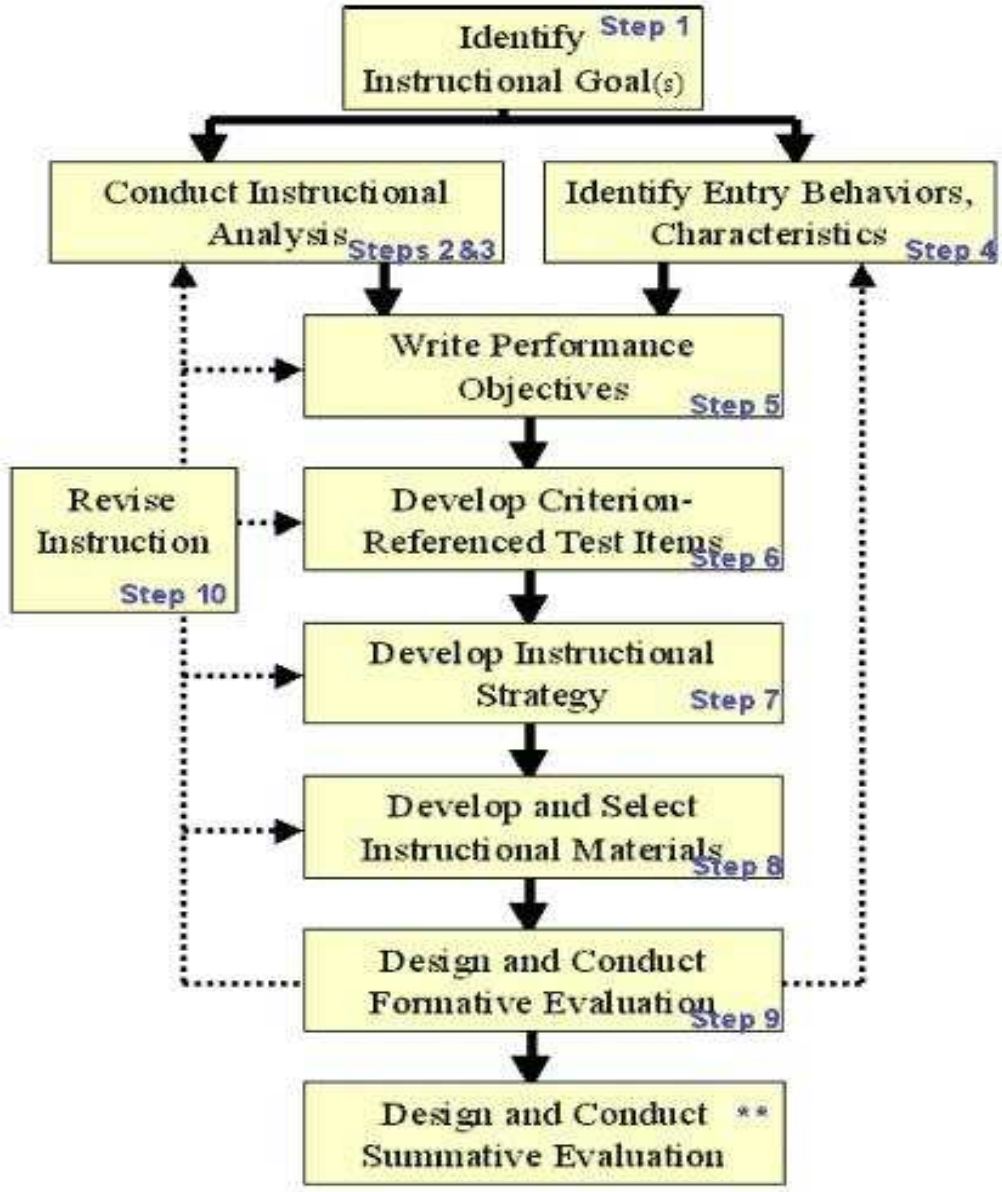
The instructional process, or teaching, has traditionally involved instructors, learners, and textbooks. The content to be learned was contained in the text, and it was the instructor's responsibility to "teach" that content to the learners. Teaching could be interpreted as getting content from the text into the heads of learners in such a way that they could retrieve the information for a test. With this model, the way to improve instruction is to improve the instructor (i.e., to require the instructor to acquire more knowledge and to learn more methods for conveying it to learners).

A more contemporary view of instruction is that it is a systematic process in which every component (i.e., teacher, learners, materials, and learning environment) is crucial to successful learning. This perspective is usually referred to as the systems point of view, and advocates of this position typically use the systems approach to design instruction.

3.1.1 Step 1 - Write the instructional goal(s)

This is an overall statement the designer will write about what he or she expects the learner to be able to do at the end of the instruction. If you say, "The learner will know how to perform a task", this only tells us what he or she knows, not what he/she is capable of doing. The goal needs to state demonstrable actions (it is behaviour that we are after). As you refine your statements about what the learner will do, ask yourself "If someone was doing those actions, would you agree that they have achieved the learning goal?"

Figure 2



3.1.2 Step 2 - **Goal statement analysis**

What the designer does next is to classify the instructional goal either as a verbal skill, an intellectual skill, a psychomotor skill, or an attitudinal goal. By doing this, the designer will use different strategies in the design process. The designer will also breakdown the goal into 5 - 15 main steps to get a picture of the major elements it comprises.

3.1.3 Step 3 - Subordinate skills analysis

This task is where the designer spends many hours dissecting and breaking down the main steps into subskills. Each of the subskills required for each step will in turn be broken down into subskills needed for them. This backward stepping breakdown process is extremely important and continues until the designer comes to a set of very basic skills. You will do best if you completely remove the question, "How am I going to teach this?" At this phase of the design, you are a scientist, dissecting the performance of someone 'doing' the instructional goal. You will ask yourself, what subskills are necessary to perform this certain step without which it would be impossible to perform it. The product of this work will be a large hierarchical diagram displaying all the required subskills. See example 1.

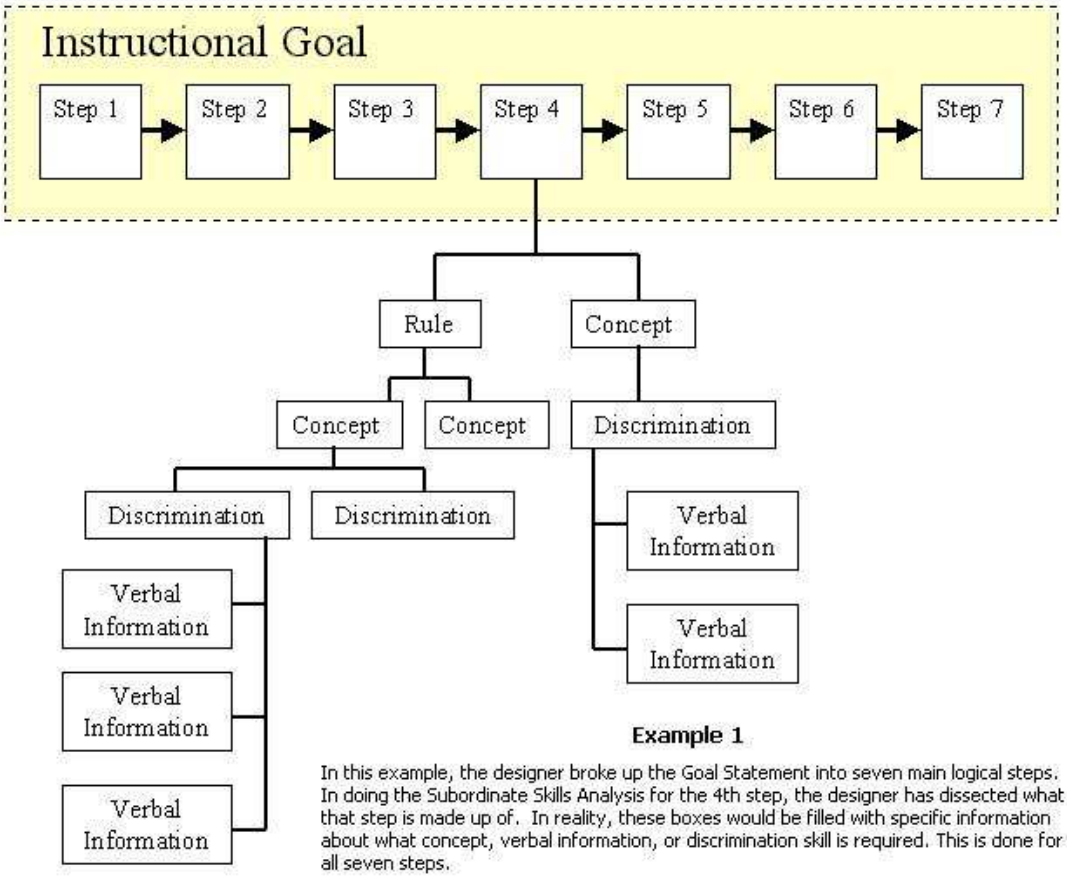


Figure 3

3.1.4 Step 4 - **Identify Entry Behaviors and Characteristics**

You now need to identify the learners' entry behaviors. That is, what is it that the learners are already capable of doing? Asking a few questions from individuals in your target group will certainly be better than relying on guesses or stereotypes. You will make horizontal dotted lines on your diagram which say, students will have to come to the instruction being able to perform all the skills up to this mark. That is, "My instruction will assume certain proficiencies and start from that skill set." Not only do you want to make sure that they are

ready for the instruction, but you must also determine if they already have some of the skills you have identified for instruction.

3.1.5 Step 5 - **Write performance objectives**

In this phase, you will go through each sub-skill box of your instructional analysis diagram and write a clear and precise statement about what behavior the learner will exhibit, under what conditions, and on what criteria it will be judged successful.

Let's now ask the defining question, "Would someone be able to determine if the learner has indeed performed this skill?" The answer is clearly yes. These performance objectives are important statements about what demonstrable behavior the learner should be able to do to indicate that he or she 'knows' it.

3.1.6 Step 6 - **Develop criterion-referenced test items**

Here we create our test items. Why should we create content if we don't yet know what we will expect of the learners? Using the criteria created for each performance objective, you will create questions that would show whether or not the learner can perform the skill. The type of test item, be it multiple choice, fill in the blank, essay, or other, should be dictated by the verbiage of the performance objective. Questions, such as essay types will need special evaluation instruments such as a checklist to verify that each key element of the answer has been addressed. The most important thing a designer does in this phase is to create a number of clearly phrased questions that give the learner the opportunity to demonstrate that he or she can perform a given skill. Questions that trick confuse, or test skills other than that of the performance objective are useless.

3. 1. 7 Step 7 **Develop Instructional Strategy**

Based on information from the five preceding steps, identify the strategy that you will use in your instruction to achieve the terminal objective. The strategy will include sections on pre-instructional activities, presentation of information, practice and feedback, testing, and follow-through activities. The strategy will be based on current theories of learning and results of learning research, the characteristics of the medium that will be used to deliver the instruction, content to be taught, and the characteristics of the learners who will receive the instruction. These features are used to develop or select materials or to develop a strategy for interactive classroom instruction.

3.1.8 Step 8 - **Develop instructional materials**

Here, you finally get to develop (or programme) the materials. Because your instructional material will certainly be revised before final production, you should construct them on paper using text, sketches, and storyboards. The development should include a student manual, the instruction, tests, and an instructor's manual. Choices of multimedia should be made upon the

congruence between the skill and the media type. Practice and feedback should be as close to the real world situation as possible.

3.1.9 Step 9 - **Conduct formative evaluation**

Formative evaluation is the testing that takes place to help you smooth out your instruction. Even with all of your tedious and careful analysis, planning, and reviewing, you have only created instruction that will theoretically work. It is now time to test these assumptions empirically. If done with the instructional design itself as a framework, you will be able to pinpoint the exact areas that will need the improvements.

Ideally you will conduct three rounds of evaluation. First, with three to five students on a one-to-one basis, second, with eight to twenty randomly selected target students, and third, a field trial with about thirty students. Each of these evaluations will give you the different products you will need to re-evaluate all parts of your instructional intervention.

3.10 Step 10 - **Revise instruction accordingly**

This step is cycled with step 9 three times, once for each of the evaluation types. In this phase, you will revise the instruction itself or the procedures of how the instruction is used. Your summaries from the formative evaluation will include learners' remarks, scores on pretests, embedded tests, post tests, your attitude questionnaire, and your debriefing notes. Using tables that show both individual and group score results categorized by learning objectives, you should first analyze the inter-objective responses to find if there are problematic test items that need to be thrown out. The point is to focus on which objectives need revision. The designer will typically create a revision table that includes the instructional component, the problem encountered, the suggested change, and the evidence and source for the problem. Your revision could involve changing any of the many design steps up to this point.

4.0 Conclusion

Often, the instructional systems design process may be portrayed as linear. In practice, however, it is frequently iterative, moving backwards and forwards between the activities as the project develops. While ISD is intended to provide the external conditions for learning, the learning still remains the responsibility of the learner. In other words, the designer can select and arrange certain external conditions to assist in the internal learning process. The designer s function, therefore, is to plan the learning experiences that results in changing current behaviour, performance and cognition to some new, as yet unlearned, behavior and mental processing in order to achieve set learning outcomes.

