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B. Ed. CC-04
TECHNOLOGY OF TEACHING

B. Ed. - ODL PROGRAMME

SCHOOL OF EDUCATION
25/2, Ballygunge Circular Road, Kolkata-700019

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PREFACE

Netaji Subhas Open University is one of the premier State Open Universities in India established in the year 1997 by a State Act (W. B. Act XIX) of 1997 and recognized by the University Grants Commission and Distance Education Council. Consequent upon the RTE Act 2009, the Govt. of West Bengal in its Higher and School Education Departments has decided to introduce B.Ed. programme in the Open and Distance Learning mode (ODL) to train up the in-service untrained teachers teaching at the upper primary level in the State. Accordingly by its Memo No. 180-Edn. (U)/1U-97 / 12 Dated 5th February, 2013 the Govt of West Bengal identified Netaji Subhas Open University (NSOU) as the only nodal University Capable of implementing the programme all over the state of West Bengal. The Govt. of West Bengal also decided to adopt the Curriculum, Syllabus and Self Instructional Materials (SIM) of a reputed University who has the updated curriculum, syllabus and standard SIMs. Therefore, NSOU approached the National Council for Teacher Education authorities for their approval of the programme and they were kind enough to accord their approval vide no. 48-18/2012/NCTE/N&S;Dtd. 19. 03. 2013. After rigorous exercise at the national level the curriculum, syllabus and SIMs of Karnataka State Open University (KSOU) have been identified and accordingly adopted through the signing of a tripartite MoU among KSOU, Department of Higher Education, Govt. W.B and NSOU. NSOU further approached NCTE for their approval for using the KSOU course curriculum and self learning materials and the authorities of NCTE were kind enough to allow NSOU to use the study materials of KSOU vide no. 48-18/2012/NCTE/NS Dt.9th July, 2013.The study materials as received are reprinted at our end. The study materials are reproduced for exclusive use by the Counsellors and Student Teachers of the pogramme. It is expected that Counsellors, Student Teachers and all concerned will take benefit from it and make the most of it.

Teacher Education is an important discipline gaining further momentum as both Govt. of India and Govt. of West Bengal are laying increasing emphasis on it as only quality teacher education can ensure quality instruction and consequently produce learners with a good understanding of the subjects. The quality of teacher education

not only depends on professionally sound and relevant curriculum, but also on the way the curriculum is transacted in the institutions. Hence, it is our earnest request to fellow faculties and dear student teachers to take advantage of this special programme of ODL and make a success of it. After completing of the course, the student teachers will go back to their classrooms, and then try to make it vibrant, instil imagination in children and ignite curiosity in them.

I am thankful to the Hon'ble Minister in Charge, Department of Higher and School Education, Govt. of West Bengal for his continuous guidance and support. Shri Vivek Kumar IAS, Secretary Higher Education Department has been a perpetual source of encouragement and he extended all sorts of cooperation and guidance as and when required. We are thankful to the authorities of the Ministry of Human Resource Development (MHRD), Govt. of India for their unstinted support. We must acknowledge the instant gesture of cooperation and help extended by KSOU authorities to share course curriculum and study materials with us. The authorities of Paschim Banga Sarva Siksha Mission (PBSSM) were very generous to provide financial support to make the project possible. My colleagues at the School of Education have made it possible to reprint the SIMs within such a short period of time. They have taken care of proof corrections, prepared the printing lay-outs and other things needed for printing. The Publication Department has also taken the initiative to print such a quantum of self learning materials within a very short period of time. The initiative must be appreciated. I sincerely believe that the Self Instructional Materials as reprinted will be appreciated by all. Any objective suggestion for its improvement from the users will be appreciated useful.

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B. Ed. –ODL PROGRAMME

(Bachelor of Education Programme through Open and Distance Learning Mode)

COMPULSORY COURSE 04 (CC-04)
TECHNOLOGY OF TEACHING

COMPULSORY COURSE 04 (CC-04)

TECHNOLOGY OF TEACHING

BLOCK 01

SYSTEMS APPROACH AND

CONTENT ANALYSIS

B.Ed. CC-04 : TECHNOLOGY OF TEACHING

Block 1

SYSTEMS APPROACH AND CONTENT ANALYSIS

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BLOCK 01 : SYSTEMS APPROACH AND CONTENT ANALYSIS

INTRODUCTION

Recent advancements in communication media and information technology have influenced all branches of knowledge tremendously. We can notice the impact of this advancement in every profession. Invention of Computers and other electronic media have necessitated systematization of knowledge and information. Every task now is considered as a process system consisting of many interrelated components.

According to Webster Dictionary a System is some whole form in structure or operation, concept or function composed of united or integrated parts. A System is a unified whole, function, process or content with interrelated component leading to a goal. In information technology the concept of System is very much used. Considering a set of concepts, functions or processes helps in clearly understanding their dynamics and helps in processing storing and communicating the information. Now the concepts of system used in all branches of knowledge and in all professions.

Analysing a system into its components is known as Systems Analysis. Application of Systems Analysis to understand a system is known as systems Approach. In this approach a problem is taken as a whole and an attempt is made to understand its various components and the interrelationship between these parts. Teaching - learning process is now considered as a system consisting of many interrelated sub-processes. In this Block you will study about the concepts of System and Systems Analysis and how these concepts are applied to understand instruction. If we consider instruction as a system, the question is what its components are. You will study about an Instructional System in the Units of this Block.

There are six Units in this Block. **Unit-I** explains the concept of Technology and meaning of Technology. In **Unit-2** you will learn about the meaning of a System. The meaning and the procedure of Systems Analysis are explained in **Unit-3.** In **Unit-4** you will understand about the nature of an Instructional System.

Analysing the consent to be taught in a logical and sequential manner is very essential in teaching meaningfully and effectively. This process is known as Content Analysis which is explained in the next two Units. **Unit-5** explains how to analyse the content of a Course. In **Unit-6** how to analyse the content of a Unit is explained.

UNIT - 1 ❐ CONCEPT OF TECHNOLOGY AND TECHNOLOGY OF TEACHING

Structure

1.1 Introduction

You know most developed or less developed countries are development minded today because every country has a quest to move forward in their own way. For all these development, 'education' is the basic factor. So, consequently, teachers face challenges to meet the increasing needs of society. Every individual in our society needs to be developed and their potentialities must be best utilized.

Without developing human potential, it is unthinkable to ensure economic growth and welfare of society. The stability of our future economy will largely depend upon how effectively we make use of our natural resources. According to the Education Commission Report, "If the pace of national development is to be accelerated there is need for a well defined, bold and imaginative educational policy and determined vigorous action to vitalize, expand and improve education".

If education is to play such a dominant role, our teachers should be concerned with helping future generations acquire the knowledge, skills and attitudes necessary to build the nation. In order to make the best use of our resources it is necessary that all

teachers should understand the mechanics and dynamics of teaching technology and provide best possible education to their pupils.

1.2 Objectives

After studying this unit, you will be able to:

- Define Technology
- Understand the concept of Teaching
- Explain the meaning and nature of Technology of Teaching
- Bring out the importance of Technology of leaching

1.3 Concept of Technology

You know that technology has yielded many new machines, materials and media which have great potentiality for use in education. A judicious use of these together with new functions and roles of education personnel can bring about more efficient and effective learning. Technology has provided us with a method of storing information in a short space and its quick and efficient retrieval as and when necessary.

Using mass media it is now possible to provide good education to children and adults in remote and inaccessible areas. The services of experts and competent teacher can be made available at any place in the country without their physical presence.

The word 'Technology' is derived from Greek word techno, meaning art or skill and 'login', meaning science or study. A wide definition of Technology means science of art or skill or study of art or skill. This word 'Technology' is differentially interpreted in different contexts. Engineers, doctors, scientists, economists and politicians, whether they are practitioners or academicians, have their own usage and understanding.

Naughton, J. (1986) in his book 'Technology in Schools', has opined that Technology can be defined in two ways, Technology as things and Technology as social process. 'Technology of things' is the application of scientific knowledge to practical tasks by organization that involves in 2 M's - Men and Machines.

Technology of social processes is the application of scientific and other organized knowledge to practical tasks by hierarchically ordered social systems that involved men and machines. That is why technology is not only a 'tool' for development of science but also a 'change' in the social process. The interaction of technology and society is one of ends and means, the society opts for certain ends for which technology provides means, conversely, technology influences the solution of inputs resulting in the out puts society need and requires.

