UNIT 16 MANAGING EDUCATIONAL TECHNOLOGY

Structure
16.1 Introduction
16.2 Objectives
16.3 Concept of Management in the Context of Educational Technology
   16.3.1 Functions of Management in the Context of ET
16.4 Systems Approach to Management of Educational Technology
16.5 Steps of Managing Educational Technology
   16.5.1 Analysis of What Needs to be Done (Systems Analysis)
   16.5.2 How the Goals and Objectives will be Accomplished (Design and System)
   16.5.3 Operationalising the Educational Technology System
16.6 Let Us Sum Up
16.7 Unit-end Activity
16.8 Answers to Check Your Progress

16.1 INTRODUCTION

Effectiveness of ET (Educational Technology) depends on its being systematically managed at different stages. The context of specific management of ET for schooling stages involves various kinds of activities. As a teacher you are expected to play a major role in management of ET at schooling stages. Hence the need arises to expose you to the procedural details of managing ET. The present unit will expose you to various components of management of ET.

16.2 OBJECTIVES

After going through this unit, you will be able to acquaint yourself with different steps of management of ET at various schooling stages and will be able to prepare a plan for management of ET at school stage.

16.3 CONCEPT OF MANAGEMENT IN THE CONTEXT OF ET

In the context of managing ET, we must be clear about the term, management. In general, management means systematic utilisation of available resources for attainment of goals or the effective realisation of results. Management is defined as the "process by which co-operative group directs actions towards common goals". It denotes to function i.e., different steps involved in carrying out activities for effective goal achievement as well as the 'people' who discharge it. As managers, teachers have to play a significant role in decision-making and execution of teaching/learning programmes. This is a commonly agreed view that educational management means making use of available resources effectively and efficiently in achievement of goals of education. In the context of Management of Educational Technology the meaning remains similar with a major focus on the goals of educational technology. As a manager of educational technology, your role will be geared towards getting things done through various sources such as men and materials for the achievement of goals of education.

16.3.1 Functions of Management in the Context of ET

The management experts emphasise on five major functions of management viz.:

1. Planning
2. Organising
3. Staffing
4. Directing
5. Controlling
1. **Planning ET** means taking decisions in advance of what is to be done, how and when it is to be done in the context of achievement of pre-specified goals and objectives. It involves futuristic exercises of exploring future needs and requirements and identification of future course of action in the context of present resources and required resources. Planning bridges the gap between present and future.

2. **Organising ET** means ‘orderly’ assemblage of humans and materials. Moreover, it focuses on systematic linkage of formally identified and distinguished tasks, roles to be performed by different persons concerning execution of ET. The organisation of ET involves the following steps:
   a) Determination of activities concerning ET keeping in view its objectives.
   b) Classification of activities into different clusters.
   c) Classification of different groups of activities related to ET for different people.
   d) Delegation of authority and fixing of responsibility for carrying out the assigned duties.
   e) Co-ordination of different activities related to ET.
   Thus, the division of work among persons and co-ordination of their efforts to achieve the specific objectives are the fundamental aspects of an organisation.

3. **Staffing** in the context of ET means recruitment of qualified personnel to man the activities concerning ET. It also means making proper arrangements for professional growth of human potential so that they can upgrade their knowledge and skills and develop a positive attitude towards changing roles in the context of new technology. It involves adequate manpower planning and introduction of different training and appraisal schemes for staff development to deal with ET.

4. **Accurate direction** in the context of ET will mean facilities for suitable communication mechanism so that different sub components interact with each other properly. Appropriate communication will form a base for proper understanding among different units. Each and every functional unit must be aware of its respective roles and functions in the context of attainment of goals for the whole system. Motivating the functionaries and giving reinforcement in the context of operation is also a significant task in this direction.

5. **Control** in the context of ET means constant monitoring of actual performance of different components of ET from time to time. There is a need for monitoring to strengthen the base for decision-making. Moreover, evaluation of performance of different components will provide feedbacks for further improvement of ET and adoption of new strategies for the effective implementation of ET.