5.0 Summary

The ISD approach brings about innovations that can translate learning problems into instructional plans so that the quality of the instruction is assured. ISD focuses on achieving set learning outcomes and, therefore, the instructional objectives show all stakeholders (e.g., learners, learning facilitators, administrators, employers and parents) what the intentions of the learning materials are. Performance standards and assessment criteria provide a means of determining whether or not those outcomes have been met. Clients and users can thus trust the effectiveness of the instruction, because all aspects that would influence the design are considered and the final version of the learning materials has been revised and tried out until the learning outcomes are met.

6.0 Tutor-Marked Assignment

1. List and explain the steps of instructional system design.
2. State The goals of instructional system design.
3. Choose a topic in your subject area and use the steps of ISD to design instruction for this further.

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UNIT 4 TASK ANALYSIS AND THE TEACHER 1

1.0 Introduction -The Analysis of Learning Task

Task analysis involves breaking a task down into functional behavioral units. Tasks are broken down into sub tasks. Subtasks are broken down into elements. Elements are broken down into steps. The amount of detail that is necessary in breaking down a task is dependent mainly on the prerequisite skills of the targeted learners. The general recommendation is that learners with lesser prerequisite skills will require a more finely detailed analysis with more steps. The complexity of a task analysis can range from a simple listing of steps to a detailed study of a job. It all depends on the particular situation. This analysis becomes the basis for writing performance objectives, performance measurements, sequencing instruction and other design decisions.

2.0 Unit Objectives

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

(a) define task analysis
(b) define subskills
(c) state the purpose of a task analysis.
(d) explain why a task analysis is important when designing instruction or learning environment.
(e) explain the three major components to task analysis
(f) do a task analysis

3.0 **What is Task Analysis?**

Task analysis for instructional design is a process of analyzing and articulating the kind of learning that you expect the learners to know how to perform (Jonassen, Tessmer, & Hannum, 1999). The first step in the design of any instruction is a task analysis to determine what should be taught" (Polson, 1993).

Designing instruction for a course or topic must surely begin with an idea of the purpose of what is being designed. The greatest clarity in conception of the outcomes of instruction is achieved when human performances are described. The question initially asked by the teacher is not *what will students be studying*? but rather *What will students be doing after they have learned?* This means that design begins with a consideration of instructional objectives.

The set of tasks, created for the student to meet a long term goal or objective, is built on a hierarchy of steps. It moves from general to specific. The logical nature of task analysis allows instruction to follow a guideline or set of tasks with short term goals throughout the

instructional plan. These smaller goals help the student achieve success and build confidence, as they work toward the long term goal.

3.1 **Why do designers perform task analysis**

According to Jonassen et al.(1999) instructional designers perform task analysis in order to determine:

- the goals and objectives of learning
- the operational components of jobs, skills, learning goals or objectives, that is, to describe what task performers do, how they perform a task or apply a skill and how they think before, during, and after learning
- what knowledge states (declarative, structural, and procedural knowledge) characterize a job or task
- which tasks, skills, or goals ought to be taught, that is, how to select learning outcomes that are appropriate for instructional development
- which tasks are most important-which have priority for a commitment of training resources
- how to select or design instructional activities, strategies, and techniques to foster learning
- how to select appropriate media and learning environments
- how to construct performance assessments and evaluation.

3.2 **Major components of task analysis**

There are three major components of task analysis: method, content and process.

Method refers to the way in which a task is to be performed. For a particular task, a subjective decision is made by the task analyst as to which method; of the methods available is the best to use for a particular set of students.

Content refers to the steps into which the method is divided. Each step is numbered and described in detail. The number of steps in a content task analysis will vary depending on the needs of the individual student. The detailed description of the steps in the content task analysis is intended to provide each person who will be working with the student with a clear understanding of the steps involved in completion of the task. It is not meant to be used as a set of verbal instructions to be given to the student during the teaching process.

Process refers to the teaching strategies which will be utilized to teach the content. The process includes information on not only the format or method of presentation, but also on the feedback which will be given to assist the student in learning the skill, as well as the types of reinforcers and schedule of reinforcement which will be given to provide motivation for learning.

3.3 **The teacher in the process of task analysis**

Teaching is one of the most complex human endeavours imaginable. Teachers arrange content information around an organizing idea, determine appropriateness of available resources, and make judgment about the people involved. Generally, teachers formulate the instructional plan, they not only consider the necessary skills to be taught to reach the long term goal, but they must also incorporate quantifiable methods for measuring student achievement. Task analysis requires teachers to create logical and concrete ways to measure a student's success at each point in the instructional plan. If a student has not performed well on the evaluation or mastered the skill, then further practice is required until the student masters the specific skill or subskill.

Subskills are smaller skills to help students reach short term goals. Students are not measured against the performance of other students, but on their ability to meet the tasks created for them. The assessments are based on whether or not the student can perform the skill. Continuous evaluation allows the teacher to measure student progress in a precise manner and on a daily basis. With the individualized nature of task analysis, each child is permitted to practice a skill at his or her own rate until mastery occurs. Mastery is reached when a student's response is accurate and timely.

Although the instructional plan and the evaluation process are very specific and task oriented, teacher involvement is an essential part of the approach. The teacher creates the sequenced instructional plan based on expertise, experience, and interaction with the student. He or she decides which tasks are essential for the student to achieve the long and short term goals, and the necessary proficiency level.

Teachers, utilizing a task analysis approach, incorporate certain techniques in their programmed sequence of lessons, such as motivational factors to inspire and maintain a student's attention, and clearly presented tasks for a student to complete. They also offer opportunities for student participation, and provide teacher feedback to the student. Reaching a mastery level for any set of skills or tasks is aided by a teacher's positive influence on a student through incentives, rewards, positive reinforcement etc. Verbal praise and academic success are major motivators. An organized and precise instructional plan coupled with a dedicated teacher results in student success.

The task analysis approach is geared toward individualized instruction and continuous assessment. In the area of reading, the approach is used to remedy difficulties through small, logical steps leading to a general goal. Many students feel defeated when they are unable to achieve success in the classroom. By conquering smaller tasks, a student gains confidence in his or her ability. Constant evaluation with each subskill, keeps the teacher abreast on student progress. Mastering each sequenced step provides a solid foundation for the overall

instructional goal. The task analysis approach is utilized as a logic-based remediation method to improve teaching and learning as well as provide tools for student success.

4.0 Conclusion

Task Analysis is an essential part of any instructional design process in designing instruction or learning environments. Understanding and articulating the ways that learners need to think or perform is absolutely essential to designing effective instruction or learning environments. Often, instruction fails to support learning because the instructional designers fail to perform a competent task analysis, resigning themselves to redundant, inappropriate, reproductive forms of instruction that do not support the kind of learning that the designers had really intended but were unable to analyze and articulate.

5.0 Summary

Planning for teaching by task analysis requires the teacher to identify all of the skills required for completion of a specific task.

The teacher must break the task down into small teachable steps, determine the prerequisite skills or entry behaviours the student should have prior to learning task, design the specific teaching strategies and procedures needed for the learner to acquire the task and determine what level of reinforcement will be provided during the teaching process.

6.0 Tutor-Marked Assignment

1. What is task analysis.
2. List six reasons for performing task analysis.
3. Define sub-skills.
4. Explain the three major component to task analysis.

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UNIT 5 TASK ANALYSIS AND THE TEACHER 2

1.0 Introduction

Designing instruction for a course or topic must surely begin with an idea of the purpose of what is being designed. The greatest clarity in conception of the outcomes of instruction is achieved when human performances are described. The question initially asked by the designer is not, What will students be studying? but rather, What will students be doing after they have learned? This means that design begins with a consideration of instructional objectives. The ordering of this unit reflects an important fact about the procedure of instructional design. It also introduces you to performance task and learning task as an aspect of task analysis.

2.0 Objectives

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

(a) Differentiate between performance task and learning task.

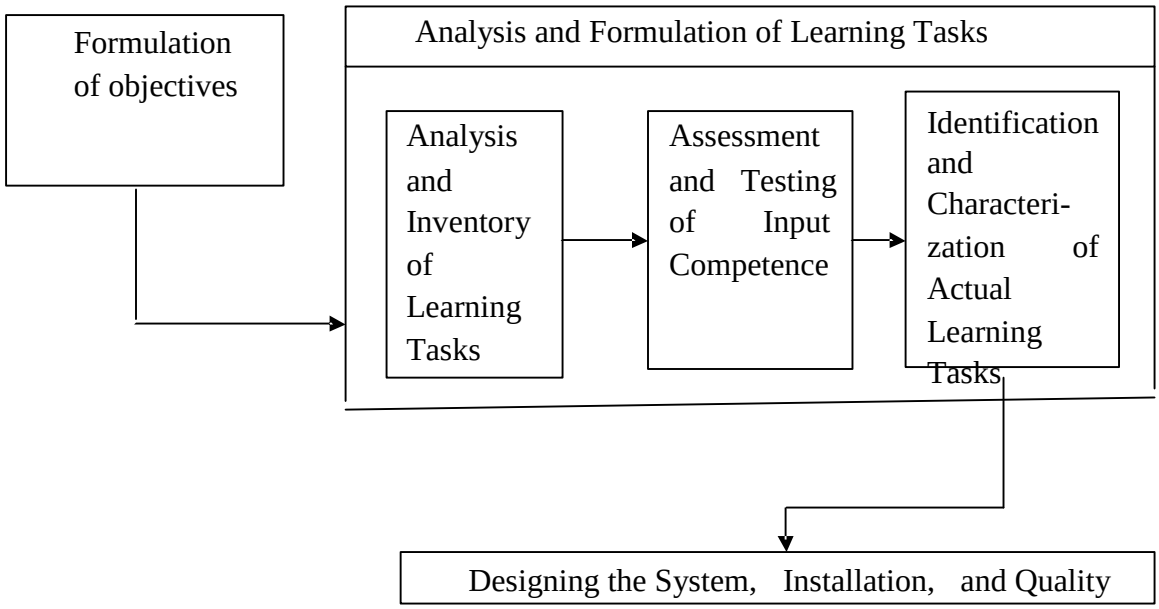
(b) Identify the actual learning tasks.

(c) Explain strategies to analyze and formulate the learning task.

3.0 The Analysis of Learning Task

Once the specific performance expected of the learner has been identified, the teacher can consider what he has to learn in order to be able to perform successfully. The next step is for the system designer to analyze and formulate the learning tasks. The analysis and formulation of learning tasks is a procedure having a structure specific to it and it is composed of a set of strategies (Figure 4)

Figure 4:



3.1 The Analysis and Inventory of Learning Tasks

If it is known from a statement of objectives the particular terminal performance expected of a student, we must then ask ourselves what the student has to learn so that he/she can perform in the expected way. In other words, we must determine the human capabilities skills, knowledge, and attitudes that the individual needs to have in order to carry out the specified output performance.

3.2 Learning task and Performance task

It is important that we understand the difference between performance tasks and learning tasks. Performance tasks, as described in a statement of objectives, communicate to us behavior which the product of the system is expected to be able to exhibit at the output point. Learning tasks and their analysis identify whatever learning is to be undertaken by the learner to enable him to demonstrate the performance described.

The need to conduct an analysis of learning tasks is questioned by some. If an objective is stated specifically enough doesn t it inform us as to what has to be learned? If the expected performance is described on behavioral terms, doesn t it also describe the learning task? The answer to these questions is not necessarily negative. It may well be that for certain categories of behavior; a description of output performance may also identify the learning tasks. This could be the case when the process of the acquisition of certain behavior falls

into such categories as response and chain learning. More specifically, whenever the attainment of a performance task requires only imitative behavior, we can say with some confidence that a statement of the task may also imply the learning task.

Most of the performance we want to facilitate in school however, is within the cognitive and affective domains. Some of the types of learning involved here are

- multiple discrimination,
- perception and use of concepts and principles,
- problem solving, and
- decision making.

A description of performance expectation in these domains will rarely, if ever, suffice as identification of learning tasks. Although it may be implied, a learning task is not explicit in a statement of performance. It must be uncovered, deduced by an examination and analysis of the task itself.

3.3 Examples of Analysis of learning tasks

The following examples demonstrate the analysis of learning tasks.

The learner will be able to perform such tasks as

- Answering questions in reference to concrete phenomena immediately observable in the environment.
- Asking questions about the same.
- Describing a picture or object.
- Describing his actions or the actions of those around him.
- Repeating a short story he has just heard.
- Engaging in a conversation about events in which he has been involved.

An analysis of learning tasks commences by considering what has to be learned by the student so that he will be able to communicate in the situations described and with the accuracy specified. The learning task, of course, is not to memorize utterances that may be used in communication events under the circumstances described in the objective. Underlying even a brief utterance is a complex set of patterns operating in the various psychomotor, cognitive, and effective domains of communication behavior.

