TOPIC : -
Approaches of
Educational Technology

Education 2ⁿᵈ Semester Paper – 06

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APPROACHES OF EDUCATIONAL TECHNOLOGY

The scientific investigations of technological developments have influenced every walk of human life. The educational process does not remain untouched by these advances. There is rapid mechanization in field of education. It has resulted the introduction of technology in field of education.

Many different approaches of technology can be used to support and enhance learning. Various approaches of Educational technology deliver different kinds of content and serve different purposes in the classroom. Each approach of technology is likely to play a different role in students' learning .

There are several educational approaches in technologies and there is great overlap among them. The educational process does not remain untouched by these advances. It has necessitated introduction of these approaches in technology in the field of education.

HARDWARE APPROACH OF EDUCATIONAL TECHNOLOGY

The hardware approach refers to the use of machines and other mechanical devices in the process of education. Its origin lies in the application of "physical science" to education and training system. The process of teaching-learning has been gradually mechanized through the use of teaching machines, radio, television, tape

recorder, video-tape, projectors etc. The teacher can deal with a larger group of students at the same time by his discourse through these machines.

The hardware approach is based on the application of engineering principles for developing electro-mechanical equipment for instructional purposes. Motion pictures, tape recorders, television, teaching machines, computers are called educational hardware.

Hardware approach mechanises the process of teaching so that teachers would be able to deal with more students with less expenditures in educating them.

Human knowledge has three aspects:

♣ Preservation,

♣ Transmission and

♣ Development.

The history of preservation of the knowledge is believed to exist since the printing machines started. The knowledge is preserved with these machines in the form of books which are shelved in the libraries, tape recorders and films.

The second aspect of human knowledge is its transmission. A teacher can impart knowledge himself to his pupils. Now a days,

transmission of the knowledge is supported by machine like mike, radio and television. With these, thousands of pupils can enjoy this home-delivery of such benefits.

The third aspect of human knowledge is its development. For this aspect, provisions are made for research work. In the research programmes, the main function is the collection and analysis of data. For this purpose, presently the researcher uses the electronic machines and computers.

Hence, all the three aspects of knowledge allow the use of machines. In short, the teaching process has been mechanized. The mechanization of teaching process is termed as the Hardware Approach.

BASIS OF HARDWARE APPROACH

> Hardware Approach has physical science and applied engineering as its basis.

> Hardware Approach has mechanised the whole teaching-learning process.

> Hardware Approach adopts a Product-oriented Approach.

➢ Hardware Approach has the potential to hand over the educational benefits to the mass with greater ease and economy.

CHARACTERISTICS OF HARDWARE APPROACH

• Silverman , called this type of educational technology 'Relative Technology'. Based on physical science and applied engineering field approach. The concept of hardware approach is derived from the application of "physical science" to education.

• The new mechanism of teaching-learning with improved technology as its basis. Suggesting innumerable new ways of doing things to the class-room teachers

• The job and the duties of the teacher are likely to have multifaceted changes as they are to deal with many new gadgets for teaching and learning .

• Engineering principles are used for the development of these types of technical equipments. The teacher can deal with larger group of students with the help of these 'Mechanical device' or 'Machines'.

•   The teacher can deal with larger group of students with the help of these 'Mechanical device' or 'Machines' , resulting in less cost and economy in finances .

SOFTWARE APPROACH OF EDUCATIONAL TECHNOLOGY

The pioneering work in software approach was done by Skinner and other behaviourists. The programmes which such a technology produces are often called software. Software Approach is also termed as Instructional Technology or Teaching Technology or Behavioural Technology.

It originates from behavioural sciences and their applied aspects concerning psychology of learning. The software approach used the principles of psychology for building in the learners a complex repertory of knowledge or modifying his behaviour . Psychology of learning provides solid technology for bringing desirable behavioural changes in the pupils and serves the cause of education of laying down definite instructional procedure, teaching behaviour and behaviour modification devices.

Newspapers, books, magazines, educational games, flash cards may also form part of software. Software approach is characterised by task analysis, writing precise objectives, selection of appropriate learning strategies, immediate reinforcement of responses and constant evaluation.

Software approach refers to the application of teaching- learning principles to the direct & deliberate shaping of behavior. Its origin lies in the application of "behavior science" to the problems of learning & motivation.

Educational technology is closely associated with the modern principles & theories of teaching. Models of teaching, theory of instruction, theory of teacher- behavior & principles of programmed learning. It is characterized by task analysis, writing, objectives in behavioral terms, selection of the appropriate teaching strategies, reinforcement for correct responses & continuous evaluation.

Software Approach is concerned with teaching objectives in behavioural terms, principles of teaching, methods of teaching, reinforcement of instructional system, feedback, reviews and evaluation. Software approach tries to develop all the three basic components of technology, i.e. Input, Process and Output.

BASIS OF SOFTWARE APPROACH

• In software approach, the basis of all thinking and working is behavioural science and psychology of learning.

• Software approach uses the principles of psychology for the purpose of behaviour modification.

• A teacher with added knowledge of software approach can use the films, flashcards, tapes etc., for various purposes.

• A teacher can plan better teaching which results into better learning. There is not end to his thinking.

CHARACTERISTICS OF SOFTWARE APPROACH

- This view of educational technology is closely associated with the modern principles of programmed learning and is characterised by task analysis, writing precise objectives, selection of appropriate learning strategies, reinforcement of correct responses and constant education.

- Silverman termed this educational technology as 'constructive educational technology.' Also known as 'Management Technology'.

- A modern approach in educational administration and organisation. It has brought to educational management a scientific approach for solving educational administrative problems.

- Origin of software approach lies in the application of 'behavioural science' to the education.   It refers to the application of teaching- learning principles in the shaping of behaviour.

