SLIDE/SOUND/NOTES PACKAGE ON
THE DISSECTION OF A RABBIT FOR
INDIVIDUAL AND CLASSROOM USE

by

OLUFUNMILAYO IBIRONKE AMOSUN (MRS)

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Zaria.

APPROVAL AND CERTIFICATION

This project by Olufunmilayo Ibironke Amosun (Mrs) meets the requirements governing the degree of Master of Education (M.Ed) of Ahmadu Bello University and it is approved for its contribution to knowledge and literary presentation.

It is certified that all of it was produced by Mrs. Olufunmilayo Ibironke Amosun.

.....
Project Supervisor
DR. F[illegible] OLOYEDE

.....
External Examiner
DR. A. OGUNRANTI
UNIVERSITY OF IBADAN
IBADAN

.....
Second Reader

.....
Head of Section

DECLARATION

I hereby declare that this project has been produced by me. It has not been presented in any previous application for higher degree. All quotations are indicated by quotation marks and the sources of information are specifically acknowledgeed by means of references.

.....

Mrs. OLUFUNMILAYO IBIRONKE AMOSUN

DEDICATION

Dedicated to God my Father, who gave me a new direction in life on May 5, 1969, saw me through my first degree, led me to my best friend - my husband and made the completion of this course possible over a period of two successful pregnancies.

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ABSTRACT

In education, individuality fosters efficiency. This is so because human beings differ in characteristics, intellect and disposition. It is very important therefore for a teacher to present instruction in such a way that individuals can interract with instructional materials at their own pace.

The project has been designed to include instructional media that are very useful for teaching and learning of "how-to-do-it" processes. The process of dissection is one of such. The project consists of a package of slides, tapes and notes for the teaching and learning of the process of dissection of a rabbit in order to expose some of its internal organs for study purposes.

The package was designed after the study of various contributions from various outputs to learning and teaching. Such contributions are discussed in the chapter on literature review and these include the fields of:

Psychology - On Motivation
Perception
Individuality
Feedback/Reward

Communication - Message Coding/Media

<

Education$_A$Technology - Systems Approach to Instruction
- Various Models for Instructional Besign
- Media Design and Production

Before the final product was made, a pilot test was conducted. Media experts, content experts and learners gave their appraisal of the package and revision was effected. Feedback is provided at the back of the script for individual users and the chapter on literature review is expected to be useful to teachers. Necessary instructions are provided at various points in the script for teachers as well as learners.

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CHAPTER ONE

INTRODUCTION

In recent times, learning and teaching has taken a different turn from the earlier form of learning which was by verbal oration delivered by one individual to a small or large audience, (as the case may be). Later, printed texts were deemed to be more authentic because they provided a better means of communication of ideas without the danger of misquotations. They also had the advantage of reaching a large and more varied audience.

In later times, however, media, with all its advantages has been found to superceed the singular use of printed materials as a means of instruction. The entire educational community is no longer speculating on whether or not to use instructional technology but on "how" to do so. The answer to this "how" has been found not to lie just in producing better looking media but in producing media in relation to the instructional process, such that the product will be used in integration with the instructional system.

Cavert says "media in instruction should be used, not as a resource for the system, but as a resource of the system" (Cavert, 1974). The systems approach to curriculum planning and instruction has provided a favourable answer to the "how".

> According to Hamreus, "The systems approach serves as a guide for systematic procedure towards the solution of some defined problem in the educational system. The approach provides for not only the means for systematic planning, designing, organising and controlling of the instructional development process, but it also builds on that which has been found to yield best results and eliminates aspects that contribute least, or negatively to desired goals (Hamreus, 1968).

In the light of the foregoing facts, this instructional package titled "Organs, show up", is a package prepared for the purpose of teaching students of post-secondary level the method of dissecting a rabbit in order to expose and identify the organs of the digestive system and the female reproductive system. It is therefore being designed using the systems approach which deals with having a goal in mind, using the best means of achieving this goal having utilized minimum effort to obtain maximum effect. In this instance, the goal is to solve the problem of reaching the increasing number of people and individuals who want to learn, to teach such people to be able to learn the huge and increasing body of knowledge on their own, by self effort and with help from the opportunities provided through media utilization. In other words, there is an explosion of the learning population and of knowledge itself and the instructional developer must seek for means of solving these problems.

The school environment and facilities are no longer adequate to meet individual needs and differences. Educationists have started to place more and more emphasis on the need to make a learner know that his thinking and feeling are worthy and appreciated. They have come to realise that individual learning through activity yields greater results in terms of learning than mass instruction and passive learning.

To overcome these problems and to provide individuals with tools for independent study, instructional packages are being developed. These packages are also useful for the teacher who wishes to introduce activity into his classroom instruction. This is more desirable now than in the former classroom setting where the teacher is the central figure. The learner-centred form of setting where the teacher is in the background, the student is being the object of attention and the media providing a source of activity is now being emphasised. With proper guidance, it is expected that learners will learn the basic skills or concepts and acquire the desired attributes.

This package was developed utilizing the various principles of learning which include the involvement of the learner in activities, the relation of past experience to new learning, the importance of media in instruction, the importance of feedback and motivation in learning and the utilization of the systems approach in the design of instruction.

In proceeding through this package development, using the systems approach, the writer hopes to look into the various models for instructional development, come up with a normative model, and compare this with the living model (currently being used). Cavert believed that before starting any instructional design, there should be a frame of reference. This frame of reference is an analysis of the total academic situation in order to determine what elements must be acknowledged as constraints and what elements remain for variable design

(Cavert, 1974). Such constraints that have been identifie as frame of reference for this package are as follows:

(1) The feasibility of employing the type of media used in this package (slide/tape/notes) in the present instructional setting where structures were constructed without provisions for facilities for media use.
(2) Media utilization being new, users must be given adequate instruction on management and utilization of this media.
(3) Financial constraints may make it difficult for individuals to actually use this package hence, it is being designed not only for individual use, but also for classroom use.

Following the normative model for the design of instruction, the package was developed after analysing the target population, setting the goals and conduction trial tests and revision before the final product is made.

1.1 Statement of Purpose of the Study

The aim of this project is mainly two fold. First, it is to provide the students of Biology in post-secondary or A-Level institution such as Schools of Basic Study, Advance Teacher Colleges and even first year students of biology in the University a tool for independent study of some biological systems, namely:

Digestive System

Reproductive System

This is done by recording the dissection of a rabbit on slide accompanied by a narrated tape. The stude can use the package at his own time and proceed at his own

pace. He can use the package either to build on previous classroom instruction or to provide activity which enhances learning. It can be used in carrels, it can also be used to teach the skills of dissection to students of Biology.

Secondly, the package is aimed at providing the teacher with teaching aid with which to achieve his instructional objectives.

The purpose of this package is to provide a situation in which learning and teaching are effective, problems minimised, and thorough learning is accentuated. The slides/tape in the package are not meant to substitute real dissection and demonstrations. However in schools which cannot afford to provide rabbit for on-the-spot dissection by the teacher, the package will come in handy. In cases where rabbits are available for dissection by both the teacher and the students, the package provides after lecture revision for students.

Since the purpose of this package is for utilization both as an individual learning package and also as an instructional tool for the teacher, there is a section in chapter 4 of the write up, titled the "Instructional Book". In this section, instruction is given to the users of the package on management and utilization of the slide/tape/notes. Instructions are provided about maintenance and manipulation, especially the need for prior preparations before viewing.

This will go further to fulfil the purpose of the package to enrich learning and instruction, and to provide activity so that learners learn by doing.

The package is purposed to succeed and not to proceed theoretical instruction on the various systems of the mammalian body, their physiology and functions, so that students are already familiar with the parts or organs of the systems.

Bearing in mind the need of the target audience, to be able to dissect a rabbit, locate and display the organs, this package is designed to include feedback. Assignments, classroom interaction and exercises with answers are provided at various points.

1.2 Significance of the Study

It is significance to note that Instructional Technology is fast becoming an area of education to be recknoned with and without which instruction cannot be successfully effected and learning cannot be fulfilling. Instructional Technology is not just the study/use of audio visual materials, it is a system whereby instruction is provided meaningfully, utilising the systems approach to realise the objective of the learning (See Chapter 2, section 2.7). According to C.E. Cavert (1974), "Instructional Technology is not only an embodiment of the items of hardware and soft ware available to the instructional process, but it is a systematic way of designing, implementing and evaluating the total process of learning and teaching in terms of specific objectives based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction".

From the foregoing definition, this project's significance lies in the fact that:

(A) It helps the teacher to attract the learners attention and also provides classroom activities for learners.

(B) It utilizes three media types namely slide, tapes, notes. This is expected to provide in-depth learning experience.

The slide, tapes and notes were developed alongside each other rather than separately, thus complementing each other.

This is of great significance when we consider the advantages of media use for instruction: Such as, the fact that they:

(1) provide reality of experience

(2) engage attention .

(3) make it possible for events to be recreated at convenient times.

(4) illustrate abstract concepts better than words or print (film, slides).

(5) provide common experience .

(6) overcome physical limitations e.g., by enlarging or reducing sizes for better perception

(7) overcome intellectual barriers.

In addition to all the above, slides have an added advantage for instructional purposes because:

- It offers best opportunity for individual and independent study.
- Note taking is possible because it can be stopped in between ,
- Interaction is also possible.

- Suitable sound can be prepared to suit the audience.
- Step-by-step processes are easily depicted.
- It does not require much room darkening devices.

According to O.L. Davies Jr. and Paul W. Kirby (Ed. 1975), "An instructional package is a system of closely related materials, each serving a particular purpose, hence while film, slide set, recording etc., for example were being developed, notes, exercises and feedback were also developed along with them, hence each component is complementary to the other. This is the aim of this project. It is hoped that this package will form a useful tool in the teaching and learning of Biology in higher secondary schools and will form the basis for the development of other teaching materials and self instructional tools.

(C) Another significance of this project is that students can do some self assessment and also be able to evaluate their own progress by examining the aims and objectives and determining how close or otherwise they are to achieve the objectives. For the classroom use, classroom/activity and participation or interraction are incorporated into the tape.

(D) The long-term goal of this package is to prepare students for their vocational life. The students having opted for Biology at this level might finally decide to go into any of the medical fields whereby the knowledge of the internal organs of the body and their interrelation and function

required. It is therefore imperative for them to be able to dissect and locate the organs. Of equal importance is the need for the student of Biology in the Advance Teachers College to be able to dissect a rabbit, in order to teach his students effectively when he is employed.

1.3 Procedure and Methodology

In this study the writer proceeded from a thorough examination of the various educational principles which should be utilized in the design of instruction. After this examination, the writer utilized them in the preparation of this instructional media, e.g.

- Feedback in instruction
- Motivation
- Relation of previous knowledge to new instruction
- Individual learning and principles of independent study
- Systems approach to instruction
- Instructional Development process and guidelines
- Principles of Evaluation of Instruction etc.

This forms the bulk of the literature review.

Next, the writer considered the General Model and the living model alongside the Normative model of Instructional Development, and gave some suggestions for such instructional developments for future purposes. The General Model is the model that gives the general procedure for designing instruction. The Normative Model is derived from the general model and it is the one the

writer advocates and utilized. The Living Model is the model currently used or the Traditional Model. This is dealt with in chapter three.

In talking about the systems approach to instruction, the writer paid a lot of attention to the part played by media in instruction and the writer gave reasons for choosing the slide/tape/notes.

Having done the groundwork by way of studying the various activities principles and components of instruction the next thing is the package itself. The package is developed following the Instructional Development Institute (IDI) Model in guide book by Indiana University. See chapter 3

Following the model, an instructional package was produced consisting of slide/tapes and notes. The slide depicted the step by step activities involved in the dissection of a rabbit. in order to display and identify the organs of the reproductive, and alimentary systems, tapes were developed alongside the slide, These form the script for the slide, which is provided in the package. The notes accompanying the package give specifications and instructions, for classroom interaction, previous preparation and directions for pre-and post-tests.

After the first prototype was developed, there was a pilot test. In this pilot test, a combination of selected response, constructed response and specific (true-false, multiple, choice and short answer) response was used.

For this pilot test, Instructions were given to the administrators of the test, the setting required was specified, materials and time allocation was also clarified. Clear instructions were given to the students, orientating them to the purpose of the test and giving information on how to answer and how best to use the alloted time.

Analysis of the test gave the basis for revision of the prototype.

The package will be incomplete without an Instructional Book to users. In this Instructional Book, instruction is given about management and utilization of slides i.e.

1. Storage and retrieval of slides ,
2. Previous preparations for utilization ,
3. Operation of the slide projector and projection procedures.

CHAPTER TWO

LITERATURE REVIEW

This chapter is a summary of several works done in various fields of education as related to Instructional Design. Inview of the fact that any development process must utilize the findings of research in order to develop an effective product, one must therefore take a good look at the various aspects of research in relation to learning, instruction and instructional development before designing instruction. These various aspects will be considered in sections one to eleven.

2.1 Packages and Their Use

Learning packages according to Paul W. Kirby and Davis O.L. (Jr) (1975) have the following major characteristics:

First, packages are conceived as programme, not ideas in order to create a new curriculum and not just to have interesting accessories....

Second, packages are a system of closely related materials and instructional media, each serving a particular purpose. Thus, while a textbook was developed, so were films, exercises, laboratory note books, booklets, equipment and recordings..... each component is integral to the system; omitting one would be to deny the validity,

and frustrate the impact, of the whole. A key to the entire system of materials seems to be the plan for their use...

Third, the characteristic element of packages appears to be their tryout and distribution".

Paul W. Kirby and Davies O.L. (Jr) (1975) however have the opinion that generally "... the packaging concept is not new, but has been the standard for many years e.g., The text book package contains instructions which are broken into 'lessons' or 'units', accompanied by visuals, exercises activities, bibliography and answers to questions. All this is enclosed by study binding, to withstand abuse". This, Kirby and Davies believe, has been part of a textbook series. According to Kirby and Davies, "The text book packaging is an incomplete packaging concept by contemporary standards because it is only one of many materials that are appropriate for instructional purposes and it was likely developed independent of other materials even if additional media accompany it.....the media plays supporting roles."

2.1.1 Characteristics and Types

"Regardless of the form, Instructional Products have the following basic characteristics:

(1) They are designed to achieve specific objectives which describes what students will learn as a result of using the product.
The objectives are usually aimed at meeting a demonstrated need.

(2) They are designed to offer replicable instruction. That is, to provide instruction in the same way and at different times. Usually, evidence is provided that learners can use the product as specified.

(3) They are demonstrably effective, having been tried out with representative samples of the learner population (A description of their instructional effectiveness during these try outs is available for users of the product) I.D.P.G. 1977.

Various types of instructional products exist consisting of various materials and designed to meet various needs. The form of each type is dictated by the objective for which it was produced and the characteristics of the target population.

For the development of instructional packages see chapter three

2.2 Individualised Instruction and Learning Packages

There are various definitions of individualised instruction and learning packages. Learning packages have been aptly described by Kirby and Davies (Jr) (1974). However, Individualised Instruction encompasses various issues. It is notable that the concept of

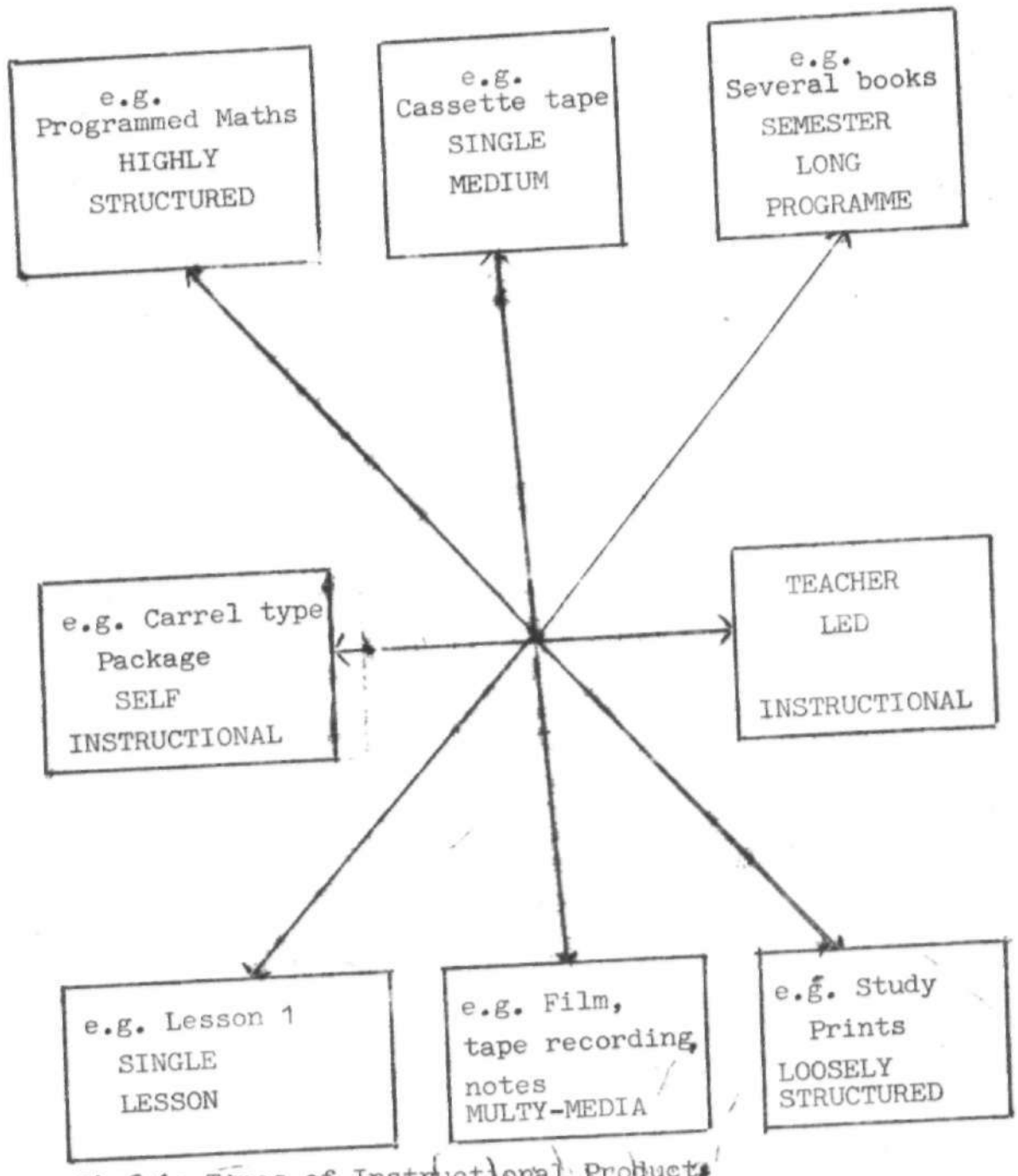


Fig 2.1: Types of Instructional Product Produced from Instructional Development Project Guidebook (I.D.P.G.) (Indiana University, January, 1977).

Individualised Instruction developed from research findings, such as, the effect of individual learner differences in learning, variability in human development, importance of activity and the effect of active interraction with learning materials e.g. the UNIPAC, a term used to designate the units of instruction or learning packages developed and disseminated under the auspices of the materials dissemination centre.

Various packages have been developed by various groups, in various places, using various formats and having a variety of goals. According to Field and Swenson (1975) "UNIPAC is to help the student to possess certain skills and characteristics which are more important to him than knowledge as traditionally defined. In order to meet this need, the general format of the package is a pre-test, to post-test, to Main concept, to Component parts (to be learned), to Behavioural Objectives, to Instruction for selection of activities, to Self-test to Post-test. In summary, UNIPAC form and elements, lead to performances and individualization."

The writer of this script believes that though the UNIPAC is good and can provide a forum for individualized learning, the teacher's role has been relegated to the background, and the feelings of the learner have not been reckoned with. Keuscher (1975) in his article 'Individualization of Instruction: What it is and what it isn't, says "Individualising Instruction along the lines of diagnosis and prescription, pre-testing and post-testing through behavioural objectives, is a manipulative method of teaching. It stresses what is to be taught and how it is to be taught with little or no regard for the feelings of the individual".

Perhaps this is where the teacher's role comes in. Packages alone cannot take the teacher's place for only a living being can recognise the feelings of the learners and help them through learning. The LAP (Learning Activity Package), the PLAN (Programme for Learning in Accordance with Needs), the TULSAPAC, (Learning Packages Prepared by University of Tulsa) etc, all follow the same format of definition of title, component, prerequisite knowledge, self assessment and evaluation, post-test and revision. Rather than Individualised Instruction, Keuscher suggests Personalised Instruction, where students are given the materials and allowed to interract with it, while the teacher plays the role of guidance. A lot of controversy has developed from Keuscher's

assertions. In his criticism of packages, he says that

> most materials and Programmes marketed in the name of Individualisation do very little over and beyond adjusting the pace at which a student wades through prescribed assignments some just go faster than others... Another indictment of most materials is that they teach only those facts that are going to show up on the tests. Both information and answers are decided before hand by some 'all knowing' person or group of people who, although they do not know, have never seen, nor will ever see the pupil, have decided what he should learn and how he should learn it .

Keuscher's opinion should not be overlooked. Considering the general theme of educational goals, which is, to develop an instructional system which gives maximum individual fulfillment, educators agree with the general goals stated by Jean Piaget that:-

> "The principal goal of education is to create men who are capable of doing new things, not simply repeating what other generations have done - men who are creative, inventive and discoverers. The second goal of education is to form minds which can be critical, can verify and not accept everything they are offered... We need pupils who are active, who learn early to find out by themselves partly by their own spontaneous activity and partly through materials we set up for them... The above goals are too general and not specific for individual students to learn. To do this, our instructional goals, either in form of packages or not, should make provision for differences in rate of learning. This can be done by restructuring of materials, techniques and setting in order to maximise each learner's rate of learning."

John O. Bolvin (1975) believes that 'the outcomes of learning are to be specified e.g., if creativity, inquiry, complex reasoning and open-mindedness are desired aspects of human learning, then they should be recognised as accessible goals and specified as observable competencies . He also goes on to say that 'detailed diagnosis is to be made of the initial state in which learner comes into a particular instructional situation. Without this initial learning characteristics assessment, any educational procedure is presumptuous. In conclusion, learning packages,in order to be most effectively utilised,requires the teacher as a guide and not instructor. This is what this package designer intends to provide.

2.3 Classroom Management of Learning Packages

Smith and Kapfer (1972) discussing about packages say that classroom management of learning packages, whether used in individual settings or in group instructional situations, require student behaviours that differ from the traditional expectations. It is difficult, but not impossible for a teacher who has had little experience with individualised learning package programmes to visualise and anticipate new behavioural competencies . Such learning competencies that a teacher should expect are that learners do the following:

- Read (listen to, or look at) the learning package.
- Follow the directions given.
- Use resources cited in the package and/or find their own resources.
- Decide when they have learnt sufficiently.

