Original Research Paper

Education

Conventional to ICT Based Teaching: Paradigm and Attitude Shift in Engineering Students

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ABSTRACT For the purpose the sample of 200 engineering students was drawn from engineering colleges of Delhi (NCR)/ Ghaziabad district. The students were divided into two groups 100 were in experimental group while 100 in control group. Pre-test was conducted for both the groups. The control group students were taught through conventional method of teaching. The experimental group students were taught through ICT. After completion of the ICT based method, the achievement test was administered as post test to the students of experimental group. Significant moderate positive relationship between learning achievement and attitude was found. The engineering students of the experimental group achieved more than engineering students of the control group.

Introduction

In India, as in rest of the world, phenomenal changes are taking place in almost all walks of individual, social and national life at fast track. Since education plays a pivotal role in liberation of individuals from ignorance, exploitation and poverty and makes the nation enlightened, prosperous and empowered, it has to respond to the demands of the changing times to retain its relevance and effectiveness.

Change then is a key contextual factor developing in engineering curricula. With incorporation of ICT in engineering develop new ways of doing things gradually, Changing the focus of classroom activities from an emphasis on teaching to an emphasis on learning .In time, their classroom practice becomes transformed as the focus of the class room becomes learner- centered and students use ICT to solved real worlds problems that cut across traditional boundaries.

Planned change in education with an overall qualitative improvement can be instrumental in achieving the target of a better and a higher quality of life. This change in educational scenario would rest on the academic acumen, chiseled professionalism and unshakable commitment of teachers and teacher educators working in perfect consonance with educational planners and managers. Their vision, zeal, imagination and creativity have to be continuously supported by fresh academic enrichment and research based pedagogic innovations.

Generally, in the societies, the status of teachers holds a very high position because the teacher is the only person on whose shoulders lies the burden of the development of the younger generation.

Conventional teaching:-

- The conventional is built around is very rigid structure.
- We have 3-4 years long degree program, semester long courses, based on an hour long lectures.
- There is practical session for some subjects and some tutorials.
- Mostly courses are conducted in lecture based fashion.
- The assignments and home works are also given to students.
- Assessments are through written examination.
- Most critical entire teaching learning process is centred around fixed syllabus and defined textbooks.

ICT

ICT"is the Information and Communication Technologies.

"ICT in Education" means "Teaching and Learning with ICT".

Worldwide research has shown that ICT can lead to improved student learning and better teaching methods.

AMENDMENTS OF AICTE RULE

There should be single entrance exam for engineering admission It will be mandatory for faculties to undergo foundation courses of ICT in education.'

Every 5 years faculties to train under new technologies

Internship should me mandatory for engineering students

"One moocs courses will be compulsory for students; it will have value of 20% of the entire syllabus.

Use of ICT in education for online blended learning will be compulsory for every teacher.

It will have recognition in NAAC, AICTE, and NBA accreditation".

ROLE OF ICT TO ELEVATE IN ENGINEERING TEACHING LEARNING

In almost all sectors of education the role of the teacher is changing from being not only a transmitter of knowledge but also that of facilitator of the teaching-learning process. Owing to the onset of information and communication technology (ICT), new applications of technology and enhanced accessibility to it are introducing new possibilities of teaching and learning. The traditional boundaries of the classroom are giving way to virtual learning and online courses. All these developments would have profound impact on teacher education programmes and processes. This technology invites learners to be more independent and the curricula to be more dynamic. Teachers need to complement their content and pedagogy expertise by utilizing online facitilies.Use of ICT effectively requires a change in classroom practice rather than mere acquisition of technical skills. Teachers need to familiarize themselves with possibilities, approaches and applications in the use of ICT that facilitate teaching –learning. These technologies along with overhead projector and computer projections have the potential to make teaching, learning and training processes more efficient and cost effective. It has opened up new possibilities of reaching out to the still unreached –disadvantaged groups and children with special needs.

