

## Chapter III

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# System Approach To Multimedia Instruction

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### SYSTEM APPROACH TO MULTIMEDIA INSTRUCTION

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#### 3.1 INTRODUCTION:

In the previous chapter the investigator has taken review of the theoretical aspects of Educational Technology and review of related studies. The present research problem is related to the development of multimedia instructional system on Educational Technology. Therefore, this chapter is devoted to the theoretical background of a system approach and meaning of multimedia instructional system with its developing procedure. This chapter is a useful background necessary for the present study.

#### 3.2 SYSTEM APPROACH:

The system approach is relatively a new approach helpful in managing, controlling and improving the process and products of education.

Every one of us might have heard the story of blind man who had been assigned the task of defining an elephant. As each of them had been located at a different part of elephant, each defined the elephant differently; still, each claimed to have a complete understanding of the total elephant. The main point of interest in this story for a system analyst does lay in the magnificent point of the storyteller the ability to see the whole elephant and consequently observe the ridiculous behavior of the blind men. The system size is relative to the observer and his resources for measuring the available status of the system. The difference lies in the strategies of climbing to the vantage point from which one can view the whole.

##### 3.2.1 MEANING OF A SYSTEM:

Ackoff defines a system as,

“A system is the set of interrelated and interdependent elements.”

The Webster’s dictionary defines a system as,

“A regularly interacting or independent group of items forming a unified whole.”

“A system is an orderly arrangement of elements, which works in a particular way; it can be a living organism or a cosmic phenomenon” – Robb.

Bertalanffy also tried to define system in mathematical form as:

$$dq_1 / dt = f_1 (q_1, q_2, \dots, q_n)$$

$$dq_2 / dt = f_2 (q_1, q_2, \dots, q_n)$$

$$dq_n / dt = f_n (q_1, q_2, \dots, q_n)$$

Where  $q_n$  is a function of all  $q$ -s from  $q_1$  to  $q_n$

On the basis of an analysis of all such definitions given by different individuals, a system may be defined as any entity conceptual or physical, which consists of interrelated, interacting or interdependent parts, in functional elements, it may be regarded separately, and each from the other, but it is not independent of the environment in which it exists.

In short a system may be defined as a dynamic, complex, integrated whole consisting of self-regulating pattern of interrelated and achieve the predetermined specific objectives.

### **3.2.2 SYSTEM APPROACH CONCEPT:**

Bertalanffy defined that –

“The systems approach involves a consideration of alternative solutions and of choosing those promising optimizations at maximum efficiency and minimal cost in a complex network of interactions.”

Dearden says that –

“The systems approach is nothing more or less than what a competent, smart, adequate business executive adopts in the ordinary conduct of his business.”

From the above definitions, clearly systems approach is a technique. Systems approach indicates systematic thinking and step by step problem solving. The purpose of the system approach is to get the best overcome by using all available resources. The system approach is concerned with identifying goals and determining and evaluating the means for accomplishing these goals. Identifying and organizing the goals and objectives requires a clean specification of the objectives of each element in the total system in relation to terminal goals or mission of the system as a whole. It also requires prorating the goals and the objectives, which implement each goal.

The systems approach involves monitoring progress. Once the system is initiated and is being maintained, with feedback to direct adjustments in the operating system. Evaluation is an integral part of the system approach. This requires checking the amount of quality of accomplishments, checking contributions of the elements in the process towards goal achievement and using the results of the evaluation to make improvements and to design new system.

In brief, systems approach refers to a scientific method of problem solving, decision making and planning.

### **3.2.3 STAGES IN SYSTEM APPROACH:**

There are three stages in system approach:

- 1) System Analysis.
- 2) System Design and Development.
- 3) System Evaluation.

### **3.2.4 SYSTEM APPROACH TO EDUCATION:**

Education is man made synthetic organism with a specific purpose. Its purpose is, generally, integrated with and influenced by the purpose of its supra-system, the society. It is society from which education receives its input, resources, constraints and evaluation of adequacy. Education also

has several sub-systems such as educational guidance, administration and so on. Each of these systems has its own objectives and each serves overall purpose, as the subsystems functions, they influence the supra system. Education is a system in specific sense of terms and therefore may benefit from the application of systems approach.