Users of packages must keep to the above rules. Much is required of a teacher who is utilising the package for classroom instruction. He should be able to use his initiative to adapt the package to the individual and collective differences of his students. Lucille W. Smith and Philip G. Kapfer, give a general rule to teachers, that,

> 'Teachers or package writers can promote greater self-motivated learning in at least two ways.... first, they can make sure that the learning activities in the package include experiences with concrete real things that are available, or can be made available in the school or in the community. (if such experiences are prerequisite for use of a learning package, care should be taken that students have these experiences before they pick up the package)..
>
> Second, the content of learning packages can be related, whenever possible, to situations in which the content to be learned can be applied immediately... The important point is that the usefulness of a specified skill be immediate, real and motivating". (Kapfer and Smith, 1972)

Having examined the utilisation of learning packages both individually and in the classroom setting, we shall familiarise ourselves with the much used words - Individualised Instruction and Independent study.

2.4 Independent Study and Individualised Instruction

Self Instruction or Independent study, is not synonymous with Individualised Instruction. Tosti Tosti and Harmon (1972) highlight the difference between the two as follows:

> It is possible to give every student a Programmed Instruction (PI) text, tell them to go away and work on it, return when they are finished, and take a final examination. If that is all, we would not have gone far along the way of individualisation from that afforded by conventional lecture ...
>
> However, independent study programmes may permit more individualisation than lecture systems, simply because the student can usually imitiate more remedial action on his own, that is, he can choose to re-read, reply, review (the notes, tapes, slide or film) at his own time...
>
> Motivational considerations of self-pacing are very real but are not yet well documented. Several studies have indicated that when asked what aspects of an Individualised Programme students most like, the response 'going at your own rate' is usually singled out".

Active participation in learning results in ability to choose from several alternatives and the readiness to accept the consequences of one's decision. Active participation in learning became popular between 1954 and 1969 and this became accepted as a key factor in effective learning. (Gilbert 1958; Holland 1959; Margilles and Eingen 1962; Markle 1969), Kersh 1962 and several other workers came up with alternatives to active learning such as direct self inquiry methods,

leading to a systems approach. The systems approach is utilising the full capacity of a medium to accomplish the objective in the most economic way. This should be the aim of learning packages.

In designing a self-teaching package such as this therefore, one should recognise that a self teaching system is one in which the student actively takes responsibility for his own progress. Such steps should include, in a nutshell.

- Analysis of the course in terms of outcomes for the learner.
- Consideration of available technique or methods
- Evaluation and revision of the course.

The above consideration are practicalised in chapter four in relation to this package.

Outcomes of Self teaching systems for the learners

This has been described by several workers on formulation of objectives (Mager 1962; Popham and Baker 1970) classification of objectives (Bloom 1956; Ndedlski, 1965) and much has been written on their merits and demerits (Ormell 1973). Independent study involves active participation in learning. When a package is prepared with ample consideration of the steps suggested above, learning, either independent or in a classroom setting, will yield the desired effects.

A good example of a self-teaching or independent study was that developed by Professor F.S. Keller

entitled "Goodbye Teacher...." (Keller 1968). The system advocates the use of a sequential set of self-study units pursued by each student at his own pace.

Keller's plan is distinguished from conventional teaching procedures in the following ways:

1. The student moves through the course at his own pace.
2. The student moves on to new material only after demonstrating mastery of previous work.
3. Lectures and demonstrations are used for motivation rather than as a source of critical information.
4. The written word is stressed in teacher-student communication.
5. Repeated testing, immediate scoring and tutoring enhances the personal social aspect of the process (Keller, 1968).

The proof of real independent and individuality of the plan lies in the fact that texts are based on what the student has been able to cover even if he has spent the whole session doing so. The question is, at the tertiary level, do we have such time on our hands? Invariably not. Most students at that level will rather want to finish the course at the stipulated time. They do this by stretching themselves to the limit. Is there any individuality in the setting anymore? In order to utilise part of the Keller plan, tests are given at close intervals within this package so that at each stage, the learner can assess himself.

"No teaching/learning method, however innovative or systematic, can succeed without a proper consideration of the two main participants - The student and the teacher". (Hill 1976). Two main areas stand out clearly; when the relationship between teachers and students is considered.

1. Better communication and understanding between students and teachers.
2. Better and more appropriate teaching methods employed by teachers.

Other Areas of Some Concern Are:

1. Need for clear aims and objectives in a course of study.
2. Greater awareness and use of variety of assessment methods.
3. More feedback to both parties.
   (a) To teachers on effectiveness of their teaching
   (b) To students on their progress
4. Need for teachers to show mastery and enthusiasm of their subject and for students to be motivated and shown the relevance of a material to their profession.
5. More time, for teachers to prepare work, and for students to produce better quality work.(Hill,1976).

This information was obtained from the following works.

1. "Teacher felt needs in relation to their own performance and to helping their students" (Riley,

Lifshitz and Ryan, 1950; Isaacson, Mckeachie and Milholland, 1963; Lee 1967; Eble, 1970; Conference on Assessment of Learning, 1970; Mckeachie, Yi Guang Lin and Man, 1971; Eble 1969; Miller, 1972; Smith, Fusilier, Bagramian and Bohomley, 1969; Bolenda and Guild, 1967).

2. "Teacher's needs as seen by students in relation to their performance and in relation to helping student" (Conference on assessment of Learning, 1970; Riley, Lifshitz and Ryan, 1950; Miller, 1972; Lee, 1967; Mcleish, 1970; Spaights, 1967; Costin, Greenough and Menges, 1971; Smith, Fusiller, Bagramian and Bohomly, 1969; Brown, 1964. Bolenda and Guild, 1967; Solomon, 1966; Macchiwola, Skerrett and Taylor, 1971; Stewart and Malpas, 1966).
3. "Student felt needs in relation to their recognition as a person in relation to help with the instructional process". (Conference on Assessment of Learning 1970; Riley, Lifshitz and Ryan 1960; Lee, 1967; Eble, 1970, Mcleish, 1970, Eble 1972, Spaights, 1967; Brown, 1964).
4. "Student's needs as seen by teacher in relation to their recognition as a person and in relation to help within the instructional process". (Conference on Assessment of Learning, 1970; Riley, Lifshitz and Ryan, 1950; Lee, 1967; Eble 1970 Brown, 1964; Macchiarola Skerrett and Taylor, 1971; Bryant, 1967).

Both teacher and student appear to advocate for a closer look into the self teaching process in terms of the individual and to see what methods and techniques can best achieve this (Hill, 1976). The effectiveness of such an approach doesn't necessarily indicate the effectiveness of the lecture, but it does show that it can be incorporated into a total system containing a variety of techniques designed to promote learning.

In such a system, student can be actively involved in working through course material,given feedback on their progress and help with difficulties which they may experience.

Independent study or self-teaching system, rather than excluding the teacher, actually includes the teacher guiding the students in making their own decision, sticking to it and being ready to bear the consequences. This is active participation in learning. In accordance with the above specifications, this package is being designed for use both as an independent learning package and also as a guidebook for teachers who want to foster individualisation in the classroom. Instructions are therefore given both to individual learners and teacher as the case may be.

2.5 Media: for Instruction

Since various media are being employed in the preparation of this package, it is imperative that we take a look at all the work done on media and media utilisation.

"Audio-visuals are an aid to good instruction; they are not a prop for poor teaching" Davies (1976). "Showing is often easier than describing. Feeling, tasting and smelling are certainly easier than telling. Media makes such tasks simpler.... They are a means to an end"

Media, ranges from Chalkboards to film projectors, to concrete objects or models, from simulation to games. Their importance lies in what they contribute to the Instructional/learning process depending on the way they are used. They are definitely most effective when they are:

- Simple and to the point
- Suitable and relevant to the task
- Essential and necessary
- Interesting and challenging
- Saving in effort and time.

They are meant to simplify instruction not to make the learning process more complex.

Media classification has been done by various workers in order to help the instructor or teacher to decide and choose the most suitable and relevant media for the subject he intends to teach. One that saves efforts and time, is interesting and challenging and one that yields the expected results in learning. Only two such categorisations will be considered here. In a paper, "Categories of Instructional Media Research" by William A. Allen (1974), a decriptive approach to media, in terms of the individual and situational factors which may interract with media, to make them more or less effective, was proposed under the following headings:

(a) Factors related to stimulus
(b) Factors related to student response
(c) Factors related to content attribute
(d) Factors related to learner attribute
(e) Factors related to instructional use
(f) Factors related to psychological process
(g) Factors external to the direct instructional situation.

The above five factors are actually a categorisation of media research into meaningful structures, useful in selection of media types for instruction.

A. <u>Factors relating to stimulus</u>

This deals with the form of the media and its organisation e.g.

1. Comparison of one type with another e.g.,motion

picture with conventional instruction.

2. Characteristics of stimulus presentation, (like real object/pictorial/symbolic or verbal) are compared to show the characteristics and values that will perform specific instructional outcomes.
3. Production variable consideration such as black and white/colour, visual/auditory embelishments, animated/live and other attention gaining devices - such as characteristics of captions, type etc.
4. Redundancy, sequential, rate of presentation, etc. All the above are related to stimulus.

B. Factors Related to Student Response

Student participation, of some kind, during exposure to media is a strong factor influencing learning outcome. Active response can be overt or covert.

C. Factors Related to Content Attribute

Factors related to subject matter content. This has to do with the relationship between media and their appropriateness for a particular topic or subject matter or in relation to the particular instructional objective, viz cognitive, affective, or psychomotor or in relation to the learning heirachy, viz signal learning (S-R), problem solving or in relation to the learning tasks viz identifying, comparing and application.

Content attributes may also be viewed in terms of how it presents the stimulus, directs attention, provides a model, assesses attainment and provides feedback.

Gage (1963) proposed that media may be used to establish set and appropriate frames of reference, to achieve closure; to control participation, provide feedback and direct attention.

D. Factors Relating to Learner Attribute

Aptitude variables e.g., age, sex, mental ability, personality factor, learning styles, cultural factors, etc, should be considered.

E. Factors Relating to Psychological Process of perception, motivation, physiology and cognitive factors.

F. Factors Relating to Usage of Media

Is the particular media well developed? This involves teaching techniques, Instructional Strategies, teacher characteristics and attitude to media use.

G. Factors External to the Direct Instructional Situation

- Media programme within the school - How versatile
- Cost effectiveness/benefit considerations
- Media application in teacher education
- Administrative procedure of the school organisation.

Having classified the various media into categories, an instructor or an instructional designer is expected to look critically at this classification and choose to utilize media which have factors that can enhance realisation of his instructional intent.

Edgar Dale (1969) in his own classification of media presents media in form of a continuum which range from concrete to abstract. According to Edgar Dale, there are several difficulties in the school system, such as the following:

(1) Verbalism - This is the use of a lot of words which hold little meaning for the student; They tend to foster the acquisition of knowledge rather than impart skills (i.e.) they emphasize knowing rather than doing.

(2) Complexity - A lot of industrialisation has crowded out the simple way of life, hence no direct experiences can be obtained in many things, e.g., spinning, dyeing, preservation of food etc. Media use will bring such experiences to the ~~xx~~ classroom.

(3) Curriculum - There is more subject matter and more knowledge i.e., more facts to be grasped.

(4) Textbooks and Workbooks - Are numerous and too many teachers rely on them rather than supplement them. Such textbooks include a lot of verbalisation having been written by specialised writers in the field.

(5) Knowledge Explosion and Learner Explosion - Are also difficulties that must be overcome. There are more facts to be learnt and more learners to be taught.

According to Edgar Dale, Audio-visual materials can do a lot to reduce, if not eleminate all the

difficulties. In his own words, Edgar Dale says, Audio-visual materials can:

1. Build clear, accurate concepts.
2. Provide a climate to help more retarded students by generating interest and providing motivation. For example, in a field trip, more gifted students learn more, but the common denominator is greater and more effective than explanations.
3. Reduce verbalism by supplying concrete basis for conceptual reasoning.
4. Make learning more permanent by aiding retention.
5. Stimulate self activity and directs pent up interests.
6. Develop a continuity of thought especially motion pictures.
7. Provide experiences not easily obtained and contribute to the efficiency, depth and variety of learning.
8. Reduce monotony and add variety
9. Help efficient teaching.

With this general background to the importance of audio-visual materials, Edgar Dale goes on to analyse the various types and categorizes them into Concrete/ Abstract. At the base of his "Cone of Experience" (see fig.2) are the direct, purposeful experiences and at the peak are the more abstract experiences.

Edgar Dale does not say anything about one being more superior to the other especially since these

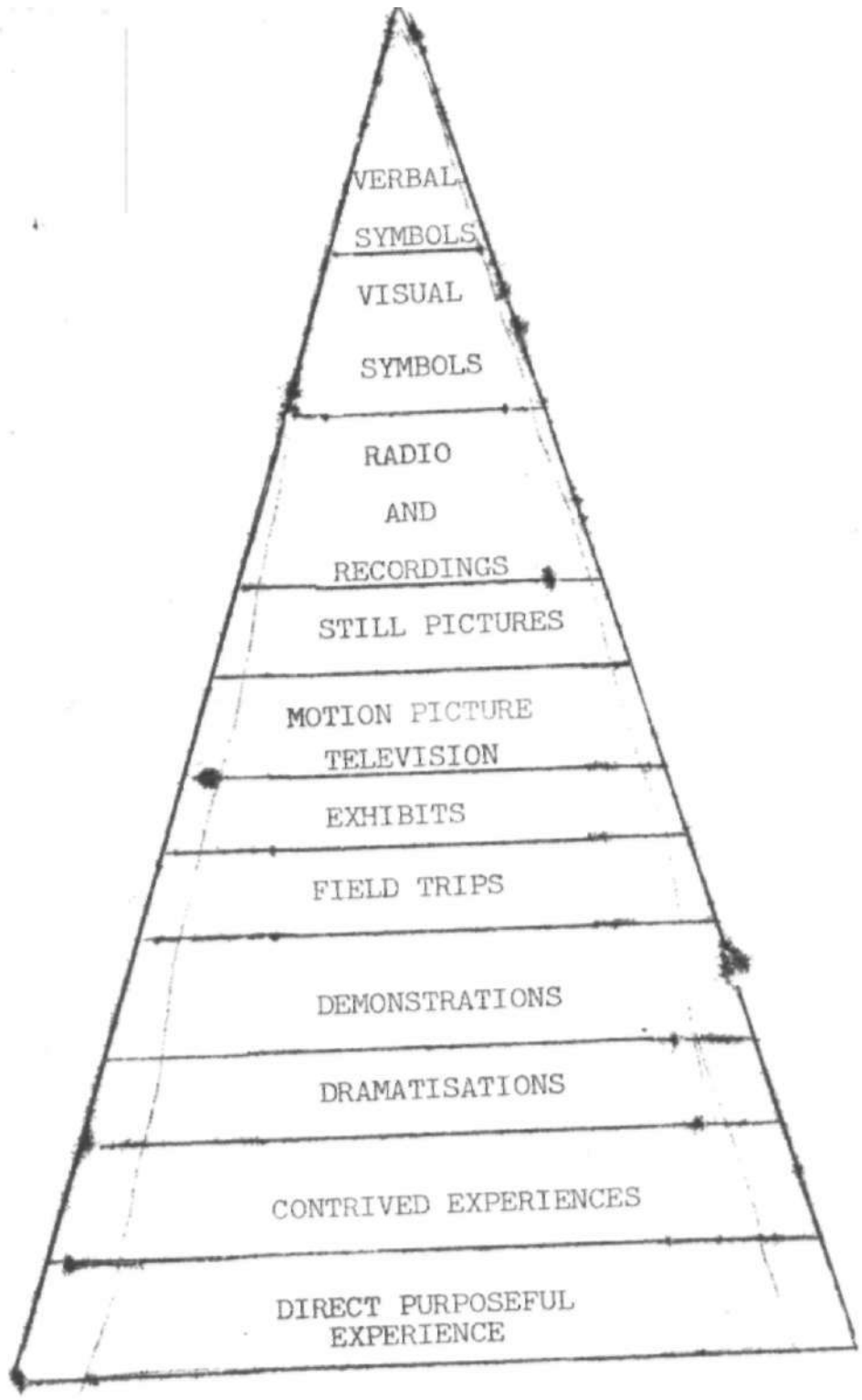


Fig2·2: Edgar Dale's Cone of Experience
Reproduced from "Audio Visual Methods in teaching. New York, Dryden Press 1969 (3rd Ed.).

experiences and the resulting learning is a factor of the learner characteristics and the subject matter. In the area of languages, verbal symbols play a great role in education, ever though the verbal symbols may be obtained by direct concrete experiences like visitation (to the place where language is being spoken) and it can also be obtained by Radio and Recording.

A teacher must consider the following before deciding on which to choose.

- Does it give a true picture?
- Does it contribute meaningfully to the topic or instructional content?
- Does it allow for student activity or creativity?
- Is it worth the time and effort involved?
- Is it appropriate for the age, intelligence and experience of the learners?
- Is it physically satisfactory?

Edgar Dale examines the advantages and disadvantages of each and suggests situation for which they are best put to use.

Direct Purposeful Experience (DPE)

This is based on sensory perception through sight, hearing, touching or doing e.g., learning about evaporation by leaving paint jars open. Seeing mud dry, and comparing the effect of wind and heat on drying. Having carried out these experiments themselves students are apt to remember what they did and the result they obtained.

DPE include experimenting, imitating or doing. "More indirect experiences are observation of a performance but postponing doing it. Also indirect are reading about and listening to something...
These are sensory experiences and sensory experiences do not ensure adequate communication. Practice is not a substitute for theory, both are needed". (Edgar Dale 1969).

Contrived Experiences:

The rationale for this is that sometimes simple direct experiences can't be obtained either because they are not accessible e.g., turbine, or because they are:

- Complex in real life e.g., working of the human eye.
- Too small or too large e.g., atom/continent.
- Beyond reach in time or space e.g., past, future, distance.
- A long process or abstraction e.g., crystallization or nuclear fission.
- Abstract in construction e.g., shapes like spiral or double helix, examples of such are Models, Mock ups, Objects, Specimens.

As much, as possible such experiences should be representative of the original and proportional to it, without giving wrong impressions of colour, size, shape and detail and without oversimplification.

Dramatisations

Further up on the cone is dramatisation. Student who play roles in dramatisation have an experience of the feeling of the role they are playing. It enhances emotional involvement, hence encourages active learning. It inculcates the cooperative spirit and helps retention. Participants may gain as much as the observers. Teacher must explain the background to dramatisations.

Demonstration

Next comes the demonstrations. Observation is the theme, not doing. It is very useful in teaching skills. It requires not only the demonstrator and audience but also audio-visual materials, ranging from chalkboards to bulletin boards, from diagrams and charts, to slides and films, to models.

Field Trips

This is a planned visit to a place outside the class. Time cannot permit the learning of everything by doing or participating, field trips offer direct experiences and learning about human relations, if students are allowed to interract sufficiently with the people and materials.

Evaluation of the usefulness of the field trip must be done before embarking on it, using the guidelines earlier listed.

Exhibits

This also encompasses a variety of audio-visual materials. They can be school-made or loaned from Museums and Educational Technology Centres. Examples are Bulletin boards. Posters etc. Their messages should be clear and with short, simple labels. "Mobile displays and sounds attract attention. Colour adds interest. They should contain only one central theme and placed at conspicous positions". Edgar Dale (1969).

Television and Motion Pictures

T.V. instruction provides concretness by producing real and immediate activities. It has the added advantage of-uniform communication to various groups.

- Recreates the past
- Provides succintness of explanation
- Provides reinforcement and stimulation of ideas.

It also utilizes many audio-visual materials. However, its disadvantage lies in its inability to establish rapport and obtain feedback, the difficulty in obtaining programmes relevant to audience, and inability to fit programmes into classroom schedule. It is worthwhile to note that this same problem is faced in the use of Radio. As for Motion Pictures, it does the same as T. V. especially now that video has been developed. They both:

- Bring the world into the classroom in condensed dynamic forms. In the case of films, this can be done at convenient and appropriate times.

- Like T.V., motion pictures overcome time, size and distance.
- Special effects such as slow motion, animation, and close-ups serve several learning purposes,
- Concepts involving motion are best illustrated by motion pictures (films). Graphs, charts or still pictures can only give stages, but not the on going process. Words or still pictures fully describe motion like T.V. or motion pictures can.

Their disadvantage lies in the fact that they can get scratched and worn out easily unlike the case with slides.

Still Pictures:

Unlike motion pictures, still pictures lend themselves to detailed study by arresting motion, and can be arranged in a series to produce a picture story. Still pictures can be abstract e.g. graphs, illustrations, diagrams. They can also be more concrete, because they look like the original. Still pictures can be non-projected (e.g. photographs and illustrations) or projected (e.g. slides, film strips etc). Projected still picture can be made to reach a larger group at once than non-projected still pictures. In this case, slides are chosen as against demonstration because slides, when projected, can reach a large audience. More will be said about slides as a form of still picture in the section which deals with the reason for choosing slides/tape/note for this package.

Radio and Recordings

At a time when speech was less developed, printed materials sufficed. Today, through application of electronics, possibilities for oral communication is limitless. Teaching with recordings offer immediacy, realism, emotional impact and authenticity (i.e. experts giving talks on the subjects in their field. It is however, usually a one way communication and stands a high risk of verbalism. It requires previous training on listening.

Unlike Radio, Recording can be adapted to audience and can be used to foster two-way communication. It is also inexpensive. More will be said on this later. McGuire (1968), cites a series of studies that show that the spoken word had greater persuasive impact than the printed word.

Visual Symbols

These are charts, graphs, diagrams, chalkboard, bulletin board, cartoon drawings and sketches, etc. "They are not direct experiences but representatives of it . Although they are easily assembled and useful for slow readers; they are attractive and give a semblance of the real; their disadvantage lies in the fact that they can be misunderstood especially where they are not explained". Edgar Dale (1969).

Having looked into the various media categories, the rational for choosing slide/tape/notes for this package will be set forth in the next sub-section.

2.6 Why Slide/Tape/Notes?

From the above classifications of media it can be seen that various media due to their nature and attribute, presentation and utilisation have unique properties which make them more appropriate for certain subjects/topics than others. e.g., motion is best depicted by films and motion pictures. In some cases, a mere photograph will suffice for illustration and identification. Maths and geometry are best illustrated with charts, diagram etc.

A dutiful teacher should choose the most appropriate of all the media for the particular topic he/she wants to teach. To justify the choice of slide/tape/notes, comparison of the advantages and disadvantages of each is necessary.

Printed texts and Reference Materials

Since notes will be included in this package preparation, we must take a look at various works done in this area and utilise such findings in the preparation of this package. Lewis, Brown and Harcleroad (1964) in their book "Audio-visual Instruction: Materials and Methods", discuss in details, the advantages and disadvantages of texts. According to Brown, et al (1964), "Texts are made up of words. Words can mean different things to different people. Writers of texts must be able to pin-point exactly what they want to convey". They must use universally known

words. Printed texts in addition to the danger of using words that are not clear, have the following disadvantages:

- They spoon-feed the learner, thus disregarding, to a large extent, the importance of active learning.
- Textbooks become too easily outdated
- Revision is sometimes too frequent, and it costs to keep up with the latest edition, therefore there is the danger of continued use of long outdated texts.
- Some texts can be too sketchy to be of much use to learners.
- They encourage cramming and provide insufficient knowledge for learners with shallow interest.
- They contain a lot of marration and description which do not enhance learning.

