

## **Educational Technology III or Systems Approach**

This type of educational technology is related to the concept of systems engineering which owes its origin to computer science. It represents the latest concept in technology of education. In this type and approach, educational technology stands for a systematic way to design, carry out and evaluate the total process of education in terms of specific objectives. Thus, it means a systems approach to organize educational system effectively and economically, keeping in view the educational objectives and available man-material resources.

The systems approach takes education as a system having a set of inputs which are subjected to a process, designed to produce certain outputs which are intended to meet the stipulated objectives of the system. The application of this type of educational technology takes the system of education as a whole and views it in the context of the specified objectives and functioning of its interrelated parts and the whole system under the existing constraints. If the system meets the requirements of the system objectives, it is maintained. If it does not fulfil the specified objectives, it is modified. As a result, various alternative strategies and tactics are explored, designed and implemented and the most appropriate and feasible one is retained.

Thus, in systems approach, one has to make a continuous comparison of the different roles played by man, machine and the media in a system of education and develop an appropriate instructional design and strategy in relation to the stipulated objectives. This type of educational technology or systems approach is a new concept in the field of educational technology. In India, at present, it is at the introductory stage but due to its usefulness and scientific as well as mathematical nature, it is likely to be developed as an effective means for the organization, management and development of education. This, in turn, can develop education as a sound system for serving the cause of individual and the society.

## **Scope and Significance of Educational Technology**

In describing the scope of educational technology, one has to seek answers for the following two questions:

1. What are the limits of its field of operation?
2. What is to be included in its study?



Both these questions are very much related to the meaning, concept and nature of the subject educational technology. Discussions about these aspects in the preceding pages has revealed that educational technology possesses a wider meaning and broader concept, which emphasizes the utilization of all the available resources in terms of knowledge of the teaching-learning principles, theories, human or non-human material resources, teaching-learning strategies and mass media, for the attainment of the stipulated objectives at both the macro and micro levels.

Keeping an eye over such broad concepts of educational technology, one is able to map out the areas of its operation in terms of topics or aspects covered through its study or application. In brief, they may be summarized as below.

1. *Analysis of the process of teaching and learning:* Educational technology tries to discuss the concept of teaching, analysis of the teaching process, variables of the teaching, phases of teaching, levels of teaching, theories of teaching, principles and maxims of teaching, the concept of learning, the relevance of the theories of learning, the relationship between teaching and learning, the integration of the theories and principles of teaching as well as learning for attaining optimum educational purposes.
2. *Spelling out the educational goals or objectives:* Educational technology tries to discuss the topics such as identification of educational needs and aspirations of the community, survey of the resources available for the satisfaction of these needs and aspirations, spelling out the broad educational objectives, analysis of the broad objectives in terms of the specific classroom objectives of teaching and learning, specifications of these objectives in behavioural terms, etc.
3. *Development of the curriculum:* This aspect of educational technology is concerned with the designing of a suitable curriculum for the achievement of the stipulated objectives. It may describe the ways and means for the selection of suitable learning experiences or contents, organization of these contents in a suitable framework in order to bring out more effective instruction and thus analyze the suitability of the curriculum in relation to the objectives, means and materials, and devices of evaluation.
4. *Development of teaching-learning material:* This area of educational technology is concerned with the production and development of the suitable teaching-learning material in view of the stipulated objectives, designed curriculum and available resources. Here educational technology tries to discuss the essential techniques of developing software and instructional material like programmed learning material, computer assisted learning material, mass media instruction material, personalized system of instruction, planning for the teaching and learning and preparation of lesson plans, etc.
5. *Teacher preparation or teacher-training:* Teacher is a key figure in any process of teaching and learning. Educational technology, therefore, takes care of the proper preparation of teachers for exercising their complex responsibilities. For this purpose, educational technology includes topics like models of student teaching, micro-teaching, stimulated teaching, team-teaching, teacher effectiveness, modification of teacher-behaviour, classroom interaction, T-group training and interaction analysis etc.
6. *Development and selection of the teaching-learning strategies and tactics:* This aspect deals with the central problem of teaching-learning act. Here educational



technology tries to describe the ways and means of discovering, selecting and developing suitable strategies and tactics of teaching in terms of the optimum learning and available teaching-learning resources, the availability of the different types of teaching methods, devices and models of teaching alongwith their appropriate selection and use for the optimum results.