Nature of education and the unique potential that the system approach can bring to the treatment of complex problems and the design of educational programs, there is no wonder if many educators turn to the systems approach in future.

System approach can be used in Education as:

**1) Effective planning of school programs:**

Many schools do not have systematic planning of short or long range goals of education. With the help of system approach one can translate broad educational objectives into actual assignments in terms of long range goals and specific short range objectives.

**2) Increased control and co-ordination:**

In system approach, effective school management techniques are used to control the various components of the instructional process. Co-ordination among the different parts is exercised as a result of the achievements of specific objectives at level of operation.

**3) Maximum utilization of school personnel:**

There is duplication of efforts in our traditional method of teaching because objectives are not especially identified by the school personnel. There is no proper utilization of human energy where objectives have not been properly delineated. Systems approach utilizes more effectively the school personnel by controlling, coordinating and evaluating continuously the activities of all the personnel.

**4) More effective methods for appraising performance:**

Traditionally, the method of evaluation has been more or less subjective. In systems approach, objectives are clearly defined. All educators participate in deciding objectives and action plan for their achievement.

**5) Better training and development plan:**

System approach is an invaluable means for improving training and developing programs.

**6) Control of quality:**

The main use of systems approach in education is to improve the quality of education.

**7) System approach can also be used in Education for following purposes:**

- For study of theories of learning and the utilization of their knowledge in the development of instruction.
- To design remedial instruction, plan curriculum, effective improvement in his own professional competence.
- For designing communication channels to develop school community relationship and relationship with superior authorities.
- It helps educational planners to analyze the goal of the systems in terms of the pattern of expenditure.
- To prepare instructional system materials.
- For developing a training course for school administration.
- For planning and administrating programs for non formal education.
- In Educational Technology for preparation of aids.

**3.3 MULTIMEDIA INSTRUCTIONAL SYSTEM:**

Multimedia Instructional System is explained briefly in the following paragraphs.

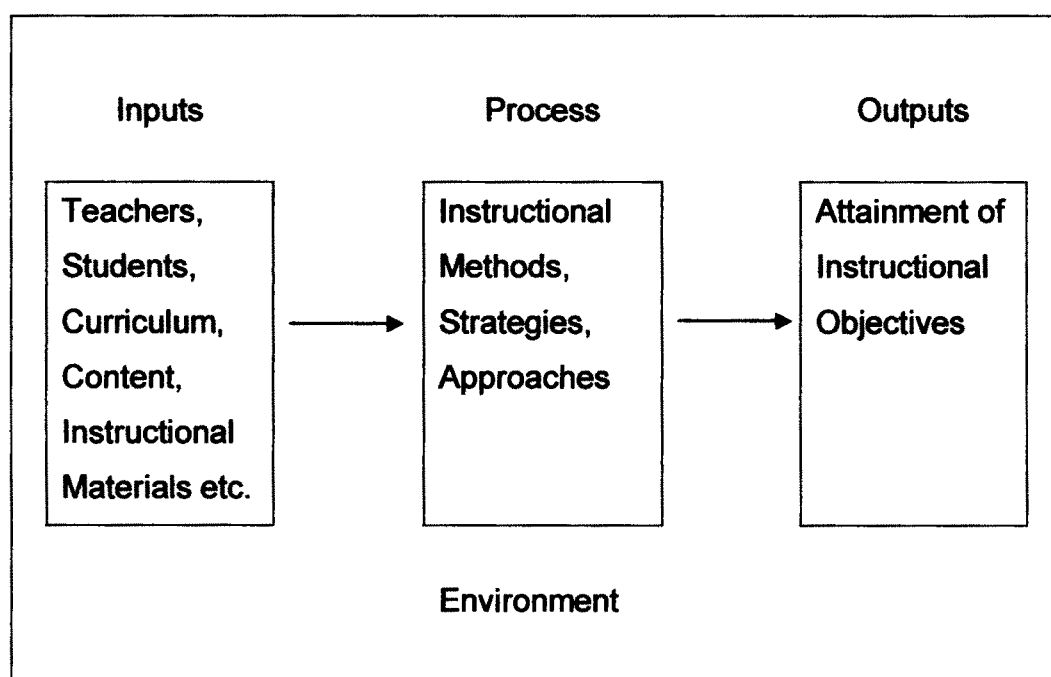
### 3.3.1 MEANING OF AN INSTRUCTIONAL SYSTEM:

Instructional system consists some interactive and interrelated elements operating systematically to achieve instructional objectives. A system designed for human instruction is an instructional system. It is broader term and not limited to curriculum.

Smith defined the instructional system as:

“An instructional system is defined as an integrated set of methods, media, and equipment and personnel performing efficiently, the functions required to accomplish one or more training objectives.”

The basic parameters involved in the instructional system may be shown diagrammatically as follows:



System approach to instruction helps in understanding, controlling and improving the structure and functioning of the system in view of effective realization of instructional objectives. It helps in providing best possible solution to the problems related to planning, process and product of instruction.

### **3.3.2 MEANING OF MULTIMEDIA:**

The word multimedia refers to the integration of multiple media – such as visual imagery, text, video, sound and animation which together can multiply the impact of your message. Interactive multimedia refers to the ability of user to control these components and interact with them as needed. Multimedia is a frequently used buzzword, but the concept itself is now new. This concept has been around since 1945, although recent technological developments have made it a simpler yet more sophisticated and powerful communication strategy.

Multimedia, or any other computer-based information technology, is not a substitute for presenter. It provides the presenter with a powerful tool that can greatly enhance communication by delivering a multisensory experience.

### **3.3.3 DEVELOPMENT OF MULTIMEDIA INSTRUCTIONAL SYSTEM:**

Successful development of the method of multimedia based communication requires careful planning, mastery of multimedia technology, as well as comprehensive and effective production management. It is the result of the integrated work of a team.

The production of interactive multimedia applications is a complex one, involving multiple steps. This process can be divided into the following phases:

- 1) Development
- 2) Preproduction
- 3) Production
- 4) Post production
- 5) Delivery

#### **1) DEVELOPMENT:**

In this phase the following activities directly involved.

- a) Support the application concept into a presentable manner.
- b) Support the Multimedia Architect in clearing the rights to develop the concept.



- c) Support the process of building a team that would potentially pull together the application.
- d) Support and co-ordinate the process of raising production funds.
- e) The multimedia application concept, goals and objectives are clearly stated.

## **2) PREPRODUCTION:**

Once the multimedia application concept, goals and objectives are clearly stated and financing is secured, the preproduction phase is initiated. This is a very hectic stage. The following activities involve in this phase.

- a) Development of budget and budget control system.
- b) Hiring of all specialists involved in the process.
- c) Contracting video and audio production crews and recording studios.
- d) Equipment rental, leasing or purchasing.
- e) Software acquisition and installation.
- f) Planning the research work of the content specialists.
- g) Development of the multimedia application outline, logic flow charts, scripts and video and audio files, production scripts and schedules.

## **3) PRODUCTION:**

Once all the preproduction activities have been completed, the production phase initiated. Among the activities related to the production process are:

1. Content research.
2. Interface design.
3. 2-D graphic development.
3. 3-D graphic development.
5. Sound recording.
6. Selection of musical background and recording.
7. Development of computer animation.

8. Production of digital video.
9. Authoring.

#### **4) POST PRODUCTION:**

In this phase, the multimedia is tested and revised, it enters the packaging stage. Following are the activities.

- a) Coordinate the testing of the application.
- b) Coordinate the communication with the client to request his feedback about the application.
- c) Coordinate the development of product documentation.