McMurray and Gronbach (1962) believe strongly that "Narration and description being artistic tools, communicate directly to the reader making it possible for him to join the scene. The danger is that narration may communicate values without the designer realising it; it may also encourage in students the habit of generalising. Selected examples,....

Prescriptions and directives which do not lead to investigative processes does not lead to creative learning .

Advantages of printed texts include the fact that:

- They are usually more economical than other forms, charts for example, are very expensive because only limited ideas can be represented on them at a time.

- They can be purchased by individuals and used for a variety of topics.
- They make individual instruction possible therefore, help students to study.
- They are useful for recall and revision of instruction.

With the above advantages and disadvantages, "whether to choose between pictures and words is not the question, but how to use pictures in a verbal medium. It is said that "The camera can go just far, words go the rest of the way" (Dale, 1969). Words help to get closer to pictures/but certain words do refer to more than visible objects e.g., How do you show pictures of "however", "and", "sister", "niece" etc? Words definitely go a longer way when complemented with visual effects. Which of the visuals best depict what is intended? In this package, slides have been chosen as complementary media.

Slides and Filmstrips

Since a major part of the package is the slides and tapes,we shall deliberate more on slides and audio materials and try to see their importance and usefulness to learning. Slides are still pictures which must be projected. Added to the advantages of projection, slides have several other advantages for instructional use. Levie and Dickie (1963), said, "Auditory signals are finite in duration and are relatively difficult to preserve.

Visual displays are normally long lasting and have high referability, that is, they are available for long periods so that they can be referred to repeatedly . This, in other words, means that things that are seen are more easily remembered than things that are heard. Also, the need for individual learning opportunities is evidenced by the increase in the rate at which modern publics with modern ideas and attributes may want to look with deep interest at slides, filmstrips etc.

The need for the learner to move at his own pace, review instruction in order to internalise it, is also one that every instructional developer must not ignore. Dunn et al (1969) in a study to compare the effectiveness of individually used tape/slide programme with conventional mass instruction, for students of the Western Infirmary, Glassgow, found students opinion highly favourable . 'Dunn, Harden, Holroyd, Lover and Lindsay, 1969). Slides have been found to have the following advantages:-

- They are very useful in the teaching of skills of "How to do it, step by step processes".
- This is because they can be projected at various speeds.
- They can also be repeated in part or in whole to consolidate learning or recapitulate it.
- They are useful for supplementation and reinforcement of other learning activities such as excursions,

lectures, demonstrations and even motion films.

- They can be used to introduce new topics and skills
- Above all, they are best for independent study, though they can serve a medium or large group.
- They do not require special room--darkening devices, hence can be used in a moderately darkroom.
- Participative activities and redundancy can easily be built into the audio part of the slides.
- They are relatively inexpensive when compared with other media and they are projected with inexpensive instruments. Most schools and individuals can afford them.
- They are compact, light to carry and easy to operate.
- Slides are flexible to use because they can be tailored to fit particular requirements in individual school situations. This can be done by adding or omitting slides in order to give a sequence relevant to the school or class and their special needs. Motion pictures cannot be put to such use. The sequences of projection can also be rearranged as desired to give special effects relative to the audience. Outdated pictures can be removed and foreign examples can be replaced with local ones. They can be prepared by the teacher to suit his instructional purpose.
- Unlike motion pictures, note-taking is possible during the showing because the teacher can proceed at the student's pace and the room does not have to be in pitch darkness.

Despite all the above advantages of slides, slides alone without an audio complement are useless. The pictures must be interpreted and explained as comprehensively as possible. This is why tapes have been developed along with the slides in this package. Chris Hawthorne (1979) in his article "Why Tape-Slide" showed how that film production is time consuming, expensive and may not be relevant to every group. In addition, students interest in a particular subject topic can be developed by involving them in the production of sound for a set of slides. These Tapes are meant to complement Slides, since tapes alone do not suffice for long time retention. Several researchers, (for example, Margrain, 1967; Murdock, 1968 and Gaik, 1969) have studied the relative effects of auditory versus visual presentation of verbal information on short-term retention. Two generalisations that have emerged are that auditory presentation is superior to visual presentation for short-term learning-tasks. Studies which manipulate the rate of information presentation have shown that auditory presentation is superior at fast presentation rates while recall of visual information improves with slower rates of presentation (Mackworth 1964).

Hopper (1966) notes that "pictures are poor signs for communicating generalisations and qualifications such as "all", "many", or "most". For this reasons iconic (picture) signs are inadequate for communicating abstractions". In Knowlton's (1966) discussion of logical pictures, he notes that, when learning tasks

involve understanding of a large number of relationships, a visual display which presents all the relationships simultaneously in a structure (e.g., a map, or a picture of a physiological system) may help overcome human being's limited capacity to retain a sequence of ideas".

Generalising from the various works of various researchers, Levie and Dickie (1963) came up with this summary on text materials versus auditory symbols. "In learning from textual material, reading is superior to listening when the learner may take advantage of the greater referability of print".

One conclusion which the designer of this script/ package has reached is that slides without tape will be as ineffective as slide with tape, without notes. With this in mind, the designer has chosen to make use of these three media in her package. Van Mondfrans and Travers (1965), though not finding any advantage for audio-visual presentation, found however that simultaneous presentation of stimulus-response pairs was superior to sequential presentation of stimulus and response items.

According to Brown, Lewis and Harcleroad (1964), learning is different from listening. Listening is a skill that should be developed early in life by providing children with opportunity to listen, to react overtly to what they hear, to select important points by discriminating, identifying and making

judgements . According to these men, listening skills can be developed by letting learners:

- Listen to instructions and follow them.
- Summarise points in lectures, debates dramatisations and films.
- Identify non-verbal areas and interprete them e.g. sound effects.
- Identify various sounds and their source, detect humour or mood.
- Listen critically in order to differentiate what was said from what he expects to be said.

Finally, in choosing to utilise slide/tape/note in this package the writer has made use of the Model for Media selection in Howard Levie's book, "Understanding Instructional Media" (see fig 2.3).

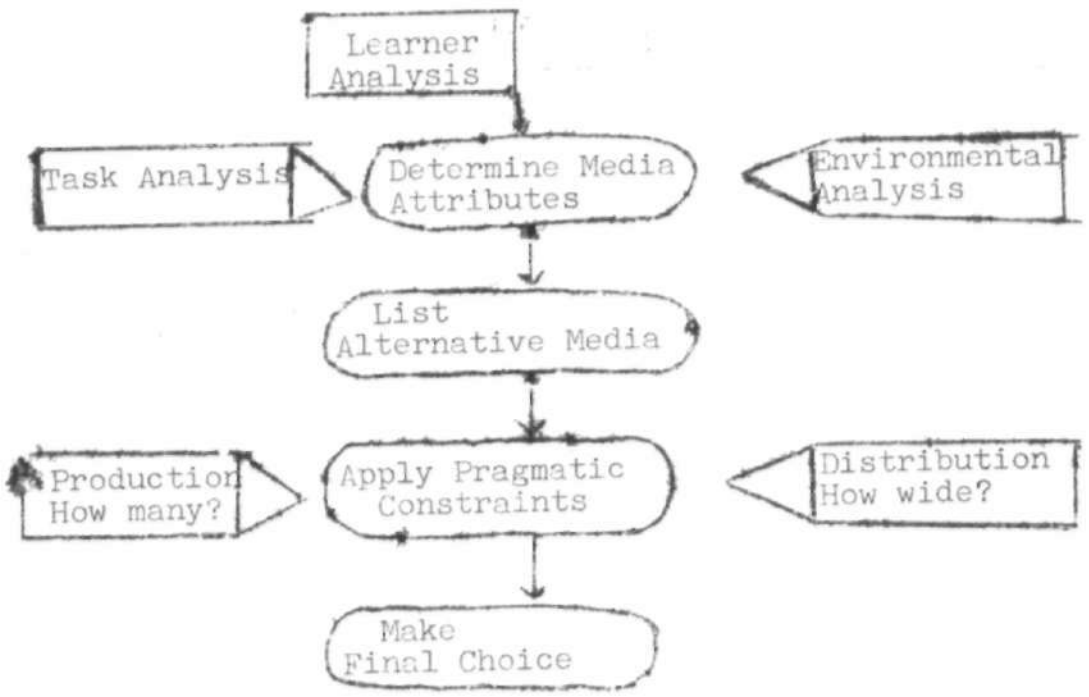


FIG 2.3: A Model For Media Selection, reproduced From Levie 1963.

Wilbur Schramm (1955) sums up the whole of the research so far done in his statement "If one medium is used to reinforce another, (e.g., print with lecture, lecture with slides/tape and pamphlet etc), there is possibility of achieving considerably more learning than from one medium alone". He goes on to say that, "Gains achieved through such coordinated use can be expected only if there is real supplementation. There is no automatic gain in using three senses instead of two, for example, unless the added channel gives added interpretation".

Since these slides are showing a "how to do it" process, they are just like demonstration, hence care has been taken to utilise the hints on preparation for, and performance of demonstration in developing this package.

Edgar Dale (1969) gives the following principles of good demonstration:

- Establish rapport by greeting, stimulating interest and arousing curiousity.
- Be sure the audience understands and knows every new term.
- Explain and emphasize the key points by telling, showing and doing.
- Outline steps on the chalkboard, (in this case, there are notes).

In the performance of the demonstration:

- Do not digress

- Check continually to know you are being understood.
- Don't hurry, stop to question.
- Don't drag the demonstration.
- Summarise as you go along by saying, "so far we have seen that" or done etc.
- Give written materials.
- Allow and encourage questions.
- Review and summarise key points.
- If conditions permit, let students do the process themselves and evaluate.

Having examined in detail the advantages and disadvantages of pictures (still or not), with sound and notes the writer decided to use the three in this package.

ב.7 The Systems Approach

In order to produce a package that is effective and efficient, it is important that we take a look at the systems approach to instruction design. Educators now realise that there is more than one way to realise desired objectives. Since several things must be considered in reaching the objectives, two main things must be taken into account viz:

Logistics - This is the manner of presenting information to a particular set of students.

Economics - This is the availability of resources with which to accomplish this. "The Learning situation is more than mere collection of elements. It only gains effectiveness when the elements are put together to encourage desired learning" (Green 1976). This process of combining resources into the most effective pattern is called the systems approach. The systems approach asks question like: Why do this? "How best can we do it?" "Is it best for everyone?" "Is it the best utilisation of resources?"

The systems approach was not developed specifically for educational purposes, but initially to improve military defence and tactical strategies. Pffeffer, (1968) comments that:

> "... during the early days of world war II, teams made up mainly of biologists, mathematicians, and physicist were mobilised - to help design soft ware, instead of hardware, plans, instead of equipment. They used methods of learning ... in the course of improving military tactics and strategies...
> ....One famous analysis ran directly counter to the established practice of dropping depth charges set to explode a hundred feet beneath the surface, indicating that a shallow setting of twenty to theirty feet would prove far more effective. The change was made, after some oppostion, and it increased the number of U-boats Sunk by more than fifty per cent", (Pffeffer, 1968).

"The systems approach either applied to defence, business or education, covers the whole process from the definition of the problem, specification of the basic objectives, selection of course of

action, down to the final evaluation of the success of the system, both in term of the objective fulfilment and in terms of cost effectiveness and other considerations" (Hills, 1976).

Duckworth (1965) illustrates this with a simple example in his problem, stated as follows:

> "There are three pieces of bread and one toaster which only toasts one side of each of two pieces of bread at once. The time taken to toast one side is thirty seconds. The objectives is:- To toast the three pieces of bread completely and to do this in the shortest time having utilised the full capacity of the toaster as far as possible one course of action might be as follows:-

	Time in Seconds
Toasts one side of pieces A & B	30
Toast other side of pieces A & B	30
Toast one side of piece C	30
Toast other side of piece C	30
Total Time	120 Seconds

The second course of action might be.

Toast one side of A and B	30
Toast other side of A and one side of C	30
Toast other side of B and other side of C	30
Total time taken	90 Seconds

Both methods fulfil the objectives of toasing the three pieces of bread, but only the second method utilised the full capacity of the toaster and toasts the total amount of bread in a shorter time (Duckworth, 1965).

Mackenzie, et al (1970) give a simple diagramatic representation of the systems approach

as applied to education, This approach includes the definition of the objective, selection of methods and implementation of the course which is designed only when evaluation shows that the objectives have been achieved.

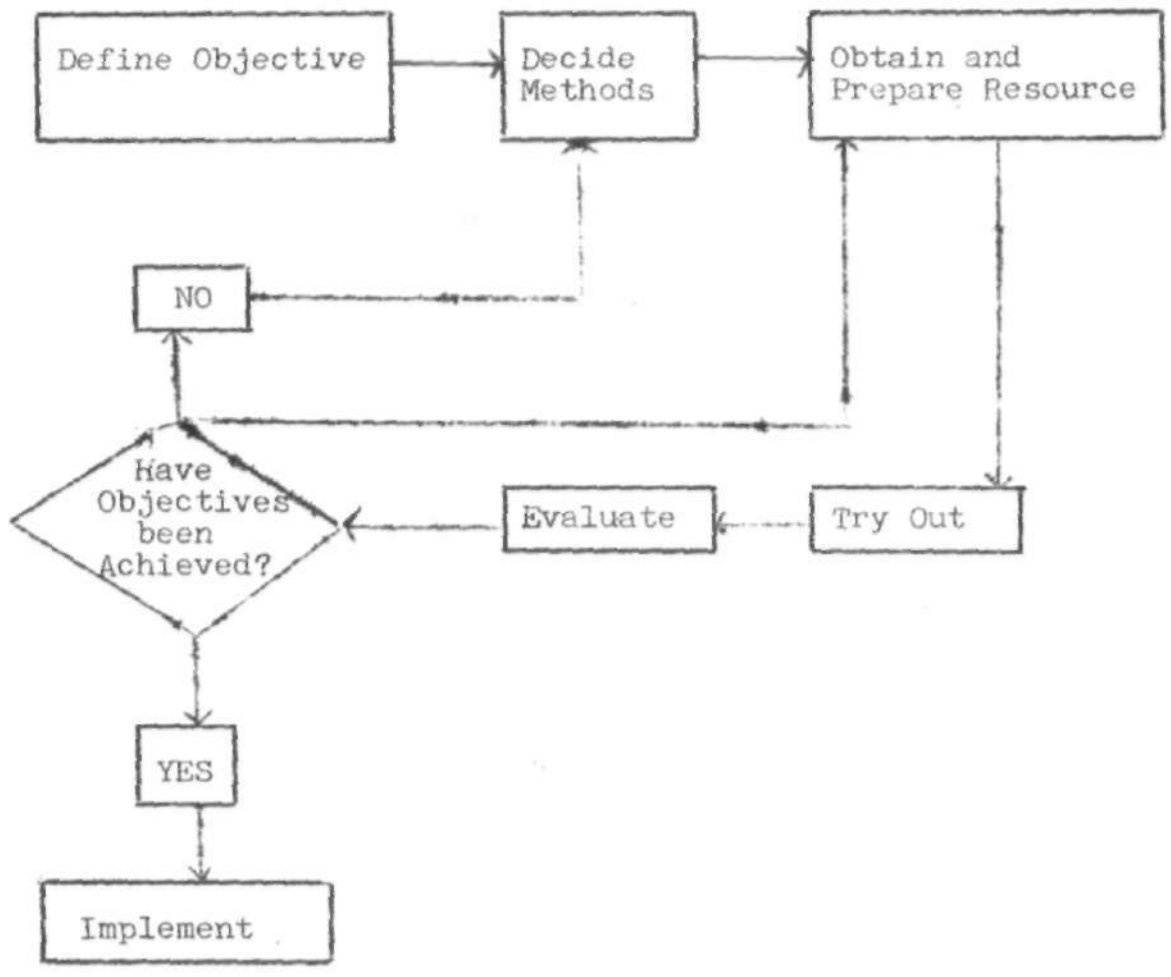


Fig 2.4 Systems Approach To Instruction (Adapted from Mackenzie, Eraut and Jones, 1970).

It should be noted that this approach bears much semblance to the various instructional development processes available now. The approach consists of three steps.

1. Careful course analysis to define what learners should learn (Objectives).
2. A consideration of methods and techniques available.
3. An evaluation and the revision of a course in terms of the level of achievement set for the course.

As the realisation of the need for systematic approach to instruction increased, various groups have tried to come up with various models for a systematic approach in various courses, in various universities. The importance of utilisation of instructional media to accomplish this has become more glaring. Many attempts to draw up a general classification of systems have been made (e.g. Jones 1967).

This can be seen developments such as:

1. Davies and Hills (1972), Hills, (1975): "A systematic approach to a first year undergraduate course in electrical circuits, using lectures integrated with a system of self-tests and library-based materials".
2. The Keller plan (described in a paper prepared for the Nuffield group for Research and Innovation in Higher Education (Boud and Bridge, 1974) etc.

The list is by no means exhaustive.

The Instructional Development models described in chapter three, show a high degree of utilisation of the systems approach to realise specified goals, in the most efficient and effective way. An

efficient system which is developed without reference to various works done on learning is like cake baked without a leaven. It is therefore necessary to look at few relevant learning principles.

2.8 Learning Theories and Principles

There are several learning theories which have been advanced. Looking for practical principles from the theories of learning, one finds that most learning theories cannot be applied directly to the uncontrolled conditions of everyday life. Certain principles, however, can be applied, independently of all theory, to everyday practical learning. Most learning theories resulted from experimental work under strict laboratory conditions and were performed with animals. To generalise from a rat, presented with food for which it had to press a lever, to the behaviour of human beings in the complex condition of normal life, is rather a presumptions affair. "It may be reasoned that a researcher's conclusions and results may be biased by their desire, for examples, to fit their observed facts into theory (Hills, 1976):

> Russell comments that "....animals studies by Americans rush about frantically with an incredible display of hustle and pep, and at last achieve the desired result by chance. Animals observed by Germans sit still and think, and at last evolve the situation out of their inner conciousness".(Russell, 1927)

This observation is of significance, if such animals are the very ones used to postulate learning theories.

However, certain factors emerge from these various theories as factors which affect learning. It follows therefore that in designing this package such factors must be examined viz:-

1. Physical, Psychological, Social
2. Maturation and Readiness
3. Motivation
4. Active Involvement Factor(by relating previous knowledge to new task).

The above four factors are actually interrelated. For example, readiness may be a factor of mxx motivation and previous knowledge. All the above four factors supposedly predispose to learning and retention, or memory.

Physical, Psychological, Social

These three factors are directly related to the learning process because they determine whether or not learning can occur and to what extent, if at all, learning can occur. Any physical impairement can obstruct various types of learning depending on the area of impairement on the body. A mentally unstable individual may not be able to learn certain things which he can learn if his condition was otherwise.

So also, psychological imbalance (to give an extreme example) can impede learning.
Usually, social background may impede learning, especially when the content of what is to be learnt is totally strange to one's social background. A pupil who was raised in the city may know a lot about machines, skyscrapers etc., but may have little idea of how yams, beans etc grow.

Before any form of learning can occur, the individual, by means of his sense must receive the stimulus and interprete it. This process is called perception.

2.9 Perception Principles

Bryant J. Cratty (1974) defines perception as "....the process which involves interpretation, contrasting and making judgements about relatively simple sensory information emanating from specific sensory organs or from a combination of outside stimuli. These judgements are influenced by expectations and past experience of the individual and the central figure, person or event in the background or context in which the perceiver resides"

Cratty believes that perception varies from person to person at any given age.
Since perception is one of the earliest stages in congnition and since it is influenced by prior learning and a number of factors, a message designer

must know and apply perceptual principles in designing and delivering his message. This view is supported by several psychologists, viz:

1. "The better an object, person, event or relationship is perceived the better it can be remembered." (Berelson and Steiner, 1964)
2. "Reality and ideology being represented in a message (by a model, picture or words) must be presented adequately for perceptual purposes" (Hochberg, 1966).
3. It is important (in communication) to avoid misconceptions and misperceptions of intent and content of a message because it leads to misunderstanding, false of irrelevant learning and misdirection.

Seeing the need for a message designer to utilise perceptual principles in his design, it is pertinent to outline some of these perceptual principles as discussed by Bryant J. Cratty (1977).

Factors that affect the perceptual process

Perception has several characteristics which have been grouped into basic principles.

Principle 1a

Perception level is related to concurrent or immediate experience which the individual uses as a references point. e.g., entering a brightly lit room from a dark room, carrying heavy objects just after dropping a light one. Relative weights, or speed are judged by immediate past or concurrent experience.

Principle 1b

Where immediate past is at a high level, new stimulus is underestimated and vice versa.

Implication for Instruction - A dramatic pause heightens the effect of words that follow and a large space adds punch to a small figure in the corner of an advert.

Principles 2a

Perception is selective. Human beings attend to only few of the stimuli available at any given time.

Instructional Implication - A message designer must know what aspects of his message need emphasis and what aspects must be de-emphasized to prevent distraction.

Principle 2b

Selective perception is dynamic, it all depends on what an individual wants or what he is interested in at that time. It is only possible for him to be aware of a small portion of it. This is called selective awareness. While sitting in this room it is only possible for us to be aware of a few of the many messages reaching us such as a voice, or the temperature of the room or the footsteps and voices outside.

Instructional Implication - This has a relationship with readiness.

Principle 2c

When a learner is ready for the particular kind of knowledge, perception is high and learning is enhanced.

Selective perception is, in part, physical and our senses do have load limits and are incapable of taking more than the limit allowed.

Instructional Implication - The implication of this to the communicator is that he must not exceed the perceptual capacities of the audience, neither should he underemploy their capacities such as to loose their interest and attention to a more stimulative message. Fixed paced messages such as are delivered by T.V., film and audio recording, have this danger. This is not the case with written materials and programmed materials which allow the learner to keep input at a level whereby he can attend to, and process the information.

Principle 3a

Perception is organised: people generally don't perceive chaotic arrays of different brightness, colour, temperature and noise but theyperceptually construct relationships by grouping objects, events, words and people. Organised perception produces the stability, order, pattern and predictability necessary for normal functions. Also, the organisation of stimulus influences to a large extent, the speed and accuracy of perception. Gestalt gives a clue to the effect of organisation in his law. "Where

material to be learnt is organised and the organisation apparent to the learner, acquisition is facilitated" (Biehler, 1971).

The visual system organises a film into one or more figures which stand out against a background, whether pictorial or verbal. Incomplete stimulus figure may be completed by the perceiver in order to satisfy his need for organisation. This perceptual organisation is affected by his past experiences, present interests and needs.