### 16.4 SYSTEMS APPROACH TO MANAGEMENT OF ET

A systematic application of systems approach to Management of Educational Technology facilitates the functioning of management to be more effective and efficient. You are acquainted with the concept of systems approach. We shall throw more light on systems approach from the perspective of the management of ET. As you know, the systems approach aims at solving problems through scientific approach involving 'effective' and 'efficient' strategies. In the context of ET, "effectiveness" means the degree to which the actual output corresponds to the pre-specific objectives of ET. In other words, there must be pre-specified objectives of ET which is to be implemented through scientific means. The degree of matching of real outcome with expected outcome will indicate the measure of the degree of success of the strategy.

Moreover, 'efficiency' indicates the potentials of an approach in terms of time and energy invested in comparison to those of other approaches; this must be seen as optimum output which emerges through adoption of efficient means. In other words, we should not aim at achieving goals through costly and time taken approach which is treated as wasteful. On the other hand, we should observe whether efficient means lead towards attainment of goals or not. If the means are efficient but they do not lead to achievement of goals then the effort is equally wasteful. Hence, we must focus on adopting appropriate strategies with the help of systems approach, which are 'efficient' and 'effective' in nature. Adoption of appropriate strategies with systems approach leads to successful completion of task.
Check Your Progress
Notes: a) Write your answers in the space given below.
       b) Compare your answers with those given at the end of the unit.
1. What are the different functions of Management?

2. What are the steps followed in the organisation of ET?

3. Why systems approach is applied in ET?

16.5 STEPS OF MANAGING ET

Systems approach incorporates three steps which can be adopted in the effective management of ET such as:

1. Analyse what needs to be done (Analysis of Objectives)
2. Design how it is to be done (Building Strategy)
3. Identify/Obtain resources for implementing the design.
4. Execute the system and study its effectiveness.

Let us examine step by step activities involved in the Management of ET as per the Systems Approach.

16.5.1 Analysis of What Needs to be Done (Systems Analysis)

In the context of adoption of ET more specifically any media based programmes like ETV or Computer Aided Instruction we must follow step-wise activities at the institutional level. The expression what needs to be done refers to the proper identification of objectives. In other words, we will have to specify what are the expected outcomes of adopting ET at the school stage, and how it can be implemented to get the expected results.

The objectives must emerge from the needs of learners, teaching-learning system and the institution. Moreover, objectives must be situation/context specific. Hence, we will have to proceed on with analysis of the following:

a) Analysis of target population and their background.
b) Analysis of situation; school system, physical conditions, external systems support.
c) Analysis of needs and problems with future perspectives.
d) Analysis of aims and objectives.

a) Analysis of Target Population: We must analyse the nature and characteristics of target population. For example, in the context of adopting Educational Television based teaching/learning activities at the primary stage, we must explore who all will be the beneficiaries of such activities. Analysis of different background factors like demography, mother tongue, dialect, family background, parental involvement in the studies of children; technology acquaintance of learners, availability of necessary physical facilities for homework and interest of learners to learn through alternative channels can contribute a lot to identify the level of homogeneity in target population. This acts as a major parameter for planning ETV based activities in the school. In the case of homogeneous group the focus of planning concentrates on limited objectives with less constraints. On the other hand, a heterogeneous group reflects varieties in expectations and planning is to be done to deal with complexities arising out of heterogeneity.
b) **Analysis of Situation/Context:** It refers to analysis of situations or contexts where the ET is intended to be put into operation, the internal and external environment of school system. (The expected outcomes of ET activities in a school system are determined by physical facilities, attitude of teachers towards ET, parents' co-operation in utilization of different kinds of activities in school, community support, necessary infrastructure like communication facilities in the locality, transportation, etc. will determine, to a great extent, the expected outcomes of ET activities in school system). Moreover, other contextual factors like policy decision, administrative support, collaboration of different agencies to execute the project, etc. influences a lot on the process of determining the aims and objectives of such technology based programme at school level.

c) **Analysis of Needs and Problems:** As stated above, the objectives must be based on analysis of needs from different sources viz., users needs, extra-curricular needs and institutional needs. The needs may be perceived by users/learners themselves. The needs of learners may be perceived by teachers. The extra-curricular needs may be perceived by learners, teachers and experts. The institutional needs may be perceived by school administrators.

Analysis of needs from different sources should focus on specific ET activities intended to be incorporated as a school system. Need refers to the gap existing between what exists and what we wish to be. To identify such gaps or needs we can apply different techniques like: interviews, opinion survey, observation of situations, job analysis etc.