Following are some of the important definitions that justify for the above said statement. Hierra, A (1973) “Technology is the set of instruments and skills which is used to satisfy the needs of community”. Alexander, R. J. (1980) “Technology describes a process - something that people do to solve problems or to achieve aims and products” - such as instruments and tools. Technology is something that is tangible that exists and can be used to satisfy the needs of the community.

‘Check Your Progress’ - 1

1. Define Technology.

2. Technology of social process brings the changes in the
   a) Society b) human being c) animals d) none of them

1.4 Concept of Teaching

So, far you have understood about technology. Now you will understand more about teaching. The concept of teaching is very complex, because of that reason; it may be understood in the following ways.

i. By analyising and studying the definitions of the term Teaching.
ii. By examining the various notions about the nature and characteristics of Teaching.
iii. By analysing how it is related to other related or synonymous terms.

As you are aware, teaching is an art as well as a science. As an art it portrays the imaginative and artistic abilities of the teacher in creating worth-while situation in the class room in which the learners learn and achieve the immediate and ultimate goals of education.

As a science, it points out logical, mechanical, and procedural steps to be followed to attain an effective accomplishment of goals. Teaching is a complex activity carried out in the complex situation of the school by human beings (teachers) directed towards more complex human beings (students) who are constantly undergoing complex changes.

Therefore it becomes clear that teaching is the area where there is no clear cut conceptual understanding. In this context, Barr (1961) said that “teaching means many

different things, that is the teaching act varies from person to person and from situation to situation".

1. The concept of teaching can be understood as follows-
   i. Little Oxford Dictionary "Preach; import knowledge or skill; give instruction or lesson; instill inspire with".
   ii. According to Morrison, H. C. (1934) "Teaching initiates contact between a more mature personality and less mature which is designed to further the education of the latter.
   iii. According to Smith, B. O. (1963) "Teaching is a system of actions involving an agent, a situation, an end-in-view, and two sets of factors in the situation - one set over which the agent has not control (for example, size of classroom and physical characteristics of pupils and another set which the agent can modify with respect to the end-in-view. (for example assignments, the ways of asking questions)".
   iv. Bubacher, J. (1939) "Teaching is arrangement and manipulation of a situation in which there are gaps or abstractions which an individual will seek to over - come and from which he will learn on the course of doing so".

According to Morrison (1934) "Teaching is disciplined social process in which teacher by virtue of his ideas, position, status, knowledge and experiences influences the behavior of the less experienced pupil and helps him to develop according to needs and ideals of society. Here teachers are center of imparting knowledge and children are blind followers and passive listeners. The definition given by Bubacher (1939) states that "teaching is a process in which pupils play the central role". Teacher's task is to create learning situations; here students have the freedom to select the things and learn. This type of teaching may lead pupils to be independent in learning and problem solving".

The definition given by Simth, B. O. is rather more pragmatic in approach. He considers teaching as a tripolar process involving

   i. an agent (the source, human or material that tries to produce learning)
   ii. a goal or target or end in view to be achieved by the students through the process of teaching.
   iii. The intervening variable consisting of learning or learning situation or environment. It involves physical things or human beings and instructional methods.

It is very clear that we do not find any definition which gives complete idea of teaching. Each definition stresses some aspect of teaching but to the purpose of each clarity we must consider the as definition given by Smith, B. O. most comprehensive "Teaching is tripolar process involving an agent of teaching, student and set of activities designed and manipulated primarily to bring change in the behavior of the student."

‘Check Your Progress’ - 2

1. According B. O. Smith teaching is a

a) Bipolar process b) Tripolar process

c) Unipolar process d) Multipolar process

2. In the definition of teaching given by B.O. Smith agent means

a) Student b) teacher c) guide d) counselor

1.5 Technology of Teaching

1.5.1. Meaning

As you already know, teaching is an art and as well as science. The scientific consideration of teaching has led to the evolution of the concept technology of teaching. Davies, Gage, Bruner and Gagne have contributed significantly in this area of teaching technology.

Technology of Teaching has fundamental principles.

i. Teaching is a scientific process and its major components are content, communication and feedback.
ii. There is a close relationship between teaching and learning.
iii. It is possible to modify, improve and develop the teaching and learning activities
iv. The technical behaviour of the learner in terms of learning structure can be established by appropriate teaching environment.
v. Teaching skills can be developed and strengthened by means of feedback devices with or without sophisticated techniques.
vi. Pre-determined learning objectives can be achieved by signing suitable teaching activities.
vii. Use of achievement motivation techniques enhances the output of the teacher and learner.

Technology of Teaching means know how teaching takes place under specific conditions, understanding about mechanism of instruction process in the classroom situations, levels of teaching, principles and conditions - operations etc.

It has well defined components. (i) man power, (ii) methods, (iii) materials, (iv) media.

Methods means while teaching we can make use of few devices, such as models

of teaching programmed learning, team teaching, micro teaching, personalized system of instruction. A material means instructional materials comprising programmed text-book, manuals, guides, written/print-materials. Media means use of audio-visual or both audio-visual media such as radio, tape recorder, films, television teaching aids which will supplement for effective teaching and learning process. Last component that is manpower is very essential because what ever may be the method, material, media, which need stabled manpower to operate and function. So that conducive learning and teaching environment can be created. Thus these four methods constitute the inputs for technology of teaching.

1.5.2 Nature and Scope of Technology of Teaching

a. Davies and Glaser (1962) studied the scope of technology of teaching in four main points.

b. Planning of teaching which includes - content analysis, identification of objectives writing in terms of behavioral terms.

c. Organisation of teaching - teaching strategies for achieving objectives of teaching.

d. Teaching process which includes, use communication strategies for teacher and student.

e. Controlling/managing teaching which focuses on the assessment of learning objectives in terms of student performance, and this gives feedback to the students as well as teachers.

1.5.3 Importance

Technology of teaching is most important in the field of teaching and learning because it is different from traditional teaching.

a. Based on modern scientific principles and discoveries.

b. It enhances the thinking power of students or learner.

c. Uses team-teaching.

d. It develops team spirit, group activities.

e. Uses techniques for individualized instruction.

f. Objectives were clearly defined in behavioral terms.

g. Materials for teaching are well prepared and organized.

h. Time required for master the material may vary across students.

i. Teacher's role is not only teaches but, he has to create conducive environment and manage instruction, diagnose students, and use the available resources effectively and make teaching-learning process effective.

j. Teaching technology includes not only man power, it includes, and new media, new measurement techniques and both should be used in coordinate way.

k. Objectives of instruction are subject to review.

l. The purpose of student evaluation is help the students and give feed back for their strength and weakness and providing information for making decisions such as extra help.

m. Teaching technology is student centered students will enjoy the freedom and environment is student friendly.

1.6 Let Us Sum Up

You have already understood that technology is study or science of art. It is the application of scientific knowledge to the practical tasks by organisation. It involves men, and machines. Technology is also application of scientific knowledge to social process so that there is change in the social pattern.

Teaching is a tripolar process which involves an agent of teaching, student, set of objectives designed and manipulated primarily to bring change in the behaviour of the students. Teaching technology means -know how teaching occurs under specific conditions and understanding about mechanism of instruction process in the class room situation levels of teaching, principles and conditions, operations, etc. It has well defined components - man power, methods, materials and media.

Nature of teaching technology -

- planning of teaching, organization of teaching.
- teaching process, controlling/managing teaching.

Importance of teaching technology -

- Teaching based on modern scientific technology principles and discoveries.
- Uses team teaching, group activities.
- Uses modern techniques for individualized instruction.
- Objectives were clearly defined and teaching material is well organised and prepared for achievement of objectives.
- Teacher's role is not only to teach, he should plan, organise, diagnose students, and use effective resources control and manage teaching.

- Teaching includes man power, media, methods and materials for teaching.
- The teaching is student centered.
- The purpose of evaluation is to help the students to know their strengths and weakness.
- So teaching is complex activity by the application of technology. It is made easier to bring desirable changes among students for the achievement of educational objectives as well as all round development of students by enhancing effectiveness of teacher using different methods media, materials that are easily available in the society.