Instructional Implication: - The designer must relate his topics such that a smooth transition occurs from known to unknown.

Principle 4a

Perception is strongly influenced by what we expect and are "set" to perceive. The communicator must therefore, direct the audience's "will" to attend to the message. This can be done by asking a question, posing a problem or presenting a puzzle.

Principle 4b

Perception of an individual or group varies remarkably from those of others in the same situation.

The implication of these principles to learning is as follows:-

1. That perception is relative rather than obsolete implies that communicators should try to make comparisions e.g., the length of an object can be illustrated by the combined length of several

familiar objects. It follows therefore that messages should be paced relatively. Interesting messages are perceived as relatively short, therefore, difficult concepts and ideas should be divided into small relatively easy points or steps.

2. That perception is selective requires the communicator:

(a) To limit the range of aspects presented at a time. For the teacher, a chart needs not include unnecessary words which do not facilitate perception.

(b) To use pointers - which can be words which direct the receiver to relevant aspects.

3. That perception is organised, makes it necessary for the communicator to:

(a) Make his message clear by numbering and giving verbal cues such as, before, after, greater, lesser, etc.

(b) Choose organisational methods that are consistent with the message content or subject e.g., a circular figure used to depict a cycle, a question raising message used to generate inquiry process.

4. That perception is influenced by what we "set" out to get makes it mandatory:

(a) For instructions to be given to the receiver such as "Notices", Appreciate" and any question that the perceiver will resolve to give response to.

(b) For a topic to be assigned to the message. This makes the receiver willing to attend to the message content. Open ended questions which motivate the receiver to think such as "Why do you suppose?",

"What do you think?" 'guess what....' etc can be utilised.

Before perception can occur, there must be pre-attention and attention. A communicator not only wants to gain attention but to sustain it. Pre-attention generally is seeing figures in relative position to other figures but attention is narrower, focusing on some details e.g., colour, shape, size etc. This means that the communicator must seek to direct attention by presenting new information and relating his message with the immediate past. Attention of an audience is drawn only if the message is at par with the receiver's cognitive level. People direct their attention where they "will" depending on their interests, experiences and needs, therefore, the communicator must know the receiver well.

Perceptual element and their processing

"Information is not only transferred to the perceiver's mind it is transduced, translated and interpreted into something else that stands for it i.e., it is coded in the brain language in chains and patterns of electrical impulses. There is no projected or T.V. like image in the thing being seen". Gregory (1973). The more appropriate the instructional design, the more rapidly and accurately it will be perceived.

2.10 Motivation in Learning

The International Dictionary of Education defines motivation as "behaviour brought about by physiological or social needs and directed towards goals".

Mukherjee (1978) defines "motive" as ....an effective cognitive factor which operates in determining the direction of an individual's behaviour towards an end or goal, conciously or unconciously approached". He gave instances such as people being motivated to seek for food, wealth, prominence, academic, achievements, social relations etc. Lovell (1973) defines motivation as "A Psyco-physiological process, initiated by some need which leads to activity in order to satisfy this need".

Generally, needs, wants, wishes and desires are terms used to explain why people behave the way they do. This means that in each individual, there are processes which initiate his activities and determine the goals towards which these are directed.

Motives determine the effort an individual puts into his work and effort, whatever the motives underlying it, is an important determinant of one's level of performance. Effort is an overt expression of motive and it is always directed towards a goal.

Skinner's(1954) theory of Operant Conditioning is one of the most applicable theories in educational practice. In an experiment with rats and pigeons he was able to come up with some useful hints on reinforcements, feedback on performance and retention.

B.F. Skinner's Experiment

The experiment consisted of a simple apparatus, which was a cage with a lever at one end of it. The lever is connected to a source of food pellet whenever the lever is depressed. A hungry rat which he placed in the box explores its new surrounding at leisure. This differs from Pavlov's dog which was unable to move since it was strapped in a harness. When the rat eventually presses the lever the pellet of food is delivered.

Each time the rat depresses the lever during his exploration, food is delivered. After some time, it was noted that the rat presses the lever more frequently, to obtain the food pellet. The rat has thereby learnt to operate on the environment to get a reward which will satisfy it. According to Skinner, operant behaviour was performed by the organism and was repeated because it was reinforced by a reward i.e., the food pellet.

Skinner was able to teach pigeons and other vertebrates to execute different responses including performing intricate figures of eight. He called this process of learning, shaping.

To do this, the experimenter determines before hand upon the total behaviour he wishes to establish and whenever the animal (pigeons) executes a response which is in any way like the total behaviour required, it is reinforced until the total performance is established.

Skinner noted that the pigeons tended to repeat frequently the behaviours they were engaged in prior to the reinforcement. This means that with patience and frequent reinforcement, any set behavioural patterns can be acquired.

Implication for Learning

Reinforcement in form of positive reward enhances learning especially when the reward is immediately offered after the performance. In the learning situation, it is essential that progressive stages be worked through, in order to reach the final complex behaviour, with each stage being reinforced.

Skinner then, on the basis of the above went on to advocate a form of programmed learning in which an item of information is supplied to the pupil who is required to answer a question on this information. He has to make a response and be informed immediately whether he is right or wrong.

According to Skinner, the same variables occur in the classroom environment. Maths students for example are to learn a sequence of operations, which require a written or verbal response from them.

The learning of each correct step demands reinforcements from the teacher in form of "right" or "wrong". For a skill to be learned, therefore, every correct step must be reinforced. Maslow (1971) puts the basic needs that motivate an individual into a heirachy. This heirachy of needs include physiological, safety, affliative, self-esteem, and self-actualisation needs. Self-actualisation needs includes the need for creativity, knowledge, understanding and aesthetics. Only unsatisfied needs are motivating factors. When a lower need is gratified, a higher need can dominate and determine the individual behaviour. Frequent gratification or frustration of needs, especially in children, determines permanent personality traits.

Prominent Psychologists such as Hull and Levin(1969) proposed that generally, all behaviour is dependent upon the needs of the individual and that learning depends upon whether the individual's needs are satisfied and tension thereby reduced. If a person behaves in a way, or takes a course of action that does not eventually meet his needs, then responses associated with such behaviour are not retained and learning does not occur.

Instructional Implication - If a learner finds certain activity rewarding or resulting in positive reinforcement, he may learn to look forward to it, but if it becomes associated with failure, pain or negative reinforcements he may learn to avoid it as much as he can.

Teacher, administrators and designers of instruction, must learn to ascertain what make an individual want to undertake learning and provide such motivatory aspects. There are at least three components in motivation towards achievement (Ausupel (1969).

1. Cognitive Motives

   This type is task oriented and the inquirer is attempting to satisfy his needs to know or to understand, knowing that the reward of discovering new knowledge lies in performance of the task. This depends on individual's natural preferences, curiosity, disposition to explore etc.

2. Self-Enhancement

   This is ego-oriented and it is the desire for increased prestige and status gained by excelling academically, professionally or socially. It leads to feelings of adequacy and esteem. These feelings, when they are craved for, become a need hence, a motivatory factor which can lead to hard work.

3. Affliative Needs

   This is the needs for social relationship such as approval, friendliness, cooperation, security, affection etc. In order to obtain these, either from teachers, parents or friends, students seek to apply effort to their work. This is motivation.

Included in this affliative needs are needs for self expression and the fear of failure. Teachers should set goals for each learner in accordance with what is within the capabilities of the student, thereby ensuring that the child tastes success as well as failure. Success inspires the learners to set higher goals while failure leads to modification of goals or depression and frustration. Teachers should also know that where success comes too easily, levels of aspirations are frequently lowered; hence tasks given to learners should be challenging.

Knowledge of results is another variable which affect a student's motivation to learn. This occurs through feed-back about one's progress or lack of it. This has high motivational values, especially when the news is good. Immediate knowledge of their performance is necessary, in order for further knowledge to have any value to the learners. This was the set up in Skinner's experiment.

Reward and Punishment are the terms frequently used to express motivation variables which are the consequences of one's effort or course of action. Healthy competition within school and between mates, praise and interests are all motivational variables. The instructional designer must be able to decipher and detect the areas of need of the student and utilise appropriate motivational variables in his instructional design.

2.11 Evaluation

By definition, evaluation is the process of testing and measuring of people, methods objects, etc, in order to use or to place value on them. In the case of Education, evaluation is the assessment of instruction in terms of what has been learnt, how it was learnt as against what should have been learnt or how it should have been given. Evaluation can be carried out in order to detect an area of need in the audience or the system, or to determine the extent to which the objective of the Instruction have been met. There are two forms of evaluation.

Summative Evaluation

This is mainly purposed to grade students and give reward for performance. It is useful in providing information for determining the effect of an instruction, or the appropriateness of it in achieving the objectives of the instruction.

Formative Evaluation

This is mainly used to monitor the learner's progress through the instruction. Also, the development of an instructional design during the production stage before dissemination requires a lot of feedback about successes and failures which will guide the designer in modifying the instruction. Since formative evaluation does the job of improving learning and instruction, it does not function as a tool for measuring achievement of learners and for grading or certificating.

Preparing Tests for Evaluation

In order to prepare a valid test for evaluating any instruction or instructional tool or instructional outcome, the following steps should be taken.

1. List objectives and decide what test format will be used to evaluate each objective (either, selected response tests, constructed response- easay type, combination - (essay an' objective or more specific - true or false, multiple test or short answer questions.
2. Write out the test items to correlate with the objective.
3. Prepare instructions to test administrators, instruction to learners and instruction to scorers.
4. Order the test items in terms of difficulty so that learners do not get bogged down with difficult items early in the test and are not able to complete most of the items.
5. Order items by topic or objective so that learners can concentrate on one topic at a time.
6. Review the test to ascertain that the format is appropriate to the objective.

- That the items are ordered systematically.
- That the instructions to test administrators, learners and scorers are complete and clear.
- That there is sufficient writing space for constructed response or essay-type answers....

Adapted from I.D.P.G. (1977).

Formats for Evaluation

The three main formats for evaluation are:-

1. Achievement Tests - which serve the purpose of detecting any change in the intellectual ability of learners.
2. Questionnaires - which serve the purpose of soliciting for users opinion about the instruction in terms of utilisation, capability, relevance).
3. Interviews - which is also a form of questionnaire, but this time face to face with the people whose opinions are needed. Questionnaires cover much more people than interview.

Conclusion

From the above review of literature, it is evident that a valid instructional package must be designed and constructed to meet the standards of effective instruction as depicted by the various works of various educators concerning:-

1. Proper use of media
2. Use of feedback as motivation
3. Construction of instruction to meet specific needs, objectives and target population.
4. Summative and formative evaluation of instruction in order to produce valid instruction.

The producer has now proceeded to utilise these in the production of this package title, "Organs, Show Up".

VARIOUS MODELS FOR INSTRUCTIONAL DESIGN

The utilisation of models for various purposes in the educational system has been fully dealt with by Kaplan (1964), in his report titled "The Conduct of Inquiry: Methology for Behavioural Science." Kaplan believes that models are useful in theory construction and that theories and models should not only represent varbal-qualitative constructions but should also express quantitative relationships. According to him, theorising by means of models requires vigilance and he likens model to graphs, to map-reading versus pictoral realism. He points out that models are not literal representations, since more than one model can picture the same phenomenon, even though the models are themselves incompatible. He suggest that it is beneficial to build at least two models in every instance so as to emphasise that no one represents reality by isolating essential feature in bold relief.

Based on the forgoing contribution by Kaplan, the producer will study several models for instructional design and evolve her own normative model.

Three models for any process are:-

The General model

The Normative model

The Living model (See Fig.3·1)

The General Model

This is a model which must have been developed as a result of a combination of various variables. It gives the general format for the development of any other working model. It is usually a result of expert proposals.

The Living model

This is the model that is presently being used in the instructional setting and which may not necessarily conform with the general model which the normative model seeks to correct.

The normative model

This is the one being proposed and it is derived from the general model. It is usually a combination or abstraction of several general models proposed by various people. This is the model used by the producer.

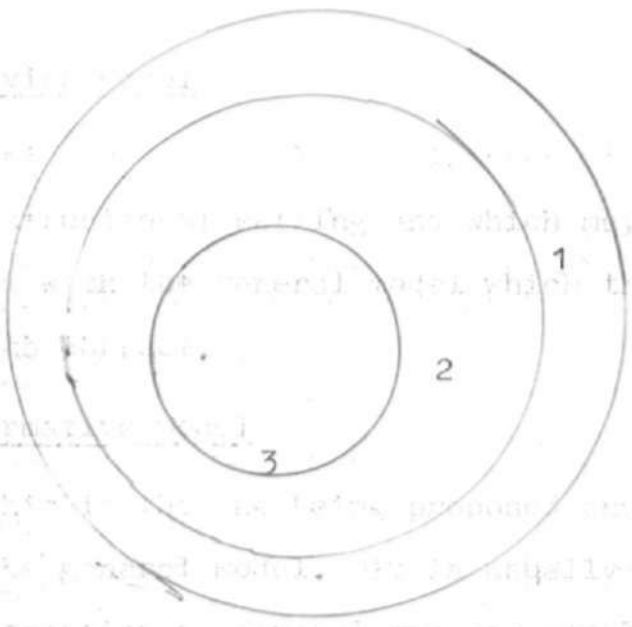


Fig. 3.1 Models For Instructional Design.

3.1 The General Model

There has been a lot of work by various people on the development of Instructional Products. Basically, the steps are as follows:-

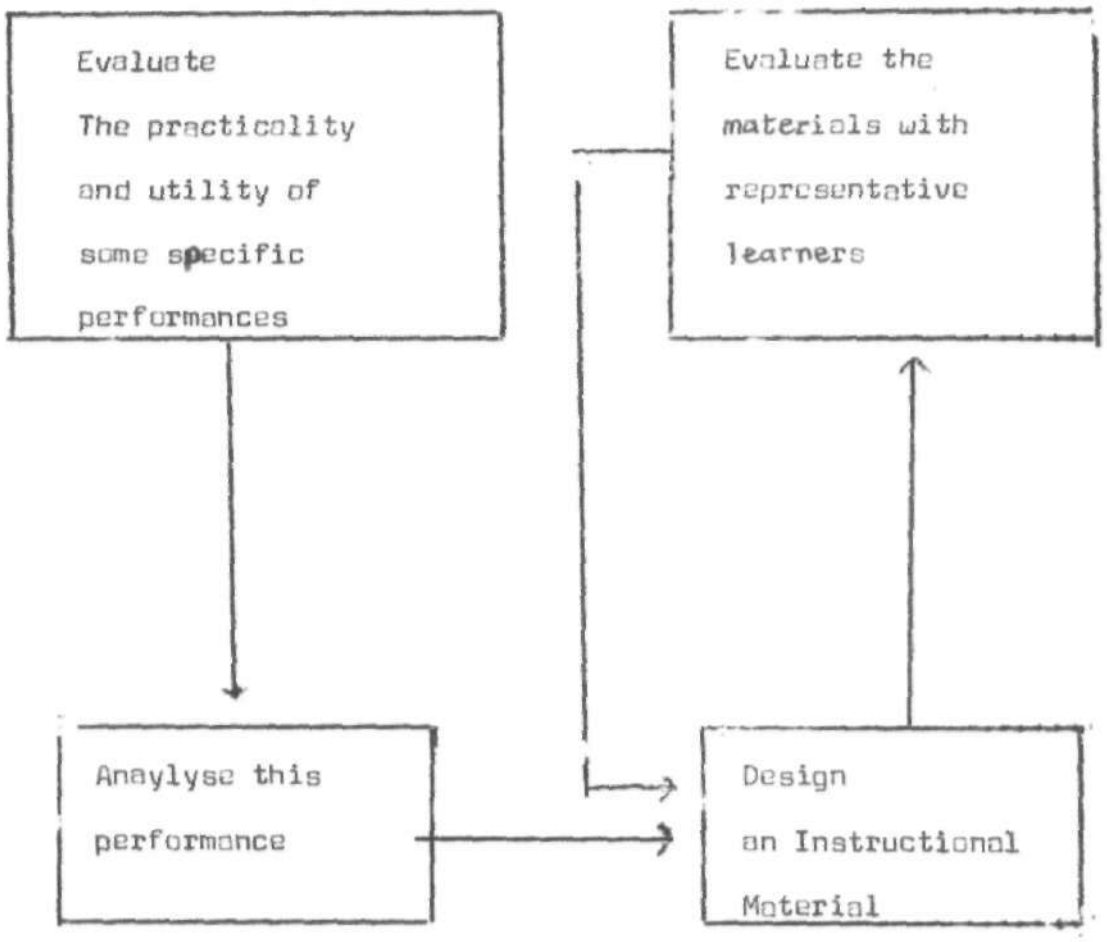


Fig 3.2 E.-A-D-E Model

From Instructional Development Project Guide-book Indiana University, (1977). (Reproduced)

1 (1) Analysis (of content)

(2) Design (of Instructional Material)

(3) Evaluation (of product with representative student).

Sometimes, the steps may go from 2 - 3 - 1,i.e., Design, Evaluate and Analyse. In this type of process, the effect of the design or the material, on the students im analysed and objectives are derived from it. These objectives form the groundwork for developing a rivised material.

Another general model which has been advanced is by Lynch. (1977). This is the E - A - D - E model (Fig3.2) as it is called in the I.D.P.G. (Instructional Development Project Guidebook). (A-E-D-E) Evaluate - Analyse - Design- Evaluate. There are several other models which have steps ranging from theee, to as many as thirty nine or more steps. Instructional Developers prefer the objectives to come before the design rahter than the post - hoc type of objectives advocated by some few developers. "This need not be a major source of conern as long as the objective (post - hoc or not, indicate to the learner what result the material can produce. However, objectives derived from a content analysis of the material and through the measurement of the actual effects, give a more realistic picture than those based on initial wishful thinking" (I.D.P.G.., Indiana University, 1977).

It is pertinent to note that these various models which are termed general models also do some analysis of learner's characteristics and learner's needs, analysis of task and constraints are also involved in the general models.

Yet few other general models worth mentioning are that of the Instructional Development Institute (IDI) (Fig.3.3) and that of the University of California, (UCLA) (Fig.3.4. They both advocate three main (stages) with various activities involved in each phase. These shall be discussed here.

The IDI Model (see fig.3.3) has it own phases as follows:-

Stage I: DEFINE
a, IDENTIFY PROBLEMS

by Assessing Needs
Establishing Priorities
Stating the problem

STAGE I : DEFINE IDENTIFY PROBLEM Assess Needs Establish Priorities State Problem	 ANALYZE SETTING Audience Conditions Relevant Resources	 ORGANIZE MANAGEMENT Tasks Responsibilities Time Units
STAGE II : DEVELOP IDENTIFY OBJECTIVES Terminal Enabling	 SPECIFY METHODS Learning Instruction Media	 CONSTRUCT PROTOPYPES Instructional Materials Evaluational Materials
STAGE III : EVALUATE TEST PROTOTYPES Conduct Tryouts Collect Evaluation Data	 ANALYZE RESULTS Objectives Methods Evaluations Techniques	 IMPLEMENT/RECYCLE Review Decide Act

Fig.3.5 Instructional Development Institute Model (IDI)
(Reproduced from Instructional Development Project Guidebook)
(Indiana University, January, 1977)

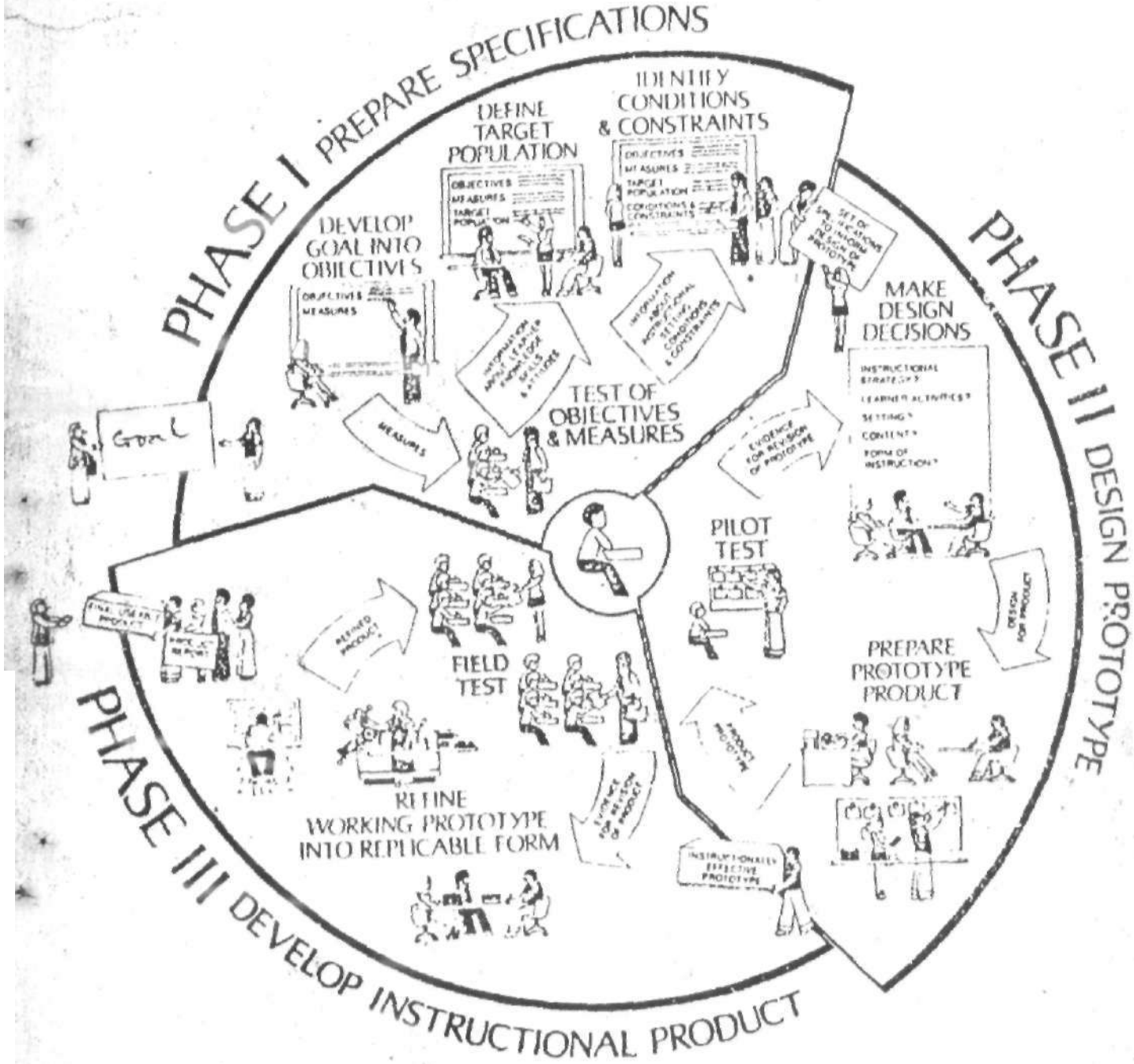


Fig 3.4 University of California Los Angeles Model (Reproduced from Indiana University Project Guidebook, 1977).

b. ANALYZE SETTING

the audience
the conditions
the Relevant Resources.

c. ORGANISE MANAGEMENT

Tasks
Responsibilities
Time limits.