7. *Development, selection and use of the appropriate audio-visual aids:* Teaching-learning is greatly influenced and benefitted by the use of appropriate audio-visual aids. Educational technology covers this aspect by discussing various types of audio-visual aids used for the educational purpose, their proper selection suiting to a particular teaching-learning situation, their development and production in view of the available resources and problems faced in a teaching-learning act, audio-visual methods of presentation and dissemination of information, their proper storage and retrieval, and consideration about their cost-effectiveness and effective utilization.
8. *Effective utilization of the hardware and mass media:* Various sophisticated instruments, equipment, gadgets and communication devices brought through mechanization and electronics revolution are playing an effective role in the attainment of educational objectives by helping the teachers and learners in their respective roles. Educational technology tries to describe these resources in terms of their specific functions and applicability in a particular teaching-learning situation; their selection, proper handling and maintenance; their preparation and development; the cost-effectiveness of these equipment and mass media in education; appropriate teaching-learning material for these appliances; and the ways and means of their optimum use in formal education on the individual and collective basis.
9. *To work for the effective utilization of the subsystem of education:* Educational technology considers education as a system operating, in a systematic and scientific way, for the achievement of educational objectives. For the coverage of a systematic approach, it tries to include the topics dealing with the theory and principles of a systems approach, explaining education as a system. It also includes study of its different subsystems, their operations and processes in terms of input and output, the needed development in the working of the subsystems in view of the economy, output and functionality of the system, and the organization and management of the system in an effective way by specifying the respective roles of the man, machine and media in relation to the purposes of teaching and learning.
10. *To provide essential feedback and control through evaluation:* Educational technology is essentially concerned with the task of exercising appropriate control over the process of teaching and learning by planning and devising suitable tools and devices for the continuous evaluation of the process and products of the teaching-learning activities. Such evaluation provides an appropriate feedback to the learners as well as the teachers for bringing necessary improvement at the preparatory and implementation stages of their specific acts. For this purpose, educational technology discusses the ways and means of suitable evaluation techniques and their planning, development, selection and appropriate use in relation to the objectives of teaching-learning system.



Thus, educational technology is concerned with all the variables, phases, levels, and aspects of the teaching-learning process. In brief, it works for the overall planning and organization of the system or subsystems of education. It helps all those who are connected directly or indirectly to the processes and products of education. It teaches the teachers the art of teaching, the learners the science of learning, the educational planners the structure of planning, and the administrators or managers the skill of managing or administering the task of teaching and learning. It works for the individualization of instructions as well as for improving the group-dynamics of the classroom. It reaches to the individuals, groups and the masses, privileged or unprivileged through its media and means. The use of mass media for educational purposes through radio, television, tele-text, computer controlled devices and correspondence courses have given new dimensions to the application and scope of educational technology.

In the above discussion, an attempt has been made to identify the scope of the subject educational technology by mapping out its field of operation, but in true sense, it is unwise to put hedge and boundaries around such a developing and fast growing subject. Its scope is essentially unlimited as it is concerned with the task of helping and organizing a discipline like education and the acts like teaching and learning that know no limits and boundaries. Educational technology is responsible for helping in each and every problem connected with education and there is never an end to the problems of education. Also there is no limit to the improvement in the art and science of teaching and learning. Therefore, the scope of educational technology should not be confined to the limited boundaries under any circumstances. Instead, it should be left free for necessary expansion and development so that it can carry out its mission, tasks and objectives.

