

# Application of ICT in Teaching – Learning Process

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## ❖ Introduction :-

The present era is the age of Information Communication Technology. Due to the advent of ICT & IT, life has become easier. During the last few decades, there has been a tremendous growth in the use of ICT in all fields such as industries, businesses, societies, lives of people and education.

Now the educational institutions all over the world are integrating ICT with the teaching- learning process in order to provide knowledge and skills to the learners to meet the challenges of educational environment. Jeelani (2011) rightly remarks, “ It is only through education and the integration of ICT in education that the one can teach students to be participants in the growth process in this era of rapid changes.”

In Watson’s (2001) description, ICTs have revolutionized the way people work today and are now transforming education systems. As a result, if schools train children in yesterday’s skills and technologies they may not be effective and fit in tomorrow’s world. This is a sufficient reason for ICTs to win global recognition and attention. Kofi Annan, the former United Nations secretary general, points out that in order to attain the goal of Universal Primary Education by the year; 2005 we must ensure that information and communication technologies unlock the door of education systems. This indicates the growing demand and important place that (ICTs) could receive education.

Since ICTs provide greater opportunity for both teachers and students to adjust learning and teaching to individual needs, so it is necessary to integrate ICT application in School education.

But introduction and integration of ICTs at different levels and various types of education in a developing country like India is the most challenging. Failure to meet the challenges would mean a further widening of the knowledge gap and deepening of existing economic and social inequalities among the developed developing countries.

## Objectives :-

1. To enhance the application of ICT in teaching-learning process.
2. To know the importance of ICT in teaching-learning process.
3. To know the benefit of application of ICT in education.
4. To enable the teacher computer aided instructions.
5. To develop the ICT skills.
6. To conducting the professional development.

## 2. **Meaning and Definition of ICT :**

ICT means Information Communication Technology. It has three parts Information, Communication and Technology.

Information is the summarization of data. Technically data are raw facts and figures that are processed into information.

Communication is a process which disseminates information and Knowledge. And Technology is a mode or media through which information can be disseminated.

So ICT is the technology required for information processing and spreading.

ICTs are technologies such as radio and the newer digital technologies like computers, satellites, mobile phones and the internet.

ICTs are electronic collection, editing, storage, distribution and presentation of information. ICT is the means in which people interact with their colleagues around the world, exchange their ideas, information, messages and coordinate each other through variety of technological means.

### **3. Components of ICT :**

ICT includes communication devices and applications like computer, hardware networks, software, mobile technology, satellite communication video conferencing, RFID Technology, WI-FI zone, pen drives, Internet, www. Web 2.0 and Social media etc.

#### **Satellite communication :**

The age of satellite communication dawned in 1962 with the launching of Early Bird, the first communication satellite. The two big international satellite systems Intelsat and Intersputnik began operating in 1965 and 1971. India launched a satellite for communication called INSAT and for Education purpose EDUSAT was launched in the year 2004. INSAT-4CR was launched on 2 September 2007 by GSLV\_F04. IT is a replacement satellite for INSAT-4C which was lost and destroyed.

#### **Video conferencing :**

It is a two way communication system. It is also called teleconferencing, is the use of televisions video and sound technology as well as computers to enable people in different locations to see, hear and talk with one another. It can still consist of people meeting in separate conference rooms or booths with specially equipped television.

#### **World Wide Web :**

The World Wide Web, known as [www.w3](http://www.w3) or simply the web, is one of the several internet developed to help, publish, organize and provide access to information on the Internet. The web was first developed by Tim Berners Lee I 1989 while working at CERN, European Particle Physics Laboratory in Switzerland.

#### **RFID Technology :**

Radio Frequency identification is the wireless use of electro-magnetic fields to transfer data, for the purpose of automatically identifying and tracking tags attached to objects. The tags magnetic field produced near the reader. Unlike a Barcode, the tag does not necessarily need to be within line of sight of the reader, and may be embedded in the tracked object.