The learning task in foreign language acquisition is to learn to perceive and use these patterns and, thus, to learn to generate novel utterances appropriate to the specific referential, situational, and cultural contexts in which the individual participates. Only a scientific analysis of the subject language and cultural will be able to uncover all these patterns emerging from such analysis would suggest the establishment of the different categories of

an inventory of learning tasks. One of these categories could cover sound features, intonation, and stress patterns. Another one could list sentence patterns the learner has to be able to use in order to speak in the manner implied by the objective.

The designer should include in the inventory specific paralanguage features and kinesics. Furthermore, the analysis must identify typical situations that are representative of the circumstances indicated in the statement of objectives and in the description of performance tasks. The analysis must also refer to categories of vocabulary that are related to the specified situations. The items uncovered in the task analysis can be listed and arranged in an inventory. The information in this inventory will then serve as input data in the design and development of the system.

The next example concerns the analysis and inventory of learning tasks on the pre-primary levels. The project conducted at the Pacific Grove, California, School System in 1967 attempted to develop a guidance subsystem for parents of children entering kindergarten. The purpose of this subsystem was to assist parents to prepare their child for his new public school experience. Of the numerous areas of development, social interaction was explored in depth. A whole set of objectives was formulated of which only one will be presented here as an example.

In a kindergarten class, under the direction of the teacher, having heard a recorded story at a listening post, a child within a group of six to eight children will participate in discussing a story with his peers. **Expectation:** Within a four-week period, an increase of frequency of verbalization will be considered growth.

This objective was subjected to an analysis. The outcome of the analysis as reported here is not inclusive at all. It gives only hints of the types of learning tasks that a complete analysis would eventually uncover.

It is obvious that the child has to learn to converse on a given topic. But what does the child have to learn specifically in order to be able to do this?

The analysis suggest that he has to learn to

- Comprehend what has been communicated to him; to grasp significant elements and relationships.
- Recall the story, its significant elements and relationships; recall events in chronological order.
- Organize his verbal account of the story with authenticity (significant elements, relationships, order, and so on).

In order to do these things, he also has to learn to

- Use patterns of language commonly used in the classroom.

- Use words within their common range of meaning.

In addition, he must learn to

Understand that there are activities in which he is expected to participate.
Pay attention to what is being said.
Respond to certain verbal and nonverbal cues.
Wait for his turn.

This analysis demonstrates that a description of expected output behavior is only a basis for an analysis of learning tasks and it is not in itself a description of them. As a result of an inquiry of what has to be learned in order for the learner to be able to behave in the way described in the performance tasks, an inventory of learning tasks can be formulated. This inventory, however, will contain-most likely more than what actually has to be learned.

3.4 Input Competence

In most instances-probably in all instances, we will find that the learner brings to the learning situation some skills, information, attitudes, and so on, that are relevant to what he is supposed to learn. It would be a waste of time to teach competences that the learner already possesses. We usually refer to competences that are relevant as the initial or input capabilities of the learner.

It is the job of the system designer to assess the capabilities the student has already acquired relative to the learning inventory. This assessment is pertinent even in a case where the learner acquire some esoteric knowledge, such as a foreign language he has never heard of. The learner of the foreign language will have at his disposal at the input point features of his native language that is transferable into the target language.

3.5 Input Test

By using an input test we can determine what a student already knows about a subject. Of course, this will vary from one student to another. To consider this variation is highly important. If we do not pay attention to individual differences in input capabilities we invite trouble. The learner who has not acquired the capabilities may be frustrated and will probably lose interest. A test of input capabilities will help to avoid both pitfalls. It will make it possible to provide a pre-input program to overcome deficiencies in some students and to arrange for the advanced placement of others.

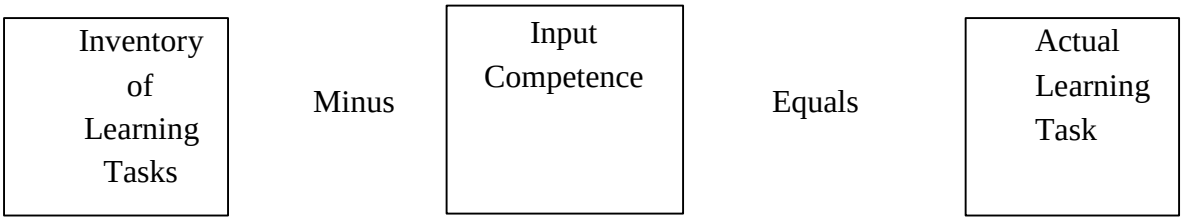
3.6 The identification and Characterization of Learning Tasks

It has already been mentioned that in most cases we will find that the learner has already acquired capabilities relevant to a particular set of learning tasks. The way to identify the

actual task of learning is to subtract whatever is already known to the learner (input competence) from a specific set of learning tasks (inventory of learning tasks). See figure 2

Figure 5

Computing the Actual Learning Tasks



For example, in learning to tell time in a foreign language, we will list in the inventory of learning tasks, the ability to properly identify numbers as represented by the figures from 1 to 12. It will be expected, however, that this capability will be possessed by the child as an input competence. This capability, therefore, will not be identified as an actual learning task.

The characterization of learning tasks provides additional information about learning tasks. This information will be used as input data for the design of the system. There are two ways that this characterization can be accomplished. One is to specify the type of learning the acquisition of a particular learning task represents. Gagne (1965) identifies a whole set of learning types, such as

- signal learning,
- response learning,
- motor and verbal chains,
- multiple discrimination,
- concept learning,
- principle learning, and
- problem solving.

These types differ significantly as to the particular conditions which need to prevail in order to ensure the mastering of learning tasks for different types. For example, producing a new foreign language sound is identified as a response learning, learning of copying a sound. The conditions governing this learning are very much different from the learning of the use of a new sentence structure, which is principle learning. The use of a grammatical structure cannot be learned by copying or memorizing sentences in which the structure occurs.

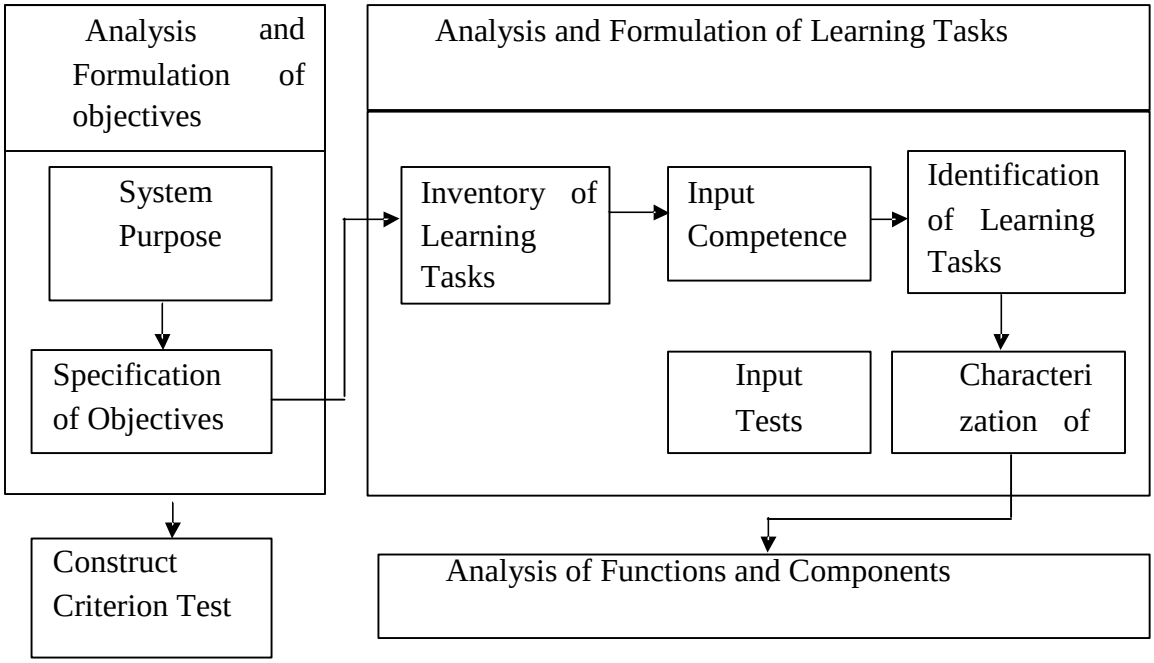
The identification of the type of learning a learning task represents is indeed a most useful information. This identification is one of the bases upon which to select and organize learning content and learning experiences. This information is needed for two purposes.

First, it can be used to project the time needed to hurdle a learning task, and second, it guides in making an estimate of the amount of needed content for the treatment of any particular learning task.

3.7 A Review of Strategies and an Examination of the Nature of tasks

The analysis and formulation of learning tasks lead the system designer to a point where he can clearly state what has to be learned in the system in general and by specific students in particular. The information in Figure 6 provides this briefly and reviews the strategies involved in this process. It also accounts for preceding strategies.

Figure 6: Strategies of Analysis of Learning Tasks



The data gained from the formulation of objectives serve as basis from which to proceed with a query of what has to be learned in order to attain the objectives of the system. As a result of this inquiry, an inventory of learning tasks is evolved. This inventory is then subjected to further analysis. In most cases we find that the learner has previously acquired some of the tasks listed in the inventory minus relevant input competence. Once the designer has identified the actual learning tasks, he must characterize them as to the type of learning they represent and as to the degree of difficulty they pose for the learner.

The nature of the processes employed during the strategies described up to this point is primarily analysis, but at times it is also synthesis. To begin with, an analysis of systems purposes leads to gathering data from which, through further analysis, a statement of

objectives can be developed. The objectives must then be further analyzed in order to identify whatever the learner has to learn in order for him to behave in the way prescribed. This analysis provides the learning inventory. To assess input competence, a test relevant to the learning inventory versus input competence furnishes a set of actual learning tasks that can be characterized as to the kind of learning they represent and degree of difficulty and they pose for the learner. Again, the integrated use of analysis and synthesis appears to be characteristic of these strategies.

4.0 Conclusion

In order to design instruction that will support learning, it is essential that we understand the nature of the tasks that learners will be performing. This is true whether you are designing traditional, direct-instruction or problem-based constructivist learning environments. If you are unable to articulate the ways that you want learners to think and act, how can you believe that you can design instruction that will help them?

5.0 Summary

Task analysis refers to several different, though interrelated, procedures which are carried out to yield the systematic information needed to plan and specify the conditions for instruction. The three procedures described in this unit are (1) analysis and inventory of learning tasks; (2) assessment and testing of input competence and (3) identification and characterization of actual learning tasks. All three types of analysis begin with target objectives for lessons or courses.

6.0 Tutor-Marked Assignment

1 What is the difference between performance task and learning task.

2 With examples define Analysis of learning tasks

3Explain the following

a Initial or input competence

B Input test.

4 Describe how do you identify the actual learning task?

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MODULE 2: Systems Approach and Fundamentals of Application of Systems to Instructions

Unit 1: General Overview of Systems

1.0 Introduction

System is a term that has been variously conceptualized and defined by various authors. In this unit we are going to take a critical look at systems, various definitions of systems by various authors. Also, attributes of systems as well as different types of systems would be considered.

2.0 Unit objectives

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

(1) Define system:

(ii) Mention the characteristics of system
(iii) Explain the types of system
(iv) Explain instructional systems

3.1 General Overview of Systems

Oxford Advanced Learner s Dictionary refers to system as a group of things or parts working together and connected in some ways to form a whole. In addition, Silvern (1969) was of the opinion that system is the organization of an orderly whole clearly showing the inter-relationship of the parts to each other and the whole itself. In the words of Kaufman (1968), system is the sum total of separate parts working independently, and in interaction to achieve previously specified objectives. Banathy (1968) corroborates this too, explaining that a system refers to an object or event made up of parts that are cooperatively working together, mutually independent and functionally related for a predetermined purpose. Adewoyin (1991), sees a system as an assembly of interacting elements working independently and in interaction with one another to achieve common objectives. A system can be perceived by as a method or procedure e.g. system of coping with stress in an environment. Others see it as a set of principles or rules linked in an orderly way to show a logical plan e.g. administrative system (Ajelabi, 2005).

3.2 Terminologies Related to Systems Concept

(i) Input: This is a collective term which refers to everything that the system receives from its environment for its sustenance. These includes persons, energy, finance, information etc.

(ii) Output: This is another collective term which refers to whatever the system sends back into the environment. It is this output which enables the system to meet the expectations, requirements, and demands of its environment. In a nut-shell, output represents systems product.

(iii)Throughput: This is the process component of a system. This is illustrated below:

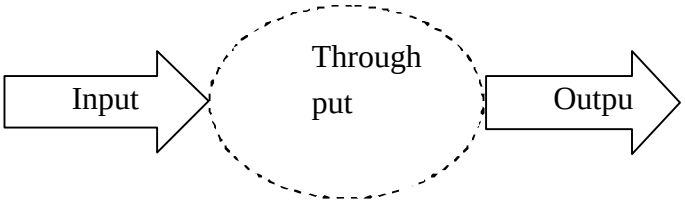

Fig 1

(iv)Sub-system: This refers to a component, element or segment of a system, e.g. if an atom is considered as a system, the sub-systems include proton, neutron and electron.