Need analysis may not focus on analysis of present need only. Planning will be more effective if need analysis focuses on futuristic needs. It means exploring needs for the use of ET keeping in view future learners, future curriculum and future school system. Different methods and techniques like Delphi, Brain Storming, Scenario Writing focus on analysis of future needs for the use of ET in a school system.

d) **Identification of Aims and Objectives:** The analysis of needs from divergent angles on ET will help us to visualise a sound framework of outcome of a scheme involving ET. They can be stated in general as well as specific forms.

For example, the general aim of School Educational Television programme may aim at:

- enabling viewers to improve the level of achievement in school subjects, pertaining to the calibre of students;
- enabling viewers to broaden general knowledge;
- enabling viewers to develop social sensitivity;
- enabling viewers to develop future awareness.

These aims are to be specific in nature so that they can be operationalised. We call them as enabling objectives which exemplify different activities to be performed with a view to indicating the achievement of an objective. The enabling objective indicates the detailed operational component linked with each objective.

For example, in the case of designing ETV project for school children, we may specify the objectives programme-wise. We may specify terminal objectives for each programme in behavioural form which can be subject to measurement easily.

You must keep in mind the programme and its message while arriving at statement of objectives.

i) Our goal statement must be explicit enough so that any one can visualise how viewers will be in a different position when the goal of ETV is attained.

ii) The objectives should indicate how viewers will perform at the end of the programme.

iii) There must be suitable procedures adopted for measuring progress in different parameters. This is known as **statement of criterion measure** for our programme goals and its corresponding objectives.

While setting the goals and objectives you should look at three most important considerations:

1. Choose objectives from a number of alternatives. Identify them with priority of needs.
2. Prepare criterion measure. Different tests and tools must be developed to measure the achievement of terminal objectives.
3. Consider all possible constraints in terms of achievement of objectives. This will help us to take advanced steps to searching for adequate inputs, appropriate methods and proper monitoring mechanism. Looking at the constraints of resources at production and implantation level the objectives may suitably be modified.

Check Your Progress

Notes:  
1. Write your answers in the space given below.
2. Compare your answers with those given at the end of the unit.

4. What are the different components which need to be analysed in the context of determining goals and objectives?

5. Which considerations you should keep in mind while setting goals and objectives?

16.5.2 How the Goals and Objectives will be Accomplished (Design and System)?

Once the needs are analysed, goals and objectives are specified and criterion measures are developed on ET, we can move towards the second step of systems approach i.e., systems design. Systems design deals with the question of how the goals and objectives are to be accomplished. In other words, the design part deals with identification of different components of a system leading towards the achievement of its objectives.

The structure will have to be identified with regard to input process, output and feedback mechanism. We must decide how different components will be linked with each other. Let us start with the consideration of inputs with regard to management of ET. Input will be decided in the context of executed outcome as well as resources constraints. Analysis of existing physical conditions and resources (materials) and manpower will form the major task on input finalisation. For example, in the context of ETV project, the pioneering institution will have to analyse existing physical facilities and technology for production of ETV programmes and delivery of ETV programmes. The analysis of studio facilities, existing technology used for production of video cassette based educational programmes, facilities for telecast of programmes and facilities at user school level will be very much essential. Moreover, existing facilities of human power support for development of software, production of video cassette programmes, dissemination and utilisation level will have to be situated in detail. The study of existing facilities in the context of expected outcomes is to be done in view of identifying the gaps between which inputs exist and which are expected.

Suppose, another teacher wants to use OHP during delivery of a lesson to his/her students, for this, he must ensure that materials required for OHP use are available with him/her. Materials like transparency sheets, OHP permanent marker pen, OHP itself, OHP screen, electric power point must be available before OHP is used for classroom teaching.

Hence, one must be careful about analysis of existing resources and expected resources.

Analysis of Resources: The resources can be of two types:

i) Physical/technological and monetary

ii) Manpower

Physical resources means necessary support base required for production of media telecast and use of media. Monetary support is needed for installation of project, its execution and improvement. Once these resources are analysed, we shall focus on the knowhow part of operating the technology for production, dissemination and utilisation of the programmes.
Moreover, we will have to examine whether existing technology will serve the purpose or we shall go for adoption of advanced technology. In case we move towards the advanced technology what kind of new physical resources will be needed will have to be emphasised clearly. What will be the financial implication of new technology based programme will have to be analysed in advance.