Now a day's RFID can be used library circulation operation and theft detection systems. RFID- based systems move beyond security to become tracking systems that combines security with more efficient tracking of materials through the library, including easier and faster charge and discharge, inventorying, and material handling (Boss 2004). This technology helps librarians reduce valuable staff time spent scanning barcodes while charging and discharging items.

#### **Advantages of RFID :**

1. It reduces staff time.
2. High Reliability.
3. Minimal human intervention.
4. High speed inventorying.
5. Long tag life.
6. Automated material handling.

**Disadvantages of RFID :**

1. High cost.
2. Accessibility to Compromise
3. Removal of exposed tags.
4. Exit gate sensor (reader) problem.
5. Lack of Standard.

**❖ Role of ICT in Education :**

Information Technology can provide a medium for teaching and learning and contribute flexibility to course provision.

The valid uses of information Communication Technologies are :

- Distance learning via electronic networks.
- Open learning through students controlled learning pathways.
- The process of changing teaching and learning styles by using a narrow range of Information Technology based facilities.

Presently there are four areas of education namely: Learning, Curriculum and Educational programme. ICT has been added essentially in the 21<sup>st</sup> century as the fifth potent area of education (SamPATH, 2011). According to the revised Draft on National Policy Information Communication Technology in school education (prepared by the Department of School education literacy, MHRD in 2011) ICTs are all devices, tools, contents, resources, forums, and services, digital and those that can be converted into or delivered through digital forms, which can be deployed for realizing the goals of teaching learning, enhancing access to and reach of resources, building capacities, as well as management of educational system. This will not only include hardware devices connected to computers and software application but also interactive digital content, Internet and other satellite communication devices, teleconferencing, video conferencing, web-based content repositories, interactive forums, learning management system and management information system.

ICT make education system more productive, interesting, give more powerful instruction and also able to extent the educational opportunities to masses and creating information- rich learning environment.

ICT has made the class-room transaction more interesting. It has extended the teaching learning process beyond the boundaries of classroom. Students are now able to use laptop computers and wireless networks anywhere in campus. A computer allows high speed information exchanges to occur with individuals within the institution as well as around the world. ICT brings the outside world in to the classroom teaching learning process, makes the things more realistic and thus helps the learners to understand the abstract thought very clearly.

ICT can improve the quality of higher education by promoting experimentations, researches and innovations, adopting the new strategies in the teaching- learning process and integrating the new information with the best practices. In 1998 UNESCO world Education Report stressed the importance of ICT in higher education to generate quality education. Recently ICT has become significant tool in the field of education. ICT stimulates the learners to acquire quality research through team work, time management, analytical thinking, global consciousness, basic communication, problem solving and guided instruction (Singaravelu and Muthukrishnan, 2007).

ICT has also played a vital role in providing distance education very effectively. IT provides online delivery of courses, online assessment and online design courses to large no. of students at a time. The IC- based system like digital libraries ; online courses, audio and video conferencing contribute significantly to the area of E- Learning and have opened a new era in the area of E- Learning.

### ❖ **Application of ICT in Education in India :**

In India, application of ICT in Education was started few years back and it has touched the every aspect of human life and it has become a vital part of our daily life. Presently ICT in India has greater potentialities and promising future because our country possesses one of the largest ICT workforces in the world and there is growing awareness building among the educationalists, stakeholders on the emerging role of ICT in enhancing the process and out-come of education.

In 1975-76, Satellite Instructional Television Experiment, a Satellite based educational programme was introduced in India and the programme related to health and hygiene were telecast to more than 2000 villages covering six states of India. The INSAT satellites were land mark in the history of Indian educational Technology. The Educational television broadcasts started through INSAT satellite in 1982 in Orissa and Andrapradesh and after that they were extended to some other states like, Bihar, Maharashtra and Uttarpradesh. Now INSAT cover whole country and a Variety of educational programmes are being telecast by it, as the vital aim of the INSAT is to bring the rural people into national mainstream. Another Satellite, EDUSAT, a satellite for Education purpose was launched in 2004.