The educational channels need to be organized, strengthened, and utilized for creating awareness, providing instructions and offering solutions to problems faced by learners of specific ages. The

increasing use of technologies has brought changes in the modes and methods of instructional processes which are becoming more learner-centered. New interactive relationships among teachers, learners and technologies are emerging.

Teacher education programmes at the pre-service and in-service levels must have ample scope for inducting pedagogic skills and management of technologies as important component s of teaching –learning environment to enhance efficacy of transaction. These need to integrate technology-related practices with the existing methodology courses and introduce specialized courses to equip the student teachers with skills of operating and maintaining hardware, acquiring and utilizing software of different kinds i.e. structured textual materials, teaching aids, audio-visual cassettes, multi-media, CD-ROMs and sharing information through networking in collaborative and participative methods. The application of ICT in the educational setting has to be cultivated, promoted and nurtured.

Teachers have to develop new understanding, approaches and attitudes in harmony with new developments in information technology. Their proficiency in these areas would help them train students effectively. Engineering institutions will have to take leadership in using information technology.

As technology has created change in all aspects of society, it is also changing our expectations of what students must learn in order to function in the new world economy. Students will have to learn to navigate through large amounts of information, to analyze to make decisions, and to master new knowledge domains in an increasingly technological society. They will need to be lifelong learners, collaborating with others in accomplishing complex tasks, and effectively using different systems for representing and communicating knowledge to others.

A Shift from teacher centered instruction to learner centered instruction is needed to enable students to acquire the new 21st century knowledge and skills.

Paradigm Shift through ICT in Education

S.N.	FROM	TO
1	Teacher-centric, stable designs	Learner-centric, flexible designs
2	Teacher direction & decisions	Learner autonomy
3	Passive reception in learning	Active participation in learning
4	Learning within the four walls of classroom	Learning in the wider social context
5	Knowledge as given and fixed	Knowledge as it evolves & is created
6	Disciplinary focus	Multidisciplinary focus
7	Linear exposure	Multiple & divergent exposure

The 21st century teachers and students require the lenses of learning –from ICT-with ICT-Around ICT with the skills of
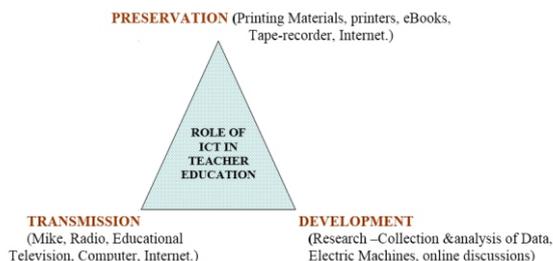
1. Digital age literacy-Basic, scientific, and technological literacy.
2. Inventive Thinking-Intellectual capital-Ability to manage complixity, curiosity,
3. Effective communication-social and personal skills-Teaming, collaborative & interpersonal skills.

• ROLE OF ICT ENGINEERING LEVEL

It occupies a unique position in the system of education. As teacher in engineering system exists today, there are many online e-courses programmes for preparing teachers at engineering .There is no provision however to prepare teachers for higher stage.

Role of ICT to elevate teachers at higher education to empowering teacher for self-study, reference e-books, critical thinking, abstract thinking, and application of knowledge by adopting various

methods such as project work, acquire skills for guidance and counseling.

PRESERVATION (Printing Materials, printers, eBooks, Tape-recorder, Internet.)

ROLE OF ICT IN TEACHER EDUCATION

TRANSMISSION (Mike, Radio, Educational Television, Computer, Internet.)

DEVELOPMENT (Research –Collection &analysis of Data, Electric Machines, online discussions)

ICT is the application in the education and teaching with which the teaching process is being gradually mechanized so that maximum teachers may be educated in minimum time and at low cost.ICT (cinema, gramophone, radio, tape-recorder, projector, computer, closed circuit television, electronic videotape etc)all makes education more effective in order to achieve the teaching objectives.