1.7 Answers to 'Check Your Progress'

'Check Your Progress' -1

1. Technology is the study or science of art or skill technology is the set of instruments and skills which are used to satisfy the needs of community

2. (a)

'Check Your Progress' - 2

1. (b)

2. (b)

1.8 Unit-End Exercises

1. Define technology.
2. What is teaching?
3. What is the meaning of Technology of Teaching?
4. Explain the importance of Technology of Teaching.

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UNIT - 2 ❐ SYSTEM - AN INTRODUCTION

Structure

2.1 Introduction

We all come across many systems, without system, no activity will complete. Take for example of human being. When body has to work effectively and efficiently the body system means every part of it i.e., eyes, nose, respiratory system etc., of human being should work completely. So in every system such as car system, economic system, political system, social system like wise every system in our society, made society completely fulfilled and self satisfied.

2.2 Objectives

After studying this unit, you will be able to:

- Define System
- Describe the concept of System
- Name the types of Systems.

2.3 Concept of a System

Let us try to understand what is meant by a system. For this we will take an example of bicycle. What are the different parts a Bicycle? The Breaks, handles, chain paddle

etc. Yes there are many more parts like wheels, Battery for break, back break etc. one can ask why we need all these parts, because all these ports are essential for the bicycle to work properly hence these are called components of the bicycle.

Suppose the break is not working the bicycle will not work. If there no air in the wheel the bicycle will not b able to function. It affects the functioning of all other components. This shows that components are inter related and inter dependent operating towards the effective functioning of a bicycle.

Most of you have observed so many things in the above example that is bicycle has to perform certain functions. It has number of components, these components are interrelated and inter dependent of effective functioning of bicycle.

Definition of System

"A system has a number of components operating together in an interrelated and interdependent manner towards the attainment of certain functions"

Websters, New International Dictionary defines a system, as "an aggregation or assemblage of objects united by some form of regular interaction or inter dependence; a group of diverse units so combined by nature or art as to form an integrated whole which function. Operate or move in unison and, after in obedience to some form of control; an organic or organized whole; as to view the universe as a system, the solar system, as new telegraph system".

Bertalanffy (1951) defines system as an "arrangement or combination, as of parts or elements in a whole"

Ackoff (1971) defines system is a set of interacted elements.

Bonathy (1968) claims that systems are assemblages of parts that are designed and built by man into an organized whole for the attainment of specific purposes.

Silver (1972) defines a system as "simply the structure or organisation of an orderly whole clearly showing the interrelation of the parts of each other and to the whole itself'.

Fill back (1974) defined a system as an object or an event which is divisible into separate parts or phases, with the entire assemblage of parts or phases functioning more or less in synchrony and the functional relationship existing for the purpose.

Now on the basis of these definitions, you can understand that a

i. System is an entity, conceptual or physical, which consisted of interrelated, inter dependent interacting parts.
ii. In function elements are regarded as separate but they are dependent on the environment in which it exists.

iii. Every system has sub system. For example human body is complex organism including skeletal system, blood circulatory system, nervous system. This is same for sschool, hospital, bank, office etc.

iv. All sub systems are interrelated.

v. System work as a whole for accomplishment of mission of entity.

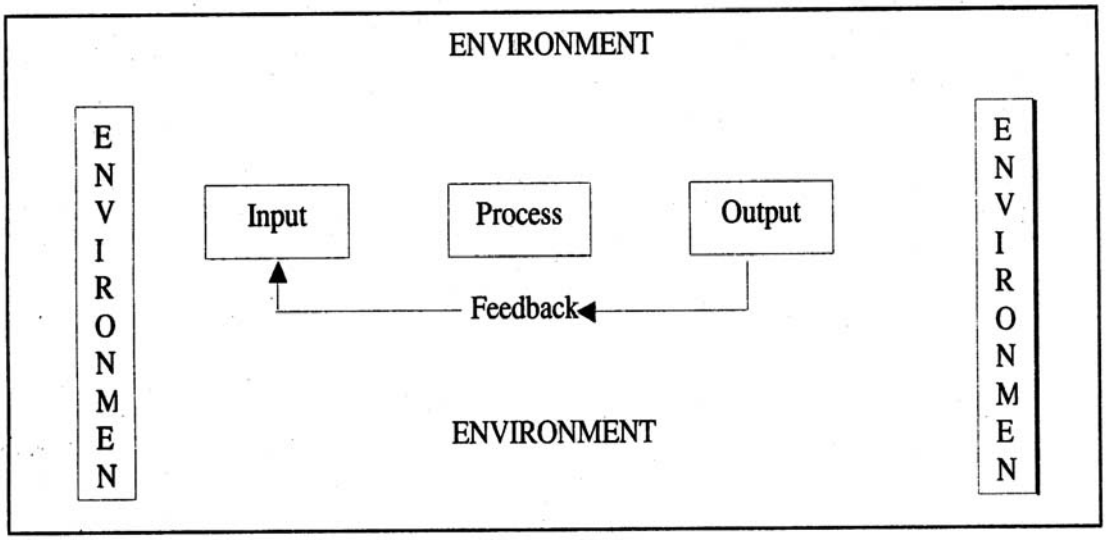
vi. Every system has purpose to achieve.

Therefore, attention must be given to develop systematic bodies of knowledge organized in to complex 'whole'. Within which sub parts or sub-systems may be interrelated. So emphasis must laid on the over all system which will provide better picture of the net work of subsystems and interrelated parts which together form a complex whole.

Parameters of a System

Any system has basic 4 parameters. (i) input, (ii) process, (iii) output and environment context, (iv) feedback.

Input means what is put into the system for example in educational system, men (or students), materials, money were put into the system. Process refers to what is goes on in a system, media, method etc., Output is product of the system, environment is the condition in which system operates, and feedback is one which will make alternation in the product. They are shown in diagram.



Parameters of the System

‘Check Your Progress’ -1

1. Give one definition of System

2. Give example of System

3. Identify the parts of System.

2.4 Types of Systems

Now you have learnt about system and let us learn more about the types of systems.

Closed Systems

Closed systems means one which does not accept new information and which is detached from interfacing with other systems out side or when the boundary is impermeable the system is called closed system.

Open System

Now let us consider the bicycle along with the rider as one system. In this case the system becomes better to react with out side environment such systems are called open system. Most of the systems are always open. They interchange with environment open system which has got following characteristics. They differentiate the closed systems.

(i) Open systems interact with the environment; therefore they have inputs and outputs.

ii. Open systems tend to maintain themselves in a steady state. A steady state means a constant ratio being maintained among the components of the system.

iii. Open systems are self regulating.

iv. In Open systems, identical results can be obtained from different initial conditions.

v. Open system maintain their steady state through dynamic inter play of subsets operating as functional process.

vi. Open system maintains a steady state through feed-back processes. Feed-back refers to that portion of the output of a system which is feedback to the input and after succeeding output.

'Check Your Progress' - 2

State whether true or false.

1. (a) Closed systems are those which will interact with environment.

   (b) Open systems are those which will not interact with environment

2. Open system maintain a steady state through

   i) feed-back ii) support of human being

   iii) Counseling iv) active involvement

2.5 Let Us Sum Up

Now you have learnt that

- A system has a number of components operating together in an interrelated and interdependent manner towards the attainment of certain functions.
- System will not be independent of environment.
- System has sub-system and is interrelated.
- System work as whole to achieve some stipulated objectives. So they have purpose.

There are two types of systems - open system and closed system. Open system is one which will interact with environment and maintain co-ordination among components to result in steady state closed system will not interact with environment the boundary is intermediate.

2.6 Answers to 'Check Your Progress'

'Cheek Your Progress' - 1

1. System has a number of components operating together in an interrelated and interdependent mariner towards the attainment of certain functions.
2. Respiratory system, social system etc.
3. Input, Process, Output feedback.

'Check Your Progress'- 2

1. (a) False (b) False
2. Active involvement.

2.7 Unit-End Exercises

1. Define system and list the characteristics of a system.
2. Give some examples of systems.
3. Explain closed and open systems.
4. Try to identify closed and open system taking day to day examples.