The National Policy on Education 1986, as modified in 1992, stressed the need of Educational Technology to improve the quality of education. The Curriculum Framework (2005) also highlighted the significant role of ICT in School Education. Sarva Shiksha Abhijan (SSA)- a mission of the Indian Government to achieve the UEE, also stresses the important of ICT in educational sector and the Central Advisory Board of education (CABE) also in its report on Universal Secondary Education- 2005 featured the comprehensive use of ICT as one of the most important aspects of schooling. Presently the government of India has taken various initiatives to integrate ICT in educational sector to facilitate information dissemination and communication in every area of education.

Our Prime Minister, Narendra Modi said that Information Technology is becoming the growth engine which has the potential to transform India into a Knowledge Economy and Society.

Even though computer have been introduced in schools in India, The education system has largely not been influenced by the potential for pervasive change intrinsic to ICTs. Hence a proposed increase in the spending on ICTs in school education from less than Rs. 1000 Crore in the 10<sup>th</sup> Five year plan to more than Rs. 6000 crore in the 11<sup>th</sup> five year by MHRD could reflect an urgency to harness ICTs for systematic change in the education sector.

In the 12<sup>th</sup> five year plan, special stress has been given on enhancing facilities in schools especially on ICT. The stress laid on implementing ICT in elementary level by replacing the erstwhile Computer Aided Learning (CAL) under SSA which would include provision of networked computers, accessories and an Internet connection in a phased manner. Development of Pedagogically appropriate e- content in local language and a variety of software tools to serve the school curriculum have also been given special emphasis. This will focus to enable students and teachers to access wide variety of resources indispensable integrated in classroom available in the digital format, store over, efforts to made to the cost- effective and efficient ICT solution have also given special emphasis.

### ❖ **Benefits of ICT application in Education :**

The benefits of ICT application in education can be summarized as bellow :

- ICT increases the access to education.
- It improves the quality of education by developing new ways of interaction and also makes teaching- learning process more interesting.
- It provides equal opportunities to the large number of learners to obtain education and information.
- It provides specialized tools for learners with visual, hearing or mental impairment, so that they learn and acquire knowledge at their own pace.

- It provides support to each and every school in sharing educational/ learning experiences with the different schools throughout the country.
- It enables the distance education system to be more effective.
- It helps in promoting technology literacy to every citizen and especially to young stars.
- It provides opportunities for lifelong educations.
- It enhances the teacher's quality both in terms of teaching and research.

#### ❖ **ICT in Classroom Instruction :**

The systematic use of ICT tools in classroom instruction makes the teaching learning process more effective and highly interactive. It has shifted the teaching- learning process from teacher-centered learning to student centered learning. Research has shown that high level of student and instructor satisfaction can be produced in ICT enabled learning process.

But the effective and efficient use of ICT depends on technically competent educators / teachers. They should be able to appreciate the potentiality of ICT and have positive attitude towards ICT.

- a) ICT literacy of Teachers.
- b) Effective use of ICT hardware and software for teaching- learning activities.
- c) ICT- based pedagogy, online support, networking and management.
- d) Adopting best innovative practices in the use of ICT.

#### ❖ **Various ICT tools used in Classroom Instruction :**

The following are some of the technological tools used in teaching- learning process. These are, Computer-Aided Instruction (CAI), Computer – Assisted Learning (CAL), LCD projector, Power Point Presentation, Smart board, E-mail, Discussion forum, Wikis, Blogs Social Media, YouTube, CCTV, Video conferencing, Teleconferencing, Google earth, Google Maps, School tube, Teacher Tube, Flickr, Classroom 2.0 Ning etc.

#### ❖ **Computer- Aided Instruction :**

Computer, as an aid to the instruction, involves a set of programming Instruction which is used in the teaching- learning process to develop certain skills among the learners. Here, the computer is used to present, drills, practice, exercise and tutorial sequences to the students, and some time to engage the students in a dialogue about the substance of the instruction. It appears that computer is used as teaching aid for a teacher. So Computer- Aided Instruction is a type of Instruction which is used to achieve the objectives of the Instructions.

CAI work as a teaching aid and it facilitates psychological based learning, self- pacing and individualized instruction on the part of the learners.