The manpower is required for the development of the software, treatment of software as a part of video production, editing of the programme, giving final shape to the production, delivery of programme and utilization of programme. We will have to gather background information of manpower involved in the above operations. Background information must cover their qualifications, training background, skills needed for performing a specific task, experiences and a positive attitude towards the technology based programme. Such analysis will help us to intervene with the design where we can explore giving additional inputs to strengthen manpower base, their skills, attitude etc., expected in the context of the achievement of goals.

Let us take the example of integrating ETV programme at your school level. What kind of physical resources are required for the installments of ETV systems is to be analysed. Moreover, efforts are to be made to renovate existing facilities like conversion of a room as TV room, making electricity facility, sitting arrangements etc. besides this, you will have to procure support for installation of TV and VCR and necessary accessories according to your budget.

If you are interested in the establishment of a computer unit in your school, you must take similar steps for analysis of physical facilities and make procurement for necessary technology on the basis of available budget. An analysis of cost is also a significant component of input decision. Several considerations should be made about capital investment and maintenance cost of new technology. How to meet such expenses is also a matter of concern. What should be the share of cost from students' sources, other sources of institution and support from grant giving authorities. All this should be analysed keeping in view a time framework of at least five years ahead.

From institutional point of view you will have to explore available manpower base to execute any ET based programme in your school. The success of every ET project depends on who mans it, with what motivation he/she means it, the know how possessed by him/her, the kind of involvement he/she has in implementation of the project and what kind of leadership support he/she gets from the institution. You must identify such persons from your school. Necessary training must be given at the initial stage of the project. Identify different sources of motivation for executing such project. Explore all the possibilities of continuous orientation where experiences can be strengthened for running the project.

Different Considerations for Identification and Selection of: While managing ET programme at institutional level every care should be taken for the proper identification of suitable learning materials, methods and media. There are several criteria which must be kept in mind for identification of suitable methods and media. Some of them are:

- Objectives of the system
- Curriculum structure
- Learners characteristics
- Physical support
- Technology base
- Trained manpower

* For details you may refer back to Unit 13.

In the context of the identification of methods and media, which act as a major input of any system, you must give first priority to their potentials in the achievement of goals. How to achieve different objectives will require analysis of each specific objective. The operating specifications for each of this also have to be obtained. You can have a list of series of fragmented tasks to be performed in the context of totality. Hence, the input characteristics, potentials of means and methods and output components must be linked with a logical framework.

The efficiency level of each media/method is to be taken care of. That means, as stated earlier you will have to examine its potential in the context of comparison of time, cost and energy
required for its execution with those of others. Which media or integration of media will be suitable for which objective should be realised for which one thing inquiry, conceptual meddle etc. is to be analysed also has to be taken into account.

As stated above, (1) Learner’s characteristic, (2) socio-economic status, (3) technology availability, (4) trained teachers/support staff, (5) physical facilities, (6) curriculum structure etc.) The following factors will determine the process of selection of methods and media in the context of any ET based project: Each method/medium must be linked with input and expected output with operational details.

Identification of Alternative Components of Means and Methods: Managing ET system becomes easier if we are flexible in adopting alternative means and methods. Hence, the component analysis of process dimension of any ET system must explore alternative means and methods with regard to the achievement of objectives. It gives openness to ET system operators to choose the best means and methods keeping in view their operational constraints, efficiency level and effectiveness parameters. Decision-making becomes flexible while operating with alternative means/methods are identified in advance.

Let us take example of school ETV programmes. There can be varieties of means and methods to operate ETV programme depending on different opportunities and constraints. While the last option is to provide option to students to view ETV on the basis of their interest, time and motivation you can explore various options for its execution in your school. Some of them are:

- Using direct telecast of ETV in classroom as a part of time-table and viewed by students in the allotted time.
- Using direct telecast of ET in classroom with the initiative of concerned teachers on different programmes.
- Teachers introductory remarks on an ETV programme followed by students viewing session.
- Discussion with teachers followed by each ETV session.
- Using recorded ETV lessons by VCP suit the school schedule.
- Peer interaction followed by ETV presentation etc.