2.8 Referemces

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UNIT - 3 ❐ SYSTEMS APPROACH AND SYSTEMS ANALYSIS

Structure

3.1 Introduction

As you know, all people living in this world face some problem or the other. These problems are now minimized by using some of the techniques available. We need to search for a new approach which looks into the problems concerned to man industry society taking into consideration the problem as a whole called as 'systems approach'. A systems approach enables us to design complex systems by the efficient use of resources in the form of men, money, machine, material, and time.

3.2 Objectives

After studying the unit, you will be able to:

- Explain the meaning of Systems Approach

- Name the types of Systems Approach
- Describe the concept of Systems Analysis
- Identify the types of Systems Analysis
- Analyze the steps involved in Systems Approach
- Comprehend their applicability to Instructional Context

3.3 Systems Approach

3.3.1 Meaning

The term systems approach came into existence in World War II. The idea of scientific approach to decision-making also emerged thereafter. During Second World War II, a team of scientists worked systematically for Great Britain and America to solve the problems faced by first Nazi bombings. Later this approach was introduced to industry and expanded to other non-military government agencies. Today this scientific, systematic approach to problem solving, decision making and planning is widely used in social services and educational professions.

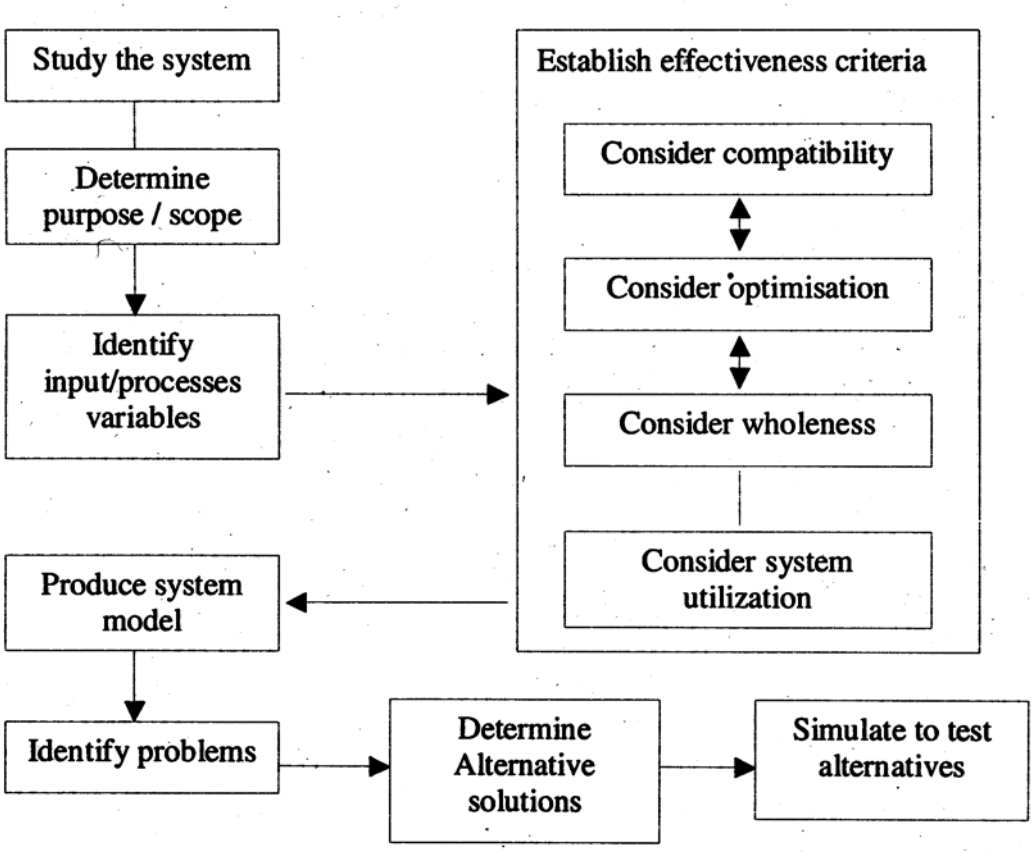
The system approach refers to a scientific method of problem-solving, decision-making and planning.

In this unit you will understand some of the definitions. Churchman, (1968) defined systems approach as a procedure for characterizing the nature of the system, so that decision making might be logical and Coherent fashion, and performance of a system might be described.

Bertalanffy, (1968) elaborated the concept to say that “systems approach involved a consideration of alternative solutions and of choosing those promising optimization at maximum efficiency and minimum cost in a complex network of interactions.

A system approach is an operational concept which referees to a scientific rational method of optimizing the outcome of systems through the implementation of a set of sequentially related activities for studying existing systems deriving solutions to problems, and developing new or modified entities. In order to make modified entities it makes use of available resources.

Now you will understand the mode of systems approach.



'Check Your Progress' - 1

1. Define system approach

_____

_____

_____

_____

3.3.2 Types

According to the application of systems approach you will know many number of types of systems approach.

i. Systems approach to organization
ii. Systems approach to management.
iii. Systems approach to curriculum development and instruction.

iv. Systems approach to teaching and learning process.

v. Systems approach to training programmes.

vi. Systems approach to non-formal education.

We now use this approach to achieve effective and efficient working while intending to work towards objectives.

3.4 Systems Analysis

Now you have understood the meaning and types of systems approach. Systems approach contains three major components they are:

i. Systems analysis

ii. Design of solution (synthesis)

iii. Implementation and evaluation

3.4.1 Systems Analysis - Concept

The needs of the systems, the resources available, and constraints present are analyzed in details on the basis of analysis the objectives were defined i.e., problem is stated in terms of objectives. This stage involved two steps (i) stating objectives, (ii) and determination of ends that are to be achieved system analysis answers two question (i) what is it? and what is required? so, here analyst forms the objectives, keeping in mind the constraints of environment, discusses interactions in the system and between the system and its environment describes, structures, functions, roles, identify constraints and out lines alternative courses of action.

3.4.2 Types of System Analysis

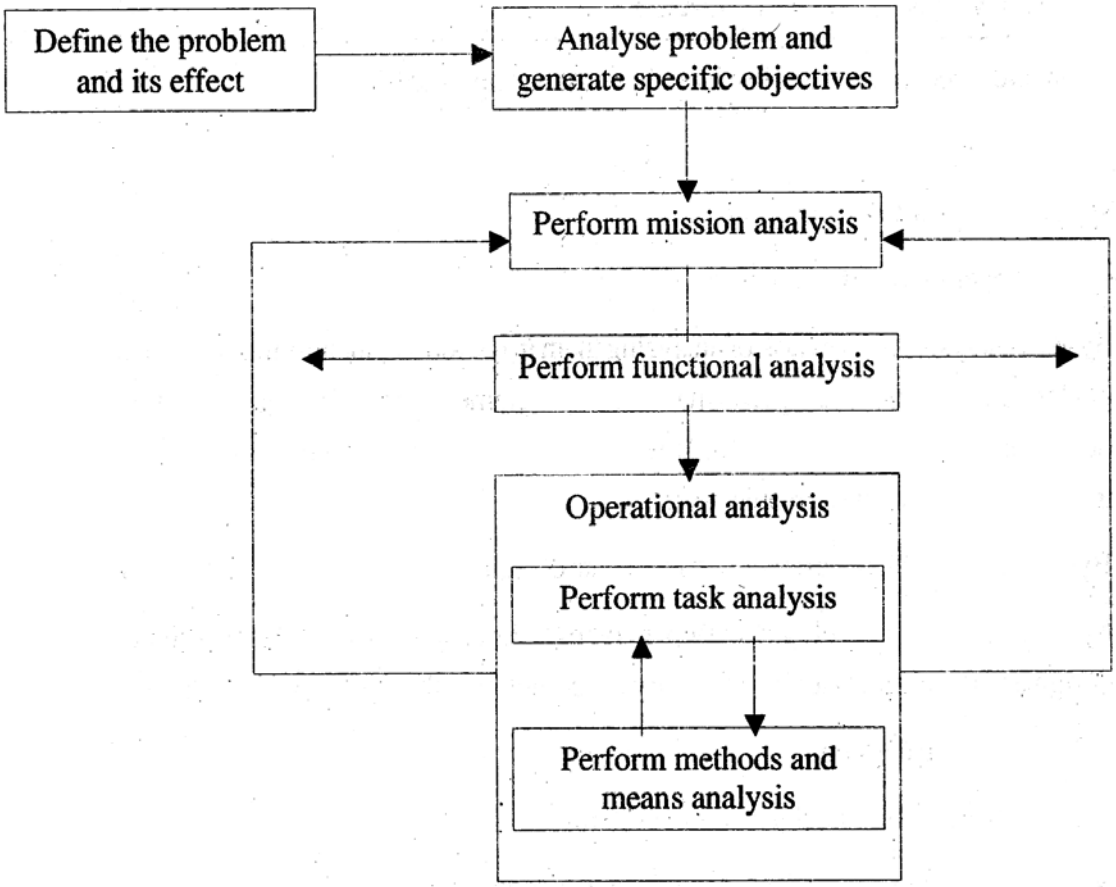
There are three types system analysis. They are:

i. Mission Analysis

ii. Functional Analysis

iii. Operational Analysis

Which is represented through the figure.