In CAI, the role of the teacher has changed from the traditional method of delivering lecture to a supervisor or a guide. NO computer can replace a teacher, a teacher, a' teacher ' role is very important in the process of teaching- learning. In CAI, the teacher has to play so may roles like computer engineer, lesson writer and a system operator, as CAI needs the services of the aforesaid experts.

#### **Mobile learning :**

The term M- learning stands for mobile learning, which means learning with the help of hand held technology such as Mobile Phone, Laptop and other portable devices, Mobile is a portable device, M- learning is convenient as it is accessible virtually from anywhere. M-Learning means, ' acquisition of any knowledge and skill through using mobile technology anytime, anywhere that result in alteration of behavior ( Tejwani & Silviya Thomas, 2013). Now days, Smart Phones are available in the market and they have most common features like laptop and computers, and they are relatively less expensive than Laptop and Computer. M- Learning also brings Strong portability by replacing books and

a note with a small RAM's filled with tailored learning contents. It can download a PDF File or E- books with the help of Android or Windows Phone and store it in its RAM.

#### **Use of M- Learning in classroom transaction :**

- Teacher can record their lecture and upload it as a podcast and can share their link with their students. Students can use this link while studying or for references.
- Through text messaging with teachers, students can clarify their doubt related to classroom lesson while reviewing the lesson, and teacher can answer them instantly or in the next class or can direct them to the reference sources where they can meet their query.
- Teacher can create short list of salient points like history dates, exam hints, short summaries etc which can be shared with students through messaging.
- Mobile dictionary can be used by the students to build vocabulary.
- Teacher can allow their students to take 5 minutes to study the National Geography using Google Maps.
- Mobile phone makes it easy for the Students to discuss class related topics with their peer-maters and their teachers in social media/ social networks.
- Mobile learning allows group learning of students when they are working same projects.
- Teacher can ask a new question related to the subject taught in the class and let their students to find out answer from internet sources by using Mobile phone and to see how quickly they find out the answer. This will enable to know how well they understand the topics.

#### **Advantages of M- learning :**

- Mobile devices are cheaper than desktops or laptops.
- M- learning can be used anywhere anytime including schools, colleges, offices, homes etc.
- Fast & easy accessing of information.
- Motivates the students with multimedia facilities.
- Enhances and compliments traditional teaching styles.

#### **Disadvantages :**

- Devices may become outdated quickly and students have to keep combating obsolescence.
- Mobile Network has limited bandwidth.
- With the help of Mobile Network people can download file but cannot print out the material.
- Mobile learning can create eye sight problem also.
- Loss of Data may occur due to discharged batteries, low storage capacity of devices.

Smart class and Blended learning also make classroom transaction highly interactive. Blended learning can be thought as a new pedagogical approach that combines the effectiveness and socialization opportunities of classroom with the technologically advanced active learning possibilities of the online environment. Where as Smart classrooms technology enhanced classrooms that foster opportunities for teaching and learning technology, such as computer specialized software, audience response technology, networking, and audio/visual capabilities. The smart classrooms demands learning initiative that assist educators to make ICT integral to learning.

Use of above mentioned technologies in teaching- learning will make the teaching- learning process more interactive and effective. All the process of learning is crossing the boundaries and barriers. For using ICT tools in teaching- learning institution must reconstruct their organizational structure. With the gaining speed of technological progress, Information Communication Technologies are opening up new facilities for learners and have played a

significant role in teaching learning process. Therefore it is high time for the teachers to get an awareness of these resources for future academic growth.

### **Benefits of ICT in Teaching Learning process :**

- ICT can make the teaching learning process more interactive and effective.
- It helps in motivating the students towards their lesson.
- Learners can learn and work at their own pace just with little guidance from teachers.
- ICT enables the learners to interact with the teachers, peers and experts on various issues outside the classroom.
- Learners can get various information very quickly.
- IT also helps the teachers to evaluate the learner's progress and proficiency in certain skills.
- It can also remove the monotonousness of traditional classroom system.
- Encourages contact between students and faculty through social networking tools, blogs, wikis, text message etc, especially those students who are shy and unable to speak out in face-to-face classroom settings.