(v) Supra-system: This refers to the bigger system which surrounds the system. In other words, it is the outer environment from where the system obtains information, energy or other means of sustenance.

3.3 Attributes of Systems

1. A system is assumed to be surrounded by an environment otherwise known as the supra-system. The system also releases the products of its internal processes in this same environment.

2. A system is made up different parts which are related to the other. These parts work together for the over-all well being of the whole. These parts are known as the sub-systems. Every system is organized to achieve a goal. No system exists without a goal. This means that each system is goal-serving or value-ladden.

3. The parts of a system are interdependent and functionally related. This means that the parts work cooperatively to achieve previously specified goal or objective

4. Systems could be natural, artificial or both at once. Examples of natural systems include Solar system, Ecosystem and Body system. Example of artificial (man-made) systems include Computer systems, Highway system. Examples of natural-cum-man-made system include Hydro-electric power system, water supply system.

5. Each system has its own boundary which can be closed or open. However, most systems are open and they continuously interact with other systems within the supra-system.

6. System is relative. What somebody considers as a system may be seen as a sub-system by another or same person at different times depending on the perspective from which it is being examined.

7. Systems are multidimensional. Whilst a system could be as large and complex as the entire universe, another system could be as small as an atom.

3.4 Types of Systems

Open and Closed Systems: A system is closed if the boundaries are sealed off from the environment in such a way to forestall interaction between the system and its environment. A system is open if its boundaries have breaks which enable the system to interact with its environment. The bigger the breaks, the more open the system and the more inputs it has to cope with. For practical purposes, one cannot speak of completely closed or completely open systems for according to Banathy (1978), closedness or openness are matters of degrees. The more varied and complex the inputs, the more complex the system and its input. The less varied the input, then, the less varied the output and the more closed the system is.

Simple and Complex Systems: The main determinant of simplicity or complexity of a system is the input. The more varied or complex the input, the more complex the system and its output. Conversely speaking, the less varied the input, the less varied the output.

Macro and Micro Systems: These two words- macro (large) and micro (small) are relative. Macro systems are more complex than the micro systems. Nigerian educational system at the federal level can be described as macro while at the state or local level it is micro.

Deterministic and Probabilistic Systems: Deterministic systems are sometimes referred to as mechanistic systems. Their behaviour can be determined precisely with high degree of certainty or precision. An example is the electrical system whose behaviour can be predicted with high degree of certainty as opposed to probabilistic system. Probabilistic systems are the opposite of deterministic systems. Systems that include human beings fall into this category, for example the cultural system of a community. To a large extent the behaviour of such a system is probabilistic because human behaviour may not be predictable at most times.

Physical and Non-Physical Systems: Physical systems are concrete and observable while the non-physical ones are conceptual (theoretical) i.e. process or methodological approach.

Dynamic and Static Systems: In static systems, there is a state of equilibrium, but in dynamic systems, there is a shift from a state of equilibrium to a steady state. When the opposing states in a system are in balance, the system is in a state of equilibrium. A steady state represents the notion for maintaining the orderliness of the system in the face of energy or information stress.

3.5 Educational System

In the educational system, there are a lot of sub-systems that makes up the system. Among the sub-systems that make up the educational system are institution sub-system, evaluation sub-system, instructional sub-system, management sub-system etc. Below is a diagram showing educational system as well as the sub-systems within the educational system.

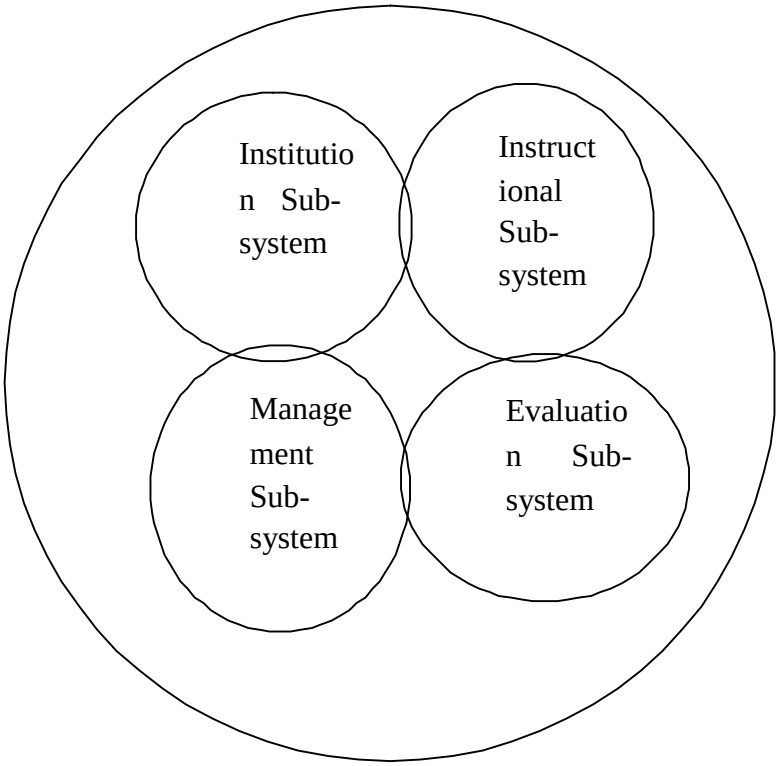

Fig.2 Educational System

3.6 Instructional System

In the instructional system, there is a lot of subsystems that make up the system. Among them are content subsystem, media subsystem, evaluation subsystem, learner subsystem, teacher subsystem, method subsystem etc. Figure 3 shows instructional system as well as the subsystems therein.

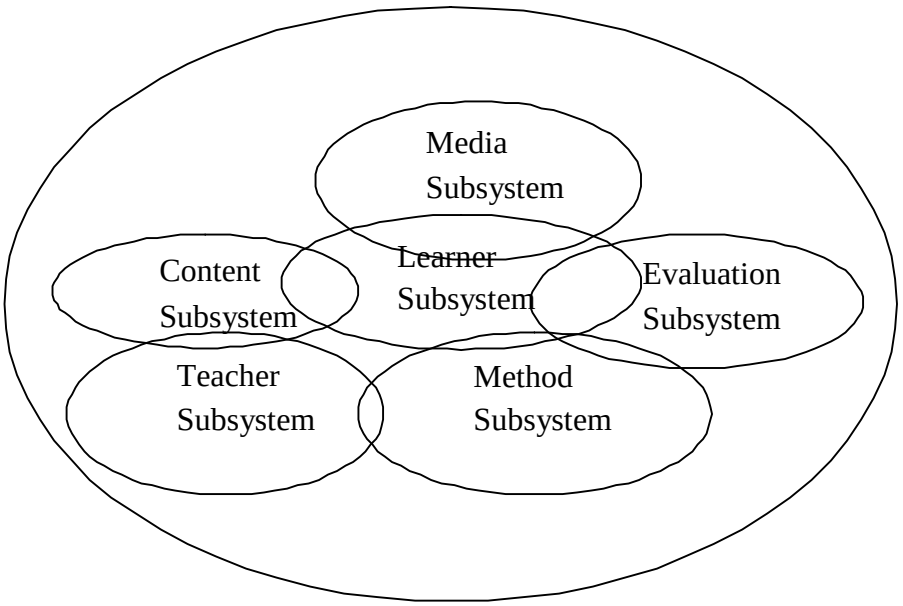

Fig. 3 Instructional System

4.0 Conclusion

In this unit, we examined various definitions of system by different authors, we also examined some of the attributes of systems. We also discussed the types of systems and took a look at educational system as well as instructional system,

5.0 Summary

A system is a group of parts or elements working together independently, cooperatively, and interactively as a whole so as to achieve specific goals or objectives. A system is more than the sum total of its parts. A system is assumed to be surrounded by an environment otherwise known as a supra-system. A system is made up of different parts which are related to the other. System is relative.

System can be classified into: natural, artificial, and natural-cum-man-made systems. Systems can further be classified as closed versus open system; simple versus complex systems; macro versus micro system; physical versus non-physical system; deterministic versus probabilistic system; dynamic versus static system.

6.0 Tutor-marked Assignment

- What is a system?
- Examine the characteristics and types of systems.
- By means of diagram only, illustrate the educational system and instructional system.

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Unit 2: Systems Approach

1.0 Introduction

The systems approach is used to describe how the different elements interact/co-operate to achieve a desired goal. Systems approach is a technique for making explicit the structure and organization of an ordered whole by laying bare its elements and showing the inter-relationship between them. Systems approach helps to reveal omissions, redundancies, inconsistencies both in structure and relation among the elements of a system and thus helps to eliminate wasted efforts.

2.0 Unit Objectives

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

(i) Explain the concept of systems approach
(ii) Discuss the historical back ground of system approach
(iii) Explain the steps in systems approach

3.1 Historical Background of Systems Approach

The systems thinking has a long history traceable to the philosophical writings of Leibniz, Nicholas of Cusa, Marx and Hegel (Akanbi,1988). In the field of psychology, Lokta (1925) and Kholer (1927) were the early pioneers of system s thinking. Kholer s gestalt model of insightful learning bears striking semblance to system s model. According to Akanbi(1988), the development of systems approach could be attributed to the advances in several disciplines such as Economics, Biomathematics, Physiology, Cybernetics and History of Science. Thus, one would expect a number of approaches different in style and aims comprising systems approach. Historically, systems thinking represent a shift from earlier analytical procedures characteristics of science to a more integrated holistic approach.

The real application of systems theory to design began in the military during the World War II. To be precise, it was borne in the field of engineering where it was applied to the design of electronic, mechanical, military and space systems. During the process, it got involved with man-machine systems. Thereafter it was introduced to the industries, factories and business organizations for a number of reasons: (a) to maximize profit,(b) to increase output/productivity, and (c) to enhance efficient and effective management of human and material resources. Examples of system s application abound in such industries as shipping, automobile banking and insurance, textile and government services such as postal agency, transportation, electricity supply and other infrastructures.

By the late 1950s and early 1960s, systems approach began to be used in training and education. Ever since, systems approach has been increasingly used in solving educational/instructional problems. The application of systems approach has made it possible to see education as whole consisting of several interdependent elements which are working in harmony to achieve common objectives.

3.2 Steps in System Approach

Basically, systems approach comprises of two major parts (i) system analysis and (ii) system synthesis. System analysis is a process whereby a given a problem is broken down into bits It is at this stage that the actual problem is identified and analyzed with a view of setting goals and objectives. According to Kaufman (1968), systems analysis consists of mission analysis, functional analysis, task analysis and consideration for methods and means.

3.2.1 Mission analysis:

This refers to the determination of the end product of the system analysis. It includes the various steps of identifying an overall mission objectives and the specific measurable performance requirements for the satisfaction of the mission. The mission is what has to be accomplished, or what is required

3.2.2 Functional analysis:

As is expected, it is closely related to mission analysis. It consists of breaking down of functions earlier identified under mission analysis with a view of grouping them into various components that would make for a functional mission profile. Functional analysis tries to leave out impossibilities and concentrate on possible options. Since functional analysis centres on specific rather than general, it naturally leads to task analysis.

3.2.3 Task analysis:

It is concerned with the determination of the sub-skills that are required to learn an identified task. The task has to be analyzed to actually identify the best strategy that could be implemented to accomplish the objective.

3.2.4 Methods- means analysis. This step is important because at every stage of system analysis, there is need to consider alternatives that are considered best in terms of speed and accuracy in the attainment of the set objectives. In practice, the methods-means analysis may begin at any point in the system analysis procedure and thus may be continually refined as more detailed performance requirements are identified

In the system synthesis available data from system analysis stage are utilized to select solution strategies, implementing solution strategies and the evaluation of the total system in the environment for which they were designed.

