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ICT as a changing Agent for Education. Effective integration of ICT in Teaching and Learning and its Barrier

(A Literature Review)

*Mrs. Mayuri Jain
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Introduction

ICT has a great potential to contribute positively towards knowledge dissemination, effective learning & development of more efficient education services. Today's teachers must be prepared to provide technology supported learning opportunities to their students because this is the need of knowledge based economy today. They must be prepared to use technology & should know how technology can support student learning; therefore it must be made integral to every teacher’s professional repertoire. Information and Communications technologies are a diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information (Blurton, 1999). ICT includes the use of computer technology, including hardware, peripheral devices, media, delivery systems and software. This term is used in the ISTE NETS standards and is used by UNESCO in reference to the integration of technology into teaching (UNESCO, 2002).

According to Daniels (2002) ICTs have become an integral part within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to 'computers and computing related activities'. Pelgrum and Law (2003) state that near the end of the 1980s, the term 'computers' was replaced by 'IT' (information technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term 'ICT' (information and communication technology) around 1992, when e-mail started to become available to the general public. According to UNESCO (2002) information and communication technology (ICT) may be regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology.

ICT enhancing teaching and Learning Process

Conventional teaching has emphasized content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance.
Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (Oliver, 2000). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained "...when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT."
According to Cabero (2001), "the flexibilization time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning". The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning.

**Effective integration of ICT enhancing the quality and accessibility of education**

The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. One of the most vital contributions of ICT in the field of education is- Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002).

**ICT enhancing the Learning and Motivation of Students**

ICT presents an entirely new learning environment for students, thus requiring a different skill set to be successful. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through (New Media Consortium, 2007).

Kennewell et al. (2000) feel it is essential that computers be placed in the classroom, in order to maximize the opportunities for curriculum activity. ICT environment improves the experience of the students and teachers and to use intensively the learning time for better results. The ICT environment has been developed by using different software and also the extended experience in developing web based and multimedia materials. ICTs have an important role to play in changing and modernizing educational systems and ways of learning.

ICTs can enhance the quality of education in several ways, by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner centered environment. ICTs, especially computers and Internet technologies, enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. ICT has an impact not only on what students should learn, but it also plays a major role on how the students should learn. Along with a shift of curricula from “content-centered” to “competence-based”, the mode of curricula delivery has now shifted from “teacher centered” forms of delivery to “student-centered” forms of delivery. ICT provides- Motivation to Learn.

ICT changes the characteristics of problems and learning tasks, and hence play an important task as mediator of cognitive development, enhancing the acquisition of generic cognitive competencies as essential for life in our knowledge society. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves and Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase.

Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (Berge, 1998; Barron, 1998).
Scholastic Performance enhancement by ICT Usage

Based on the extensive usage of ICTs in education the need appeared to unravel the myth that surrounds the use of information and communication technology (ICT) as an aid to teaching and learning, and the impact it has on students’ academic performance. ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICT. The direct link between ICT use and students’ academic performance has been the focus of extensive literature during the last two decades. ICT helps students to their learning by improving the communication between them and the instructors (Valasisiou and Bousiou, 2005).

Kulik’s (1994) meta-analysis study revealed that, on average, students who used ICT-based instruction scored higher than students without computers. The students also learned more in less time and liked their classes more when ICT-based instruction was included.

Atwell and Battle (1999) examined the relationship between having a home computer and school performance, their findings suggest that students who have access to a computer at home for educational purposes, have improved scores in reading and math.

Barriers to the Successful Integration of ICT in Teaching and Learning

The act of integrating ICT into teaching and learning is a complex process and one that may encounter a number of difficulties. These difficulties are known as “barriers” (Schoepf, 2005). A barrier is defined as “any condition that makes it difficult to make progress or to achieve an objectives” (WordNet, 1997, as cute dub Schoepf, 2005, p. 2.).

Classification of the barriers:-

Several studies have divided the barriers into two categories: extrinsic and intrinsic barriers. However, what they meant by extrinsic and intrinsic differed. In one study, Ertmer (1999) referred to extrinsic barriers as first-order and cited access, time, support, resources and training and intrinsic barriers as second-order and cited attitudes, beliefs, practices and resistance; whereas, Hendren (2000, as cited in Al-AIwani, 2005) saw extrinsic barriers as pertaining to organizations rather than individuals and intrinsic barriers as pertaining to teachers, administrators and individuals.