• TABLE SHOWING THE PARADIGM SHIFT THROUGH ICT

S. No.	Different Teaching domain	Objectives	Role of ICT
1	KNOWLE DGE	All round development, new observational skills, habit formation.	Establishment of "learning resource center" equipped with audio-visual material like T.V, VCR, slide projectors of different methods of chemical engineering
2	UNDER- STANDIN G	Integrated & holistic approach; inculcating social, cultural, aesthetic, moral & scientific values; responsive & transparent evaluation	Multicultural settings, training of cooperation among teachers, skill training in undertaking action research. Online conference, seminars & expert discussions.
3	APPLICA TION	Empowering teachers to guide learners for self study, reference skills, critical thinking adopting various methods such as Project work & tutorials. Research attitude.	Electronic information resources, E-journals, E-conferences, Bulletin board services, Global classroom, E-libraries.
4	EVALUAT ION	To know existing educational policies, curricula & syllabi, skills for effective transaction of curriculum. New educational development	Audio-Video teleconferencing. Connectivity with the concerned agencies like NCERT, SCERT, NCTE, UGC, CABE. etc. Training of computers & higher learning opportunities through correspondence.

Reviews on study:

1 jeyamani (1992) –has selected the topic the effect of simulation mode of teaching through CAI,in his studies he found there is same effect of simulation through CAI on both language medium.

2 Singh R.D.(1992) –has selected the topic the study the effectiveness of computer assisted instruction in teaching science and maths at elementary level.

He found that

The study has been designed to achieve the following objectives-Different achiement results and concluded that students using CAI method scores significantly high percentages than those who

taught through the conventional method.

STATEMENT OF THE PROBLEM

The present study is designed to find out the paradigm shift in conventional and ICT in engineering student. The topic entitled as-
Conventional to ICT Based Teaching: Paradigm and Attitude Shift in Engineering Students.

Objectives of the study :

To find out the status of learning achievement in energy resources among engineering students:
1. To study the effectiveness of student helping student methods on learning achievement.
2. To examine the energy resources attitude of engineering students.

Hypotheses of the study: The important step of a scientific investigation is to formulate hypotheses.

The hypothesis is a tentative solution of a problem.

The meaning of the word hypothesis is the pre imaginative idea. This is the important aspect of the process of research. According to Bacan and his Coworkers - "Hypothesis should be suggested as soon as the existence of a problem is discovered".

1. There is no significant difference between the learning achievement of engineering students in engineering chemistry taught through conventional method and ICT Method..
2. There is no significant difference in the scientific attitude of control and experimental groups.
3. There is no relationship between learning achievement and scientific attitude of engineering students.

Sample and Sampling Technique:

The sample of this study comprised of 200 students studying in engineering from 2 engineering colleges of Ghaziabad by random sampling technique.

The investigator selected 2 engineering colleges and each college have 100 Engineering Students. The investigator divided the control group and experimental group.

Tools Used:

The topics included for teaching were -Chemical Bonding, Polymer Chemistry, Water Treatment, Electrochemistry and fuels.

The investigator developed and validated and chemistry attitude inventory which was tried out on engineering students.

Experimental Procedure:

The control group was taught through conventional method of teaching. The experimental group was taught through ICT in the topics . These topics were taught to the experimental group for duration of five weeks.

Post –testing:

After completion of content matter by conventional and ICT approach, achievement test and tools of chemistry attitude were administered as post –test to engineering students of experimental group and control group.

Statistical Techniques:

Mean, Standard deviation, t value and r value were used.

## Results:
Pre-test Analysis

The investigator constructed an achievement test on Chemical Bonding, Polymer Chemistry, Water Treatment, Electrochemistry and fuels.