Let us suppose that the objective of using ETV programme in classroom teaching is to improve the level of achievement in school subjects. The teacher, therefore, decides the subjects in which he/she has to improve the level of achievement and accordingly change the School time-table as per the direct telecast of ETV. For example, if there is a lesson on science being telecasted at 11.30 a.m., the teachers have to keep the science period at 11.30 a.m.

Exploring different alternatives by different means and methods of operation will make management of ET flexible and realistic.

Organisation of different Components/Activities Related to Specific Strategy: Different kinds of activities/responsibilities are to be assigned to different individuals/groups. Moreover the activities are to be arranged following a certain order. Sometimes some activities can be organised in a linear form and some activities can take place simultaneously with an interaction of each other. For example, an ETV programme will involve three major steps of operation viz.: Development of script; Production of video programme; and Dissemination/Utilization of video lessons. Each of these steps requires different kinds of activities to be performed by specific groups of persons.

i) Development of Software: This activity is performed by the subject expert who is well-trained in writing video scripts for educational programmes. He keeps into consideration while developing the script needs like curriculum, difficulty level of content, the nature of concept, learners expectation, media support and expected outcomes of the programme. The script outline is developed with necessary structure of the programme. A final touch is given to the script after discussion with subject experts and media experts.

ii) Production of Video Programmes: This task is mainly left to the media system where the programme producers manages the production with the assistance of technical personnel like camera men, production assistant, free lancers etc. Production may be done either outdoor or indoor. Organisation involves production activities with various components
like; identification of subjects, forms of presentation, presenters, selection of sites, shooting the programme, editing the programme etc. After production, the programme is subject to previewing by sample viewers, subject experts, user teachers etc. Necessary corrections are made in the programme on the basis of reactions in the previewing session. Finally, the video lesson is ready for use.

iii) Delivery and Utilization of Video Lesson: It depends on the condition of the delivery of the system. If this is to be telecast, proper arrangement is to be made in collaboration with Doordarshan. Proper arrangement is to be made for scheduling of telecast and dissemination of programme schedule to the user schools. To make it more effective, the user schools are supplied with the outline of the programme in advance. Besides telecast the video lesson cassettes can be supplied to the schools on their demand.

In utilization of video lesson programmes the user school will have to organize different activities depending on its needs and facilities available in the institution. As presented in the previous section, there are alternative ways of using ETV programmes. The user school will have to organize activities accordingly. Whether you go for using direct telecast based one way mode presentation or presentation of video recorded programme in classroom encouraging group interaction you will have to plan different kinds of activities related to different means of using ETV. Time schedule is to be developed, teachers’ role is to be specified, expected role of learners are to be jotted down, assessment procedures to be worked out, physical arrangements are to be made in advance etc.

iv) Maintenance: In the context of preparing designs for the utilization of ETV, one must be careful about the maintenance of different elements particularly hardware and support system. Proper arrangement is to be made for procuring appropriate hardware like video cassettes, TV sets, VCP and accessories. How to maintain the functioning quality of such hardware is very much significant. Preserving them properly, monitoring their working condition and appropriate repair facilities must form a part of Management of ET.

v) Collaboration: Collaboration mechanism with other support agencies is to be worked out. At different levels collaboration is worked out among ETV production institutions like Central Institute of Educational Technology (CIET), State Institute of Education Technology (SIET) and National Open School; Technology support institutions like Doordarshan, Indian Space Research Organizations (ISRO), Department of Electronics etc., education administration set up central level, state level, district level, block level; user institutions like school complex and individuals schools. Particularly at school level you must plan your ETV programme activities in collaboration with other schools in your vicinity, exploring support systems in the community and parents agencies for supplying equipments and its maintenance, security etc.

vi) Budgeting: Budgeting occupies a major component of management of ET. While major projects following systematic procedures for budgeting at institutional level you will have to workout the nature of expenses to be incurred in connection with your ET based activities and to workout the financial support required therein. Basically, readymade budget provision is attached to a standard format of operation of ET like school ETV programmes. However, if you want to use alternative means of organising ET activities, one will have to do budgeting at school level. Explore the possibilities of additional financial support as per requirement of different strategies, to be implemented.

---

Check Your Progress

Notes: a) Write your answers in the space given below.

b) Compare your answers with those given at the end of the unit.