## **Use and Significance of Educational Technology (in the Indian Context)**

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In India, before the 1960s, the term educational technology was almost unknown to the education system. If at all this was used, it was used as a synonym to audio-visual teaching aids. In the early sixties, use of the term educational technology took its roots through programmed learning. The programmed learning-movement contributed a lot to the improvement of instruction in a number of ways. Gradually, the meaning and concept of educational technology has grown wider. At present, educational scenario in India witnesses the latest emerging trends in the field of educational technology. The role of an educational technologist in India, today, is not merely that of an audio-visual aid master, hardware expert, media expert or programmed text writer, but of one who is concerned with the information of an overall design to carry out an evaluation of the total process of education in terms of specific objectives. In other words, technology of today is accepting systems approach to the problems of education. The emphasis now is on the application of system analysis to organize and manage the task of teaching and learning, and frame out the alternative strategies and system for the improvement of education.

Educational technology, as we find it today, has a meaningful present and promising future in our country. It has been contributing a lot to the improvement of products and



processes of education at all levels and stages of planning, implementation, and evaluation. It is serving the cause of formal as well as informal education and helping the developmental tasks of the country. Some of the significant developments in this direction may be summarized as follows:

1. There has been a wider and more effective utilization of radio for broadcasting educational programmes throughout the country. The programmes related to local needs and adult education have been very fruitful. These well-planned programmes are now broadcast throughout the country for both in-school and out-of-school groups. Many states have taken steps to integrate the radio broadcasts with teaching in schools.
2. Another significant development in the use of educational technology is concerned with the development of television programmes. Today, telecast lessons and educational programmes have established themselves as an important educational medium in India. Formal as well as non-formal education of the country is now closely linked with the television instructions of the country. With the advent of satellite services, especially with the launching of the EDUSAT project, there has been a beginning of a series of innovative and constructive television programmes for national development and for educating the Indian masses living in remote, rural, or underdeveloped areas.
3. The third important area where educational technology has been useful is the problem of training and re-training a large number of school teachers in an effective way. This has been made possible through the use of mass media for in-service teacher education. The in-service teacher training courses by using a multimedia package, developed by the Centre of Educational Technology of NCERT, represent a major breakthrough in this direction. In the teacher education programme, the educational technology has helped to reorganize the courses and make them effective by introducing new practices and innovations in all aspects of the teacher preparation. It has added new dimensions by introducing micro-teaching, simulated teaching, team teaching, teaching models and similar other concepts.
4. Another application of educational technology in our country is known as distance education. It involves the use of combination of media for the instructional purposes and provides the facilities for out-of-school education in a very flexible way at any place and at any time in the life of a person.
5. Another major area where educational technology is being used in our country relates to language instruction. Besides producing material for language instructions through mass media, it has contributed towards the development and functioning of the language laboratories to teach Indian as well as foreign languages like German, French, Russian, English, etc.
6. Another field of operation of educational technology in our country is concerned with the correspondence education. Today, the well-planned and systematically developed correspondence courses are being provided by a number of universities in our country. There is also provision to offer these courses at intermediate and higher secondary levels. In these courses, students may be approached through four media, i.e. instructional materials, student response sheets, personal contact programmes and radio or telecast instructions. The establishment of open school has been another major step in this



direction. The teaching is provided here through specially prepared lessons, study centres, local counsellors and tutors and summer as well as vacation courses.

7. Another use for which educational technology is being put in our country is concerned with the preparation, development and utilization of audio-visual material, and handling as well as maintenance of the hardware appliances and sophisticated gadgets. Department of teaching aids, NCERT, has been doing significant service in this direction through training programmes of personnel, production of materials, conducting survey research and evaluation of the use of aid material, and providing guidance and service to the educational institutions regarding the use of aids and appliances.
8. In the latest trend, educational technology is proving its worth by utilizing the services of computers and advanced form of ICT technology in the field of education. Use of these advanced technologies has a tremendous scope in improving the products and processes of education. In the developed forms of computer and ICT technology, it can help the teachers, learners, researchers, administrators and educational planners to get access to a valuable treasure of knowledge, skill and application for improving their own tasks. Distance learning or education, virtual classrooms, e-learning and m-learning, are the latest concepts and trends that are emerging in the educational horizon of our country.

Thus, educational technology has been proving its worth in our country by guiding, planning, implementing and evaluating various programmes of formal as well as non-formal education. It is being used as a big helping hand for attaining the macro and micro objectives of education in our country.