Stage II:
DEVELOP

a. a.en
a. IDENTIFY OBJECTIVES

both Terminal and Enabling

b. SPECIFY METHODS

of Learning
Instruction
Media

c. CONSTRUCT PROTOTYPES

by producting Instructional Materials
and Evaluation Materials.

Stage III: EVALUATE
EVALUATE

a. TEST PROTOTYPES

Conduct Tryouts
Collect Evaluation Data.

b. ANALYZE RESULTS

Objectives
Methods
Evaluation Techinques

c. IMPLEMENT/RECYCLE

Review
Decide
Act.

The difference between the IDI model and the UCLA model (see Fig 3.4), lies in the positions of the goals/objectives and the audience analysis.

The IDI prefers to identify problems first, in terms of learner's needs, priorities and to analyse the audience and the conditions (constraints), before formulating the needs and the contraints.

On the other hand, the UCLA model, also in three phases, puts the setting of the goal as first. From these goals, objectives are developed and after this, follows the definition of the target population , and then an identification of conditions and constraints before setting specification for the prototype.

Both models advocated a pilot test before the final product and even the UCLA model includes a field test before dissemination of the final product. (see Fig 3.4)

Considering these two models, the IDI model, which identifies the problem with respect to the leaner before going ahead to design specifications, is preferable by the producer of this package.

Also, the UCLA model correlates highly with the Instructional Devllopment Process found in the 1967 year book of the United States National Society for the Study of Education (Lange, 1967).

The Lange process of courses development is described in the following steps:-

1. Formulation of objectives.
2. Design and test of criterian measures in order to determine when the objectives has been achieved.
3. Definition of trayget population.
4. Analysis of learning tasks.
5. Preparation of the Instruction/programme
6. Testing and revising of Instruction/Programme.
7. Validation of Instruction/Programme

These seven steps form the basis of what is now called the systems approach to curriculum development, which is central to the philosophy of educational technology.

Molenda, 1977 (see Fig 3.5) designed one that is very similar to the IDI model. His needs assessment and audience analysis are put before setting the Instructional Objectives.

Both specify the need to choose the media to be used. The step in the Molenda model which deals with self appraisal, expert appraisal and learner verification is in effect the pilot or trial test advocated for in the UCLA model, the IDI model and in almost all models which talk of evaluation after design and revision following evaluation.

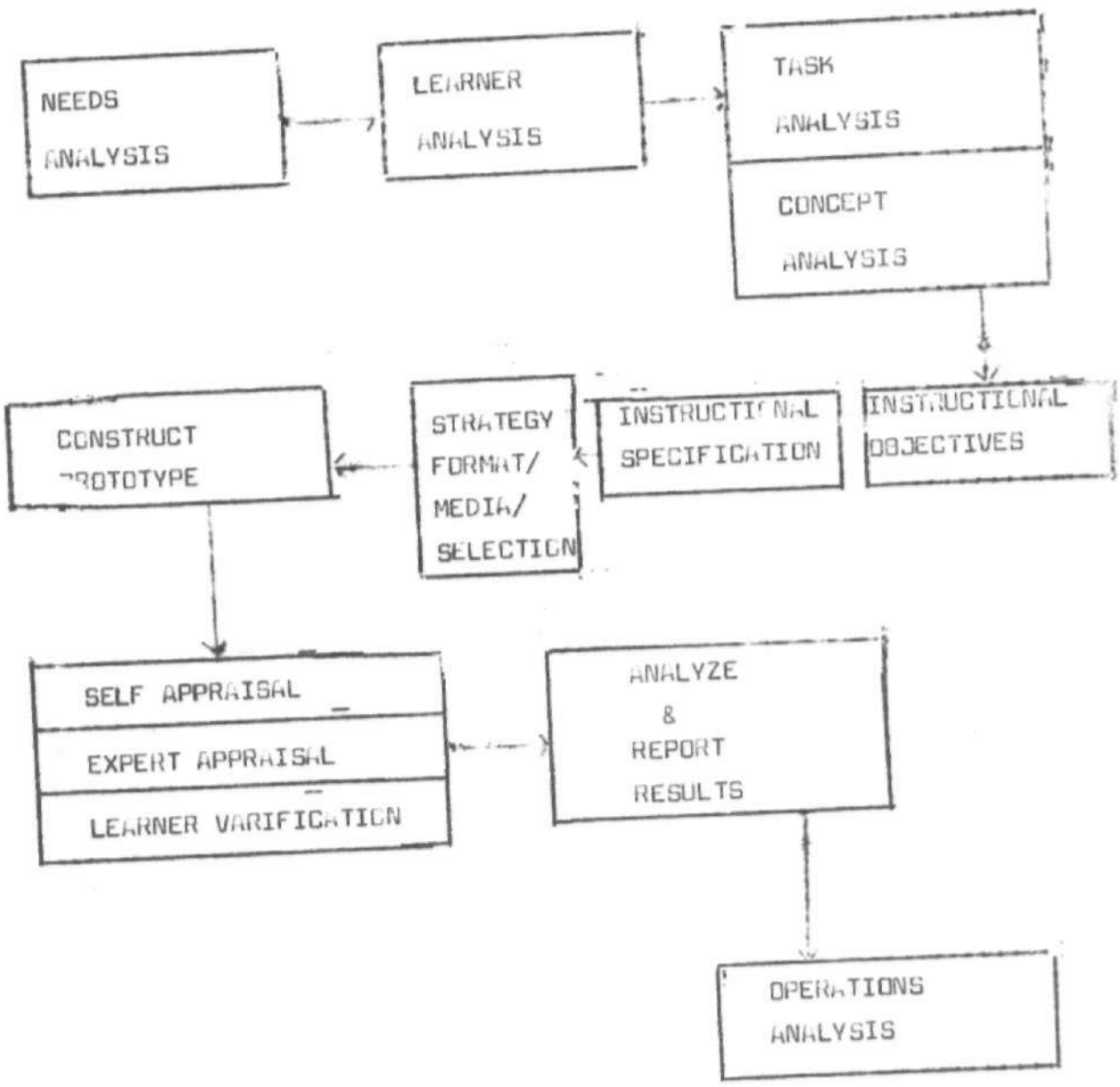


Fig 3.5 : Steps in the I.D. Process by Molenda (Reproduced from the I.D.P.G. Indiana University, January, 1977).

3.2 The Living Model

The Living Model in this instance is the actual method that is currently being used by zoology lecturers in College of Agriculture Samaru Zaria. Having watched the teaching of zoology, especially the topic in question, viz dissection of rabbit in order to expose its internal organs, and having personaly utilised this method from February 1978 till May, 1982 several class observations were made using the following guidelines:-

(1) Are the student's needs considered before the instruction begins?

(2) If so, what are some of such needs that have been discovered?

(3) Is there any analysis of the learners in terms of:

(a) Subject matter competence

(b) Background in subject matter using pretests.

(c) Misconceptions of subject matter in part or in whole.

(d) Maturity and readiness.

(4) Is there any analysis of the task by breaking the task up into simpler tasks and identifying the area where instruction is needed, or where learners need no instruction?

(5) Are the conditions and restraints analysed in terms of:-

(a) Instructional Environment

(b) Level of dependence on Instructor.

(c) Availability of educational resources

(6) What about the use of media; are they

available?

How often, and when are they used?

What media are they?

(7) Does the teacher foster Independent

Instruction by encouraging students to either whatch

films on dissection or purchase rabbits in order to

practice the dissection?

(8) Is there any form of formative evaluation?

(9) When is the evaluation carried out?

(10) How is the evaluation carried out?

(11) What form of feed back is given to the students about

their performance in terms of negative and postitive

reward?

The Producer, using the above guideline made the following observations:-

Identification of Problem and Needs Assessment

It was discovered that no formal needs assessment is done in terms of the expected or desirable behaviour and the current level of behaviour.

Analysis of the Setting

In College of Agric, Samaru, Zaria, there is usually no learner analysis in terms of the subject matter competence and background knowledge and misconceptions. Task analysis is also not done by the teacher. If at all analysis of conditions and constraints are done, this is not done formally but mentally.

Development of Instruction:

The development of instruction is in form of formation of notes to be handed over to the students. This usually does not include the preparation for utilisation of media in the instruction. There is usually no form of formative evaluation. The only form of evaluation that takes place is a summative evaluation carried out at the end of the whole course. If at all any evaluation takes place it is usually done for the purpose of continuous assessment and not for the purpose of revision of the instruction.

The Procedure in the Living Model:

The teacher follows the syllabus and termly scheme of work. When the time comes to teach this particular topic, the teacher informs the laboratory technician to provide a rabbit for the class. There are usually three classes, each class containing two groups. On the whole six groups of students must use a sing single rabbit to learn to dissect, especially to learn to identify the various organs in a system.

Needs Assessment:

There is usually no formal assessment of students' needs as to why they must learn this aspect of the course It is assumed that the designers of the syllabus did this before inserting the topic in the syllabus.

Learner Analysis

It is very usual to have one teacher giving the theoretical instruction within the classrooms. Another teacher takes the practical class in which the dissection of the rabbit is done. It should be stated here that the dissection of the rabbit in the College of Agriculture Samaru, Zaria is purposed to teach the students to be able to identify the internal organs and not to teach them to dissect by themselves.

The teacher taking the practical class hence assumes a lot of things which should have been clear to the learner.

(A) The teacher assumes that the student have some degree of competence in tracing the path of the organs in any given system which they have studied in the theory class.

(B) The teacher does not usually inquire into their background in the subject matter by giving pretest. If at all this is done a few questions are thrown to the group (of about thirty six students). This type of open test obviously cannot give the true level of the individual student's background knowledge and competence.

(C) The same goes for analysis of learners in terms of major misconceptions of subject matter.

Task Analysis:

It is not usual to find any form of formal task analysis. What happen is that the teacher simply dissects the rabbit in the presence of the first group and then the gives a "lecture"

on the various organs, the path taken during the metabolic process and the means of identifying each organ. She then instructs the students to draw.

Analysis of the Setting: (Conditions and Constraints)

Whatever analysis of the setting that is done, it is not along the lines earlier specified i.e. level of learner dependence on instructor, effectiveness of instructional environment. Amount of time allocated for the topic, personnel,availability etc.

In terms of personnal, the deparmtment is short-staffed and the teachers know that they must teach a set of about two hundred students a particular topic within a given period of time (usually one week).

No wonder, the teachers do not bother to follow the basic procedure for insturctional development. There is just not time to do so, in view of the fact that the topics must be covered within a week, in one practical period of three hours, or two weeks, (where the topic is intricate) in two practical periods.

The most common form of analysis of conditions and constraints occurs when the teacher makes the following inquiries from the laboratory technician to find out whether:-

1. The rabbit can be obtained from the schools livestock section or must be bought.
2. There is formalin for putting the rabbit to sleep
3. The refridgerator is still in good condition and not already occupied with botanical specimens.

(since the zoology & Botany sections share the same fridge which is 250 cu cm i.e, 100 cm high, 50 cm wide, 50 cm long(.

Use of Media:-

Media use for this particular topic is nil except for a specimen drawing of the various systems placed on the board and also available on a wall chart in the laboratory. The teacher directs the students attention to these.

There is usually no practice by individual students in order to learn the skill of dissections to practive this on their own since only one rabbit is available for over two hundred students.

From the foregoing points, the development of instruction goes as follows:-

- The week before the topic will be taught, arrangements are madeto obtain a rabbit from the livestock section or purchase one from the market.
- The teacher makes sure that formalin is available and that the refridgerator is in good condition and free from use.
- On the appointed week, the teacher, assuming that the students have already mastered the pre-requisite knowledge in their theory class, goes on to dissect the rabbit while the students watch.
- The teacher then explains the functions of the various parts to the students. The path taken by food in the digestive system. The functioning of the reproductive and excretory system. Means of identification of the organs are then highlighted.

- Students are told to draw the dissected specimen.
- The only form of immediate evaluation is the marking of the drawings in the practical notes which are deposited by students before leaving the laboratory.

Having had a thorough study of the general model i.e. various models proposed by various educationists, and also comparing these models with the living model the producer came up with a combination of the various models as the normative model. This is discussed in the next chapter.

CHAPTER FOUR

THE INSTRUCTIONAL PACKAGE

Having carefully studied various contributions to learning process and instructional design, the producer come up with the following model of instructional design.

4.1 The Normative Model

A normative model which, having been obtained from a general model is to be utilised in effecting or constructing the prototype. In this case, the producer has used the basic steps in the IDI model (Fig 3.3) where necessary, and for further detail, the producer utilised some parts of the Molenda model (Fig 3.5), for clarification of the activities that should go into each step of each phase. The normative model (Fig 4.1) which was evolved from this combination is set below.

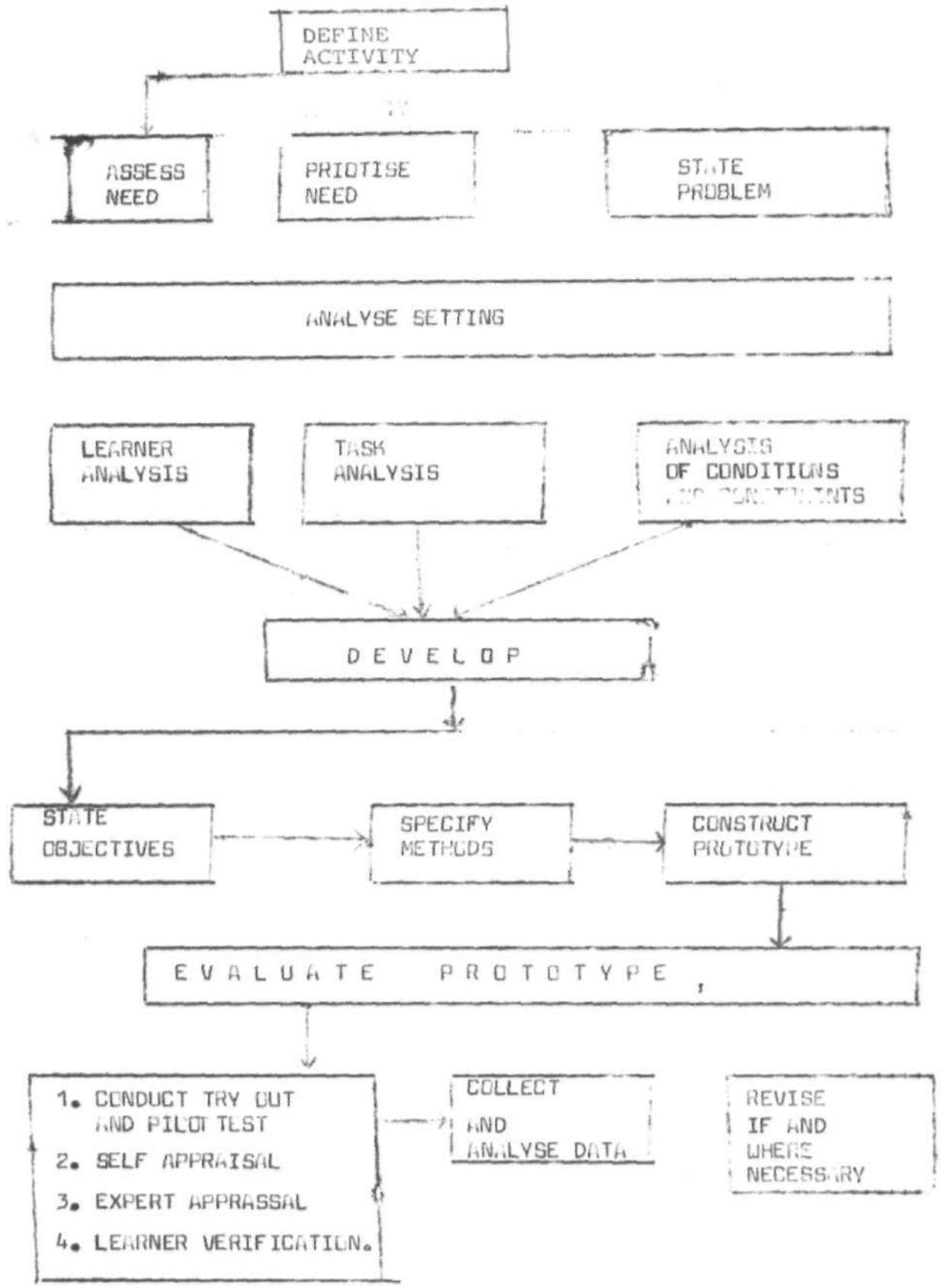


Fig. 4.1 THE NORMATIVE MODEL .

STAGE 1 DEFINE

AA IDENTIFY PROBLEMS

1. Needs Assessment
2. Priortise Needs.
3. State Problems

B. Analyse Setting

1. Learner Analysis)
2. Task Analysis) Molenda.
3. Analysis of Conditions and Constraints

STAHE II: DEVELOP

A. Identify Objectives

Both terminal and enabling.

B. Specify Methods

1. Instructional (learning) methods
2. Criterion methods } Molenda.
3. Select Media/Strategy/Format

C. Construct Prototypes

i.e. Instructional Materials and Evaluation Materials.

STAGE III: EVALUATE

A. Test Prototype

1. By conducting try outs } IDI
2. Collecting Evaluation data

3. Self Appraisal
4. Expert Appraisal
5. Learners Verification

} Molenda

B. Analyse Results

Based on the tryouts, objectives and products is analysed in the light of:

1. Methods and Evaluation Techniques;
2. Results Reported;
3. Revision;

C. Implement/Recycle

1. Review
2. Decide
3. Act.

Using the Normative model, theproducer designed the Instructional Package.

STAGE I. DEFINITION OF MATERIAL

This Instructional Package is to be used for individual and classroom learing and teaching, in post-secondary Biology, to teacherdissection, identification and display of the organ of three system of a rabbit viz:

Digestive System ;

Reproductive System;

Excretory System.

It can also be used at first year level in the University.

1 Identification of Problem

Needs Assessment:

This was done by examining what exists and what is desired. At Post-secondary level, students are being prepared for education in Higher Institutions in various fields of science (viz:, Basic, Sciences, Human and Animal Sciences) and also for teaching in Human and Grade II Teachers College, as is the case with advanced Teachers Colleges.

The need then arises for such students to be able to dissect an animal (especially a mammal) in order to locate, identify and display the internal organs.

What Exists?

Much of the practice in College of Agriculture, Samaru has been set out in the previous chapter under the living model.

In Oyo State College of Ecucation, there is at present, no attempt by the teachers to dissect the rabbit. The various systems of the rabbit are studied in theory and not in practice.

In such a situation, the skill of dissection cannot be taught. In the case of College of Agriculture, Samaru, only the first practical group can actually witness the process of dissection, the remaining groups only come in later to see the dissected rabbit and observe the various organs which by the next day has changed from their original colour at the point of dissection.

Individual students never have the opportunity to do the dissection themselves either in the class or during his independent, post-classroom, study. Students are therefore left to depend on the text book to learn the skill of dessection, identification and display of organs. Should a student decide to purchase a rabbit and practice on his own, the lack of example to follow, the lack of means to verify his rightness or otherwise (i.e., lack of feedback) is enough to discourage and frustrate his efforts.

Utilisation of Instruction Media will go a long way to overcome this handicap.

What is desirable:-

It is desirable for every student to be given a chance to watch a rabbit being dissected.

- It is desirable for each student to attempt to dissect a rabbbit on his own.
- It is desirable for each student to be given feedback as to his progress in the process of dissection.
- It is desirable that students should not only dissect, but display the internal organs after identifying them. This is best achieved by doing it themselves after watching it done, and not learning from textbooks alone.
- It is desirable that teachers should start to utilise the advantages of the projected media in executing those parts of their instruction that are made impossible either by finances or any other constraints.
- A once-and-for-all purchase of instructional packages is more economical on the long run than nothing at all or the purchase of rabbits. every term the topic is to be treated. Since these one rabbit, used over a week, does not really achieve the purpose desired.

From the foregoing appraisal of what exists and what is desired, the need can be framed as follows:-

(1) *Theere is a need for schools to have a means of demonstrating clearly and systematically, the steps involved in the dissection, identification and display of the digestive and reproductive organs even, in a classroom setting.

(2) There is a need to provide an example for the independent student, rich enough or willing to

purchased a rabbit and learn the skill of dissection at his own pace.

(3) There is a need to give students a forum for participation and individualised learning by discovery.

B. Analysis of Setting

This will involve the analysis of the learner and the task and also of the condition and constraints involved in the learning environment.

1. Learner Analysis:

This deals with their entry knowledge

a. Subject Matter Competence

- The learners that will use this package are expected to have had one or two lessons on the physiological functions of the various systems. Hence they should have known the directions of each process that takes place in the systems.
- They are expected to have been introduced to the dissecting instruments, their names and their uses.

b. Background in The Subject

- As for their background, part of the sylabus for secondary and Grade II Teacher Training Colleges is the study of the functions of these systems and the step by step processes that take place in them.

c. Major Misconceptions They May Have:

- As for major misconceptions, some of the students might have misconceptions, especially those from schools with poor backgrounds where, for some reason

or the other, the teacher never taught one or more of the systems or never introduced the dissecting sets. this may be due to the fact that the particular Biology teacher has no flare for dissection. He may be a graduate in Botanay or Microbiology and sometimes, for want of personnel, Chemistry or Physics graduates are used to teach Biology e.g. Colleges of Agriculture, Samaru, Zaria.