The system approach can be summarized in a model:

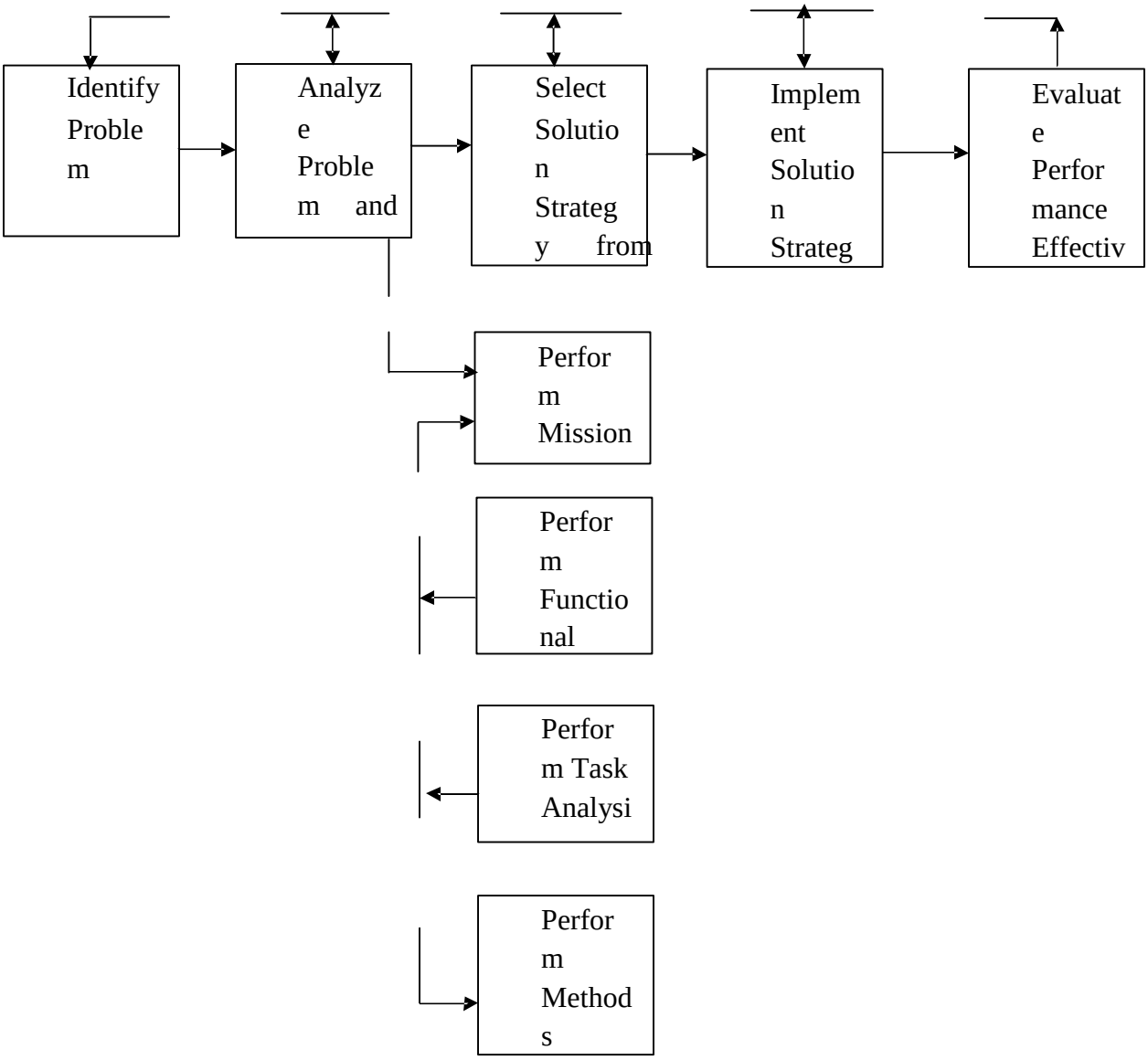

Fig 1: Steps in Systems Approach **Source:** Kaufman (1968). Systems Approach to Education

4.0 Conclusion

In this unit, we have examined the historical background of systems approach. We also examined the two major parts of systems approach which led us to the steps in systems approach.

5.0 Summary

Systems approach as a concept was developed during the second World War. To be precise it was borne in the field of engineering where it was applied to the development of electronic, mechanical, military and space systems. Broadly speaking, systems approach comprises of two major parts (i) system analysis, and (ii) system synthesis. System analysis consists of mission analysis, functional analysis, task analysis and methods-means analysis. System synthesis on the other hand consists of selection of solution strategy, implementation of solution strategy and evaluation of the total system.

6.0 Tutor-marked Assignment

- What is systems approach?
- Briefly describe the historical background of systems approach**.**
- With the aid of diagram, explain the steps in systems approach.

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Unit 3: Systems Approach in Education and Instruction

1.0 Introduction

The use of system approach started in the field of engineering after the world war II. Since then it has been used in different field of human endeavors such as banking and insurance, transportation, textile industries etc. Systems approach entered into the field of education between the late 1950s and early 1960s and since then, systems approach has been used in solving educational problems.

2.0 Unit Objectives

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

(i) Explain the role of systems approach in education
(ii) Explain the role of systems approach in instruction

3.1 Systems Approach in Education

The development of systems approach in the military and industries extended in the spheres of education at the time when education was experiencing incursion from technology. In the late 1950s and during the 1960s, the fragmentary development in the field of audio-visual instructions alongside those of theories and principles in the field of education in general and educational psychology in particular called for total reorganization. This wave of reorientation in the field of education could not be divorced from the earlier wave being experienced in other fields such as science, economics, geography and engineering. For example in the field of education, curriculum developers are redefining curriculum to include hidden curriculum in recognition of significant other variables that account for human learning. Educational psychologists are extending their areas of interests beyond behavioural and cognitive aspects to environmental/ecological aspects in recognition of the interaction of such situational variables (classroom size, seat arrangement, building design) and other learning variables (Akanbi, 1981). The arrival of technology, has influenced the development of system concept in education and this has constituted a greater force behind the movement for the reorganization in the field (Akanbi, 1988)

The development of system approach is an evolutionary growth in the field of educational technology from its narrow base of audio-visual instruction. It was a response to advances in quantity and quality hardware and software instructional materials. The effects of this and growth in conceptual base include changing a structure of the curriculum development and role of the teacher. For instance, systems approach has forced on curriculum development the consideration of instructional technology at the planning stage rather than at the classroom

implementation as it used to be. Systems approach conceives of teacher as manager of instruction rather than the purveyor of information.

A system analysis of education has been based on various parameters some of which are hierarchical structures, educational activities and functions of different components. For instance, an educational system could be analyzed in terms of different structural levels such as primary, secondary and university. Another scheme was based on the following activities: teaching and instruction, management and adminision, facilities and support and communities and learners (Kaufman, 1968). This same construct could be easily classified in terms of the following levels: micro level, meso level and macro level. The micro level is a phase of interaction among learners, teachers, materials, media, mode and content. The meso level is the level of educational system that refers to the activities of the educational institution relating to the translation of the policy encoded in national objectives into institutional objectives. At the macro level, an interface exists between an educational system and its environment. The interface with the environment refers to relationships between educational system and other systems- political, social, economic. These levels of educational systems allow a systems analyst to consider most if not all, the element in the system and their functional relationships. The assumption is that a defect at any level or in any sub-system, would affect other sub-system and the overall system. Consequently, a careful planning and management should ensure harmonious relationship between the input, throughput and output of the system at different levels.

3.2 Systems Approach to Instruction

Systems approach to instruction can be described as a set of procedure (a logical and methodological approach) whereby all the elements in an instructional situation are analyzed and synthesized so as to objectivize and optimize the efficiency and effectiveness of instruction (Adewoyin, 1991). It is a wholistic way of viewing the entire teaching-learning process. It ensures proper monitoring of the teaching-learning process so that the defective parts, omissions, redundancies e.t.c. can be promptly located and corrected.

Instructional system is efficient only when it is viewed as a unified whole that is, when it acts and function as a unit. This means that laying bare the elements of an instructional system does not and should not imply isolating any of its elements. All the parts must be handled simultaneously because they are supposed to function interdependently together to achieve the desired objective.

Basically, systems approach to instruction can be defined as a set of planned, learner centred, logical and methodological procedure whereby all the elements in an instructional situation are analyzed and synthesized to achieve efficient and effective teaching and learning. As a wholistic, systematic and dynamic procedure, systems approach requires multidimensional thinking as opposed to sequential, one-step-a-time approach.

4.0 Conclusion

In this unit, we have discussed systems approach in education and system analysis in education was based on various parameters. We also went ahead to discuss systems approach to instruction which can be described as a set of procedure (a logical and methodological approach) whereby all the elements in an instructional situation are analyzed and synthesized so as to bring about the efficiency and effectiveness of instruction

5.0 Summary

A system analysis of education has been based on various parameters some of which are hierarchical structures, educational activities and functions of different components. For instance, an educational system could be analyzed in terms of different structural levels such as primary, secondary and university. Systems approach to instruction is a wholistic way of viewing the entire teaching-learning process. It ensures proper monitoring of the teaching-learning process so that the defective parts, omissions, redundancies etc. can be promptly located and corrected.

6.0 Tutor-marked Assignment

- How is systems approach being applied in education?
- Instructional system is efficient only when it is viewed as a unified whole. How can you use systems approach to do this**?**

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Unit 4: Values and Limitations of Systems Approach

1.0 Introduction

Systems approach delivers unto us a tool for analyzing problems and proffering solutions to educational issues. It is advantageous to apply such a tool to education and instruction because it is systematic. Other values of systems approach will be discussed in this unit. As good as systems approach is, it also has a lot of limitations in its applications. This would be explained in this unit .

2.0 Unit Objectives

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

(i) Discuss the value of system approach
(ii) Explain the limitations of systems approach

3.1 Values of System Approach

As mentioned in unit 2, systems approach had been widely used in all areas of human endeavour. This indicates that it is of great importance to human activities. Adewoyin (1991) quoting Balogun (1970) highlight the values of system approach as follows:

- It helps to reveal omissions, redundancies and inconsistencies both in structure and relation among the elements of a system and this helps to eliminate wasted effort.
- It helps to focus attention on the requirements and performance of the total system so that the system might achieve optimal efficiency.
- The methodology satisfies the criterion of functional utility since it demands the selection of techniques and methods appropriate to the desired educational and training goals.
- It helps in planning, organizing and evaluating educational programs and instructional processes.
- It helps in the identification of various elements of the system, it can expose the hidden mechanism and entities.
- Systems approach gives chance for proper articulation of the problems. It is functional and very useful for effective communication.
- It involves specifying objectives, operationalising the objectives and implementing the objectives. By specifying our objectives and operationalising and then implementing them enables us to devise the values or competency to develop what are the goals to be achieved. It helps us to pay attention to the requirements of any system.

- Problem identification in systems approach leads to order, unity, manageability, harmonization, logicability and methodological approach which leads to a global and dynamic view of the system.
- It enables us to look at the appropriate methodology to achieve our goals.

3.2 Limitations of Systems Approach

The limitations of systems approach can be seen in the three areas of the approach. The areas are:

3.2.1 Design

At this stage a lot of issues can crop up and they include:

i. Inadequate conceptualization of the paramount elements of the system e.g. the inputs and variable elements.
ii. Not being able to identify all the possible relationships of the various elements or parameters.
iii. Not being able to conceptualize the problems of transformation of output from the input. That is defining the strategy to be involved
iv. On objectives- There could be difficulty in determining unambiguously input specifications.
v. There is also the problem of boundary conditions in education, knowing that education is an open system.

3.2.2 Implementation

The personnel involved in implementation are human beings. One of which is the teacher. The teacher would determine the interaction(s) of the learners. The human nature is conditioned by many factors and could be unstable at most times. Thus a perfectly planned strategy may not achieve its purpose.

We are thus faced with the:

i. Probabilistic nature of human beings.
ii. Inadequate knowledge of behaviour dynamics of human and social systems.
iii. Problem of inadequate articulation
iv. Compatibility of systems elements (Teacher, learner and materials), levels of communication, teacher s readiness.
v. Problem of equi-finality various means of getting educational objectives done.
vi. Law of requisite variety- It says to cope with different abilities, you must have variety of resources. Pupils are different in abilities. It may be difficult to put into consideration all the abilities of all pupils when addressing an instructional problem. Whatever

medium or strategy we choose may not satisfy all goals. Because of the limitations of the resources it is very difficult to satisfy law of requisite variety.

3.2.3 Evaluation

Evaluation process would involve various considerations. The considerations include:

- Making decision on the form of assessment. Knowing that evaluation process should not stop wit examination- there should be follow-up.
- Making decision about the product/output. Is it cognitive, effective,or psychomotor.
- Making decision about what to evaluate and criteria- issues of validity and reliability.
- Social expectations must be considered too- those of the learners might be different from the teacher s vested interest and values

All these considerations would take time if systems approach is applied. It would also be tedious and could get confusing at a stage thus discouraging the personnel implementing the approach

4.0 Conclusion

Systems approach should be applied with caution. As good as it is, if not properly handled it may lead to confusion in the process. It may also lead to shifting of focus from the main issues to minor issues.

5.0 Summary

In this Unit, we have considered the values of systems approach as well as the limitations. The challenge here is to identify areas of possible applications that would not lead to confusion and shift of focus.

6.0 Tutor-marked Assignment

- Discuss the values of systems approach
- What are the limitations of the applications of systems approach to instruction.

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MODULE 3 PSYCHOLOGICAL THEORIES AND THEIR APPLICATIONS TO INSTRUCTION

UNIT 1 DEFINITION OF PSYCHOLOGY AND PSYCHOLOGICAL THEORIES OF LEARNING

1.0 INTRODUCTION

Psychology is concerned with a wide area of interest. It has been defined as the systematic study of animal and human behavior (observed and mental process) and covers all kinds of pursuits from making dogs salivate at the sound of a bell to a study of the growth of intelligent behavior in humans. The term behavior includes all those aspects of human activity which we can observe: in effect, it represents the outward life of individual which is public knowledge and which can be noted objectively. But behavior also involves personal experience, which can be studied only by asking individuals to express their feeling and thoughts. Unit 1 starts you off by giving you the definition of psychology, terms used in Psychology and importance of educational psychology.

2.0 **Objectives**

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

- Explain what is meant by psychology?
- Explain educational psychology.
- Give reasons why educational psychology is important.