Systems Analysis Flow-chart

‘Check Your Progress’ - 2

1. What is System Analysis?

2. What are the types of System Analysis?

3.5 Steps in Systems Approach

There are three major steps involved in a systems approach

i. systems analysis
ii. system design and development
iii. systems operation and evaluation

- System analysis involves the task of analyzing them in the form of identifying its elements, organisation of elements, functions and performance of these elements, need for adjustment for achievement of objectives. These steps also involved the identification of environmental constituents which interfere in the attainment of system objectives.

By analyzing the problems the designer will formulate objectives specific to the particular system to achieve.

- System design and development step involves tasks of synthesizing. Here designer will attempt to design and develop strategies necessary for completing the first step i.e., systems analysis.

The main activities in the step

i. Understanding different objectives of systems.
ii. Solution of appropriate devices methods strategies and approaches for the achievement of objectives.
iii. On the basis of these elements he prepares integrated action plan or designs the systems in terms of input, process (procedures and transactions within the system including decision and control mechanisms i.e., feedback) and output.
iv. In order to improve the internal validity of the system, a number of feedbacks are used.

‘Check Your Progress’ - 3

1. Name three steps of Systems Approach.

3.6 Applicability to Instructional Context

Systems approach is rational problem solving method of analyzing the educational process and making it more effective. It will take whole educational system components namely pupils teachers, curriculum context, instructional materials, instructional strategy, physical environment and evaluation.

The system approach to instruction is an integrated, programmed complex on instructional media hardware and personnel whose components are structured as a single unit with schedule of time and sequential phasing. In the instructional context teacher on instructor and resources made use of by him are included as a component of system. There is provision for continuous evaluation and self correction for realizing the stated objectives.

3.7 Let Us Sum Up

As you know systems approach is a scientific method of problem solving decision making and planning. In accordance with the applicability systems approach has member of types, systems approach to economic, systems approach to industry, education, instruction, management etc.

Systems approach involves three components:

i. Systems Analysis

ii. design of solution of problem

iii. implication and evaluation

This step is concerned with system operation and its evaluation with respect to the stipulated objectives for providing necessary feedback to bring desirable improvement and modification of the system meet the requirements of the norms or objectives. If any kind of discrepancies arise between these two designers, you can use some ways to improve the system by using certain steps given below.

i. By manipulation of elements, or making certain changes in inputs of the system.

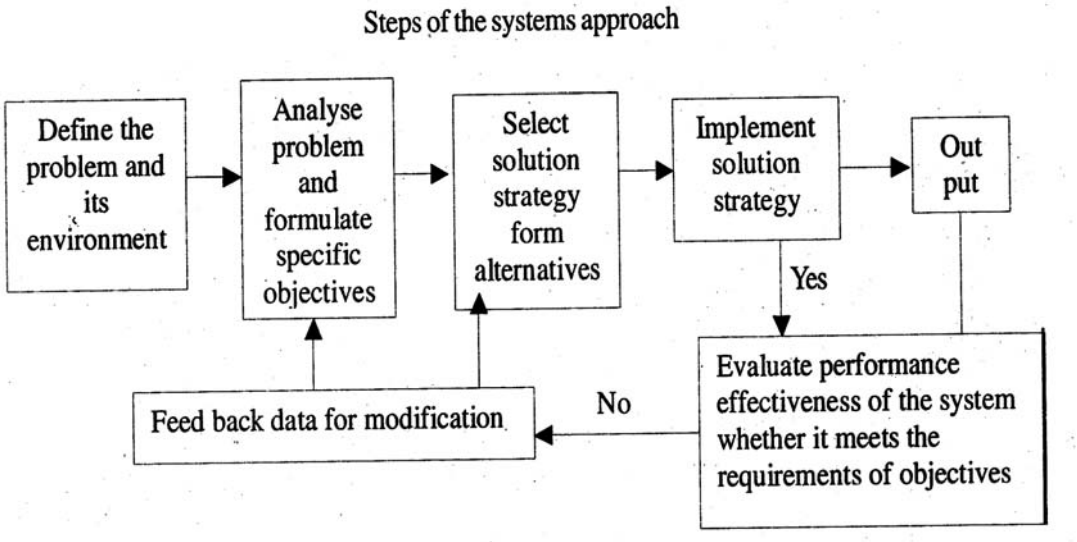
ii. And making certain modification in the functions like strategies, media method etc.

iii. By making modifications in the process pail of the system, i.e., changing interaction styles in particular elements.

iv. And also finding the constraints of the system in the environment.

These are the steps which may be restructured or reorganized for better functioning

of the system. This process of operation evaluation feedback modification, restructuring re-operation is continued till the aim to get best economic results in terms of stipulated objectives with greater precision and accuracy is not achieved.



Systems analysis means analyzing the systems in terms of its resources, needs, constraints and on the basis of this formulate objections. It involves three types of analysis.

i. Analysis of mission - environment

ii. Analysis of functions

iii. Operational analysis which involve task analysis, methods and means analysis

Systems approach involve three steps

i. Systems analysis

ii. System design and development

iii.. System operation of evaluation

3.8 Answers to Check Your Progress

'Check Your Progress' - 1

1. Systematic and scientific method of problem solving decision making and planning

'Check Your Progress' - 2

1. Analysing needs resources constraints of the system in order to generate objectives.
2. Three types of analysis are:
   i. Mission Analysis
   ii. Functional Analysis
   iii. Operational Analysis

'Check Your Progress' - 3

1. Three steps of System Approaches are:
   i. Systems Analysis
   ii. System Design and Development
   iii. Systems Operation and Evaluation

3.9 Unit-End Exercises

1. What is systems approach?
2. Explain the types of systems approach.
3. What is systems analysis? Describe.
4. Draw a flow chart showing systems analysis
5. What are the steps involved in systems approach?
6. How Systems approach is applied to instruction? Explain.

3.9 References

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UNIT - 4 ❐ INSTRUCTIONAL SYSTEM

Structure

4.1 Introduction

The word 'instruction' is explained in number of ways. So call it as guidelines given in a home regarding its working and some others take it as the directions given by an army commander to his subordinates. With reference the education instruction means all the experiences that organized in such a way that which brings expected learning among the students. Sometimes, we call 'teaching as instruction' but the teaching is some time used as narrow term, teaching may bring learning or may not, but instruction which always changes the behaviour of the students according to stipulated words, so educationists thinks that 'instruction' is the better word for bringing learning.

The present unit explains the various aspects of instruction and development of instructional system.

4.2 Objectives

After the study of this unit, you will be able to:

- State the meaning of Instruction, instructional System;
- Interpret the concept of Instruction and Instructional System;
- Interpret the instructional System Units its components
- Enumerate the various stages involved in the System Approach to Instruction

4. 3 Concept of Instruction and Instructional System

Sometimes instruction is also numbered among the family of activities related to teaching. But it is not the case because there are many instances of teaching which do not involve instruction. The concept of instruction involve a kind of conversation, the object which is to give reason, weigh evidence justify, explain conclude. So on and so forth. It is an activity, of teaching allied more closely to the acquisition of knowledge and belief. In brief we say instruction is closely related to just for understanding. The pursuit of truth is teaching because giving instruction is central to it. Instruction is essentially related to the search for truth.

So, instruction involves provision of controlled environment with which the individuals interact leading towards the attainment of certain pre-specified learning outcomes or instructional objectives.

Instructional system - the teacher or instructor and the resources used by him are included as components of a system there is provision for continuous evaluation and self correction for realizing stated objectives.