2. *Task Analysis*

In analysis of the task, the producer makes use of the format as found in (fig 4.2) and at various points specification by other authors are included for task analysis, as follows :-

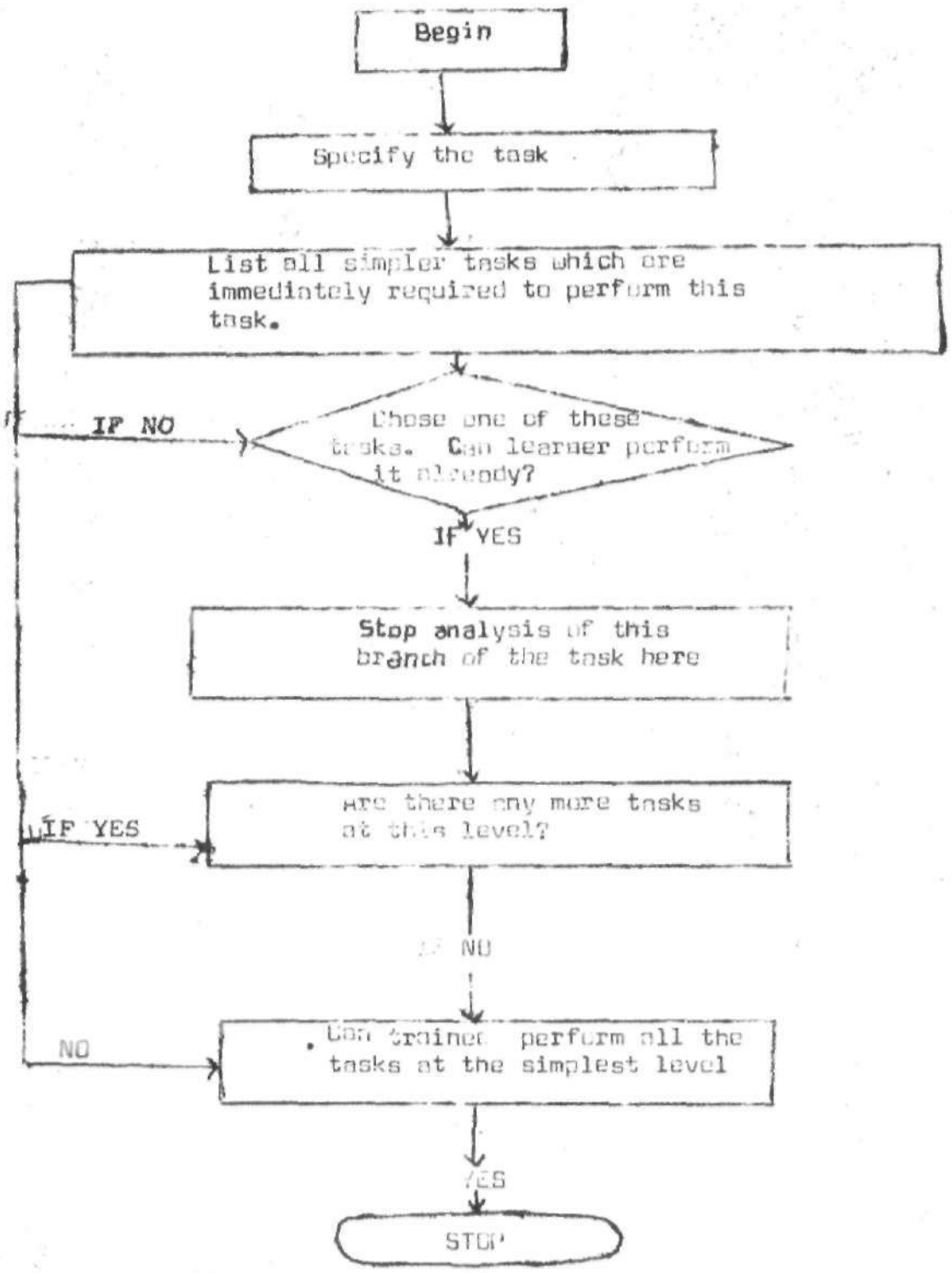


Fig. 14.2 PROCEDURE FOR TASK ANALYSIS

(Reproduced from IDPG (Instructional Dev. Project Guide book) (Indiana University, 1977).

Task Analysis of the Package

1 SPECIFY TASK: - Dissection of a Rabbit in order to display and identify the organs of the digestive system, [illegible], the Reproductive system.

SIMPLE TASKS REQUIRED TO PERFORM THE TASK	CAN LEARNER PERFORM
1 a. Handling of dissecting instruments	YES
b. Identification of each tool and appropriate utilisation of each.	REQUIRES PREVIOUS INSTRUCTION (RPI)*
2. Anaesthesising rabbit and pinning down rabbit securely.	NO REQUIRES DEMONSTRATION (RD)*
3. Trimming central hairs with razor	NO REQUIRES DEMONSTRATION (RD)
4a. Raise skin and cut open skin	NO REQUIRES DEMONSTRATION (RD)
b. Avoidance of peritoneal membrane	(RD)
5. Raising up peritoneal membrane and cutting through	(RD.)
6. Pinning down skin and peritonial membrane	NO (RD)
7. Displaying the organs of the alimentary system	NO (RD)
8. Teasing out the mesenteries of the [illegible]m	NO (RD.)
9a. Displaying the organs of the excretory system	NO (RD)

SIMPLE TASK PRODUCED TO PERFORM THE TASK		CAN LEARNER PERFORM IT?
9b.	Teasing out the ureters	NC (RD)
10.a	Displaying the organs of the Reproductive system	NC (RD)
11 b.	Teasing out the Oviduct/ovaries and Uterus or Testes/Uterus Seminal Vesicle and Penis as the case may be.	NC (RD)
11.	Drawing the dissected product	NC (RPI),(RD)
12.	Labelling the organs	(RPI)

3. Analysis of Conditions and Constraints:

This has to do with the available facilities, resources, including human resources, financial resources, physical resources etc. and are factors affecting design and develoment of Instructional Materials.

Dick and Carew (1978) grouped factors into the following groups.

- Instructional Environment
- Degree of Insturctor Dependency
- Availability of existing Materials
- Size of group (individualised or large group)
- Personnel, facilities and equipment.

These are all considered by the Producer as follows:

*RPI - Requires Previous Instriction
RD - Requires demonstration

The Instructional Envriomnt:

This has to do with the instructional strategy or environment where the materials should be used either in a learning centre, in carrelsor in the classroom. These various environment require various degrees and forms of instructional and motivational activities and the materials designer must tailor his material development to suit the environment in which it is to be used. In this case, theproduceris satisfied that the materials can be used individually or in a group, because the instructions are given to teachers as well as students and the media can be used in both circumstances.

The Degree of Instructor Dependency

As earlier said, various Instructional Materials require various degrees of instructor dependency while some require instructor to provide added motivational activities. This package can be used for whatever purpose hence the author has provided instruction in those area that students need instruction.

Availability of Existing Materials

Instructional designer must decide whether existing materials can be adapted to instruction or whether they are adequate for the instruction.
For example, in making a package consisting of slide/tapes/notes, the producer notes that even some of the school for which the package is intended may have no screens nor slide projectors.

In Collge of Agriculture Samaru, Zaria, the slide projectors and screens are available in the audio-visual room,

but no slides that demonstrate dissection.

Outlets are usually absent, even where outlets are present, their placement may make their utilisation difficult, (e.g. Oyo State College of Education).
In pareparing this package, it is believed that many of these impediments can be overcome by a resourceful teacher.

The Amount of Instruction

This depends on the use to which the materials is to be put. If the material is simply motivational, it may not contain much details. In a situation where the material is to provide activity, the specifications for activity must be included. "Above all, the instructional strategy can be used to guide instruction regardless of where, or under what condition, and to whom the Instruction occurs" (Dick Carey, 1978).
In this case, the material is both motivational and instructional, hence a lot of review, repetition, summarisation, testing and follow-through activities are included in the package.

Individualised or Group Instrucation:

The difference in size of the group affects the methods of presentation and the nature of practice and feed back activities. Clustering students into similar groups based on prequisite skills and learning rates usually provides the benefits of individualised instruction" (Dick and Carey, 1978).

The Major problem with individualised instruction in group-made instruction is that the instructor must plan and manage instruction so that all students regardless of their

rate of progress, are challenged and are busy, learning actively. The writer of this package has forestalled this by giving suggestions to teachers.

Characteristics of the Target Group

This factor also affects the instructional strategy and hence the nature of the materials. For example, whether students can read, see or hear will affect the nature of the strategy. The students maturity level and social background also influence learning.
This has already been discussed earlier in this chapter under learner analysis.

Personnel, Facilities and Equipment:

Materials connot be implementeduntil available personnel, facilities and equipments are carefully consdiered. In order to overcome the major problems posed by this factor, the instructional book, which is a part of this chapter, is devoted to instruction to users on utilisation and maintenance of slides/tapes/nootes.

STAGE II Develop

In developing this material, the producer hopes to make this a whole section on its own, since it contains the real Instruction i.e; the skill/knowledge/attitude to be taught and learned.

4.2 The Instructional Book/Script

"Organs Show Up"

For the utilisation of this instructional package, it is important to follow the basic guidelines for the utilisation of slides - tapes - notes. Since activities of individual vary appreciably from that for classroom use, instruction will be directed both to individual learners and to teachers.

Good listening is much more than hearing of sound, it involves interpretation of the sound received resulting in over reaction to the sound received. Such reaction involves discriminating, identifying and making judgements after the listner does analysis and evaluation of the stimulus received.

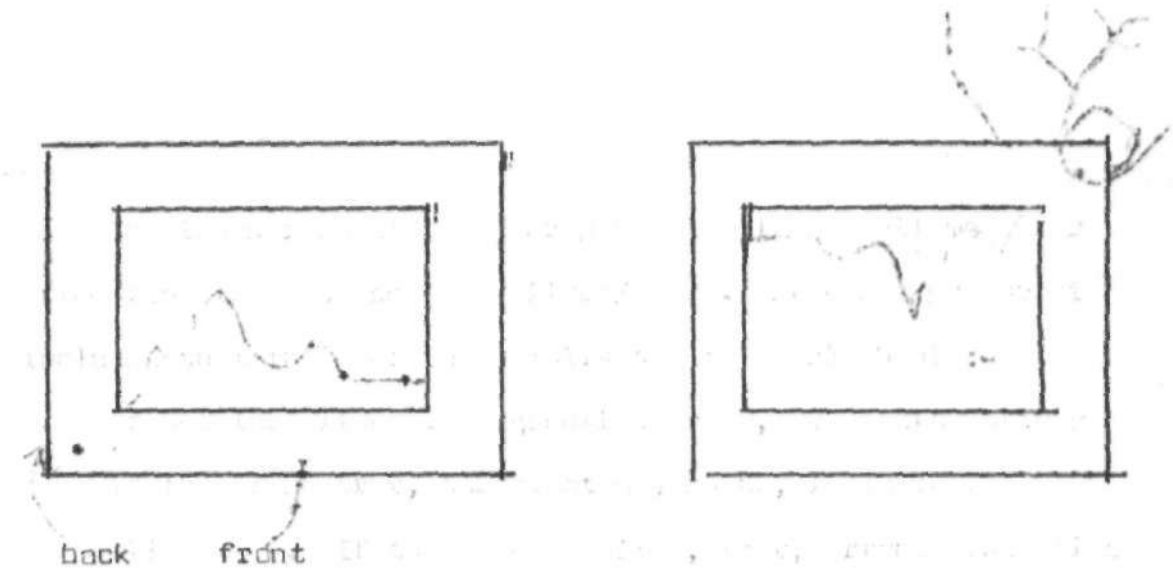
To develop this skill therefore, students using this package should practice the following; and teachers should let their pupils do the following as often as possible:

- Listen to instructions and try to follow them.
- Summarise points in lectures, debates dramatisations documentary films.
- Prepare written outlines based on what has just been listened to.
- Identify non-verbal cues and interprete them e.g. sound effects.
- Recognise voices of known people or instruments.
- Identify various sound and their sources.
- Prepare themselves for listening i.e. develop an inquiry attitude.

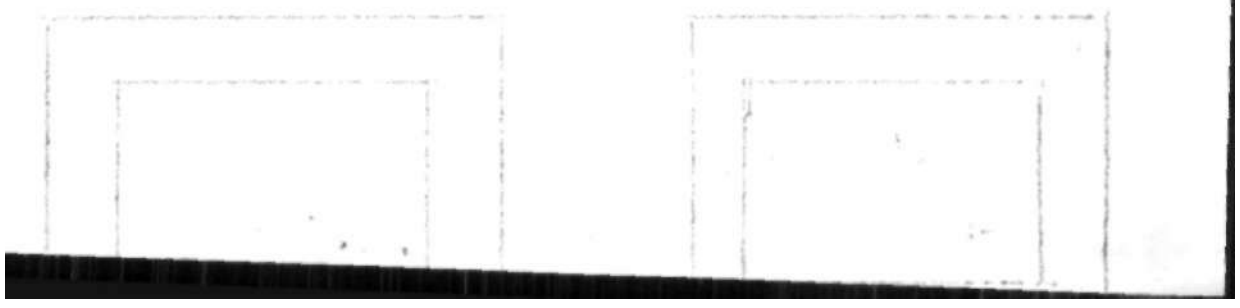
The teacher should also prepare himself as follows before attempting to teach with slides/tapes. Previous preparation includes that the user (especially the teacher) should:-

1. Preset the slides in sequential order, by placing slides in the slide tray, the right way round, if there is a slide tray. If there is no slide, tray, arrange the slide sequentialy on a table. To place slides the right way round, do the following:- Number the slides sequentially,

- -Place a dot on the left bottom corner of a slide held upright with front side facing, as shown.



- With the right thumb on the dot, turn the slide face downward and place in the slide tray.
- Place the next slide behind the first one in the slide tray.
- Preview the slide, using the study guide provided.
- Pre-audit the tape along with the slides.



- Prepare the instructional setting by prearranging the classroom environment.
- Ensure optimum viewing and hearing by each student as follows:-

1. Choose the most appropriate screen.
2. Check to see that seats are not too near, too far or at an uncomfortable angle to the screen.

- Provide a chart (if possible) showing dissected rabbit with lables.
- List key words on the board.
- Tell them the follow-up activity as stated in the guide book e.g. reading/ discussion, or practical application of skill.
- Allow students to lead in dissussions or carry out applications.
- Always give students time to do the follow up activities.

How to Use the Slide Projector

1. Plug in the power cord and switch on electricity
2. Switch on fan and then lamp.
3. Focus on the screen - screwing the lens in or out until the frame on the screen is sharp, then switch off lamp.
4. Insert the slide carrier in the space provided between the lamp and the light channel with the slide carrier handle up. Tighten knob over carrier.
5. Take the first slide. follow the instruction on Sheet page 105

6. Rotate until the bottom left corner becomes the top right corner. Thus the picture is upside down and right side left.
7. With that side facing you drop the slide into the slot that is outside the body of the projector.
8. Switch on lamp.
9. Push the slide carrier towards the other side until it stops.
10. Re-focus if picture is not sharp enough.
11. Insert the next slide in the same way into the empty slot and push or pull the carrier until the second picture is on the screen.
12. Remove the first slide which is now free and insert the next one. In this way, keep on changing the slides. If you are using a caroussel place all the slides serially on the slide tray and begin to project.

The Dissection

THE DISSECTION OF A RABBIT IN ORDER TO SHOW:

THE ALIMENTARY SYSTEM

THE REPRODUCTIVE SYSTEM.

FOR THE TEACHER: The teacher should motivate the students by telling them the rationale for giving this particular instruction.

RATIONALE: (Why must you be able to dissect a rabbit; identify and display its internal organs ?

This package introduces you to the procedure for dissecting a rabbit so as to display its organs. There will be occasions in your life when a doctor discusses certain ailments with you and what organs are affected. Some of you will find yourselves in various feelds of medicine, veterinary medicine, pharmacy, physiotherapy, anaesthetics, radiology and other paramedical professions. To excell in such fields, you need to be able to locate the organs by dissecting small animals.

This package is out to teach you the step by step process involved in dissection, the propoer use of dessecting sets to expose internal organs neatly and to identify the organs.

Being able to see for yourself will help you to understand the physiological functions of mammals.

General Content:

This package consists of slides, tape and notes. The instruction is dealt with in units. There are 3 units in the package.

OBJECTIVES: (What is expected)

After completing the package, you will be able to:-

1. Make clean straight cuts in dissecting the rabbit.
2. Expose the organs of :-
   1. The digestive system
   2. The Reproductive system.
3. Pin down skin and muscle nearly in order to displny the organs.

4. Tease out connective tissues and fats around organs in order to expose the organs and display them clearly.
5. Identify and lable each organ that has been displayed.

Instruction to Users

Each of the units in this package begins with a pretest which helps users to know whether or not to skip that unit. A post-test after each unit also serves as a self evaluative material to know how much has been learnt.

Students can write the answer in a book and cor cross-check before going on to the next unit. It is advisable that students master one unit before going on to the next one.

FOR TEACHERS:

The pretest can serve as a pre-instructional evaluation of previous knowledge in order to know what to teach, what to clarify and what to proceed to.

UNIT 1

OPENING UP THE RABBIT

Introduction :

This unit contains the dissection of the rabbit in order to expose all the internal organs. This does not include a definite display of the organs.

Motivation: For the Teacher:- What does it look like when a rabbit is cut open and the intestines and other organs clearly seen? Have you ever seen any animal cut that way before?

If you are to display the internal organs of a rabbit, how will you do it? (The teacher should give room for answers).

OR:-

If you have ever watched butchers cutting up their cows and getting them ready for sale, will you follow their method?

Let's watch how scientists do thier exposure of internal organs.

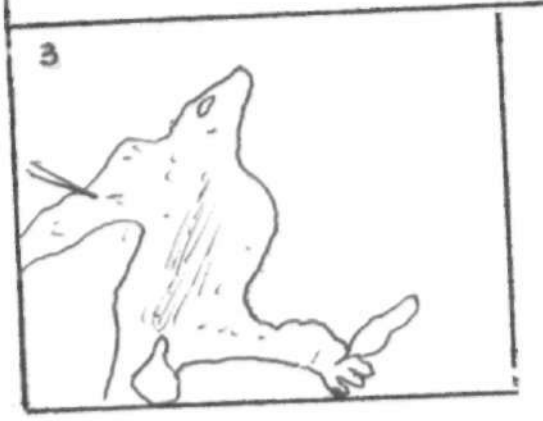
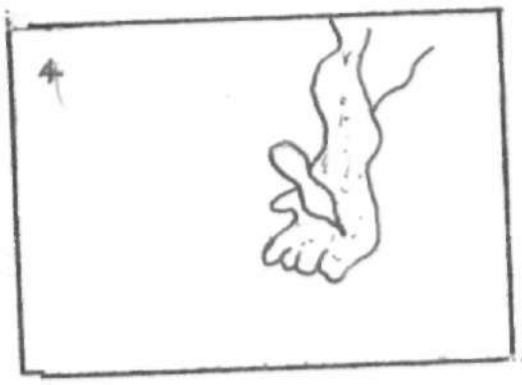
SLIDE STORYBOARD

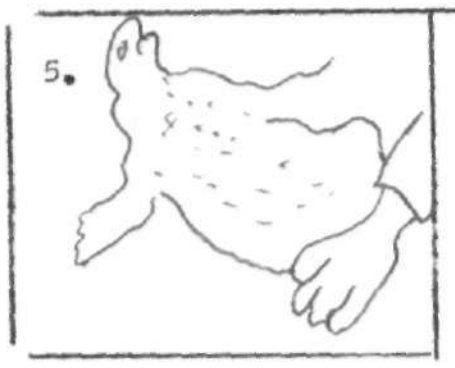
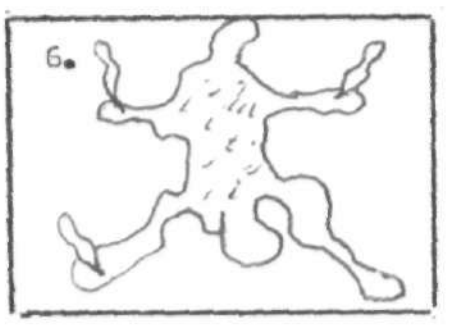
UNIT I

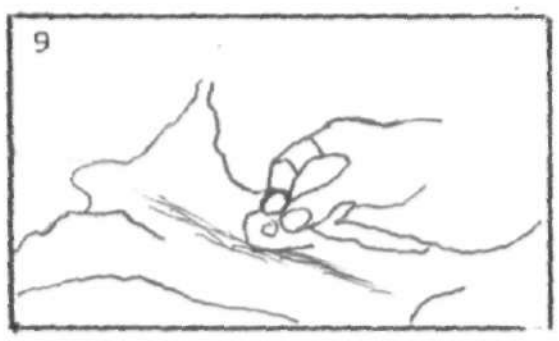
OPENING UP THE RABBIT

SLIDE	AUDIO
1 OPENING UP THE RABBIT	TITLE
2 	A live rabbit is difficult to dissect carefully and neatly for study purposes. It follows therefore that a rabbit must be rendered inactive before it can be neatly dissected. To do this, put a large cotton wool previously soaked in chloroform over the snout of the rabbit for some time (about 2 minutes). If you don't have chloroform use ethanol. It does the job equally well. The rabbit becomes unconcious

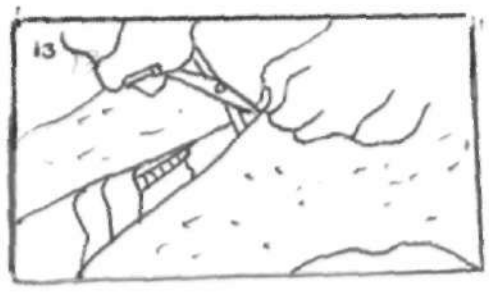
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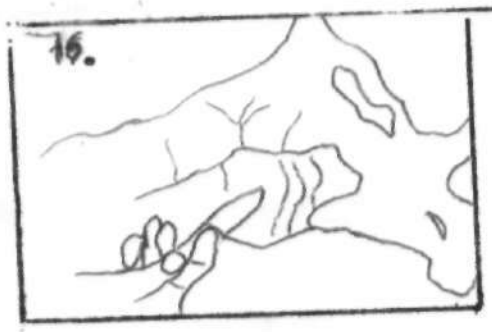
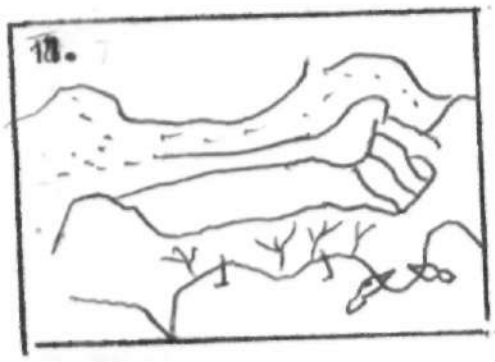
VIDEO	AUDIO
3 	place the unconcious rabbit on its back and try to spread out each of the limbs sideways as shown.
4 	Hold the limb and prick the centre of the paw with large dissecting pins, pinning down each limb securely, one limb at a time.