3.1 **Concept of Psychology**

Psychology is a social and biological study. It is the scientific discipline that studies behavior and the behavioural expression of experience in humans and other animals. When psychology is seen as a science, it is a way of finding out knowledge about human and animal behavior that is novel using special research methods. As a profession, it can be seen as a way of applying what is known to enhance human welfare. According to Mukherjee (1978) psychology is concerned with understanding of human behavior. It looks at the way behavior occurs, and the probability of its occurrence., furthermore it considers how it can be controlled and predicted if necessary..

Psychology is a very diverse field, for convenience, however, scholars have divided it into theoretical and applied psychology. Theoretical psychology includes social, comparative, physiological, abnormal, developmental and experimental psychology. Applied psychology includes, educational or school, engineering, vocational, personnel, industrial or organizational psychology.

3.2 Educational Psychology

Educational psychologists spend their time studying ways to describe and improve learning and teaching, Thus it may be convenient to say that, educational psychology is the psychology of learning and teaching, Glover and Ronning (1987) has suggested that educational psychology includes topics that span human development, individual differences, measurement, learning, and motivation and is both a data-driven and a theory-driven discipline. Educational psychology can therefore be seen as the application of psychology and psychological methods to the study of development, learning, motivation, instruction, assessment, and related issues that influence the interaction of teaching and learning.

3.3 Importance of Educational Psychology

Data gathered from educational psychology can be useful to the learner, teacher, administrator and the educational system itself. It can be applied to help the teachers obtain basic knowledge about the developmental stages of learners from birth to adulthood. It gives information about psychological factors which affect learning in the classroom. It can show why effective teachers work creatively or teach the way they do.. It can be used to find out the way new technologies such as computer; behaviour technology and curriculum techniques can be most effectively utilized.

Through Educational Psychology learners get an understanding of how they can learn effectively and what makes them to remember and forget.. The learner can find new ways of improving his learning activities and earn better scores in his various school subjects.

According to Akinboye (1987) educational psychology will facilitate effectiveness in the following ways amongst others:

(a) General interest of learners in the subject matter.
(b) Motivating learners.
(c) Inculcating realistic aspiration in learners.
(d) knowing what learning pupils are ready for.
(e) Deciding on difficulty level of subject.
(f) Organising subject matter sequentially and properly.
(g) Integrating current and past learning.
(h) Developing creativity.
(i) Executing lesson plans.
(j) Using adequate reinforcers.

Chauhan (1987) listed the following as part of the importance of educational psychology. It can be applied in;

(a) Handling problems of discipline in a more rational and even democratic way. Teachers can now examine the cause of indiscipline among their students before reacting to them.
(b) Teachers understanding of the importance of the use of audio-visual aids in classroom teaching.

(c) Time-tabling of subjects is more carefully done so that no two difficult subjects are taught in successive periods.

(d) Writing of textbook: Teachers now write books that are tailored in language and difficulty level appropriate to various classes of readers.

(e) Co-curricular activities such as games, drama, creative activities are receiving some encouragement so as to let learners develop as many of their talents as possible.

(f) School and class administration:- The current trend is that those at the helm of affairs are becoming less autocratic, the idea of consultation or dialogue is becoming more popular.

On the theoretical level, Chauhan stated that educational psychology helps teachers to understand developmental characteristics of the learners and how to utilize these to the advantage of learners.

3.4 Psychological theories of learning

To help our understanding of how we learn, several psychologists have put forward some ideas and general principles which guide learning and they are called learning theories . These theories emanate from scientific efforts of workers in the field. Generally, the theories help to explain, organize, interpret a phenomenon or an event and direct our attention more sharply on learning activities. There are several learning theories. They are for convenience, classified into two board groups:

a. Stimulus Response (S-R) theories .
b. Cognitive theory (field) theories.

The S-R theory concentrates on the study of overt behaviors that can be observed and measured (Good & Brophy, 1990). It views the mind as a "black box" in the sense that response to stimulus can be observed quantitatively, totally ignoring the possibility of thought processes occurring in the mind.

The cognitive theory was put forward as a reaction against the S-R theories. The theories strongly opposed the atomistic, molecular and mechanistic approach to behaviour as well as its quantification and statistical analysis. They disagreed that individuals learn in bits or through mastering separate parts of a problems as was put forward by S-R theories. They believed that we learn through insight. They thought that when a problem is presented, an individual would by conscious effort find its meaning.

All these theories have implications for selection, application and use of instructional resources.

4.0 Conclusion

Psychology is the study of overt and covert behavior in humans and animals and therefore has an obvious contribution to make to our understanding of education problems relating to the learner, the processes of learning and the conditions of learning.

5.0 Summary

Psychology is the scientific study of behavior and cognitive processes. The purpose of psychology is to describe thinking and behavior and look at the relationships between them and try to explain the causes for them. When a psychologist describes behavior or thought he does so to understand, predict, modify, or improve.

6.0 Tutor-Marked Assignment

1. What is meant by psychology?
2. What is educational psychology?
3. List ten importance of educational psychology to teachers and students.

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UNIT 2 The Behaviourist Theory and applications to instruction

1.0 Introduction

Behaviorism (or behaviourism), also called the learning perspective (where any physical action is a behavior), is a philosophy of psychology based on the proposition that all things which organisms do including acting, thinking and feeling can and should be regarded as behaviors.. Behaviorism is based upon the premise that all theories should have observational correlates but that there are no philosophical differences between publicly observable processes (such as actions) and privately observable processes (such as thinking and feeling).

2.0 OBJECTIVES

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

- Explain the behaviourists theory
- Explain how it applies to instruction.
- List some resources that are based on the behaviourist theory

3.0 BEHAVIOURIST THEORY AND APPLICATION TO INSTRUCTION

Based on observable changes in behaviour, behaviorism focuses on a new behavior patterns being repeated until it becomes automatic. It is described as a developmental theory that measures observable behaviors produced by a learner s response to stimuli. Responses to stimuli can be reinforced with positive or negative feedback to condition desired behaviors. Punishment is sometimes used in eliminating or reducing incorrect actions, followed by clarifying desired actions. Educational effects of behaviorism are keys in developing basic skills and foundations of understanding in all subject areas and in classroom management.

According to behaviorism, knowing is giving the correct response when exposed to a particular stimulus. The behaviorist is not concerned with how or why knowledge is obtained, but rather if the correct response is given. Yu Ching Chen s web site on behaviorism states that, Learning is defined as nothing more than the acquisition of new behavior .

In terms of the concept of learning, the process tends to be passive with regard to the behaviorist theory. The learner uses low level processing skills to understand material and the material is often isolated from real-world contexts or situations. Little responsibility is placed on the learner concerning his//her own education.

3.1 Instructional resources and Behaviourist Theory

A typical classroom instruction based on the behaviorist theory would encourage rote memorization, and drill and practice. Rote learning involves repetition of facts and figures until it is part of the learner such that when it is required, the learner automatically recalls the answer. There are many instructional resources that can promote rote learning, Some of them are

- Flash cards with facts
- Picture cards
- Self corrective puzzles and toys
- Computer assisted drill and practice packages

Series of flash and picture cards can be presented to the learners, they memorise the cards one after the other, they use the pictures or other cues on the cards to remember the facts and figures.

Self corrective puzzles and toys are those that have words, figures or numbers on them. Pieces can only be fitted together if they match. For example, a pair of puzzles can have one piece with the word cup and the other piece with the picture of a cup. It is only these 2 pieces that can be fitted together amongst all the other pieces in the set. If a piece with the picture of a cup and another piece with the word dog are brought together, they would not fit into one another.

Drill and practice come in form of card or board game pieces as well as computer software. These types of software provide positive and negative reinforcements for answering problems correctly or incorrectly. Facts are presented to the learner and choices given, depending on the choice made by the learner, computer provides a positive response to show the learner is correct, -most times by showing something positive like people clapping, bouquets of flower being presented or a simple statement- you are correct. If the learner s response is negative, the student would be given the immediate feedback too and guided to correct the choices made.

All these are useful when learning basic facts, for example, states and capitals, words and opposite, animals and their young ones, multiplication facts and so on. Some of these resources can also be applied to higher order thinking skills.

4.0 Conclusion

Behaviorism is primarily concerned with observable and measurable aspects of human behavior. In defining behavior, behaviorist learning theories emphasize changes in behavior that result from stimulus-response associations made by the learner. Behavior is directed by stimuli. An individual selects one response instead of another because of prior conditioning and psychological drives existing at the moment of the action (Parkay & Hass, 2000). Behaviorists assert that the only behaviors worthy of study are those that can be directly observed; thus, it is actions, rather than thoughts or emotions, which are the legitimate object of study. Behaviorist theory does not explain abnormal behavior in terms of the brain or its inner workings

In assuming that human behavior is learned, behaviorists also hold that all behaviors can also be unlearned, and replaced by new behaviors; that is, when a behavior becomes unacceptable, it can be replaced by an acceptable one. A key element to this theory of learning is the rewarded response. The desired response must be rewarded in order for learning to take place (Parkay & Hass, 2000).

5.0 Summary

The theory of behaviorism concentrates on the study of overt behaviors that can be observed and measured. It views the mind as a "black box" in the sense that response to stimulus can be observed quantitatively, totally ignoring the possibility of thought processes occurring in the mind. Some key players in the development of the behaviorist theory were Pavlov, Watson, Thorndike and Skinner.

6.0 Tutor-Marked Assignment

- Briefly explain Behaviorist theory and its application to instruction.
- List some resources that are based on the behaviourist learning theory

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UNIT 3 The Constructivism Theory and its application to instruction

1.0 Introduction

How do we learn? Watching a young child grow from infancy to toddlerhood, we marvel at the amount of learning that has allowed her to understand her expanding environment. This child taught herself by gathering information and experiencing the world around her. Such learning exemplifies constructivism, an idea that has caused much excitement and interest among educators. Constructivism emphasizes the importance of the knowledge, beliefs, and skills an individual brings to the experience of learning. It recognizes the construction of new understanding as a combination of prior learning, new information, and readiness to learn. Individuals make choices about what new ideas to accept and how to fit them into their established views of the world.

2.0 OBJECTIVES

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

- Explain the constructivists theory
- Describe the constructivist classroom
- Give examples of instructional resources that are based on the constructivist theory.

3.1 The Constructivism Theory and its application to instruction

Constructivism is described as a learning theory based on authentic and real-world situations. Students internalize and construct new knowledge based on past experiences. The constructivism theory is student-centered and encourages higher level processing skills to apply their working knowledge. The educational impact of constructivism is positive, in that instruction is based on student s prior knowledge, allowing them to make significant connections and solve complex problems.

In terms of process of learning, acquiring and constructing new knowledge, the student plays an active role. The student brings past experiences and prior knowledge to the classroom and uses these to actively connect with new ideas or problems that are presented. Knowing is being able to internalize the material, connecting it with things you already know. Students use higher level processing skills, such as evaluating, analyzing and synthesis to apply newly constructed knowledge to problems or situations.

According to the theory of constructivism, student responsibility is greater, as they discover how new knowledge connects with prior knowledge. The learner continuously asks questions and guides their own learning process. Students learn that there is not just one way to solve problems, but rather multiple ways to finding answers. The teacher s role is to anticipate and address student misconceptions while presenting authentic questions and real-world problems or situations. The teacher does not provide clear answers on how to solve these problems or

questions, but guides students to make sense of how things work according to what their past experiences are and how it applies to the new knowledge they are constructing.

Typical classroom instruction, consistent with the constructivist learning theory may include: problem-based approach to teaching, hands-on activities, including the use of manipulatives, experimentation, and simulations. While the ideas listed above are just a few examples, the constructivist theory allows teachers to be creative and innovative with teaching. Details of some classroom instruction that demonstrate constructivism in the classroom are provided below.

An example of a problem-based approach to teaching is when the teacher poses a problem to the class that needs to be solved. The problem is usually authentic with real world applications. An example problem may be the amount of littering in and around school grounds. The teacher would ask his/her students, How are we going to solve this problem? The students may then be required to write a proposal on their plan of action to help solve this problem.

Hands-on activities are also used in the constructivist model of teaching. In mathematics classes, manipulatives are essential tools to help build student understanding of mathematical concepts. For example, students learning about perimeter might be given a tape measure to find the perimeter of the classroom. They may use this information to help buy carpet for the classroom.

Other instructional practices include experimentation or simulations. Simulations provide real world experiences in a manipulated environment. Science classes offer wonderful opportunities for students to experiment while doing laboratory experiment. This is also consistent with the hands-on approach. The students experiment to apply their working knowledge and to make sense of things in the world.

Overall, the constructivist approach to teaching allows students to actively be involved in decision-making and problem-solving scenarios. Prior knowledge and past experiences help shape student connections to new material. Students use higher level processing skills and apply that knowledge to the world in which they live.

3.2 Instructional Resources and Constructivist approach

The type of resources that is consistent with the constructivist approach are those that enable the students to construct solutions based on their experiences. They include 3- dimensional visuals such as toys, manipulatives, specimens and realia. Students can use manipulatives such as lego pieces(plastic building blocks, Cuisenaire rods, wooden pieces of different shapes and sizes) to solve problems in mathematics.

