6. IMPACT OF TECHNOLOGICAL INNOVATIONS ON TEACHING – LEARNING PROCESS IN TECHNICAL EDUCATION: A CASE STUDY

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ABSTRACT

In the last decades of the twentieth century, World has seen remarkable growth in the field of Information Technology and Electronics & Communication. This offers number of challenges & opportunities to the various sectors. Education is one of them. In the light of Global Competitive Environment, Educational Institutes are considered as emerging pioneering service sector. They are to put lots of effort to satisfy their valuable customers & to survive in the competitive environment.

In this paper an attempt is made to understand the applications of latest technology in the field of Technical Education. The existing teaching methodology is to be reshaped by introduction of latest techniques like use of Multi – Media facilities, Internet, Video Conferencing etc. This paper consists of five parts. The first part includes the basics of Teaching – Learning Process. The second part highlights the innovations in teaching aids and its application in Technical Education. The third part talks about the pros & corns of the application of teaching aids. The fourth part consists of a case study showing the impact of innovative teaching aids for the Diploma Students. The concluding part is a blend of remarks, suggestions & future of applications of innovative technology in Technical Education.

1. GLOBALISATION AND CURRENT SCENARIO

We have seen and experienced lots of changes in the different sectors like Banking, Insurance, Communication, Medical, Media & Entertainment, Manufacturing etc... in the last two decades of the twentieth century. All these leads smooth functioning and better output with pleasant working conditions of the organisation. This is because of Globalisation, which leads to change in today's scenario rapidly and continuously. Due to this, every sector needs to have innovative technology for survival in the globally competitive market. Educational Institutes are also considered as emerging pioneering service sector with fast developing technology like Information Technology, Electronics & Communication etc... Educational Institutes have to utilize these innovative changing technologies for effective Teaching – Learning process.

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2. TEACHING - LEARNING PROCESS

Learning is a process through which one acquires new modes of behavior or changes the existing mode of behavior. It is fundamental to a person's development. It is individual to a learner. Learning takes place through the steps of attention, perception and conceptualization and also with one's own motivation and interest.

Teaching is an art as well as a science. As art it portrays the imaginative and artistic abilities of the teacher in creating a worthwhile situation in the classroom, in which the learners learn and achieve the immediate and ultimate goal of education. As a science, it points to the logical, mechanical and procedural steps to be followed to attain an effective accomplishment of goals. There is a close relationship between teaching and learning.

A simple systems model of the Teaching – Learning Process is shown in Figure-1.

3. TECHNOLOGICAL INNOVATIONS IN TEACHING-AIDS

People are using ATM / Credit Card / Debit Card for withdrawing money from their bank account without giving cheques and standing in a queue. Indian Railway has provided facility of online ticket booking, through mobile and payment can be made through credit card. These are few examples of use of latest technology and likewise, which can be used in all sectors. Hence technology can be used as a Teaching-Aid for the Teaching-Learning Process, which creates readiness in the learner for participating in the learning experience. Here is the brief of few Teaching-Aids used in Teaching-Learning Process in Technical Education.

The Teaching-Aids can be classified as Non-Projected Visual Aids, Projected Visual Aids, Audio Aids and Audio-Visual Aids. These are used to increase the effectiveness of Teaching - Learning Process and are discussed in brief as follows.
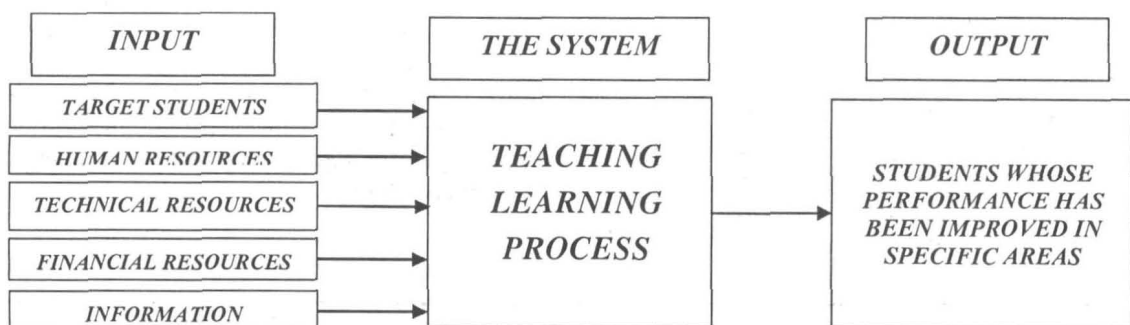
3.1 Non – Projected Aids