### **Problem faced in Implantation of ICT in Teaching- Learning process in Indian Context :**

- Lack of proper infrastructural development in rural areas.
- Lack of Skilled and trained teacher in primary and secondary schools in remote areas where most of the primary schools are run by single teacher.
- Lack of proper funding is another problem, mostly found in developing country. ICT implementation in teaching learning process needs widespread investment which is not possible for developing country, though India is trying their level best to reach the elevation but skill it is one the process.
- Underpinning educational planning.
- Frequent power cut problem. Most of the village schools are still starving for proper electrification.
- Lower bandwidth capacity than developed country.
- Language barriers : An estimated 80% online is in English Language. A large proportion of educational software produced in world market are in English. Where as I developing country like India Where English proficiency is not high especially outside the cities.
- Lack of ICT awareness among the mass. Now it is high time for the people to change the mindset and accept the new technology for their future academic growth.

### **❖ Developing ICT Skills and Knowledge :**

In the emerging approach, teachers are developing their ICT literacy, learning how to apply ICT to a range of personal and professional tasks. The emphasis is on training in a range of tools and applications, and increasing their awareness of the opportunities to apply ICT to their teaching in the future.

ICT literacy is not really different for pupils than for teachers: the basic concepts of understanding and using ICT contain essentially the same elements. Hence, for this basic level of teacher literacy, the same units as for the students curriculum presented in Chapter IV are appropriate. As already indicated, these ICT literacy units have a parallel with the International and European Computer Driving Licence. Of course, the actual use of ICT will be different for teachers than it is for students. Table 5.1 presents a brief description of each of the nine ICT Literacy units together with a brief statement of the rationale for their inclusion in a programme of teacher development. An ICT literate teacher should be familiar with all the ICT Literacy units.

❖ **Conducting professional development :**

To raise teachers' awareness of the need to become ICT literate, most countries expend considerable effort in public relations around ICT, describing good or emergent practices, organizing discussion sessions, developing informative web sites, and so on.

There are different ways of conducting professional development programmes. Many schools organize meetings and after-school sessions where teachers can be trained in using particular software under the guidance of a fellow teacher, for example, the ICT- coordinator or an expert colleague. Sometimes a lecturer or teacher is engaged from a local teacher education institute or from another school. In some countries, teacher education institutes and other (often private) enterprises provide a range of courses in basic ICT instruction. In other countries, there are accredited organizations for delivering courses of instruction for the International Computer Driving Licence, or similar especially modified units for teacher. In these latter cases, assessment and testing certification is also provided (other computer driving licence).

❖ **Further points to consider :**

Teacher education and professional development are essential for the success of an ICT curriculum in schools. A few additional points to consider are the following:

- At the very initial stage, psychological or affective factors are critically important. One of the main goals is to decrease teachers' fears of computers, and to show new learners that they are able to use a computer. Confidence is as important as competence.
- Most of the professional life of teachers is spent at home. Many of the basic ICT skills relevant at this initial stage are of value in their personal lives. Confidence and competence can be acquired through autonomous work, using carefully prepared learning materials and, where possible, some distance interactions through appropriate communication tools.
- Teachers, like all learners, need to be provided with opportunities to make mistakes. Such opportunities are often best provided in arranging professional development programmes for small groups of teachers with similar needs.
- At the initial stage of ICT development, many teachers are affected by serious motor- skill difficulties. The most basic motor skills (e.g. pointing, clicking, and dragging with a mouse) need to be mastered before developing skills to use ICT tools: mastery is about confidence and self-esteem.
- Beginners have not only to be able to use ICT tools and environments, but to understand basic principles about architecture, file managing, and email transmission. Hence, it is important to provide accurate representations of the computing systems and ICT tools they are expected to use in their schools, not the theory of what may happen.

❖ **Organizing teacher development :**

The ability to use ICT in teaching and be competent in the areas noted above in a given teaching subject requires more adapted training. The way this training is conducted depends very much on the learning style of the teachers involved, as well as on the specific subject and application. The following are two possibilities :

*Training courses, seminars and workshops on specific applications used in a teacher's subject area.* It is sometimes recommended to include these ICT workshops in accepted conference within the specific teacher subject community in order to increase the opportunities for participation.