Another classification found in the literature is teacher-level barriers versus school-level barriers. Becta (2004) grouped the barriers according to whether they relate to the individual (teacher-level barriers), such as lack of time, lack of confidence, and resistance to change, or to the institution (school-level barriers), such as lack of effective training in solving technical problem and lack of access to resources. Similarly, Balanskat et al. (2006) divided them into three levels: micro-level barriers, including those related to teachers’ attitudes and approach to ICT, and meso-level barriers, including those related to the institutional context. The latter added a third category called macro-level (system-level barriers), including those related to the wider education framework.

I) Teacher-level Barriers

Lack of teacher confidence:- Beggs (2000) asserted that teachers’ “fear of failure” caused a lack of confidence. On the other hand, Balanskat et al. (2006) found that limitations in teachers’ ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Similarly, Becta (2004) concluded their study with the statement: “many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do”

Lack of teacher competence:- Another barrier, which is directly related to teacher confidence, is teachers’ competence in integrating ICT into pedagogical practice (Bect, 2004). In Australian research, Newhouse (2002) found that many teachers lacked the knowledge and skills to use computers and were not enthusiastic about the change and integration of supplementary learning associated with bringing computers into their teaching practices.

Current research has shown that the level of this barrier differ from country to country. In the developing countries, research reported that teacher’ lack of technological competence is a main barrier to their acceptance and adoption of ICT (Pelgrum, 2001; Al-Oteawi, 2002). Inpsyria, for example, teacher’ lack of technological
competence has been cited as the main barrier (Albirini, 2006). Likewise, in Saudi Arabia, a lack of ICT skills is serious obstacle to the integration of technologies into science education.

**Resistance to change & negative attitudes:** Much research into the barriers to the integration of ICT into education found that teachers’ attitudes and an inherent resistance to change were a significant barrier. From his/her analysis of the questionnaires, Gomes (2005) found that science teachers’ resistance to change concerning the use of new strategies is an obstacle to ICT integration in science teaching. Schoepf’s study (2005) found that, although teachers felt that there was more than enough technology available, they did not believe that they were being supported, guided or rewarded in the integration of technology into their teaching. According to Empirica (2006), teachers who are not using new technology such as computers in the classroom are still of the opinion that the use of ICT has no benefits or unclear benefits. According to Earle (2002), the change from a present level to a desired level of performance is facilitated by driving (encouraging) forces such as the power of new developments, rapid availability, creativity, Internet access, or ease of communication, while it is delayed by resisting (discouraging) forces such as lack if technical support, teacher expertise, or time for planning. In their study, Cox et al. (1999b) found that teachers are unlikely to use new technologies in their teaching if they see no need to change their professional practice. They showed that teachers who resist change are not rejecting the need for change but lack the necessary education in accepting the changes and are given insufficient long-term opportunities to make sense of the new technologies for themselves.

**Student-level Barriers**

**Lack of time:** Several recent studies indicate that many teachers have competence and confidence in using computers in the classroom, but they still make little use of technologies because they do not have enough time. A significant number of researchers identified time limitations and the difficulty in scheduling enough computer time for classes as a barrier to teachers’ use of ICT in their teaching. According to Sicilia (2005), the most common challenge reported by all the teachers was the lack of time they had to plan technology lessons, explore the different Internet sites or look at various aspects of educational software. According to Al-Alwani (2005), lack of time is a barrier affecting the application of ICT in Saudi Arabia because of busy schedules. He indicated that because Saudi teachers work from about 7:00 a.m. until 2:00 p.m. and the average number of class sessions taught by science teachers is 18 per week, both teachers and students have a limited number of hours during the day to work on integrating ICT into science education. Similarly, in Canada, Sicilia (2005) concluded that teachers take much more time to design projects that include the use of new ICT than to prepare traditional lessons. Teachers interviewed by Sicilia (2005) commented that “the constraints of different class schedule [sic] contributed to the lack of time they spent together to work on planning classroom activities”.