Non-Projected Aids include Boards (Chalk board, Magnetic board, Marker board), Charts, Models and Handouts.

Boards (Chalk board, Magnetic board, Marker board) are widely used in all sectors in education, which is cheapest, simplest and effective teaching resource. No electricity or expensive equipment is required. It can be used singly or jointly with other Teaching – Aids.

Charts are used because of its easiness to use and their versatility. It is useful aid while discussing in small group of students and act as an information store and memory substitute.

Models are often used where three – dimensional representation is necessary (e.g.

FIGURE: 1 THE SYSTEM MODEL OF TEACHING – LEARNING PRECESS

Solids, cut section models of mechanical component, crystal structure etc.). It provides a feeling of reality. It can either be carried in a classroom or kept in laboratory depending upon its size.

Pre-prepared notes, diagrams and tables can be given to students in the form of handout. This can save the time of both teacher and students of notes-taking, thus allowing students to concentrate better and have more chance to interact.

3.2 Projected Aids

Projected aids are Filmstrips & Filmstrip projector, Slides & Slide projector, Overhead projector and Opaque projector.

Filmstrip & Filmstrip projector is used in large classes where standard projection screen, Filmstrips & Filmstrip projector are available. Filmstrips are less expensive than corresponding sets of slides.

Slides & Slide projector has been one of the simplest and most popular methods. Slide projectors are usually fully automatic and can be linked to a tape – recorder in order to enable synchronized tape – slide presentations to be shown.

The Overhead projector is simplest, cheapest & portable compared to all the projected aids. It can be used in the normal classroom light. One of the advantages of the OHP compared to boards is that teacher can always face the class. The photocopies of the transparencies may be handed to students for the reference if required.

The opaque projectors can be used to project an image of a small diagram or a page of a book directly on a screen. This is useful when the time or technical equipment needed to make slides is not available.

3.3 Audio – Visual Aids

Audio – Visual Aids are Tape – recorder / Compact Disc Player, Television with Video cassette Player and Broadcasting unit / channel.

Tape –recorder / Compact Disc player can be used with workbooks which can bring about the cognative learning.

Television with Videocassette player is used to cover large audience. The Close Circuit Television (CCTV) can be used in-group to discuss & analyze the facts related to topics. The use of such gives en experience of both sound and pictures. Now – a – days programs related to education are extensively broadcast through satellite. [2]

3.4 Computers with Multi – Media Facilities

Since last few years, Computers with Multi – Media facilities & other things related to it are extensively used not only in higher level but also in primary & secondary school level education. This becomes possible because of high speed, consistence & accuracy, compactness & portability, better interconnectivity and versatility.

Internet is one of the critical source in all respect of education specifically Technical Education. Books, Magazines, periodicals presentations are easily available on the Internet. Conferencing is also possible through Internet.

4.   PROS AND CONS OF APPLICATION OF TEACHING–AIDS

There are different instruction techniques for Teaching – Learning Process in Technical Education. These techniques have their pros and cons, as discussed in brief in TABLE: 1.

There are few general benefits to the students as well as to the teacher by using the Innovative Teaching – Aids which are as under.