In instructional system teacher has to plan using available resources and classroom activities. According to individual differences in their learning capacities and plan accordingly. Robb (1974), analysing instructional systems said that each instructional system should be designed to include ten functions in proper balance. He decides these ten into three phases. They are planning, execution, and evaluation.

'Check Your Progress' - 1

1. What is Instruction ?

2. Instruction System involves ...

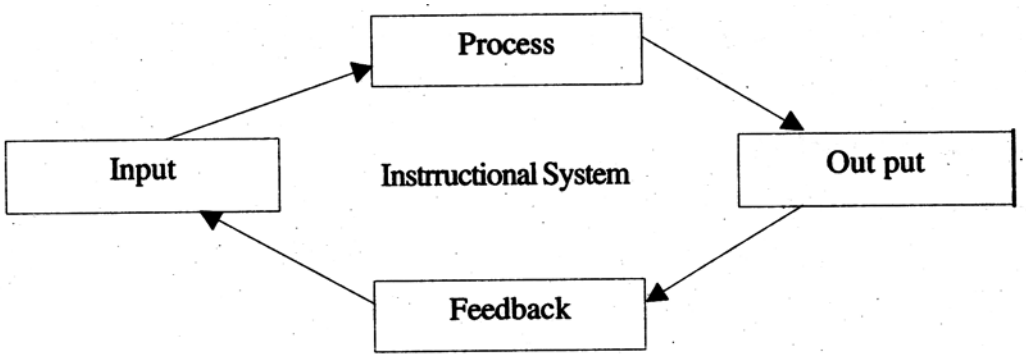
   i. Planning ii. Planning execution

   iii. Evaluation iv. Planning, execution, evaluation

4.4 Components of Instructional System

Instructional system approach involves four main components, input, output, process and feedback.

- Inputs means, what is put into the system. If we consider, the instructional system, here teacher or instructor is asked to plan and organize the use of all learning resources including audio-visual aids to achieve desirable objectives. The planned input and process involve structural learning materials and methods suitably geared to the needs of the particular group of students.
- Output means what will be product that comes from the system - these are also called as explicitly stated standards of output performance including sequence behaviour objectives post test.
- Process means what goes on in a system. It means whatever input we put in system it will be processed by using some strategies media methods so expected output will come out.
- Feedback is used to revise, improve, evaluate, the instructional system, providing feedback to teachers and students by giving feedback some kind of control can be established for the system to work effectively and efficiently to achieve expected goals or objectives. The components of the systems shown in figure.



Flow chart on Instructional System

'Check Your Progress' - 2

1. Components of instructional system
   i) Input, output ii) Input, process
   iii) Process, output iv) Input, process, output, feedback
2. Output means
   i) Process ii) Product iii) Input iv) Feedback

4.5 Steps involved in Instructional System

The components of instructional system are "essential for the systems to achieve its objectives. There are steps which involved in the efficient and effectiveness of instructional system they are:

1. ***Formulation of objectives****:* In this step specify exactly what is to be taught and kinds of learning experiences students will be expected to undergone, and also identify what are expected outcomes.

2. ***Pre assessment****:* By using certain reference test as pre-test, define the entry level of students before entering to the learning environment. This is to know what the students have already learnt and what is to be taught.

3. Specify appropriate approaches and methods with respect to the context, nature of learner traits of the population instructor has to select strategies. So that maximizes optimum student learning and achievement objectives.

4. ***Select materials and media****:* As per the demands of the strategies and methods select material and media and develop learning experiences for students and provide them academic environment.

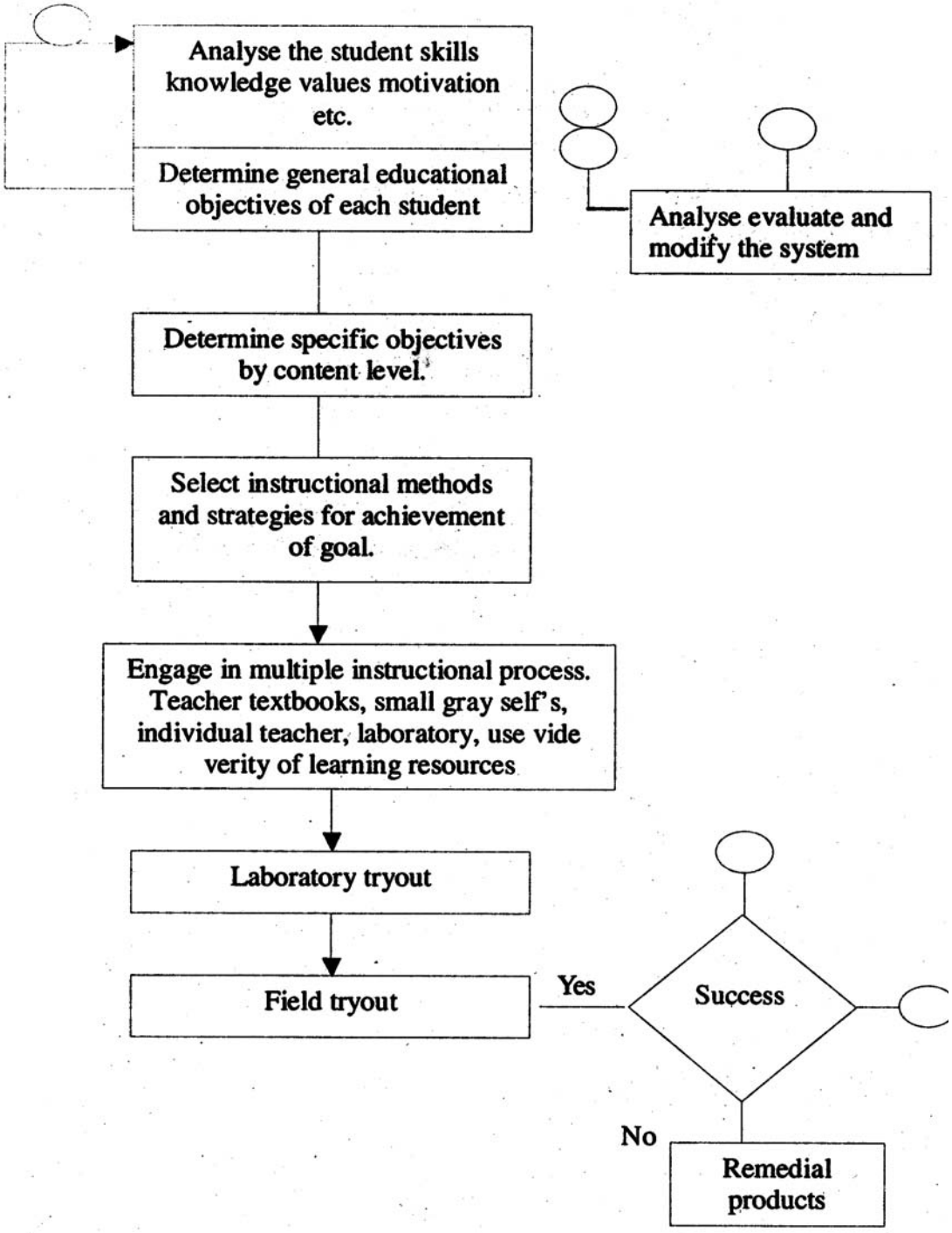
5. ***Define / design personnel rules****:* Identify students define the various roles of teachers and professionals involved in the instructional system and help the students achieve the pre-determined objectives.

6. ***Laboratory tryout****:* Now we have decided the components of the system and necessary materials. But how do we know that it would work? So, after the development of instructional system is 'effective' in terms of achievement of objectives - effectiveness of developed instructional system should be determined by testing phase in the development process of an instructional strategy. Thus the initial testing of system is called laboratory testing or laboratory tryout. Here, the sample was small, but it is representation of the population for which instructional system formed.

7. ***Field tryout:*** After small sample tryout or laboratory tryout the system is tried on a large sample we shift it to real field this called as field tryout. If any mistakes found they were rectified on the basis of this system is revised.

8. ***Revision and outcome:*** Revision takes us to the final form of the instructional system. However, after every implementation of the system, as per the information obtained from its functioning the system is modified this process is continuous process.

These steps were represented through flow chart.



