

**Educational Technology – The Fourth Educational Revolution**

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**Abstract**

The word 'Technology' is derived from the Greek word 'Technic' which means art or skill and 'logia' means study or science. Thus technology is the science of study of an art or skill.

**Introduction**

“Educational Technology is a system in Education in which machines, materials, media, men and methods are interrelated and work together for the fulfillment of specific educational objectives.

It is a branch of study in which the results of engineering techniques, information science, natural sciences, behavioural sciences and human technology are to be used to promote the efficiency of education. This phrase though coined and used three decades ago by Brybnmor Jones Report in UK it has undergone vast Changes.

**Educational Technology Connates Three Meanings**

- The use of equipment for presenting instrumental material such as still and motion picture projectors (Silent and sound) tape – recorders (including language laboratory), television, teaching machines, and computer based teaching (James O.Finn and others 1960).
- The second view refers to the application of scientific principles instruction. This is the view of Skinner, Gagne and others. Here Psychological principles of learning are stressed.
- The third and modern view:

This view incorporates both the above two, though application of a 'system approach' to education and training. This view also implies planning, implementing and evaluating a system in education according to scientific principles so as to best achieve the educational objectives.

Educational Technology as the fourth educational Revolution Erich Ashley (1967) talks of the four revolutions in education

- Revolution of shifting the task of educating the young ones from parents to teachers and from home to schools.
- Revolution of adoption of the written word as a tool of education.
- Revolution as results of invention of printing and availability of books and other teaching – learning material.
- Revolution on account of development in electronics, chiefly involving radio, and computer and development of systems concept.

During the last four decades in the advanced countries there has been tremendous use of educational technology in making education more productive, relating to the individuals, providing instruction (Teaching – Learning) on more scientific bases, making learning more powerful and lasting, making up the cultural handicaps of certain categories of pupils and for extending educational services in the remote areas.

Educational technology needs to be employed in the spread of useful information, the training and retraining of teachers to improve quality, sharpen awareness of art and culture.

To inculcate abiding values etc., both in the formal and non – formal sectors. In the villages without electricity, batteries or a solar pack needs to be used to run the programme.

An important component of the Educational Technology should be the generation of relevant and culturally compatible educational programmes.

### **Some Definitions of Educational Technology**

- Department of education and science DES (UK). 'Educational Technology' is the development, application and evaluation of systems, techniques and aids in the fields of human learning.
- De Ceoco (1971): Educational Technology is in the form of detailed application of the psychology of learning to practical teaching problems.
- D. Unwin (1969): Educational Technology is concerned with the application of modern skills and techniques to the requirements of education and training. This includes the facilitation of learning by manipulation of media and methods and the control of environment in so far so this reflects of learning.
- M. Leith (1967): Educational Technology in the application of scientific knowledge about learning, and the condition of learning to improve the effectiveness and efficiency of teaching and learning.
- National council of Educational Technology, (UK) (1967) : Educational Technology is the development, application and evaluation of system, technique and aids to improve the process of human learning.
- National Academy of Engineering's Instructional Committee on Education – USA : Educational Technology is the body of knowledge resulting from the application of science of teaching and learning to the real world of the class room, together with the tools and methodologies developed to assist in these applications.
- W. Kenneth Richmond (1979): Educational Technology is concerned with providing appropriately designed learning Situation which holding in view the objectives of teaching or training bring to bear the best means of instruction.

### **Nature & Characteristics of Educational Technology**

Educational Technology is the application of scientific ideas points out the following characteristics.

- Educational Technology is the application of scientific principles to education.
- It lays stress on the development of methods and techniques for effective teaching – learning.
- It stresses the organization of learning situations for the effective realization of the goals of education.
- It emphasis the designing and measuring instruments for testing learning outcomes.
- It facilitates learning by controlling environment, media and methods.
- It involves input, output and process aspect of education.
- It is not confined to the use of electronic media in education. It includes systems approach also.

- It is an important medium of communication.
- It is not to be taken as a synonym to audio visual aids in education.
- It includes instructional technology, teaching technology, programmed learning micro – teaching and system analysis etc.

### **General Objectives of Educational Technology**

#### **Hillard Jason:**

- Transmitting Information
- Serving as role methods.
- Assigning in specific skills
- Contributing to the provision of feedback.

#### **Meckenzie and others:**

- The need to reach more students.
- To reach them with an improved range of learning materials.
- To offer quarter opportunities for independent study and
- To permit at least a limited student response.

#### **Macro Level of Objectives: (Broad Educational Goals)**

- Identification of educational needs and aspirants of the community/
- Determination of the aims of education broad strategies and structure of education.
- Developing a suitable curriculum with interaction of arts, human values and sciences.
- Identification of man – material resources and strategies for achieving the desired aims of education.
- Developing certain models leading to improvement in the process of teaching – learning.
- Identification of major constraints in the environment and the ways and means of tackling them.
- Assisting in extending vocational opportunities to masses especially neglected and oppressed sectors of the society.
- Managing the entire educational system covering planning implementation and evaluation phases.

#### **Macro Level of Objectives of Educational Technology:**

##### **(Objectives in terms of specific class – room Teaching)**

- Identifying and analyzing the characteristics and educational needs of the students.
- Determining the specific class – room objectives and stating them in behavioral terms.
- Analyzing the contents of instruction and organizing them in proper sequence.
- Identifying the available teaching-learning material and resources.
- Evaluating the effectiveness of the class – room teaching in terms of the students' performance or change in behavior.

○ Providing appropriate feed back to the students as well as teachers to bring modification in the teaching learning process.