The test consisted of the topics Administration of this test to the experimental group and control group helped the investigator to study the initial level of achievement of the engineering students. The mean and standard deviation for the control group and experimental group in the pre-test is shown in Table3

## Showing the pre-test score analysis of learning achievement (table3)

S.N.	Group	N	M	SD	t –value
1.	Control Group	100	25.6	7.1	
2.	Experimental Group	100	26.2	8.0	.52 (Not significant)

The mean value of the control group and experimental group are 25.6 and 26.2 repectively.It indicates that the performance of engineering college students in the two groups during the pre-test was almost same.
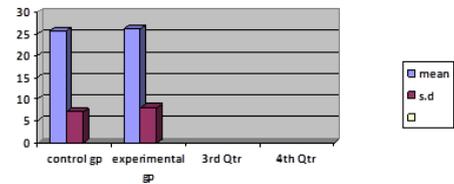
Pre-test Analysis of engineering chemistry Attitude

Showing the pre-test analysis of chemistry attitude(table3)
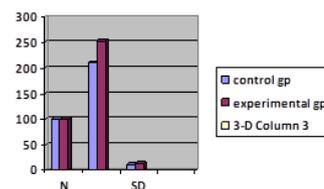
S.N.	Group	N	M	SD	t-value
1	Control Group	100	206	12.35	0.51(Not Significant)
2	Experimental Group	100	201.2	17.32	

The above table indicates that the performance of the Engineering Students in the two groups on the pre-test is almost same on the measure of chemistry attitude.
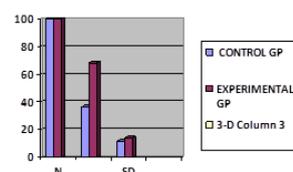
Post-Test Analysis:

After examining the results of the pre-test, investigator presented the teaching by using multimedia approach to the experimental group to improve learning achievements of the engineering students.

The teaching based on the multimedia approach to the experimental group was followed by post-test. The mean, standard deviation and t value for the control and experimental groups on the post-test are shown in table.

Showing the post-test analysis of learning achievement (table4)

| S.N.	Group	N	M	SD	t -value
1.	Control Group	100	36.45	11.34	10.34 (Significant)
2.	Experimental Group	100	68.34	14.13	

It is clear from the above table that the mean of the experimental group is significantly higher than the mean of the control group.i.e

the experimental group scored higher than the control group.

Post-test Analysis of chemistry Attitude:
Showing the post-test analysis of chemistry Attitude (table5)

S.N.	Group	N	M	SD	t -value
1.	Control Group	100	211.12	10.2	5.5
2.	Experimental Group	100	252.12	14.13	(Significant)
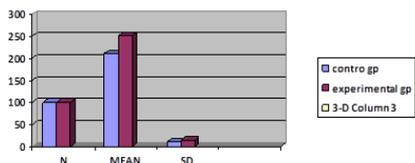
It is clear from the table that the mean of the experimental group is significantly higher than that the mean of the control group .

Therefore, it is concluded that the student helping student approach has made a positive impact on the chemistry attitude among the experimental group.

Educational Implications:
From studies conducted in recent years, it is evident that information and communication technologies (ICT) can help to broaden access to education and improve learning outcomes. Research has also shown, however, that success in the use of ICT in education depends largely on teachers and their level of skill in integrating ICT into the teaching process and in utilizing ICT to provide learner-centered, interactive education. Therefore, training teachers to be able to use ICT and to integrate ICT into teaching is crucial for achieving improved educational outcomes with ICT.

In recent years, various programmes have been implemented in the Asia-Pacific region that seek to raise the capacity of teachers to utilize ICT effectively in teaching or that seek to utilize ICT tools to improve teacher education, or both. Many of these programmes are innovative in that they have pioneered this type of training in their country or they have introduced new techniques and training procedures.

Since the engineering teachers needed to become qualified to different aspects of multimedia in colleges, the curriculum development process included a concerted effort to match the curriculum to the schools' computer studies syllabus. However, at the time the curriculum was being developed there was a move to revamp the old computer studies syllabus for Grades 9 to 12. Because of the uncertainty of the school syllabus, it was therefore difficult to develop the curriculum. Consequently, it was agreed that the curriculum would be based on the existing syllabus and the relevant modules would be altered in future to match the revised school syllabus.

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