'Check Your Progress' - 3

1. What is laboratory tryout?

2. Inputs of System selected on the basis of …….

   i. students ii. teachers iii. Objectives iv. output

4.6 Let Us Sum Up

Instruction is a process which brings learning. Instructional system is application systems approach components, input process, output to the instruction to make effective and efficient of objectives.

Steps in the instructional system

- formulation of objectives
- pre-assessment
- specify appropriate approaches and methods
- select material and media
- define design - personnel rules
- laboratory tryout
- field tryout
- revision and outcome

4.7 Answers to Check Your Progress

'Check Your Progress' - 1

1. Instruction is a process which brings learning
2. Instructional system involve - planning, execution, evaluation.

'Check Your Progress' - 2

1. (iv) Input, process, output, feedback
2. (ii) Product

'Check Your Progress' - 3

1. Laboratory tryout means the system is tried on small sample which is representative of the population

2. (iii) objectives

4.8 References

- Hyman, R. T. *Contemporary Thought of Teaching.* New Jersey, Prentice-Hall, Inc., Englewood Cliffs.
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UNIT - 5 ❐ ANALYSIS OF COURSE CONTEXT

Structure

5.1 Introduction

The steps in planning course includes more than one topic and covers wider period involving weeks or months. Essentially, courses are to be designed to enable the students to achieve components. The competencies must be related to vocation or specific intellectual skill, attitudinal, or value oriented goals. One should 'analyse' such competencies or goals rather than just depend on textbooks course involve many units. They should be 'analysed' according to the stipulated objectives. Then from particular course the students will get the necessary knowledge, skills and develop favourable attitude towards them.

5.2 Objectives

After studying this Unit you will be able to:

- to understand the course content into units.
- give reasons for analysing course content into units.
- analyse the courses into units.
- analyse the unit into lessons for one period

5.3 Analysis of the Course Content into Units

The course content analysis depends upon

i. the instructional objectives of the particular course.
ii. the competences and / or goals and needs of the students
iii. their entry behaviour and their abilities and interests
iv instructional material available for the particular course
v. the course is analysed by team of teachers
vi. the course contents should be sequencing and time allocation to different topics
vii. the weightages given to the different units they should decided in terms of their contribution to the over all objectives and not an availability of the classroom etc.,

Take for example the course is divided into two to four blocks these blocks again divided into units.

Steps in the analysis of the course content are:

- Title
- Target group
- Duration of the course
- Formation of objectives
- Specification of the course content - based on need analysis
- Classification the course content into blocks'
- Classification the blocks into number of units
- Reference books

Course content analysis example -

Title : A course in mathematics

Target group: B.Ed. students

Duration : 1 year

Objectives : After learning this course students will be able to

i. understand the nature and scope of mathematics
ii. identify principles of curriculum construction in mathematics and new trends in curriculum construction
iii. from instructional objectives of teaching mathematics with its behavioural changes
iv know methods of teaching mathematics

v. teacher-students will be able to use resources for teaching mathematics

vi. teacher-students will understand the evaluation process in teaching mathematics

Course content is analysed according to the need analysis of the students:

i. Intellectual development of the students

ii. Emotional development of the students

iii. Social development of the students

iv. Physical development of the students

v. Aesthetic and Spiritual development of the students

vi. Spiritual development of the students

The course content is analysed into 6 blocks:

Block 1: Introduction to teaching of mathematics

Block 2: Curriculum in mathematics

Block 3: Instructional objectives in mathematics

Block 4: Methods of teaching mathematics

Block 5: Resources to teach mathematics

Block 6: Evaluation in mathematics

The blocks are again divided into number of units.

Block 1: Curriculum in mathematics

Unit - 1: Recent development in mathematics curriculum in India - objectives, content methodology.

Unit - 2: Revision in SMP - A review

Unit - 3: Revisions in Nuffield curriculum - A review

Unit - 4: Critical analysis of Karnataka secondary school mathematics curriculum-content selection, securing, approach.

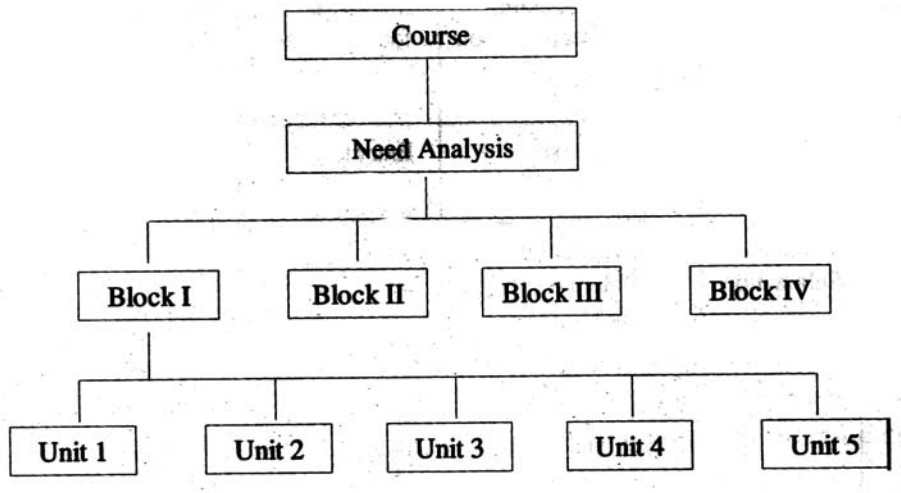
Unit - 5: Content analysis of mathematics curriculum of secondary school of Karnataka- 1.

- Commercial arithmetic
- Commercial mathematics
- Statistics

- Computer
- Algebra
- Geometry

Unit - 6: Content analysis mathematics curriculum of secondary schools of Karnataka-

- Conventional arithmetic
- Commercial mathematics
- Statistics
- Computers
- Algebra
- Geometry



'Check Your Progress' - 1

1. Course content is divided in to:
   i. Blocks ii. Units iii. Lessons iv. Paragraphs
2. Blocks were divided in to
   i. lessons ii. Paragraphs iii. Units iv. Sentences

5.4 Analysing the Course Content Units into Lessons of One Class Period each

We will now try to include in the lesson planning context - planning session or lesson includes 45 minutes duration usually in such a limited period you will be able

cover a topic or lesson. Now, see the steps involved in particular lesson, 'fraction'.

Topic - Fraction

Target group - VIII standard students

Entry behaviour - Students have studied the numbers and representation of numbers. Duration - 45 minutes

I	II	III	IV	V
Instructional	Teaching points	Methods during and offer the lesson	Materials focusing prior to during and offer lesson	Evaluation test (formative)
Statement see in Box 1	Function meaning - Types. - Addition Subtraction	- Entry test - Inductive deductive approach - Problems salving method	Entry test transferences Solved examples	Solve problem see in Box 2

Box – 1
Instructional objectives on the topic – Fraction

i) students will be able to
   a) understand the meaning of fraction
   b) identify denominator, numerator
   c) classify the types of fractions
   d) understand addition of fractions
   e) understand subtraction of fractions

Box – 2

(i) Entry behaviour is measured the knowledge of students regarding numbers/facts about fraction

(ii) This is oral test. revising the necessary information

Box – 3
Post test

i. Students were given problems and able them identify types of fractions.

ii. Students were given addition of fraction, subtraction of fraction.

A teacher of Mathematics or any other subject must plan. Similarly the objectives of teaching different subjects is completely varies also methods of teaching. Lesson plan is a blue print, it gives systematic steps for the teacher to form his lesson. It can be tried out on students and modifications may be made in materials and methodology

'Check Your Progress' - 2

1. The components involved in plan are
   i. 5 ii. 4 iii. 3 iv. 2 v. 6
2. Minimum time for achieving objectives of lesson in
   i. 45 minutes ii. 60 minutes iii. 120 minutes iv. 90 minutes

5.5 Let Us Sum Up

You are aware that the course content analysis is the main task of the beginning of any new course. Here course is analysed according to the need analysis of the students and that is divided in to blocks and blocks are again divided into units.

Unit is a larger concept than the lesson, which includes number of lessons. These lessons are planned for 45 minutes duration which include 5 components - (i) statement of objectives, (ii) teaching points, (iii) methods, (iv) materials for using prior during and after the lesson, (v) evaluation test which is of formative type.