In the science classroom, experimentation is carried out with specimen and other materials which the students try to manipulate. For example a bowl of various plastic materials, wooden toys, metal objects and so on, with a bowl of water and the student is to list materials that float or sink in water.

For language teaching, students can construct stories, sentences and phrases using letter or word blocks which can come in plastic or wooden pieces. Simulations can be used in the social studies

classroom to explain various issues in the society; the students are challenged to present representations of real life situations whether in form of prose, dance or drama.

Resources such as charts, posters, picture albums and all other forms of visuals can be used to discover the prior experiences of the learners as well as help them to express the conceptions taht have held prior to the class.

All these resources pre-supposes that the students have some prior experiences, and they build on those experiences with the teacher just acting as the guide.

4.0 Conclusion

Constructivism as a paradigm or worldview posits that learning is an active, constructive process. The learner is an information constructor. People actively construct or create their own subjective representations of objective reality. New information is linked to prior knowledge, thus mental representations are subjective. Based on the premise that we all construct our own perspective of the world, through individual experiences and schema. Constructivism focuses on preparing the learner to problem solving in ambiguous situations.

5.0 Summary

Constructivists believe that learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events.

6.0 Tutor-Marked Assignment

1. Briefly explain constructivist theory
2. Describe a construcivist classroom
3. What type of resources can be used in a constructivist classroom?

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UNIT 4 The Cognitivist theory and application to instruction

1.0 Introduction

Cognitive theorists view learning as involving the acquisition or reorganization of the cognitive structures through which humans process and store information while they also accept such behavioristic concepts, that much learning involves associations established through contiguity and repetition. They also acknowledge the importance of reinforcement, although they stress its role in providing feedback about the correctness of responses over its role as a motivator.

2.0 OBJECTIVES

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

- Explain the Cognitivist Theory
- Describe Instruction that is based on cognitivist theory.
- List resources that are consistent with the cognitivist theory

3.1 The Cognitivist Theory and application to instruction

During the 1960s, discontent with the inadequacies of behaviourism was developing. The behaviourist perspective could not easily explain why people attempt to organise and make sense of the information they learn. One example includes remembering general meanings rather than word for word information. Among learning psychologists there emerged a growing realisation that mental events or cognition could no longer be ignored.

Cognitive psychologists share with behaviourists the belief that the study of learning should be objective and that learning theories should be developed from the results of empirical research. By observing the responses that individuals make to different stimulus conditions, Cognitivists believe that they can draw inferences about the nature of the internal cognitive processes that produce those responses. Many ideas and assumptions of cognitivism can be traced back to the early decades of the twentieth century. Of all theories, the theories of Jean Piaget of Switzerland are the ones that have provided psychology with much elaborated account of developmental changes in cognitive abilities.

3.2 Instructional Resources and general educational implications of cognitive theories

Generally from the congnitivist theory we have the following implications for learning

1. Cognitive processes influence learning.

2. Learning difficulties often indicate ineffective or inappropriate cognitive processes.

3. As children grow, they become capable of increasingly more sophisticated thought.

4. People organize the things they learn.

5. New information is most easily acquired when people can associate it with things they have already learned.

6. People control their own learning. Ultimately students, not their teachers, determine what things will be learned and how they will be learned.

All types of Instructional resources can be used to promote the beliefs of the cognitivists. However it is the content of the resources that may differ from those that the behaviourists or the constructivists would use.

The content or the message of the resources must be such that would enhance the cognitive processes of the learners, that is , you just do not put all the information the learner needs on the resources, the learner has to put together various facts and information before he/she can arrive at the whole picture.

For example in science, to teach a principle or law, the learner is provided with all the Materials that would prove the principle or law. The learner then has to discover what should be done to the materials and how they can be used to prove the law. Whereas with the behaviourist, the learner is provided with a step by step guide of how to use the materials and his/her main task is just to record what would happen (response) when the instructions are carried out or the instructions are varied (stimulus).

Another example to make this clearer is the use of computer assisted instructional packages for teaching. If a behaviourist is to use such packages to teach say - parts of speech, he /she would provide the learner with all the definitions of each part of speech with various examples. After this, the learner would be given a drill and practice exercise on the part of speech before going on to the other parts of speech, repeating the same process. The drill and practice exercise may require the learner to choose the state if the words presented are examples of that part of speech. As the learner clicks on the correct answer, the computer gives it the immediate feedback of results by reinforcing the correct answers and giving clues about the incorrect ones. The cognitivists on the other wise, may provide all the definitions of all the parts of speech give a list of words and sentences or phrases, and ask the learners to try to see which of the words or words in the sentences or phrases actually fits the definitions of all the parts of speech given. It is when the learner has done this, that the results would be given. With the cognitivists approach, the learner tries to make sense of all that has been presented and proceeds to use the computer to classify, differentiate and find similarities of the words provided.

This latter use of the computer presents a more wholistic approach to learning the parts of speech, whereas the former one gives a bit by bit, sort of mechanistic approach.Other

technology tools that are consistent with the cognitivist theory include Webquests, science discovery laboratory packages, mathematics problem solving software and so on.

4.0 Conclusion

Based on the thought process behind the behavior. Changes in behavior are observed, and used as indicators as to what is happening inside the learner's mind. This is what the cognitivists practice.

5.0 Summary

Contemporary cognitivism emphasizes mental processes and proposes that many aspects of learning may be unique to the human species. All types of learning resources could support the cognitivists perspectives of learning, it all depends on whether the content or the message of the resource is presented in such a way as to enhance wholistic understanding of the concepts or not.

The role of the teacher is to present instructional materials in a manner that facilitates students' learning (e.g., helping students to review and connect previous learning on a topic before moving to new ideas about that topic, helping students understand the material by organizing it effectively, understanding differences in students' learning styles, etc.)

6.0 Tutor-Marked Assignment

1. Briefly explain the Cognitivist Theory
2. What type of resources are consistent with the cognitivist theory.

7.0 References/Further Readings.

Chomsky, N. A. (1959), A Review of Skinner's Verbal Behavior

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R. Sun, (ed.), (2008). The Cambridge Handbook of Computational Psychology. Cambridge University Press, New York. 2008.

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MODULE 4 LEARNING PRINCIPLES AND INSTRUCTIONA L MEDIA

Unit 1: Basic Concept of Instructional Media

1.0 Introduction

Teaching-learning process in the modern time makes greater demand on the use of instructional media on the part of the teachers who are supposed to help the learners understand certain concepts. In this unit, the concept of instructional media would be discussed; types and the reasons for using instructional media would also be presented briefly.

2.0 Unit objectives

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

(i) Define instructional media
(ii) Identify types of instructional media
(iii) Discuss roles of instructional media in teaching and learning

3.1 What are Instructional Media?

Media refers to a collection of materials and equipment that can be used effectively to promote communication. It can also be seen as channels through which messages, information, ideas and knowledge are disseminated. Any time a collection of materials and equipment are used for teaching and learning so as to promote effective communication in a classroom setting, then, we refer to it as instructional media. In other words, instructional media could be defined as collection of teaching-learning materials that constitute an integral component of an instructional process and are utilized in delivering educational information to the learners.

Instructional media are used either for individual, small or large group of learners. It must be emphasized that instructional media are designed, prepared, produced, evaluated and utilized mainly to facilitate learners understanding of topics being taught.

3.2 Classification of Instructional Media

Instructional media are classified into different groups by different people depending on the perspective from which it is being viewed. There is no rigid classification of instructional media. All educational media certainly fall under one of these three categories of Audio media,Visalmedia and Audio visual media

(i) Audio media: They are the instructional media that mostly appeal to the sense of hearing. They include audio tapes, radio, public address system, talking drums, audio CD, human voice etc.

(ii) Visual media: They are the instructional media that appeal to the sense of seeing only. They can be sub-categorized into projected and non-projected visuals. The projected visuals

require electricity for projection, e.g. film strip, slides, transparencies using their projectors. The non-projected visuals do not need electricity or power and they can be sub-categorized into 2-Dimensional and 3-Dimensional non-projected visuals. The 2-Dimensional non-projected visuals have only length and breadth in other word they are flat and they include charts, posters, maps, text books, magazine, etc. The 3-Dimensional non-projected visuals on the other hand have length, breadth and height/depth/volume and examples include models, real objects, toys, globe, mock-up specimen etc.

(iii) Audio-visuals media: They are the instructional media that appeal to the senses of seeing and hearing. In other words they provide learners with the opportunity of seeing and hearing at the same time. Examples are Television, Motion pictures, DVD, VCD, computers, ipod, closed circuit television etc.

3.3 Why do we use Instructional Media

(i) It makes learning real, permanent and immediate.

(ii) It gives learners opportunity to learn at their own pace, rate and convenience.

(iii) It helps in focusing attention and motivating learners.

(iv) It brings to the classroom what is not in the immediate environment of the learners.

(v) It saves time and energy.

4.0 Conclusion

In this unit, we have examined the definition of media in general and instructional media in particular. We also discussed the various types of instructional media as well as the reasons for using instructional media in the classroom.

5.0 Summary

Instructional media could be defined as collection of teaching-learning materials that constitute an integral component of an instructional process and are utilized in delivering educational information to the learners. Instructional media can be classified into audio media, visual media and audio-visual media. One of the reasons for using instructional media is that it makes learning real, permanent and immediate.

6.0 Tutor-Marked Assignment

- What is instructional media?
- What are audio-visual media? Give three examples of audio-visual media.
- Why do we se instructional media in the classroom?

7.0 References

Abimbade, A. (1997). Principles and Practice of Educational Technology. Ibadan: International Publishers Ltd

Adewoyin, J.A. (1991). Introduction to Educational Technology. Lagos: Johns-Lad Publishers Ltd

Ajelabi, A. (2005). Essentials of Educational Technology. 2nd Edition. Lagos: Raytel Communications Ltd

Unit 2: Learning Theory and Instructional Media 1 (Motivation)

1.0 Introduction

The study of motivation is crucial for a teacher, this is because without a knowledge of the way and means of encouraging children s learning, knowing about their appetites, being sensitive to their interests, the teacher s task would be impossible. In this unit, motivation and types of motivation would be discussed. Also, instructional media that teachers can use to motivate their learners would be discussed.

2.0 Unit Objectives

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

(i) Define motivation.
(ii) Discuss types of motivation.
(iii) Identify instructional media that can motivate learners.

3.1Motivation

Motivation can be defined as the internal processes and external incentives which spur us to satisfy some need. It can also be defined as a force that energizes, sustains, and direct a behaviour towards a goal. Researchers have found a high correlation between motivation and achievement. Motivation however occurs in two forms- intrinsic and extrinsic motivation.

Intrinsic motivation: This is motivation which is due to internal factors. The stimuli may be abstract or not physical but mental in nature such as love of something, interest to achieve, ambition.

Extrinsic motivation: This is motivation due to some external factors such as concrete rewards, money, prizes and gifts.

Extrinsically motivated learners study hard for a test because they believe studying will lead to high test scores or teacher compliments while intrinsically motivated learners study because they want to understand the content and view learning as a worthwhile activity in itself.

3.2 Instructional Media That Increases Students Motivation To Learn

Basically, using instructional media in the teaching-learning process increases learners motivation to learn. Some of the instructional media that can motivate learners to learn are computer, real objects, motion pictures etc. Learners get motivated to learn when they can use all their senses while interacting with the media. They are not passive hearers of the teacher, rather they see colorful visuals, listen to creatively packaged audio lessons and manipulate audio-visuals while learning.

Motivation can also be provided in form of the responses that the learners receive while using the Media. For example a student that uses drill and practice software package which gives it immediate knowledge of results through colorful and creative presentations of the learners marks would be highly motivated to continue on the tasks.

4.0 Conclusion

In this unit we have examined the concept of motivation. We also discussed the two forms of motivation. Some Instructional media that increases students motivation were also presentated.

5.0 Summary

Motivation is a force that energizes, sustains, and directs a behaviour towards a goal. Motivation however occurs in two forms- intrinsic and extrinsic motivation. Computer, motion pictures and real objects are some of the instructional media that motivate learners to learn

6.0 Tutor-Marked Assignment

- What is motivation?
- Discuss the two forms of motivations
- What makes media motivating to learners?

7.0 References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. 5th Edition. Boston: Pearson/ Allyn & Bacon.

Unit 3: Learning Theory and Instructional Media 2 (Knowledge of Result)

1.0 Introduction

Immediate knowledge of results or feedback is one of the factors that can motivate learners to learn. In this unit, knowledge of results will be discussed as well as the instructional media that gives learners immediate knowledge of results.

2.0 Unit Objectives

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

(I) Discuss knowledge of results.

(II) Highlight instructional media that provide immediate knowledge of result.

3.0 Knowledge of Result

Most theorists and practitioners agreed that favourable feedback about performance has a positive effect on subsequent performance. Skinner called it reinforcement; Thorndike called it the Law of Effect. In human terms, there must be some reassurances about level of successes and to be a really effective reinforcer in educational achievement, knowledge of result must follow quickly upon completion of a task for it to have maximum influence on future performance. School work should be dealt with and commented on as soon as possible after children have completed work; children s progress should be up to date and fed back to them while the work is still fresh in their mind and still likely to have a reinforcing effect.