**Lack of effective training:** The barrier most frequently referred to in the literature is lack of effective training. One finding Pelgrim’s (2001) study was that there were not enough training opportunities for teachers in the use of ICT in a classroom environment. Similarly, Heaps (2000) found that one of the top three barriers to teachers’ use of ICT in teaching students was the lack of training. According to Becta (2004), the issue of training is certainly complex because it is important to consider several components to ensure the effectiveness of the training. These were time for training, pedagogical training, skills training and an ICT use in initial teacher training. According to Newhouse (2002) teachers need training in technology education (focusing on the study of technologies themselves) and educational technology (support for teaching in the classroom). Other problematic issues related to professional development in ICT are that training courses are not differentiated to meet the specific learning needs of teachers and the sessions are not regularly updated (Balanskat et al. 2006).

**Lack of accessibility:** Several research studies indicate that lack of access to resources, including home access, is another complex barrier that discourages teachers from integrating new technologies into education. In Sicilia’s study (2005), teachers complained about how difficult it was to always have access to computers. The author gave reason like “computers had to be booked in advance and the teachers would forget to do so, or they
General Conclusion of the Review

This literature review has sought to explore the role of ICT in education. As we have gone through various studies based on ICTs impact on educational practice in education till date is quite small but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact on: ICT and teaching learning process; quality and accessibility of education; learning motivation, learning environment and ICT usage and academic performance. In order to conclude we will try to proceed to synthesize from a general viewpoint the results obtained, taking into consideration the relevant aspects of the literature. The results provided by both the quantitative and qualitative analysis of the literature obtained will be exposed especially regarding those aspects which are related to ICTs for Education. ICT simplifies the part of teaching as a visual presentation. We learn 80% of the learning through visual. So, the visual presentations of the particular topic could be easily understood by the student teachers. It will be more effective of the student teachers gain knowledge of integrating ICT in their classroom instruction. The use of ICT in higher education level, the information can be delivered very easily and helps the students to understand the particular topic with proper visualization and enjoy the new learning experiences.

Effective integration of ICT has the following advantages:

- Eliminate time barriers in education for learners as well as teachers
- Eliminate geographical barriers as learners can log on from any place
- Asynchronous interaction is made possible leading to thoughtful and creative interaction
- Enhanced group collaboration made possible via ICT
- New educational approaches can be applied.
- It can provide speedy dissemination of education to target groups
- It enhances the international dimension of educational services
- It allows for just in time and just enough education for employees in organizations
- It can also be used for non-formal education like health campaigns and literacy campaigns

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EDUCATION STANDARD CAN BE IMPROVED BY INTEGRATING ICT IN EDUCATION

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ABSTRACT

Information and Communication Technology (ICT) can be utilized for the education sector. Education includes online, distance and part time education. There are unlimited applications of ICT in the real world. This paper is emphasized on the education field. Traditional Non-formal education system process includes activities like admission, Individual Contact Programmes. Exam for any course in a University or Institution, In this process ICT can play a great role in all the activities by providing a lot of benefits to students, teachers, parents and Universities itself. ICT can be used for providing education to the people who are not able to come to school due to various constraints. ICT can play great role in formal and non formal forms of education. The paper examines certain important issues related with the effective implementation of ICTs in all levels of education and provides suggestions to address certain challenges that would help in the implementation of ICTs in education and simultaneously enhancing Quality of education.

KEYWORDS: ICT, IT, Education, MIS, Quality Education.

1. INTRODUCTION:
The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing radio, television, cellular phones, computer, and network hardware and software, satellites, systems and so on, as well as the various services and applications associated with these technologies. The vision of learning and distance learning. When such technologies are used for educational purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology. ICTs in education are being used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc. ICT has become a buzzword while talking about technology and its applications. It is used in various business and management functions but not in the field of Education. ICTs Convergence of these two technologies gave birth to ICT. Education system includes formal and Non-formal forms of education at various levels of education. Teaching is imparting knowledge or skill whereas learning is skill acquisition and increased fluency. Usage of ICT is one of the way by which India's large population base can be effectively reached. Moreover in enhancing the quality and delivery of services through ICT, especially in case of developing relations with citizen- Government will be better positioned. Passive learning occurs when students use their senses to take in information from a lecture, reading assignment, or audiovisual. Traditional lecture is not an effective learning environment for many of our students because so many students do not participate actively during a traditional lecture. This is the mode of learning most commonly present in classrooms whereas active learning involves the students through participation and investment of energy in all three phases of the learning process (input, operations, and feedback). This type of learning is more apt to stimulate higher cognitive processes and critical thinking. In the past few years there has been a paradigm shift in curriculum where teacher acts as a facilitator in a student-centered learning. In Student centered learning focus is on the student's needs, abilities, interests, and learning styles with the teacher as a facilitator of learning. Here students have to be active responsible participants in learning process. Teacher has key role in the whole process whereas in case of ICT based education, various ICT tools are supplemented to make the teaching-learning process effective. With the help of blended learning, total time devoted to teaching can be decreased. A survey says that there was a sense of pride created and interest generated among the teachers and students for gaining ICT and its privileges. ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. ICT as a tool can overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers. In this paper how learning through ICT can be made easier and effective for improving the quality of both formal and non-formal forms of education. Section 2 explains ICT tools, section 3 explains ICT application for quality improvement in formal and Non-formal education, section 4 shows ICT for Content development section 5 shows ICT and teachers Training whereas section 6 shows certain challenges and their solution for the implementation of ICT in the education sector.