5.6 Answers to 'Check Your Progress'

'Check Your Progress's - 1

1. Course content is divided into (i) blocks
2. Blocks were divided into (iii) units

'Check Your Progress' - 2

1. The components involved in the lesson plan are (v) 5. (instructional objectives, teaching points, methods, materials, evaluation).
2. Minimum time for achievement of objectives of lesson is (i) 45 minutes

5.7 Unit-End Exercises

1. What are steps of analysing course content?

2. What are components of lesson planning?
3. Prepare one lesson plan for period of 45 minutes.

5.8 References

1. Dale, E. (1954) *Audio-visual Methods in Teaching*. New York: Holt Rinehart and Winston.
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UNIT - 6 ❐ ANALYSIS OF UNIT CONTENT

Structure

6.1 Introduction

The curriculum of the formal education has specific function to do that is arranging content. So that desired goals and objectives are most effectively achieved. The main task curriculum development is to determine what to teach, from the growing knowledge in the subject area and then organise it into logical sequences to serve all learners. Poor organisation and selection of objectives lead to disorganized educational effort. So it is very important for an educator to give attention to the content analysis with reference to objectives and nature of subject matter and sequential development of course.

6.2 Objectives

After learning this unit, you will be able to:

- Explain the meaning and importance of Content Analysis
- Organise the content into facts, concepts and generalizations.
- Sequence elements according to maxims of Teaching

6.3 Content Analysis - Meaning and Importance

As we see in the introduction, content is necessary for the curriculum planners, because without content the teaching-learning process will not get the idea of how to

teach and what to teach. So now we shall study the meaning of the content.

Saylor and Alexander define: "Content is those facts, observations, data, perceptions, discernments, sensibilities, designs and solutions drawn from what the minds of men have comprehended from experience and those constructs of the mind that reorganize and rearrange these products of experiences into lore, ideas concepts, generalizations, principles, plans and solutions".

Hyman (1973) defined content as knowledge (i.e., facts explanations, principles, definitions, skills and process (i.e., reading, writing, calculating, dancing, critical thinking, decision making, communicating) and values (i.e., the beliefs, about matters concerned with good and bad, right and wrong, beautiful and ugly)".

Curriculum content involves three elements identified above. Thus it is necessary include these elements - knowledge, process and value. But we restrict the meaning of 'content' as substantive information, ideas, concepts, generalizations principles and the like.

The object of content analysis is to measure the content by classifying it in terms of defined criteria which could relate to many qualities, subject matter, pedagogy, suggested, underlying value system, and so on.

Content analysis means classifying the content according to the objectives, structure and nature of the subject. So that sequential arrangement or organized development of subject matter is possible, this will lead to learning among the students.

The importance of content analysis is that

- The teacher can form definite objectives to be achieved in the course.
- The teacher can organise the content systematically logically and psychologically.
- The teacher can put all the bits of information in meaningful manner.
- If teacher gives organised information the students will get better understanding of the content.
- Content analysis will give the idea to relate different facts, generalizations and concepts.
- Sequencing of the content will lead the students to attend and take interest in particular subject.
- Teaching will become more interesting and arousing motivation in students to learn.
- Students will engage in the activities of the class.

'Check Your Progress' - 1

1. Content analysis means.....

   i. Classification ii. Discrimination iii. Organization iv. Accumulation

2. Content analysis leads the teacher

   i. to teach monotonously ii. to give more organized information

   iii. not to take interest in teaching iv. give information in illogical order

6.4 Analysing the Content (Viz. into Facts, Concepts, Generalization etc.,)

In a well structured and sequenced course, the learner is in a better position to understand and comprehend the lesson and determines the related parts of the subject. So, teacher has to organise the content thoroughly for this one should understand the analysis of the content. It involves three major components, facts, concepts, and generalizations.

Facts are the components of content analysis. It is not easy to define in concrete terms. Paul D. Eggen, defines fact as the types of content which singular occurrence, which have occurred in the past or exist in present and they are not predictions acquired solely through process of direct observation of the event. For example, experiments in laboratory, getting information from the reliable sources or primary sources from dictionaries, encyclopedias, etc., so these can be analysed while, analysing the content ex. Newton's laws of motion, equations of motion.

Concepts

Concepts are the norms given to the categories formed as a result of classifying factual data. Concepts are the norms given in order to make sense of various stimuli in the world. Concepts involve certain attributes that are giving to make concept meaningful. In order to analyse the concept learns pay attention to likeliness, ignore differences, and place similar objects in the some categories. So, identification of attributes is main aim in identifying the concepts.

Generalizations are students, that generally link two or more concepts are known as generalizations these generalizations are predictive in character and involve more than one element. They are dependent upon the proofs by providing dimension to simple

facts because of that they need additional data to prove the accuracy. For example, if we make two situations, one is that the teacher teaches more interestingly, another situation teacher will not teach interestingly. These two generalizations need more data to weigh their accuracy these two situations are predictions, and they need proof because teaching involved many elements.

So, facts, concepts and generalizations make up larger part of content. So teacher has to sequence and organise in effective manner. Then teaching becomes more systematic and planned.

'Check Your Progress' - 2

I . The major components of the content analysis.

i. Concepts ii. Generalizations

iii. Facts iv. Facts concept generalizations

2. Fact is based on

i. indirect observation ii. direct observation

iii. Thinking iv. Generalizing things

6.5 Sequencing the Analysed Elements - Maxims of Teaching

You may note that content analysis involves three major components, that are facts, concept and generalizations. They take larger part of the content of the instruction. Once the teacher analysed these he/she must ask some questions while sequencing and selecting and organising the content of instruction.

a) What are the facts which are most relevant and accurate?

b) Which concepts are familiar to students and which need to be explained?

c) How do students make generalizations or predict the things into generalizations?

It is not analysis of the content is that important but, it is also most important how to organise and present. According, to Ausubel's theory, learning begins with simplest idea and develops greater specificity. So sequencing is putting the elements facts concepts generalization analysed arranging contents or arranging the content in orderly manner, orderly means so subjects arranged chronologically or thematically when planning instruction or make it mere effective sequencing must be clone according to the maxims of teaching. Maxims - of teaching are those which will make the instruction by arranging

the content according to them. Maxims of arranging the facts concepts and generalization from (i) simple to complex and (ii) known facts into unknown facts, (iii) examples to generalization, (iv) concrete to abstract, (v) definite to indefinite etc., with this inter disciplinary approach must be used which means the facts and concepts, generalizations were integrated into different field of studies. HildaTaba (1962) said that "it is recognised that learning is more effective when the facts and principles from one filed can re related to another, especially when applying this knowledge. While using foster disciplinary approach teacher must use correlation approach.

'Check Your Progress'- 3

1. Sequencing of content means.....
   i. facts generalization concepts in orderly manner ii. not arranging orderly
   iii. keeping facts one by one iv. writing content step wise

2. Give two examples of maxims of sequencing content

6.6 Let Us Sum Up

The content of curriculum of the formal educations has specific functions. To achieve the objectives of the education, the teacher has to organise the content logically and systematically. The teacher's most effective work is to organise the content. If he wants to organize, he must make content analysis which gives him idea to organise his content and make his teaching effective and efficient. The object of content analysis means classifying the content by classifying with respect to objectives structure and nature of the discipline.

Content analysis involves three major components namely are facts, concepts and generalizations. A teacher has to analyse the content in to facts, concepts generalizations. After analysing the content, it is teachers' responsibility to proper sequencing of the content which is most important task of teacher. Sequencing of content has done using maxims of teaching known to unknown, simple to complex.

All these steps give systematic perspective about the arranging organising subject (content) and make his teaching effective.

6.7 Answers to 'Check Your Progress'

'Check Your Progress'- 1

1. (i) classification of elements
2. (ii) to give more organised information

'Check Your Progress' - 2

1. facts, concepts, generalizations
2. (ii) direct observation

'Check Your Progress' - 3

1. (i) Arranging facts, concepts generalizations in orderly manner
2. "simple to complex, known to unknown"

6.8 Unit-End Exercises

1. Define content analysis. Give two examples of content analysis.
2. What are the major components of content analysis?
3. What is the meaning of concepts generalization? Give examples.
4. How do you sequence the content using maxims of teaching?
5. Take a topic on your choice and analyse content into facts, concepts, generalizations.

6.7 References

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