*Communities of teachers, set up to achieve a particular goal.* In this case, a few teacher colleagues (from different schools, but within the one subject- best number seems to be between 6 and 12 teachers) can decide to work together ( perhaps under guidance from the ICT coordinator) on the implementation of a certain ICT topic in their subject area. They can communicate by means of email but it appears important also to organize face-to-face meetings. The success of these teacher networks is proven, although there are pitfalls to be aware of :

- not too much difference in starting position,
- an equal input from participating members,
- an open mind for sharing experiences,
- involvement of all members,
- task orientation.
- Shared responsibility, but also somebody who takes an organizational lead.

#### ❖ **Infusing ICT to improve learning :**

At the infusing stage, teachers are fully integrating ICT in all aspects of their professional life to improve their own learning and the learning of their students. Teachers use ICT to manage their own learning and that of their students. They use ICT to assist all students assess their own learning in completing specific personal projects. It is natural for teachers to collaborate with other colleagues in sharing experiences to solve problems. ICT becomes a stimulus for exciting new teaching opportunities.

Specific examples are provided in Appendix C of how ICT is being used to infuse subject knowledge and skills from across the curriculum to achieve individual learning objectives for students and teachers. The examples illustrate how infusion can be achieved for the individual class teachers working with a single class and for the whole school.

#### ❖ **Teacher competencies:**

There are general competencies and abilities common to all approaches to infusing ICT in learning and the management of learning. The focus of professional development building upon their previous education and professional development in applying ICT to teaching.

Professional development in this stage will encourage teachers to collaborate in developing their subject curriculum and identifying innovative teaching methodologies. Opportunities for students and teachers to experiment to identify preferred learning styles and differentiated pathways is encouraged. Infusing ICT across the curriculum to enhance learning and the management of learning leads teachers to an understanding of how to transform their teaching practice as well as the learning of their students. General competencies include, and build on, those at the applying stage.

#### ❖ **Organizing teacher development :**

The kind of teacher activities described in this section on professional development cannot be obtained through short courses, seminars or workshops. These forums can be used as appetizers to inform teachers about infusing ICT into all teaching activities but teachers cannot be expected to achieve all this as a result of just a short course. Most effective for this kind of teacher development is teamwork and educational leadership within a school.

#### **Conclusion :-**

Transition, Transformation and Revolution is the scenario of today's educational system. Application of ICT in education and teaching learning process has changed the traditional system of learning to modern ICT based learning. Teaching – learning process is not now limited within the boundaries of classroom. The modern technologies including new web 2.0 has changed the total scenario of teaching learning process. ICTs are making major's difference in the

teaching approaches and the ways students are learning. ICT-enhanced learning environment facilitates active collaborative, creative, integrative and evaluative learning as an advantage over the traditional method. Several surveys are showing that ICT use in education system of developed nations is comparatively advanced than ICT used in education system of developing countries. ICT use in education system of developing countries is also facing some challenges. ICT introducing innovative pedagogies in to the classroom, creating network among educational institution, improving overall standard of education by reducing the gap between the quality of education in urban area and rural area, initiation of smart school with objectives to foster self-paced, self-assessed and self-directed through the application of ICTs and developing ICT policy for education and training.

There is a consensus that the development of any country depends upon the quality of educational programme offered to citizens. ICTs, despite of their known limitations, are believed to be beneficial in this regard. The computer and the internet are especially useful to enhance students engagement in learning and positively impact student's performance and achievement.

Rule of teacher is very much important in teaching learning process. Teacher is the main pillar of teaching – learning process. Teacher is the facilitate of learning. ICT cannot replace the teacher, it can aid the teacher in the process of teaching and make the teaching-learning process more interactive. The effective use of ICTs in teaching learning process also depends on teacher's ICT competency and skill. So the teachers have to realize that if the students are to achieve a high level of competency and competitiveness, they have no other choice but to adopt technology as an integrated tool in the field of education.

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