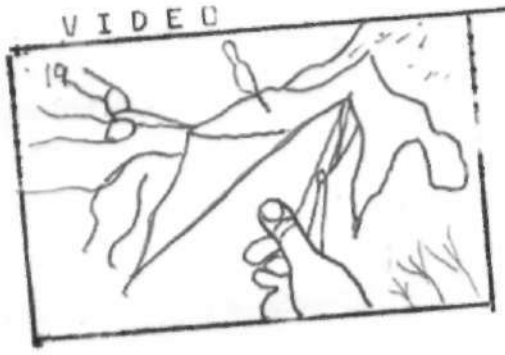
VIDEO	AUDIO
 5.	Notice that the four limbs are stretched out straight to reduce folds in the abdominal section.
 6.	This slide shows that all the four limbs have been securely pinned down and dissection can now begin. When the limbs are properly stretched out the abdominal wall is taut and allows for easy dissection. It is very important that the four limbs be streched tightly.
 7.	Moisten the central part of the ventral surface of the rabbit with a piece of cotton wool, previously soaked in water. (Pause) Can you give a reason for doing this? The reason is to soften the hair

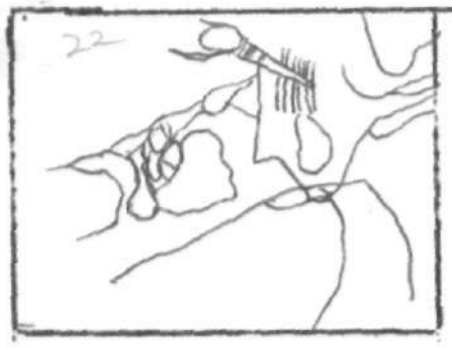
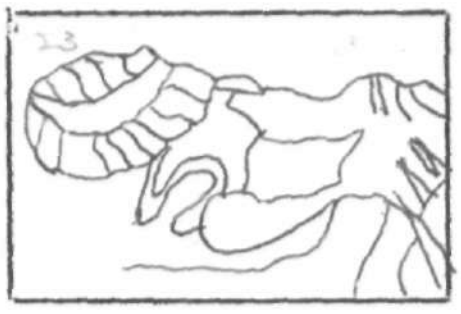
VIDEO	AUDIO
 8	The hair along the central part of the abdomen is now wet and can now be easily removed with a razor blade without the danger of cutting the skin. (Pause) Can you think of a similar action among human beings? (Pause) Some men usually moistem their beard with soapy water when shaving with shaving stick and razor blad in order to soften the hair.
 9	Using a relatively sharp razor blade, scrape off the moist hair along the middle of the ventral surface of the rabbit.

VIDEO	AUDIO
	With a fine pair of forcepts, lift up the skin in the middle of the xantral surface along where you previously moistened with water (Pause) Can you give a reason for lifting up the skin? (Pause) The reason is to prevent the internal organs from damage when a cut is made with scissors.
	Using a fine pair of scissors, make a [illegible] slit at the point of the skin you lifted up. Then start cutting from this slit.
	Continue to open up the rabbit as you cut through the skin from the slit up to the mouth, along the region from which hair [illegible] had been removed.

VIDEO	AUDIO
	Then cut to the anus, as shown
	Further expose the abdomen by cutting again from the central line at chest region to the paws of the forelimbs. When cutting, a pair forcepts is used to hold the outside of the skin, as is the case in this picture.
	Then cut the skin of the thigh region down to the paws of the hind limbs or just as much as can allow the skin to be bent backward and laid sideways.

VIDEO	AUDIO
 16.	To make it easy to lay the skin down flat. Use a scapel to "peel" the skin by te ting out the [illegible] - connective tissues between the skin and the muscle.
 17.	Open up the skin and lay it on the dissecting table, pinning down the skin with fine dissecting pins. Pin down one side first and then the other side.
 18.	You will observe that there is still some muscle tissue covering the abdominal region and the organs cannot be seen clearly. This is the abdominal muscle.

VIDEO	AUDIO
	Cut through the centre of this muscle tissue upwards to the thoracic cage and downwards to the anus you did to the skin. Note that the contents of the thoracic cavity cannot be see yet, it is covered by a muscle called the diaphragm.
	Lay down the muscle tissue sideways, It will stay flat on the skin without pinning it down because it is moist and can stick easily to the skin.
	Open up the thoracic cage by cutting through the cartilage of the chest region with a coarse pair of scissors.

VIDEO	AUDIO
	Pull apart the rib bones and pin them down sideways with strong dissecting pins. The diaphragm, which is a small muscle separating the abdominal cavity from the thoracic cavity is seen in this slide, lying across the opening of the cavity, above the liver. It is partly cut (Pause) Can you observe the heart lying at the centre of the thoracic cavity in this picture? (Pause) What colour is it? (Pause) It has a coffee brown colour. (Pause) Can you see the liver ? What colour is it? (Pause) It is dark brown.
	The rabbit has now been dissected or opened up ..... But we did not open it up for fun We wanted to know about certain ortans sinside it, Study this slide carefully (Pause) What organs can you observe direclty after opening up? (i.e. in sity) before displacing any of the organs? (Pause) The lungs, the small intestine, the caecum, the liver, part of the stomach and the heart. (Pause) which organs need to be displaced in order to see some others? (Pause)

VII D E O

A U D I O

The intestines must be teased out in order to see the duodenum, the ileum, the colon and the appendix clearly.
The whole of the intestine must be displaced to one side. The liver too must be displaced.

(Pause)

which organs lie beneath the one that must be lifted up or displaced to one side?

(Pause)

The ovaries and kidneys, which lie beneeth the intestines, the gall bladder which lies within, the liver. The pancreas lies between the small intenstine and the stomach The spleen lies below the stomach.

(Pause)

In this slide, the liver can be clearly seen and the caecum is the large sac at the lower side of the animal. Can you touch it?

(Long Pause)

The appendix is the coilly tube lying accross the caecum. A part of the stomach is also visible in this slide.
It is pink in colour. The colon is the large tube lying just below the stomach It is pink but darker then the ileum.
The rectum contains balls of faeces Try to touch it.

(Long Pause)

In summary, the organs that must be displaced are as follows:-

1. The Stomach ---- in order to see the duodenum and oesophag and sometimes, the ovaries.

2. The intestines ------- in order to see the oviduct, the kidneys the ovaries, the uterus and the rectum clearly.

VIDEO	AUDIO
	3. The liver, in order to see the gall bladder. The gall bladder lies between the liver lobes and the kidneys lie below the intestines. The cross lies below the intestines and the spleen is partly hid by the stomach
	(pause)
	The next unit, Unit 2, will show how to display the digestive system Go over the slide again and answer the post-test questions at the end
	Then check up the correct answers at the back of this book
THE END	THE END.

POST-TEST QUESTION FOR UNIT 1

1. Why must we remove the hair on the central part of the rabbit's ventral surface?
2. State what you do after removing the central hair?
3. How do you expose the thoracic cage?
4. What organs are direclty visible, in situ? i.e. immediately after opening up the rabbit.

FOLLOW - UP ACTIVITY

1. Go through the notes in this package, paying attention to the diagram of the dissected rabbit.
2. Write down the main steps in the dissection.

UNIT 2

DISPLAYING THE DIGESTIVE (ALIMENTARY) SYSTEM

Skills To Be Learnt.

Differentiation between organs of the digestive system for instances, and care in teasing out the ileum.

Previous Knowledge:

You have learnt about the part food takes from mouth to the body and anus. You know the organs that work together to produce a healthy body. You are expected to be able to dissect a rabbit, to identify the organs of the digestive system a without damaging or rupturing any delicate organs or tissues. Can you do it in one hour? Try.

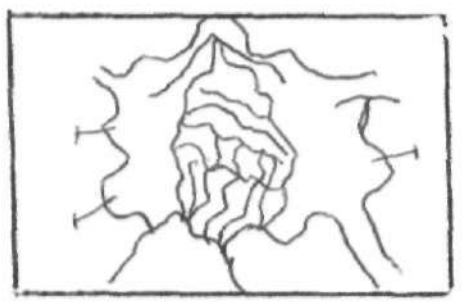
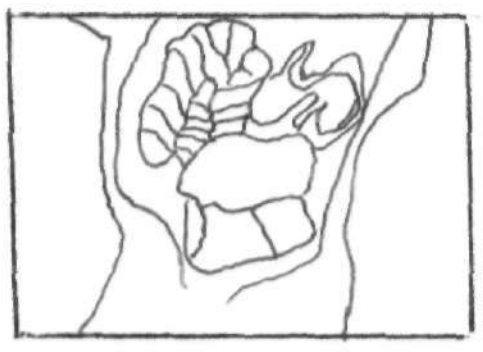
Pre-test.

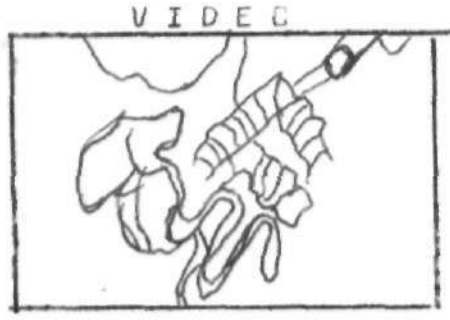
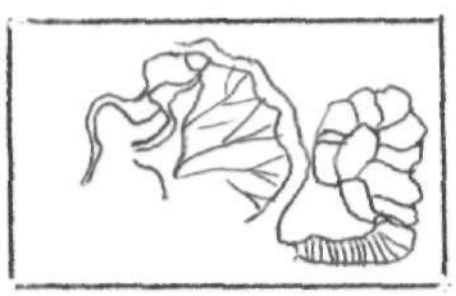
1. List the organs that make up the alimentary system.
2. What do you cut away in order to disentangle the much coiled ilium?

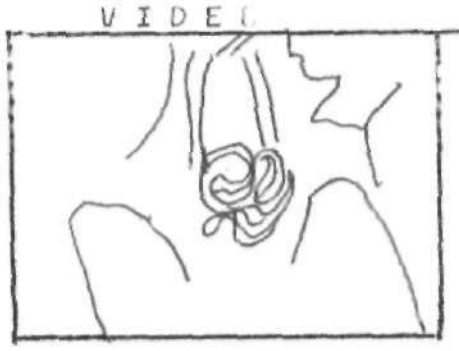
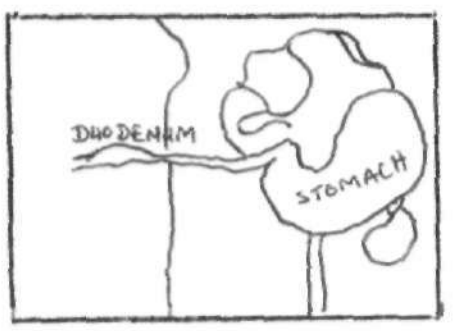
Now go ahead and watch the slide.

STORYBOARD FOR UNIT 2

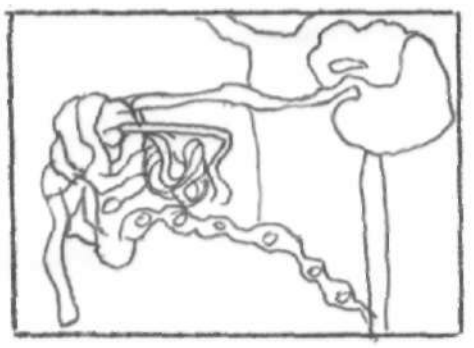
DISPLAYING THE DIGESTIVE ORGANS

V I D E O	A U D I O
1.	Displaying the Digestive Organs.
	Having learnt how to open up the abdominal region of the rabbit to observe the organs in situ (that is, as they are before displacing any of them). We should now differentiate between each of these parts.
	In order to be able to observe all the tissues within this system, we must displace some organs to one side and others to the other side. When displaced to the left side the caecum looks like this. At the end of the caecum and lying on top of it the appendix. Note the position of the rectum, it leads to the anus. The liver is coffee coloured and lies partly on top of the stomach which is light pink in color. A portion of the rectum which contains balls of faecal matter can be seen at the centre.

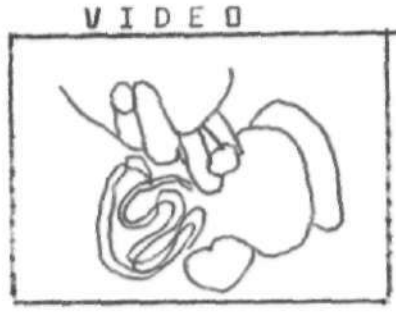
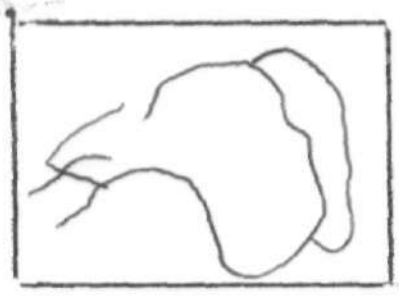
VIDEO	AUDIO
	In this picture, the appendix is held up with a coarse pair of forceps. The scissors is resting on the caecum
	Pack the Caecum and the appendix to one side and try to separate the ileum from the colon, placing them on one side as shown.
DITTO 2	What you are looking at here is the well displaced abdominal region of the rabbit. The colon, which is the large intestine is the tube which lies coiled below the stomach. The ileum is the smaller and thinner tube coiled below the colon. The colon is darker then the ileum. Notice the network of blood vessels surrounding the ileum. Can you say what their function is? (Pause) The blood vessels supply blood to the ileum and colon. They also take away digested food and water to the body from the ileum and colon respectively. Notice that all the intestine lie coiled together. To display them, they must be teased out and separated.

VIDEO	AUDIO
	Gently, using a blow pipe or the tensing rod, tease out the connective tissue joining the blood vessels together.
	The intestines have now been displaced neatly to show the various parts of the digestive system. Draw this display and note the parts. (You can stop the tape and slide for this purpose). The pink, round substance lying on top of the centre of the caecum is a swollen region at the junction where the ileum joins the caecum and where the colon begins. It is called Sacculus rotundus The dark tube lying on the lower top of the caecum, to the left is the beginning of the colon, and as mentioned before, the inner tube lying over the caecum to the right upper region is the ileum. The rectum containing balls of faecal matter is clearly visible in this picture. (Pause) You have finished drawing the display and can now go ahead and study the organs. - The stomach looks like a large sac to the right side of the upper part of the abdomen. - There is a blood vessel running down the centre of the rabbit. It carries blood from the heart to the body. -

2.6

VIDEO	AUDIO
	- The liver, which lies left of the stomach and coffee brown in colour. It has several lobes. The upper lobes of the liver have been lifted up in order to see the gall bladder which lies between the lobes and has a green colour. What substance is present in the gall bladder? (Pause) - Bile is stored in the gall bladder. (Pause) Do you know the function of bile? (Pause) Bile emulsifies fat, This means, it helps to convert fat into smaller more fluid molecules so that enzyme lipase can easily act on it during digestion. Write this down in your exercise book (Bile emulsifies fat)
	The duodenum is the part of the intestine leading out of the stomach. Note how the thoracic cage is pinned down with strong dissecting pins. There is a thin muscle dividing the thorax from the abdomen. In this picture it was cut through to open up the thoracic cage it has a crimson colour. It called the diaphragm. The diaphragm closes off the thoracic cage from the rest of the body so as to help the lungs to function properly during inhalation and exhalation. This arrow is pointing to the oesophagus The oesophagus carries food from the mouth to the stomach. The urters are also visible here. Can you touch them? The urters emanate from the right and left kidney and lead into the bladder. Here, the right kidney is partly hid by the stomach.

2.8

VIDEO	AUDIO
10 	The spleen lies just below the stomach, left of the liver. It is very dark, almost black in colour. In this slide, it was lifted up from the dorsal surface of the abdomen in order to show it clearly Was it clearly visible beford it was displaced.
	(Pause)
	Of course it was not
11. 	This slide shows the pancreas . It is the pink tissue attached to the duodenum and lying beside the stomach. What does the pancreas secrete?
	(Pause)
	The pancrease secretes some hormones called Insulin and glucagon. It also contains enzymes maltase, trypsin, protease amylase. lipase and so on.
	(Pause)
	Can you now list the various parts of the digestive system from the intestine to the anus?
	(Pause)
	Then do so on a piece of paper and check out the correct anser at the back of this book
THE END	THE END

Post Test For Unit 2

1. Write or list (in points) how you will proceed to display the organs t of the digestive system.
2. List the organs of the digestive system?
3. Is the liver part of the digestive system?
4. Is the caecum part of the digestive system?
5. Name the delicate tissues and the tough ones.

Check out the correct answers at the back of this book.

UNIT 3

DISPLAYING THE FEMALE REPRODUCTIVE SYSTEM

Instruction to Users

It requires a lot more care to display the organs of this system. As the slides are shown, note where display of organs begins, if you tease out fats and tissues carefully, you will not cut or damage any organ. Note the labels on the organs and their relative positions.

Previous Knowledge:

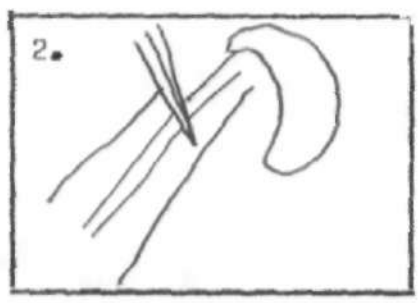
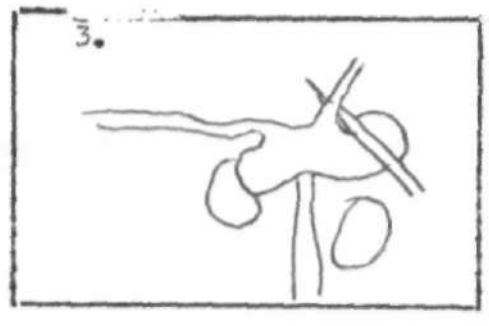
You know that male and female reproductive organs are separate in mammals. You know the organs that make up the reproductive system.

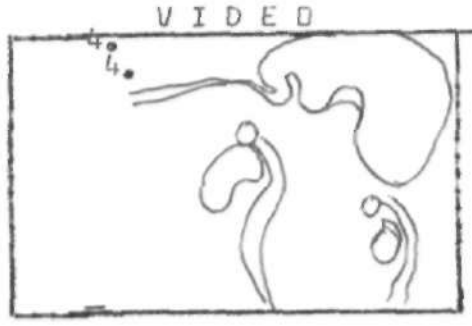
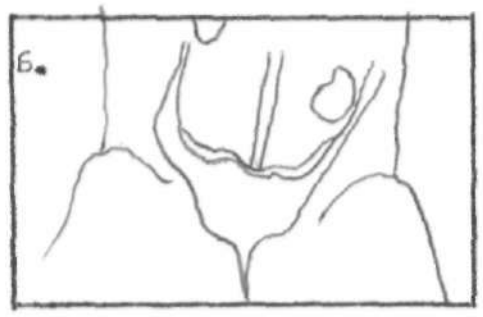
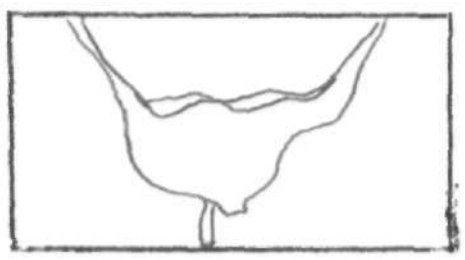
Pre-test

1. List the organs you expect to display in a female rabbit and that of the male rabbit.
2. Do you need to lift up any organ before you see another one clearly? Which organs are they?

Check out the correct answers at the back of this book.

STORYBOARD FOR UNIT 3

VIDEO	AUDIO
1.	Displaying the Female Reproductive System.
2. 	In the set of slides, only the female reproductive system will be displayed. It consists of four major parts. Can you mention them? (Pause) 20 Secs They are the ovaries, the oviduct, the uterus and the vagina. Is any of them clearly visible in this slide? which of the ovaries is clearly visible in this slide. (Pause) The ovaries are situated at the central part of the abdomen. In some rabbits, they can be seen without lifting up the stomach. in this, the stomach has been lifted up in order to see the ovaries. The arrows are pointing to the two ovaries.
3. 	This was the position of the stomach before it was lifted up . The ovaries were lying below the stomach.

VIDEO	AUDIO
	The right and left ovaries are the pink coloured, pea-shaped substances at the centre of the slide, shown by the two arrows.
5. DITTO 4	Trace the oviduct from each of the ovaries. They are the tubes lying on the white pieces of paper shown in this slide.
	Notice that the tubes are very pink in colour and they lead into a saclike but flat substance lying on the centre of the lower part of the abdomen. In this slide note that two white pieces of paper are placed under the oviducts so as to see them clearly.
	Notice that the uterus has a funnel shape and it leads to the vagina which is a tube opening out of the uterus. Pull the vagina down with a pair of course forces and you will see the uterus clearly since the uterus will be much more well defined when you pull. To the right of the vagina which is being held with a pair of forceps, there is a red rodlike substance. Note its position.
	Now take note of the red rodlike substance lying between the thighs. It is not the vagina but the urethra and it leads out of the bladder. What is the difference between the vagina and the urethra?

VIDEO	AUDIO
	(pause) 2 secs.
	The vagina leads into the uterus, while the urethra leads out of the bladder. The vagina is a part of the reproductive system while the urethra is a part of the excretory system.
	Now draw a fully labelled diagram of the female reproductive system in your note-books (s) and then crosscheck your drawing with that given at the back of this book.
	Answer the question in the post-test, at the end of this unit, cross check your answer with those given at the back of the book.
	THE END.

Post Viewing Activity

- Learners should describe the steps involved in the display
- Describe the relationship of one ovary to the other? Is the one on the left side higher up the body than the right. i.e. one lying at a lower level in the body?
- Is there any difficult step or manipulation?

Instruction to Students

1. Practice this skill on a rabbit, at your own time.
2. Try to compare the slides with your own dissection.
3. How many blood vessels did you cut? Try again without cutting any tissue.

Post Test for Unit 3

List the steps in the dissection, then go over the slides to see which step you missed out.

Check out the correct answer at the back of the book.

FOLLOW UP ACTIVITY

- Students should ask themselves "What new thing did I learn?
- Check the answer to the post-test at the back of the notes and write out correct answers to the one you got wrong.
- Go and find out from the library if the human reproductive organ is the same as these ones. Give your report during the next class. If you are an individual student, show your findings to your instructor.

CHAPTER FIVE

EVALUATION OF THE PACKAGE

Measures for Assessing Effect of the Package

In order to test the effectiveness of the package, two main things were done.

1. Questionnaires were administered to teachers as well as student sample who have used the package.
2. A Pilot test was given to student sample.
3. Analysis and Revision of product was done.

The Questionnaire was purposed to collect information about:-

- Learner's use of various components of the product
- Learner's reaction to the product, its directions, activities, vocabulary level organisation, appearance
- Learner's evaluation of the content and skills acquired.
- The ability of the product to meet the objectives.

The The Pilot Test is to gather information about the achievement of the product in terms of realising the objectives for which it was prepared.

Copies of the Questionnaire and Pilot test are available at the back of the book.

5.1 Conducting a Pilot Test

In carrying out a Pilot Test which was to show the effect of the Instructional Package and to do the formative evaluation, eight activities are involved:

A. Acquiring a group of Learners:

A group of learners (about 3 -8) were selected randomly

such that they are representative of the group of utilise the package.

B. Orientating Learners:

The learners were told in writing what the purpose of of the prototype or package was e.g. "By participating in this test, you are helping to improve instruction for yourself and others". The pilot test administrator did the following:-

- Let them know the time for the test.
- Outlined the sequence of the Instructional Activities.
- Outlined the type of activities in which learners will be engaged.
- Outline the materials to be collected at the end: either their notebooks, exercise books, answer sheets or their instructional book.

C. Presentation of Instruction:

Learners and Instructors can use the completed prototype as intended. The instructor should be given clear guidelines about how to carry out the instruction and handle learner's questions.

D. Observe Instruction:

Someone other than the instructor observed the prototype test and commented on the following:

- Time spent on each instructional activities
- How the activity was conducted, especially, if there was any departure from the prototype.
- Questions raised by students, does it reflect interest difficulty or clarity in the instruction?
- How instructor handles learner's questions and problem was it aptly done?