Benefits to Students:

1.   Multimedia Content enhances learning experience through simulations and by fostering collaborative learning.

TABLE: 1 PROS & CONS OF APPLICATION OF TEACHING – AIDS

Sr. No.	Instruction Technique / Teaching Aids	PROS	CONS
1.	*Lecture Method with Boards, Charts, Models, Handouts*	• Highly cost – effective in terms of Staff / Student ratio. • Useful when large number of students needs to receive the same information at same time with explanations. • Popular with many Teaching Staff.	• Highly dependent on skill of Lecturer. • Little Student involvement. • Difficult to cater for mixed ability groups • Lectures are longer than students' concentration spans.
2.	*Filmstrips & Slides with projector, Overhead projector (OHP) & Opaque projector*	• Visual effects & completed figure can be projected. • Time saving. • More interaction with student.	• Without power supply it is of no use. • Separate projector room & projector are required. • No audio effects are available.
3.	*Television, CD / DVD Player, Computer with Multi – Media Facilities*	• Combinations of both audio – video effects are available. Also animation is possible. • Great time saving • Better understanding among students by virtual reality. • Repetitive use • Individual learning is possible • Highly simulating & memorable.	• Can be expensive to make compare to other aids. • Cannot be used unless suitable playback / projection equipment is present. • Basic skill to operate is necessary.

2. Teachers having varying degree of proficiency to deliver high quality learning experience to students can use deployment of multimedia content.

3. Content can be used as a tool for superior concept building, saving teacher's time and for better student performance.

4. Technology in education leads to improvement in:

   • Class attendance

   • Pass percentage

   • Student performance

   • Teacher motivation

5. Students absorb information better when they use their senses for learning

Benefits to Teachers:

1. Teachers are encouraged to try alternative methodologies, other than chalk-and-talk.

2. Teachers are encouraged to be more creative and have a greater ownership of the process of teaching.

3. They are better able to deal with the 'individual differences' of the learners.

4. Teachers can easily tackle 'difficult' areas of the curriculum.

5. Teachers have an unending and ready resource base, which they can tap to make their own learning more proficient and up-to-date.

6. Teachers are able to spend more time on mentoring and not have to be 'presenters of information'.

5.   A CASE STUDY

The course of Engineering Drawing / Graphics is such a typical course to teach and to make Diploma Students to learn. Generally black boards, charts and models are used for teaching the course but still common difficulties in

understanding the topic was noticed among students. Since 2004 Multi – Media presentations are being used to teach the course and surprisingly interesting observations are found which are presented as a study.

Target Students: Diploma Students (S. S. C. Passed)

Course Name: Engineering Drawing / Graphics

Common Difficulties:

1. Students lack power of imagination.

2. Since Students are of Low Entry Level, the course is difficult to digest.

3. Teacher fails to create interest among students in some cases.

4. Good board work is required with colored chalk.

5. Difficult to mug up the topics. It is difficult to understand courses in which drawing is involved & hence the implementation of Engineering Fundamentals is difficult.

Multi – Media Presentation: A Multi – Media presentation with audio – visual & solution of problems (Fully Animated) along with a book.

Observations after Use of CD presentation:

1. Students have better perception & conceptualization since the animated solutions of problems are available.

2. Teacher can repeat the same topic again & again until the students have proper understanding.

3. Students can repeat the CD of their own since the CD presentation is self-explanatory.

4. A full chapter can be easily divided into subunits. Students can give a small test at the end of each topic.

5. It improves the final result.

6. CONCLUSION

"A Teacher who can bring out the creativity of children is the real teacher. The computer lesson has made in such a way that it brings out the creativity of children, so I believe even up to the age of 17, that is up to ten plus you can keep the children smiling if the education system keeps the focus on themes of creativity"

- Dr. A. P. J. Abdul Kalam – The former President of India

The author strongly believes that the use of innovative technologies incorporate ample improvement in Teaching – Learning Process at any stage to the entire stake – holders of the process. I also suggest that all Educational Institutes of the Country must use such innovative technologies for enhancing Teaching – Learning Process.

7. REFERENCES

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