6. What are the different sub-components of designing any ET system?
16.5.3 Operationalising the ET System

This section deals with the functional part of your management. You will apply the design worked at the second phase of management. The input measures are taken into consideration. Necessary appraisal is done regarding different contextual variables and input variables. Criterion measures are developed. The means, methods and materials are identified. Media based softwares packages are developed. The audio-video packages are produced. Their operational details are worked out. Hence, all the necessary details chalked out at the programme design stage are set for operation. Many a times before final try-out of ET pilot try-outs are made in sample situations. Necessary modifications are made in the design on the basis of feedback from pilot try-out (Test trial).

While the ET programme is in operation you will have to monitor the following:

- Integration of different components of the programme on day-to-day basis;
- Involvement of different agencies at operational stage;
- Different skills involved at transaction level;
- Participation of teachers, pupils and other concerned components.

In the context of operation of ET you will have to be vigilant about co-ordination of different components like: (1) media facility, (2) time schedule, (3) physical support including power supply, (4) working condition of gadgets, (5) communication facility, (6) teachers and learners preparatory tasks, (7) activities taking place during teaching-learning sessions etc. Proper monitoring tools must be adopted to record such co-ordination and identify the limitations if existing in any of the components.

As stated earlier, collaborative efforts are suggested for operationalising ET. Proper arrangement should be made about encouraging participation amongst different agencies through meetings, workshops, discussions, seminars and other kind of interactions. Monitoring should focus on this dimension of ET.

Varieties of skills are to be used for the transaction of ET based activities. For example, introducing the ETV based instruction, exhibiting the ETV lessons, conducting question answer activities, conducting peer learning activities, evaluating learner’s performances etc. requires several kinds of skills on the part of teachers and learners. These skills must be exercised in view of achieving the desired target.

As you know, operationalisation of ET involves participation of teachers, pupils, support staff and other concerned components. How to motivate them in such activities? how to sustain their involvement in various activities? and how to enhance the spirit of participation are some of the points to be kept in mind while implementing the project.

In the context of operationalisation of ET system most relevant queries are made about how smoothly the programme is being implemented and whether the execution is in the right direction of achievement of goals and objectives. In other words, the process evaluation is to be given due weightage from the point of view of on the spot decisions about the programme. Hence, decision-making should be integrated with monitoring and evaluation activities of ETV programme.

You may refer to Unit 16 where detailed presentation has been made about policy oriented evaluation. One of the most popular models which can be used in the context of Management
of ET is CIPP model. Evaluation of context helps us to assess needs and objectives of a programme. Evaluation of inputs helps us to study the worth of different inputs in the context of achievement of objectives. Evaluation of process streamlines decision-making during the operation of ET and product evaluation validates the entire strategy of ET i.e., whether expected outcome has been achieved through application of ET or not.

**Check Your Progress**

**Notes:**
- a) Write your answers in the space given below.
- b) Compare your answers with those given at the end of the unit.

8. What are the different areas of operation of ET which need monitoring?

9. What kind of evaluation strengthens the base of Management of ET?

---

### 16.6 LET US SUM UP

In this unit, you have been exposed to different functions of Management in the context of ET. Detailed description has been made about the steps of systems approach in Management of ET viz., analysis of needs and objectives; designing the system i.e., to design how the objectives will be accomplished and operationalising the system. Different steps of Management of ET involves a number of activities which can be shared by programme planners; institutional heads, teachers, students and others. This exposure may help you to manage ET activities at your institutional level smoothly.

### 16.7 UNIT-END ACTIVITY

1. Suppose you have to develop a programme in your school of using puppets for teaching environment-related concepts to 9th, 10th and above students. Develop a plan for managing (from production/purchase of puppets to evaluating the learning outcomes) of this programme.

### 16.8 ANSWERS TO CHECK YOUR PROGRESS

1. Planning, Organising, Staffing, Co-ordination, Control.
2. Refer para 16.3.3.
3. To make the programme efficient and effective.
4. Analysis of Target Population; Situation/Context; Needs and Problems.
5. Refer last para of 16.5.1.
6. Analysis of Resources:
   - Identification of alternative means/media.
   - Organisation of different activities concerning the strategy.
7. Refer 15.2.4.
8. Refer second para of 16.5.3.