- Its application while writing objectives in behavioral terms, selection of appropriate teaching, strategies, reinforcement for correct response etc

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SOFTWARE TOOLS

Word processing, database, spreadsheet, telecommunications, presentation, authoring, graphic paint programs. Teachers need to know how to use them, how to teach them to students, and how and why to use them in the classroom.

SOFTWARE TYPES

Drill and practice, tutorials or computer-based instruction, and simulations. Teachers need to know what these are as well as why, when, and how to incorporate them into their teaching.

SOFTWARE REVIEW AND EVALUATION

How to select appropriate software for specific grade levels and content areas, how to evaluate the effectiveness of this software, and what types of software are available. Teachers need to be thoroughly familiar with many of the software options available and understand when and how to use them in the classroom.

COMPARISON OF HARDWARE AND SOFTWARE APPROACH

Hardware Technology	Software Technology
1. Has its origin in physical sciences and applied engineering.	1. Has its origin in behavioural sciences and their applied aspects concerning psychology of learning
2. More concerned with the production and utilization of audio visual aid material and sophisticated instruments and mass media for helping teacher and learners in their task.	2. Try to make use of psychology of learning for the production and utilization of software techniques and materials in terms of learning material, teaching-learning strategies and other devices for smoothening the task of teaching learning.

3. Tries to adopt product-oriented approach, in the shape of teaching-learning material and strategy through thein utilization of the hardware instruments and gadgets for effective teaching learning.	3. Tries to adopt a process-oriented technique or approach for the production of teaching-learning material and strategies. The material produced here is made available for being used by the hardware application.
4. Based on the concept of service meaning hereby that it provides services in the field of education.	4. It helps in the production of software material being used by the hardware applications and gadgets for delivering their service to the users i.e. teachers and learners.
5. As examples of the appliances and gadgets being used in hardware technology service we can name radio, television, tape recorder, video, slides and film projectors, teaching machines and computer etc.	5. As examples of the material produced through software technology we can name, programmed learning material, in the shape of charts, pictures, models, slides filmstrips, audio and video cassettes, software packages etc.
6. Needs the services of software technology for its use and functioning. It can't go without the aid of software technology e.g. computer hardware in the shape of a machine like device is of no use if it does not make use of software services both for its operation as a machine and its multi-dimensional utilities. The use of application and utility software is in fact must for taking any service from the hardware technology of the computer.	6. Most useful and productive in the case if it is assisted and made into use by the hardware applications and gadgets. However, it can go alone for delivering its services to the users without calling aid from the hardware technology i.e. you can make use of programmed learning material a graph a text, etc. directly for the individualized as well as group instructions.
7. Has its mass appeal and utilization. It can contribute a lot in handing over the educational benefits to masses with greater case and economy.	7. Has no such wide application and appeal to masses as found in the case of hardware appliances like radio, telephone, computer application, etc.
8. Has resulted in improving the efficiency of educational, means and reducing the cost of education. A teacher may handle a big class with the help of hardware appliances like microphone, slide and film projectors etc.	8. Works for increasing the efficiency of the teachers as well as learning. However, it lags behind in the task of improving efficiency and reducing the cost of education.

Though there is difference in the aspects being stressed the hardware & software approaches, in educational technology they are functionally related to each other. Both software and hardware approaches are so interlinked that they cannot be separated from each other. One without the other is incomplete.

Role of hardware and software technologies in modern educational practices

1. Making the task of teaching-learning interest, purposeful and productive:

- Suggesting suitable teaching-learning methods, devices and strategies based on psychology of teaching-learning.
- Suggesting suitable maxims and principle of teaching-learning based on the theory and practice of technology of teaching-learning.
- Putting various types of audio-visual aid and materials and equipment at the disposal of teachers and learners.
- Providing a variety of instructional and self-learning material suiting the varying needs of teaching-learning situations and individuality of the teacher and learners.

2. **Use the multimedia and multi-sensory approach to teaching-learning:**Hardware and software technologies help the teacher as well as the learners for making a proper and judicious use of multimedia and multi-sensory aid material, equipment and principles of teaching-learning, derived from psychology and technology of teaching.

- All the sensory organs sense the sight, hearing, touch, smell and taste for the acquisition of the desired teaching-learning experiences.

- Multimedia, material and appliance involving hardware and software technologies for sharing desirable teaching-learning technologies.

- All the relevant and needed teaching-learning method, devices, and strategies, well-accompanied and aided by hardware and software technologies.

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3. **Management of the affairs of educational practices in an efficient and productive way:** Educational and professional responsibilities

- Planning o teaching-learning.

- Organization of teaching-learning.

- Leading teaching-learning.

- Controlling teaching-learning.

4. **Providing proper input and process for the best possible outcomes (products):** in the true spirit of the system engineering, use of hardware and software technologies can help the educational and instruction system to make all possible efforts for providing adequate and the needed process organizations to arrive at the best possible outcomes.

5. **Fulfilling the expectation of distances and correspondence education:**the demands of today's education and modern education practices are putting increase emphasis on the extension of distance education and correspondence and online education facilities to the increasing number of learners.

6Individualization of instruction: Individualization of instruction is a major trend in the modern educational practices and is the demand of the hour. In brief, we can highlight the role of hardware and software technologies on this account by stating some of the materials and equipment as follows:

- Programmed instruction, programmed books, and programmed learning modules.
- Teaching machines, computer assisted instruction and computer managed learning.
- Video and audio recorded learning and instructional material.
- Email, internet, teleconferencing and other online educational facilities.
- Special aid material, equipment and appliances used for special education and adjustment measure of for the disabled.
- Special provisions and facilities for the creative and gifted to nature and develop their individual capacities according to their pace and interest.