3.2 Instructional Media That Gives Knowledge of Results

Prominent among the instructional media that produce immediate knowledge of results are Computer (Computer Assiated Instruction), programmed instruction (text-based or computer-based), self correcting materials such as puzzles and toys.

A pair of self correcting puzzles that can only fit together perfectly must have matching concepts on them. For example on one piece of the puzzle, there is a multiplication fact (e.g 3x2) and on the other, the answer to the multiplication fact (6). These two pieces would fit together giving the learner the clue that he/she is correct. However another piece which has for example- 9 on it will not fit together with the piece that has 3x2 on it. This is because 3x2 is not equal to 9 . By trying all the pieces, the learner automatically is given an immediate feedback of all his/her responses.

The application of computers to instruction has made the issue of immediate knowledge of results easier. The software would have been programmed to grade the students after they give their responses without recourse to the teacher. This has made individualized instruction possible and it removes the stress of unending grading of scripts from the teacher.

4.0 Conclusion

In this unit, we have discussed knowledge of results as well as examples of the instructional media that can have inbuilt in them - immediate knowledge of results.

5.0 Summary

Favourable feedback about performance has a positive effect on subsequent performance. Skinner called it reinforcement; Thorndike called it the Law of Effect. Knowledge of result must follow quickly upon completion of a task for it to have maximum influence on future performance. Computer, programmed instruction and self correcting materials are some of the instructional media that produces immediate knowledge of results.

6.0 Tutor-Marked Assignment

- In two simple sentences, discuss knowledge of results.
- Mention three instructional media that give immediate knowledge of results

7.0 References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. **5**th Edition. Boston: Pearson/ Allyn & Bacon.

Unit 4: Learning Theory and Instructional Media 3 (Whole or Part Learning)

1.0 Introduction

A theoretical debate surrounds the subject of whether it is better to learn by small steps or large chunks. In this unit, the concepts of whole and part learning will be discussed. Instructional media that can facilitate whole and part learning would also be presented.

2.0 Unit Objective

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

(i) Discuss whole or part learning.
(ii) Give examples of instructional media that can facilitate whole or part learning.

3.1 Whole or Part Learning

Individuals learn in different ways, with some children, especially the mentally disadvantaged, small steps are useful because with a limited channel capacity there are more chance that the information will be held in mind. Part learning by small steps, however, might be a disadvantage where the material is connected in some way. Poetry, theories and laws of science, for example, really need to be presented in their entirety; otherwise the relationship between the parts is lost. Where total content is important, whole learning is an advantage because taking part of the content out of context may lead to material being meaningless. When to use whole or part learning is a matter which the teacher must judge from his or her experience of the content.

3.2 Instructional Media That Can Facilitate Whole or Part Learning

It is actually the content of the instructional resources that distinguishes whether the resource can be used for whole or part learning. Thus it is safe to conclude that all resources could be used for whole or part learning, depending on how the concept is presented. For example, a flip chart or picture album could be used to show pictures of electrical appliances for the first few pages and the next pages show picture of mechanical appliances, in the house, Another flip chart or picture album however could contain various appliances used in the house whether electrical or not and the student asked to sort the pictures according to categories given. The former falls under part learning while the latter promotes whole learning.

Despite what has been said however, there are some of the instructional media that can be used to facilitate a type of learning more easily than the other. For whole learning, computers, 3-dimensional visuals and projected visuals can easily be used. While for part learning, materials for laboratory experiments, drill and practice or tutorial software, self corrective puzzles, manipulatives in the form of building blocks, mock-ups and models are easily applicable.

4.0 Conclusion

In this unit we have discussed whole or part learning. Also discussed in this unit are the instructional media that can facilitate whole or part learning.

5.0 Summary

Part learning is the type of learning whereby contents are learnt in small bits, while in whole learning the content is not broken down in bits to be able to see the connections and relationships easily. There are instructional materials that easily promote one learning over the other.

6.0 Tutor-Marked Assignment

- Differentiate between whole and part learning?

- What type of instructional resources can a teacher use for whole and part learning

7.0References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. **5**th Edition. Boston: Pearson/ Allyn & Bacon.

Unit 5: Learning Theory and Instructional Media 4 (Closure)

1.0 Introduction

Closure as a terrn was introduced by Brown (1975) as part of microteaching programmes in the 1970s. In this unit, the concept of closure would be discussed as well as instructional media that can facilitate closure.

2.0 Unit Objective

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

(i) Discuss closure.
(ii) Highlight instructional media that can facilitate closure.

3.1 Closure

Whatever the preferred method of conducting lesson, the teacher must achieve goals, mainly predetermined, by the end of the lesson. This process of rounding off a lesson is called closure. A ragged or half-finished ending to a lesson can be unproductive in terms of retention of lesson content, and ends the teacher-pupil contact in a tense rather than a relaxed fashion. This aspect of content completion and personal relationships are sometimes referred to as cognitive and social closure.

Cognitive closure can be achieved in a variety of ways. Frequently a short written or oral test is used just to remind children of the main points. The teacher may present a summary on the blackboard or a visual aid. Sometimes the closure is delayed for homework. The reason for cognitive closure are that it: (i) directs attention to the need for consolidating what has transpired in the section or lesson; (ii) gives the section or lesson a coherence so that people can identify a

relevant chunk of information; (iii) offers an opportunity for revision of the main points; (iv) enables the teacher to appraise and reinforce work well done.

3.2 Instructional Media That Facilitates Closure

A lot of instructional media can be used to facilitate closure in the classroom. Pictures that are not completed can be used where you ask students to complete the pictures to form a scene or a process. One can also play a video drama to and stop at a point in the video, the learners are then asked to give suggestions on how the story in the video would end. This can be used in subjects like social studies, literature, religious and moral instruction and Health Education. One can also set up and perform an experiment to a point and ask the learners to finish the experiment**.**

Posters, charts and other visuals can also provide closure in the classroom, a summary of the content learnt is presented on the visual and used at the end of the class. The computer can be used as well to provide homework for the students based on the content learnt.

4.0 Conclusion

In this unit, we have looked at closure, how closure can be achieved and the reasons for cognitive closure. We also looked at instructional media that can help to facilitate closure in the teaching-learning process.

5.0 Summary

Closure is a process of rounding off a lesson. The aspect of content completion and personal relationships are sometimes referred to as cognitive and social closure. Cognitive closure can be achieved in a variety of ways. Instructional media that can be used to facilitate closure in the classroom include incomplete pictures of a scene or process.

6.0 Tutor-Marked Assignment

- Briefly explain the concept of closure.
- Explain how visuals can be used to facilitate closure and give examples of such visuals.

7.0 References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. **5th** Edition. Boston: Pearson/ Allyn & Bacon.

Unit 6: Learning Theory and Instructional Media 5 (Learning Styles 1- Visual)

1.0 Introduction

Because individuals are different in a number of ways, they tend to learn in different ways. The way an individual prefers to learn is called the person s learning style. There are basically three learning styles, they are Visual, Auditory and Kinesthetic. In this unit, visual learning style would be discussed as well as instructional media that help visual learners.

2.0 Unit Objectives

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

(i) Explain Who a visual learner is.
(ii) Highlight instructional media that help visual learners learn best.

3.1 Visual Learning Style

A visual learner is someone who learns best by seeing a representation of what he or she is studying, either in pictures, or written words or an actual demonstration. Good visual learners tend to-

- Be strong readers
- Be good spellers (usually because they can see the words)
- Prefer, after a certain age, to read for themselves rather than have stories read to them
- Find it easier to remember the things they see rather than what they hear (such as having instruction written down rather than spoken, reading a map rather than listening to directions)
- Doodle(like drawing, scribbling or sketching) when thinking, talking on the phone, or during a meeting

3.2 Instructional Media That Can Help Visual Learners To Learn

Since visual learners learn best by seeing, visual and audio-visual media would be most effective for their instruction. They could either be projected or non-projected visuals. The paramount thing to the visual learner is that they can see what they are leaning. Examples of the visual/ audio-visual instructional media are charts, flat pictures, motion pictures, posters, text books, journals maps, books, etc.

4.0 Conclusion

In this unit, we have discussed the concept of visual learning style as well as the instructional media that are best for visual learners.

5.0 Summary

A visual learner is someone who learns best by seeing a representation of what he or she is studying, either in pictures, or written words or an actual demonstration. Since visual learners learn best by seeing, visual and audio-visual media would be best in passing instruction to them.

6.0 Tutor-Marked Assignment

(i) Explain the term Visual Learner
(ii) List some of the instructional media that are best for visual learners

7.0References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. 5th Edition. Boston: Pearson/ Allyn & Bacon.

Paul, K. (2002). Study Smarter Not Harder. Accra: EPP Books Services

Unit 7: Learning Theory and Instructional Media 6 (Learning Styles 2- Auditory)

1.0 Introduction

Because individuals are different in a number of ways, they tend to learn in different ways. In this unit, auditory learning style would be discussed as well as instructional media that help auditory learners.

2.0 Unit Objectives

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

(i) Explain who an auditory learner is.
(ii) Give examples of instructional media that help auditory learners learn best.

3.1 Auditory Learning Style

An auditory learner is someone who learns best by hearing things. Such learners prefer hearing material in a lecture or classroom setting. Good auditory learners tend to-

- Prefer talking to writing when describing something
- Prefer making a telephone call to writing a letter
- Become distracted by noise more than a visual learner
- Have a stronger sense for music than visual art such as painting
- Remember what they hear easily than what they see

3.2 Instructional Media That Can Help Auditory Learners To Learn

Since auditory learners learn best by hearing, audio media as well as instruction presented in the classroom would be best in passing instruction to them. Auditory learners can be assisted to record classroom lectures, discussions and group presentations which they can use over and over again. Examples of audio based media that can help facilitate the learning of Auditory learners include radio, audio CD, audio cassette and its player.

To enhance the audio materials that can be used for auditory learners, music can be in the background or at intervals while presenting the content. The presentation should be slow paced such that the learner would be able to write or quickly scribble points that he/she wants to remember and the content can also be broken into bits and small steps with musical interlude.

4.0 Conclusion

In this unit, we have discussed the concept of auditory learning style as well as the instructional media that are best for auditory learners.

5.0 Summary

An auditory learner is someone who learns best by hearing things. Such learners prefer hearing material in a lecture or classroom setting. Since visual learners learn best by hearing, audio media would be most effective in giving them instructions.

6.0 Tutor-Marked Assignment

(i) Explain the term Auditory Learner
(ii) Give examples of instructional media that are best for auditory learners

7.0 References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

Child, D. (2004) Psychology and The Teacher. London: Continuum.

Eggen, P.D & Kauchak, D.P. (2006) Strategies and Models for Teachers: Teaching Content and Thinking Skills. **5th** Edition. Boston: Pearson/ Allyn & Bacon.

Paul, K. (2002). Study Smarter Not Harder. Accra: EPP Books Services

Unit 8: Learning Theory and Instructional Media 7 (Learning Styles 3- Kinesthetic)

1.0 Introduction

Because individuals are different in a number of ways, they tend to learn in different ways. In this unit, kinesthetic learning style would be discussed as well as instructional media that help Kinesthetic learners.

2.0 Unit Objectives

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

(iii) Explain who a kinesthetic learner is.
(iv) Give examples of instructional media that help auditory learners learn best.

3.1 Kinesthetic Learning Style

A kinesthetic learner is someone who actually learns best by doing it. Moving, touching, and experiencing something firsthand are often essential to this type of learner. Good kinesthetic learners tend to-

- Speak and write more slowly than the other two modalities of learners, but have confident fluid physical movements
- Use hand gesture more often
- Prefers hands-on learning to just seeing or hearing about something
- Have difficulty sitting down for extended periods when younger (not because of any disorder, but because they are used to moving and exploring their world, and formal school discourages this)
- Memorize things better and more easily when being physically active (such as walking around the room when reciting)
- Understand things better when they are acted out.

3.2 Instructional Media That Can Help Kinesthetic Learners To Learn

Since kinesthetic learners learn best by doing, manipulatives such as building and construction blocks, knock down toys,, would be most effective in giving instruction to them. Models, specimens, mock-ups enable the kinesthetic learner to interact with materials and do rather than listen to or passively watch the instruction being given.

4.0 Conclusion

In this unit, we have discussed the concept of kinesthetic learning style as well as the instructional media that are best for the kinesthetic learners.

5.0 Summary

A kinesthetic learner is someone who actually learns best by doing it. Moving, touching, and experiencing something firsthand are often essential to this type of learner. Since kinesthetic learners learn best by doing, manipulative such as blocks and legos would be best in passing instruction to them.

6.0 Tutor-Marked Assignment

(i) Who is a Kinesthetic Learner
(ii) Give examples of instructional media that are best for Kinesthetic learners

7.0 References

Akinade, E.A. (2002) Psychology of Learning: A Basic Text for Colleges and Universities. Lagos: Babs Olatunji Publishers.

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