- - How attentive and active are the learning learners etc.?

E. Collection of learners materials e.g. Exercises attempted during the programme like answers to post-test questions available after every unit.

F. Administer Post-Test and/or Questionnaire:
This is usually done immediately after the Instruction. (In cases where retention of learning is of interest, the test may be delayed for several days).

G. Data Analysis:
The result of the analysis will indicate objectives achievement or lack of it.

H. Interview Learners:
After analysing the data and identifying major problems, the producer verified his or her interpretations and conclusions by interviewing instructors, observers and learners.

This procedure was adopted from the I.D.E.G. , 1974.

5.2 Data Analysis Of Pilot Test And Summary

The Pilot test is available at the appendix. The Pilot test is mainly useful for evaluation of the effectiveness of the instruction and subsequent revision.

5.2.1 Accounting for Learning Wholly Attributable To The Instruction

Procedure:

1. The sample was chosen randomly from the specimen sample.
2. Learners were arranged into three groups of equal numbers (three in each case).
    1. The Instructional Group
    2. The control Group 1
    3. The control Group 2
3. Instructional group and Control group 1 were pre-tested to get scores a and b respectively.
4. Instruction was provided for the instructional group and Control group 2.

Note:

Control group 1 was pre-tested but not given instruction. Control group 2 was not pre-tested but given the instruction.

5. Assuming an appropriate matching procedure, pretest scores for group 2, (c) can be infered by averaging the pre-test scores for the instructional Group and the control group 1.

$$C = \frac{a + b}{2}$$

6. All three groups were post-tested to get scores a_2, b_2, c_2, respectively.

Student	Group	Pretest Scores	Post test Scores
1	Instructional Grp	12	30
2	"	15	28
3	"	18	34
	Control Grp I		
1	"	16	17
2	"	10	36
3	"	16	18
	Control Grp 2		
1	"	-	27
2	"	-	38
3	"	-	25

Table 14-1 Data Collection for Pilot Test.

Data Analysis:

In order to ascertain that the instruction was effective, the statistics used is the T-value, to find out whether there is :-

1. A significant difference in the pre-test and post-test results of both the instructional Group and the Ctonrol group 1.
2. A significant difference between the post-test scroes of the Instructional Group and Control Group 2 as against the post-test scores of the Control Group 1 (which did not receive instruction).

Null Hypothesis:- Ho

That there is no significant differe□ in the pretest and post-test scores of the Instructional Group.

Raw Data for Instructional Group

Student pretest Scores	Students Post-tes Score	Average Deviation		Standard Deviation	
X_1	X_2	x_1	x_2	x_2^2	x^2_2
12	30	-3	-0.66	9	0.44
15	28	0	-2.66	0	7.08
18	34	3	-4.66	9	21.72
				18	29.24

Table 2 Standard Deviation of pretest and post test scores.

$X_1 = 45$, $X_1 = 92$

Means = $X = \frac{45}{3}$, $X = \frac{92}{3}$

$= 15$ $= 30.666$

$\geq x_1^2 = 18$

$\geq x_1^2 = 29.24$

To find the t-value, the following formula is used:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{-\Sigma x_1^2 + \Sigma x_2^2}{N_o\,(N-1)}}}$$

$$= \frac{15 - 30.67}{\sqrt{-\frac{18}{3(2)} \cdot 29.24}}$$

$$= \frac{15.67}{\sqrt{-\frac{47.24}{6}}}$$

$$= \frac{15.67}{\sqrt{-7.87}}$$

$$= \frac{15.67}{2.806}$$

Calculated t = 5.58

i.e. The calculated value of t = 5.58
At 99% level, critical value = 4.604
At 95% level, critical value= 2.776

The calculated value of t is therefore greater than the critical values of t at 95% and 99% levels.

i.e. Calculated t 5.58 > 4.604 > 2.776.

Conclusion:- Reject Ho; accept Hi that there is a Significant difference in the post-test results of the instructional group. By inference, the instruction providdd has had the intended effect on the learners, since it produced a significant positive change in cognitive level.

2

Null Hypothesis:- Ho

That there is no significant difference in the pre-test and post-test scores of the control group 1

Raw Data for Control Group 1

Students Pretest Scores	Students Posttest Scores	Average Deviation		Standard Deviations	
X_1	X_2	x_1	x_2	x_1^2	x_2^2
16	17	2	0	4	0
10	16	- 4	1	16	1
16	18	2	1	4	1

Table 4.3 Standard Deviation for Control group 1 and 2

$\Sigma X_1 = 42$ $\Sigma X_2 = 51$

Mean $\bar{X}_1 = \frac{42}{3}$ $\bar{X}_2 = \frac{51}{3}$

$= 14$ $= 17$

$$X_1^2 = 24$$

$$X_2^2 = 2$$

$$t = \frac{X_1 - X_2}{\sqrt{\frac{X_1^2 + X_2^2}{N(N-1)}}}$$

$$= \frac{14 - 17}{\sqrt{\frac{24 + 2}{6}}}$$

$$= \frac{-3}{\sqrt{\frac{26}{6}}}$$

$$= \frac{-3}{4.33}$$

$$= \frac{-3}{2.08}$$

$$t = 1.44$$

The calculated value of t = 1.44.
The Critical value of t : -
at 99% level = 4.604
at 95% level = 2.776

The calculated value of t is therefore lesser than the critical value

i.e. Calculated t (1.44) < 4.604 > 2.776

Conclusion:

Accept Ho, that there is no significant difference between the post-test and the pre-test scores of the control group 1. This is interpreted to mean that there was no improvement in the cognitive level of the control group because they were not exposed to the instruction. The little improvement in the individual scores are likely to be a result of interraction to the pre-test with the post-test.

3.

To find out if there is a significant difference in the post test scores of the groups that received instruction and the one that did not.

Null Hypothesis:- Ho

That there is no significant difference between the post-test scores of the two groups that received the instruction and the group that did not undergo the instruction. The statistics employed for the purpose is Variance Analysis.

Raw Data of Post Test Scores

Instructed Groups X	Uninstructed Group Y	X	Y_2	X^2	Y^2	Y^2
30	17	0.33	0.0	0.19		0.0
28	16	2.33	1.0	5.19		1.0
34	18	4.33	1.0	18.75		1.0
27		3.33		11.09		
38		8.33		69.39		
25		5.33		28.41		

Table 4:4 Chi square calculation for instructed and uninstructed group.

$\Sigma X = 182 \qquad Y = 51$

$\bar{X} = \frac{182}{6} \qquad \bar{Y} = \frac{51}{3}$

$\bar{X} = 30.33 \qquad \bar{Y} = 17$

Grand Mean $\bar{X} = \frac{X + Y}{N_1 \quad N_2} = \frac{182+51}{6+3}$

$= \frac{182 + 51}{9} = \frac{233}{9}$

$= 25.88$

Degree of freedom for the variance within

$= \Sigma N - 2$

$= 9-2$

$= 7$

Variance within $= \frac{X^2 - Y^2}{\text{deg of freedom.}}$

$\frac{135.26}{19.32}$

Calculate Variance between.

				X	X^2	$X^2 \times N$
$\bar{X}$	-	$X...$	= 30.33-25.88	4.45	19.81	118,82
$\bar{Y}$	-	$\bar{X}...$ ££££	= 17.00-25.88	8.88	78.87	236.55

Variance between instructed and uninstructed group.

Degree of freedom for the between variance
= *No of colums* - 1
= 2 - 1

Variance Between $\frac{355.37}{1}$

= 337.73

$$F = \frac{\text{Variance Between}}{\text{Variance Within.}}$$

$$= \frac{355.37}{19.32}$$

= 18.39

From the statistical table, the critical value at:-

95% level = 5.59
99% level 12.25

Conclusion:-

The calculated value is higher than the critical value at both levels, that is, the calculated F = 18.39. Therefore F = 18.39 is greater than 5.59, 12.25, therefore Reject H_o, that there is no significant difference between the post-test scores of the groups that received instuction and the one that did not. That is, thewis definitely a significant difference between the post-test scores of both groups.

Since statistics showed that there is a significant difference between the instructional group and the non-instructional group, then the instruction has benefited those who received it.

Evaluation

Validation of Process and Content

A questionnaire was administered to the learners as well as the users of the package viz teachers and observers. The aim was to rate the content, mode of presentation and usefulness of the package ratings above 3.0 on a 5 point scale indicates that no revision is needed. Results of the questionnaire is as follows.

Question	Average Rating on a 5 point Scale
1	3.5
2	4.1
3	4.6
4	4.5
5	4.9
6	4.9
7	4.7
8	4.5
9	4.4
10	5.0
11	4.7
12	4.4
13	4.4
14	4.0
15	3.3
16	4.5
17	4.4
18	4.4
19	4.0
20	4.9
21	4.9

Table 5: Average rating on questionnaire.

Inference and Summary

Analysis of the questionnaire shows that the prototype is appropriate to the objective, that students pay much attention when the package is being utilised, that the instruction as well as the objectives was clear, media used was appropriate to the topic, slides were clear and elliminate confusion.

- An individual using the package can know how to dissect.
- The notes and tapes were clear
- All steps in the process were given
- The labels were clear and showed what they were expected to show.
- That extra diagrams of the organs were not necessary since the slides were clear enough.
- That the package is not too difficult for post secondary use neither is it too easy for that level.
- That the product is Interesting
- That there was charity in the Instructions and directions in the notes.
- That the availability of answers to all the questions asked makes the individual use possible since it provides feedback.
- That the vocabulary level was not too high
- That the organisation was good
- That the type was clear and
- That the skills acquired are very useful.

Test data also indicate that the package was instructionlly effective. Since almost all the students achieved a eriterion level of performance.

However, suggestion and comments include the fact that:-

- Independent students cannot afford to buy the package. They can however borrow it from the library.
- Users need to be taught how to operate the slide projector.
- That the learning of the various systems should be proceeded by the use of this package or should be used concurrently with it rather than proceeding the instructing in theory.
- That it generates interest in the topics treated and makes reading and post instructional study easier.

Conclusion:

From the result of the pilot test and the questionnaire, the producer of this package is satisfied that the package has the ability to meet the need of the students and can fulfilled the objective for which it was designed.

The producer hopes that users will find it as useful as she found it when it was used on the learners' sample.

The author also takes this opportunity to urge all teachers and Instruction designers to utilise the systems method to realise their instructional objectives in an effective and efficient way.

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APPENDIX I

THE PILOTS TEST

Instruction to learners:

You have just utilised an instructional package prepared for teaching/learning of the dissection of a rabbit to expose the following two systems.

(1) The digestive system

(2) The female reproductive system

Now answer the following questions

Attempt Sections A and B.

Section A is on the dissection, section B is on the display of the various parts. You will be supplied with writing sheets only. All used sheets will be collected after the test.

Section A

1. List Consecutively, the steps involved in opening up a rabbit.

2. Name the contents of the abdomen that can be seen immediately you open the intestine by underlining the appropriate one below:

a.	Stomach	i.	Rectum
b.	Anus	j.	Pancreas
c.	Gali bladder	k.	Kidney
d.	Heart	l	Oviduct
e.	Caecum	m.	Iteum
f.	Appendix	n.	lungs
g.	Spleen	o.	duodenum
h.	Uterus		

3. Trace the path of food from the mouth to the anus.

4. Answer Yes or No:

a. It is necessary to life up the middle part of the abdomen before cutting the abdominal skin.

b. Both the skin and muscle covering the intestines can be cut open at the same time.

c. Only the uterus can be seen clearly before displacing the intestines.

d. It is necessary to be careful when the oviduct is to be exposed because it can easily be cut.

e. It is not necessary to place pieces of paper below the small delicate tissues.

f. The reproductive system is visible immediately after dessection.

Section B

1. What tissues lies below the stomach to the right?

2. What tissue is in between the liver.

3. The tube that leads out of the stomach into the ileum is _____

4. Which is darker, the ileum or the colon? Why?

5. What must you lift up in order to see the ovaries.

6. Before you can see the ileum and the colon, you must displace two main tissues, name them.

7. In order to see the uterus clearly you need to pull down one tissue with a pair of forceps. Which tissue is it?

8. Underline the Appropriate Sentence:

A. a. The rectum leads into the vagina.

b. The rectum is the tube containing balls of faecal matter.

C. The rectum is the largest tissue in the abdomen.

B. a. The caecum is longest tissue in the abdomen of the rabbit.

b. The caecum is longer than the ileum.

c. The caecum leads into the anus.

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C a. The ileum is bigger than the colon.

b. The ileum has blood vessels attached to it.

c. The ileum is very dark in color.

D. a. The pancreas lies beneath the ileum.

b. The pancreas lies in the stomach.

c. The pancreas lies near the duodenum and the stomach

E. a. The spleen is white in color.

b. The kidneys lie on the same level in duodenum.

c. The kidneys are been shaped and lie at different level.
The right kidney is higher up than the left.

Co,plete the following :-

9 The opening of the female reproductive system is

10 The posterior open ing of the digestive system is

11 Only the part of the oesophagus entering the stomach can be seen clearly; True or False?

b. The rectum is the pink tube passing out of the caecum; True or False?

c The point where the ileum joins the caecum is called Sacculus rotundus True or False?

d The gall bladder can be clearly seen without displacing any organ. True or False?

e The color of the spleen is reddish brown. True or False?

12 Label the following diagram :-



QUESTIONNAIRE ADMINISTERED TO

LEARNERS OTHER THAN THE INSTRUCTOR

This questionnaire is aimed at evaluating the effectiveness and appropriateness of the instructional product. Please answer the questions after being exposed to the package. Your honest answers will be very much appreciated.

Please tick your answer clearly under the appropriate column.

	Strongly Agree	Agree	Uncertain	Dis-agree	Strongly disagree
1. Time spent on each unit was just appropriate.					
2 In conduct of the activity there was no departure from the instuctional book.					
3 The Instuctional book was appropriate to the objective of the Instruction.					
4 The instructions were clear as well as the objective.					
5 The Media used was appropriate to the topic.					
6 The slides were clear and eleminate any confusiob.					
7 An individual using the package can know how to dissect					

		Strongly Agree	Agree	Uncertain	Dis-agree	Strongly disagree
8	The note and tapes were clear and easy to follow.					
9	No step in the process was missing.					
10	The labels showed clear'y what they were expected to show					
11	The package is not too difficult for post-secondary use.					
12	The package is not too easy for post-secondary use.					
13	The product is very interesting.					
14	It is good that one can cross-check answers to questions in the notes, at the back of the notes.					

PILOT TEST ANSWERS

SECTION A

1. Steps involved in opening up a rabbit.

a. Chloroform rabbit with cotton wool soaked in chloroform.

b. Lay rabbit on its back.

c. Pin down four lunbs with dissecting pins

d. Moisten central hair with wet cotton wool.

e. Scrape off central moist hair with razon blade.

f. Lift up skin with fine forceps.

g. Make a slit in the lifted skin so as not to damage the internal organs by cutting directly.

h. Cut upwards from the slit to the mouth.

i. Cut downwards to the anus.

j. Cut sideways from chest region to forelimbs.

k. Cut sideways from thigh regions to hind-limbs.

l. Open out skin and lay them down on either side, pinning them down neatly with dissecting pins.

m. Lift up muscle tissue.

n. Make a slit and out open upwards, downwards, and sideways as was the case for the skin.

o. Pin muscle down.

p. Cut the thoratic cage with coarse pair of scissors and pin down.

2. Contents of the abdomen that can be seen.

   a. Stomach

   b. Caecum.

   c. Appendix

   e. Rectum.

   f. Ileum.

   g. Duodenum.

3. Path of food from the mouth to the anus.

Mouth → Oesophagus → Stomach → Duodenum → Ileum → Caecum, Appendix → Colon → Rectum → Anus.

4. a. Yes.

   b. No

   c. No

   d. Yes

   e. No.

   f. No.

SECTION B

1. The tissue that lies below the stomach to the right is the spleen.
2. The tissue lying between the liver is the gall bladder
3. The tube that leads out of the stomach unto the ileum is the duodenum.
4. The Colon is darker, because it contains mostly undigestable food on their way to the rectum from which much water is being removed.
5. To see the varies, one must lift up the stomach and the Right Kidney.
6. You must displace the caecum and appendix in order to see the ileum and the colon.
7. The vagina when pulled will make the uterus more visible.

A - **A** - The rectum is the tube containing faecal malt

B - b - The ileum has blood vessels attached to it

C - d - The panoeas lies near the duodenum and the stomach.

D - e - The kidneys are bean shaped and lie at different levels, the right kidney is higher up than the left kidney.

11. a - True

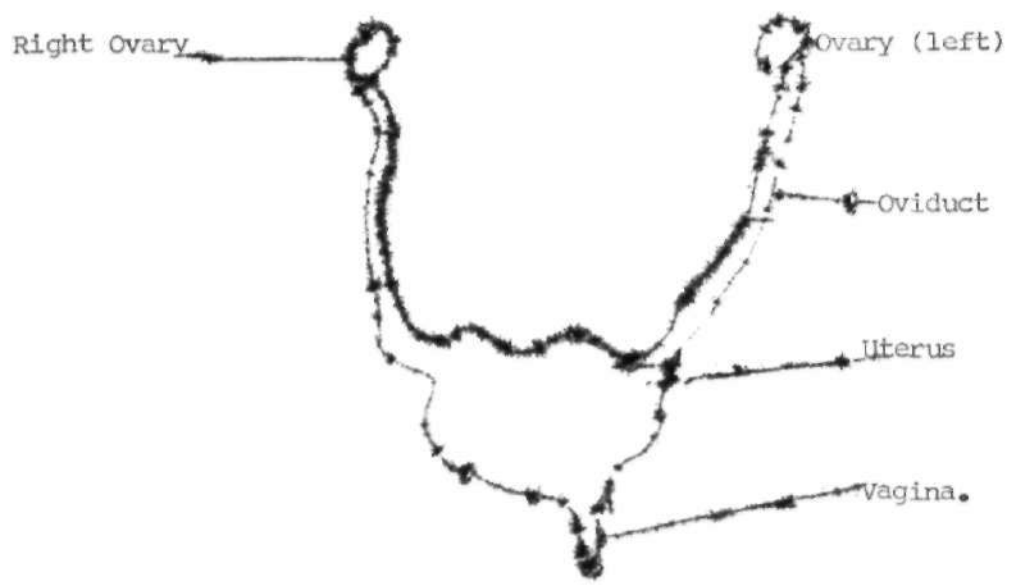
b - False

c - True

d - False

e - False

12. A labelled diagram of the female reproductive system.



ANSWER TO POST-TEST AND PRE-TEST QUESTIONS

UNIT I

Post-Test

1. We remove the hair so that we can see clearly to cut through the skin neatly.
2. You make a slit in the skin which was previously lifted up with fine forceps.
3. By cutting the thoracic cage with a pair of coarse scissors.
4. Caecum

   Appendix

   Ileum

   Rectum

   Duodenum

   Anus

   Stomach

UNIT 2

Pre-Test:

1. List the organs that make up the alimentary system:-

   Mouth, Oesophagus, Stomach, Duodenum, Ileum, Live, Colon, Caecum, Appendix, Rectum, Anus.
2. The network of blood-vessels.

Post-Test.

1. Check, section A no 1 under answers to pilot test.

2. Mouth, Oesophagus, Stomach, Duodenum, Liver, Ileum, Colon, Caecum, Appendix, Rectum, Anus.

3. Yes, the live is part of the digestive system.

4. Yes the caecum is part of the digestive system.

5.

Delicate Tissues	Tough Tissues
Intestines	Cartilage
Liver	Bone
Lungs	Skin
Blood Vessels	
Oviduct.	
Weter	
Bladder.	

UNIT 3

Pre-Test

1. Ovaries, Oviduct, Uterus, Vagina (Female) Testes, Penis, Seminal Vesicle, Urethra, Epidydimis.

2. The Caecum and Appendix along with the colon and Ileum must be lifted up and displaced to another side before the reproductive system can be clearly seen.

Post-Test

1. Steps in the dissection.

   - Displace the intestines to the left.
   - Lift up the stomach and tight kidney and displace them slightly to either side.
   - Trade the oviduct from the two ovaries.
   - Place white pieces of paper beneath them in order to see clearly.
   - Pull down the vagina with a pair of coarse forceps.

V

LEARNER APPRAISAL FORM

1. To me, the subject of this package is.....
.....

Very important Less important

5 4 3 2 1

Comments:.....
.....

2. Students using this package will benefit from it
.....

Very much Not much

5 4 3 2 1

Comments:.....
.....

3. The Language in this package is simple enough for me
.....

Very true Not true

5 4 3 2 1

Comments: .....

4. I will recommend the package to my friend

Yes:..... No:.....

5. The package is not too difficult for post scondary level

Very difficult Easy

5 4 3 2 1

6. The product is:.....

Very interesting Boring

5 4 3 2 1

General Comments:.....
.....

VI

MEDIA EXPERT APPRAISAL FORM

NAME:

TITLE:

DATE:

1. The medium used in this programme is called.....

2. The medium is appropriate to the topic

Appropriate Inappropriate

5 4 3 2 1

Comments:.....

3. The slides in the program are clear and focus is:

Very Good Poor

5 4 3 2 1

Comments:.....

4. The Narration is clear and understandable (well recorded)

V. Good Poor

5 4 3 2 1

Comments:.....

5. Any individual at the specified level using the package can know how to dissect

Very Well Poorly

5 4 3 2 1

Comments:.....

6. The objectives of this programme were cearly evidence

Cearly evident — Vague

5 4 3 2 1

Comments:.....

.....

7. The learning activities were:.....

Very interesting — Dull

5 4 3 2 1

Comments:.....

.....

8. The scope (coverage) were.....

Very adequate — Inadequate

5 4 3 2 1

Comments:.....

.....

9. The students use of this presentation should prove to the very beneficial.....

Very beneficial — None - beneficial

5 4 3 2 1

Comments:.....

.....

10. The method of presentation of materials is:.....

Most efficient — Less efficient

5 4 3 2 1

Comments:.....

.....

11. Overall, I consider this programme:.....

Excellent — Poor

5 4 3 2 1

Comments:.....

.....

12. The product was well organised and eliminated confusion

Well organised Disorganised

5 4 3 2 1

Comments:.....

.....

13. What I like best about the presentation.....

.....

.....

14. What I didn't like about the presentation.....

.....

.....

15. General Comments:.....

.....

.....

APPENDIX VII

SUBJECT EXPERT APPRAISAL FORM

NAME:.....

TITLE:.....

DATE:.....

1. The information presented in the package are:.....

.....

Very accurate Less accurate

5 4 3 2 1

Comments:.....

.....

2. Information presented for the object:.....

.....

Very adequate Inadequate

5 4 3 2 1

Comments:.....

.....

3. The students' completion of this package should be:.....

.....

Very beneficial Not beneficial

5 4 3 2 1

Comments:.....

.....

4. What I like about this presentation: .....

.....

5. What I didn't like about this presentation:.....

.....

6. General Comments:.....

.....

.....

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