### **Main Benefits of Educational Technology**

#### **(US Commission Instructional technology 1970)**

- Technology can make education more productive.
- Can make education more individual
- Can give instruction a more scientific base.
- Can make instruction more powerful
- Can make access to education more immediate.
- Can make access to education more equal.

### **Assumptions in Educational Technology**

- Human being is served as a communicating biological system.
- Human behavior is observable and modifiable.
- Technology is an expanding media.
- Teaching is considered as an art as well as a science.
- Teaching Theories can be formulated to understand the nature of teaching.
- Learning theories can be formulated to understand the nature of Learning.
- Training institutions can prepare effective teachers.
- The communication media can facilitate learning substantially.

### **Sequence of Steps and Tasks in Educational Technology**

- Analysis of the Teaching – Learning process in behavioral term.
- Identification of all elements that are necessary for initiating teaching to achieve the goals
- Determination of inter – related elements and reducing the probability of repetition of some elements.
- Presentation of instructional material.
- Evaluation of the effects of teaching in terms of achievements of goals.
- Providing feedback for improving teaching – learning activities so as to modify teaching – learning activities for optimal realization of objectives.

### **Scope of Educational Technology**

There are three major areas in education in which its scope is very wide.

- Technology related to general educational administration.
- Technology related to the instructional process.

The Following are the provinces of educational technologists – Rowntree (1973)

- Identifying aims and objectives of learning.
- Planning the learning environment.
- Exploring and structuring the subject matter.
- Selecting appropriate teaching strategies and learning media.

- Evaluating the effectiveness of the learning system.
- Using the insights gained from evaluation to improve their effectiveness for the future.

### **Importance Areas of Educational Technology**

- Concepts and various facts of educational Technology.
- Teaching – Learning Process.
- Individualized instructional technology.
- Programmed Learning
- Teaching models.
- Learning Theories
- Multimedia approach to teaching.
- Mathematics.
- Cybernetics
- Task analysis
- Modules
- Systems Approach

### **Classification of Educational Technology:**

#### **(1) Mackenzie and Others (1980)**

- TV Language laboratory and other Audio – Visual resources.
- Feedback devices including teaching machines.
- Reprographic equipment like computers and programmed learning material.

#### **(2) Percival and Ellington (1984)**

- Mass instructional Techniques.
- Individualized Instructional techniques.

### **Mass Media Instructional Technology**

- Broadcast on an educational channel.
- Broadcast on a commercial channel.
- Closed circuit to supplement or provide direct instruction exclusive of class – room Instruction.
- Open type in which limited techniques are distributed via the closed circuit medium as replacement for class – room teachers. In all cases the aim is to reach more students with fewer teachers or to obtain quality instruction.

### **Technology of Individual Instruction**

- Individual reading papers and similar devices.
- Individual viewing and listening equipment like slides, film strips, motion picture and recordings.
- Language laboratories of all types.
- Specifically programmed printed materials.

- Teaching machines of the skinner type containing carefully worked out verbal or pictorial programmes.

### **Divisions and Sources of Educational Technology**

- **ET (I):** Direct use of psychological principles is recommended. It deals with diagnostic assessments of pupils educational objectives in behavioral terms, deciding for methods, devices for class room instruction and stimulus – control for self instructional strategy.
- **ET (II):** Instructional materials and communication means are produced after deciding and examining them carefully.
- **ET (III):** The Management aspects such as planning, programming budgeting, decision making operations, research, system analysis and organization of models for problem solving, computers and information system, and organization of man – machine system.
- **ET (IV) :** It covers educational systems engineering ie., the planning designs, construction and evaluation of instructional systems, administrative systems, operating system (Course resources centre, curricular development work)
- **ET (V):** The economic aspects and finances are the main base in educational planning is considered.

### **Hardware and Software Technology of Education**

#### **Hardware Approach**

- Audio – Visual Aids – Charts, Models, Film Strips, Slides, Audio – Cassettes and sophisticated equipments and gadgets – Films, Projectors, Radio, Tape recorder, Record player, Television Video Teaching machine and computers etc., originated from physical sciences and applied engineering.

#### **Software Approach to Education**

The software approach owes its origin to the behavioral sciences and their applied aspects concerned psychology of learning. It originated from the pioneering efforts of skinner and other behaviorists. Software teaching technology directly related to the psychology of learning which comprises behavioral changes resulting from experience (Melton 1959).

The software technology is sometimes referred to as instructional technology, teaching technology and behavioral technology.

Complementary use of Hardware and Software technology in Education:

The Hardware technology has contributed more to behavioral sciences.

#### **Significance of Hardware and Software Technology**

- They cater to individual differences of students.
- Economy of time, energy and resources of teachers and students.
- Bring clarity and vividness of the subject matter.
- Proper use of hardware and software helps in motivating the students.
- Developing and sustaining the interests of the students.
- Make the subject matter easy to comprehensive.
- Make the subject matter interesting
- Make the teaching learning attractive inspirational and effective.

- Make the subject matter lively.
- Provide ample opportunities of student's participation.

### **Principles of Using Hardware**

- Purposiveness
- Economy
- Ease in the use of aids.
- Availability
- Simplicity
- Stimulation
- Self – Preparation

### **Contributions of Educational Technology or Advantages of Educational Technology**

- Individualized instruction
- Improvement in the quality of Teaching
- Meeting the problem of mass education
- Equalizing Educational opportunity (irrespective of economic, social and geographical status of the learners).
- Providing continuing education.

### **Conclusion**

Educational Technology neither diminishes the role of teacher nor replaces him nor de-humanises education. Rational use of Educational Technology will improve the quality of education. As skinner puts, "Almost all our major problems involve human behavior and they cannot be solved by biological technology alone, what is needed is technology of behaviors".

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