#### **5) DELIVERY:**

The final phase of the development and implementation of multimedia application is the delivery of the product. The following are the activities:

- a) Identify the logistical needs of delivery modes.
- b) Negotiate locations, permits, contracts and other aspects associated with the location of the delivery.
- c) Verify the availability of delivery equipment.
- d) Verify the conditions and adequacy of the delivery equipment.

### **3.3.4 MULTIMEDIA BUILDING BLOCKS:**

Following are the multimedia building blocks.

- 1) Graphics
- 2) Text
- 3) Video
- 4) Sound

#### **1) GRAPHICS:**

A graphic is a multimedia application can be more appealing and meaningful than a thousand text characters. People often learn and retain more information from pictures than from other forms of information. This is a function of their learning style. Learning styles are the various methods individuals have for perceiving and

processing information while reacting to their environment. The integration of graphics into a multimedia application could include the following elements.

- a) Backgrounds
- b) Photos
- c) Three-dimensional pictures
- d) Charts (graphs)
- e) Flowcharts
- f) Organizational charts
- g) Drawings (line art)
- h) Clip art
- i) Buttons (icons)

## **2) TEXT:**

Text is one of the most widely used multimedia building blocks. The intensity of text usage depends greatly on the purpose of the program. You can use and display text in different forms for different purposes. These are some possible uses.

- a) Titles
- b) Buttons
- c) Bullets
- d) Paragraphs
- e) Scrolling text

The research and selection of text are the responsibilities of the content specialist. The paragraphs of text bullets are depend in coordination with the Text Editor. Text is related to the other multimedia building blocks. For example, when planning to place text over a background, you must consider for color, font size and the contrast against the background. If the characters are not legible against the background, you may have to place the text over a text box with a solid or translucent color.

### **3) VIDEO:**

To integrate video into an interactive multimedia application, you can employ a number of different technologies, including the following.

- a) Digitized video.
- b) A video window displaying the output of a laser disc or video tape player.
- c) A video window displaying a live TV signal or a broadcast signal using PC-TV.

The following factors should be considered when planning the application:

- a) Goals of the application.
- b) Availability of video footage.
- c) Length of video to be displayed.
- d) Video digitizing computer capabilities and configuration.
- e) Video window size.
- f) Hardware configuration of the playback equipment.
- g) Available video projection equipment.
- h) Budget.

The video could be stored on a laser disc and displayed in a video window, or it could be displayed through a video monitor next to the computer. Long videos can also be stored in a digitized compressed format on a large hard drive. In the proposed application only short videos (30 sec to a few minutes), an on-screen digitized video format is recommended. The playback equipment configuration for digitized video requires at least 8M of memory and a processing speed of at least 33 Mhz. The size of the video screen needed will depend on the quality of the digitized video when captured and on the hardware configuration of the playback equipment. A good rule of thumb is to use a  $\frac{1}{4}$  screen-size video format for maximum performance and image quality.

#### **4) SOUND:**

All the information need not be text or visual. Sound (music, narration and sound special effects) can enhance the application significantly.

Sound should be considered while planning the application. Some forms of sounds that can be used are:

- a) Special sound effects.
- b) Narration.
- c) Audio tracks from analog or digital sources.
- d) Background music or musical performances.
- e) Background or ambient sounds.

One can associate special sound effects, such as alert sounds (beeps, door slams, explosions and so on) with buttons. The sound indicates to the user that the button has been activated and an action is expected. In another instance, animated text rapidly entering the screen can be preceded by the sound of a Jet or a "Whoosh" sound. The integration of alert sounds and special effects provides an additional dimension. The use, number and length of recordings will vary with the purpose of the application.

Audio tracks from CDs can be played back from a multimedia application. In this case, plan to develop and use a script in the authoring application to play a specific track or segment of an audio CD. In such cases, a script in the authoring application and in some applications such as Macromedia Director X object must be in place in the application directory or folder. An Xobject is a set of programming instructions that are developed as a resource to allow additional functionality to a multimedia application.