2. ICT TOOLS:
Today ICTs including laptops wirelessly connected to the Internet, personal digital assistants, low cost video cameras, and cell phones have become affordable, accessible and integrated in large sections of the society throughout the world. It can restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the development in social integration.

ICT stand for information and communication technologies are defined, as a “diverse set of technological tools and resources used to communicate, and to create, disseminate, store and manage information”. These technologies include computers, computer work stations, display facilities, hardware, software recording and processing system for sound, still and moving pictures, graphical calculator, the uniform, broad casting technologies (Radio and Television) and other wide range of communication facilities. It may also be defined as use of hardware and software i.e. storage, retrieval, processing, communication and enhancing cultural upliftment. ICT makes the classroom learning interesting and effective, self-learning easy and successful and lifelong learning possible for all. By 1990, the choice of technologies for education was limited because these were expensive and required high skilled technicians to create and use them. At that time Radio, TV, Overhead Projector, Slide Projector etc. were the best example of technology use in teaching-learning process. But recently technology applications in education no longer are limited by convenience, cost and their potential.

In recent years there has been a ground swell of interest in how computers and the internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings.

With the arrival of internet and broadband connections to schools, the applications of IT knowledge, skill and understanding in all subjects become a reality. This change in emphasis has resulted in a change of name for IT to ICT i.e. Information and Communication Technology. Thus Information Technology (IT) comprises the knowledge, skills and understanding needed to employ information and communication technologies appropriately; securely and fruitfully in learning, employment and every life.

Different scholars stated the meaning of ICT in different ways. Some of the definitions of ICT is given here which would help to explain the meaning of ICT. According to Raghuvan (2000) ICT refers to a range of technologies, which includes computers, computer work situations, display facilities, hardware, software, recording and processing systems for sound, still and moving pictures, graphics, calculations and a wide range of communication facilities.
According to UNESCO, ICT is a scientific, technological and engineering discipline and management technique used in handling information, its application and association with social, economical and cultural matters.

There are various ICT tools available which can be utilized for the knowledge creation and dissemination in the modern world. Tools include Radio, TV, Internet, Mobile phone, Computer hardware and software, and other hardware and software applications. Certain ICT tools like laptops, PCs, mobile phones, and PDAs have their own implication in Education. These devices can be imparted using information and training for teachers and students. Many of the ICT tools are much hyped but have not given fruitful results till now. Use of radio for pedagogical practice has been very much popular in past but is still in use and is used by IGNOU. But One-to-many broadcast technologies like radio and television are seen as less revolutionary ICTs in education, as their usage is seen as reinforcing of traditional instructor-centric learning models, unlike computers, which many see as important tools in fostering and encouraging student-centric instructional models. Such interrelated objectives: availability, access, and demand. Educational ICT tools are not for making educators master ICT skills themselves, but for making educators create a more effective learning environment via ICT. Teachers can utilize ICT tools to get benefits from using these tools in the areas of content, curriculum, instruction, and assessment. ICTs include fixed-line telephony, mobile telephony, newspapers, radio, television, radio tracking, very small aperture terminal (VSAT), computer, and internet must be accessible to rural people as per their demand.

3. ICT application for quality improvement in formal and non-formal education:

ICT applications are becoming indispensable parts of contemporary culture, spreading across the globe through traditional and vocational education. In India, the National Education Policy (NEP) talks about a primary and secondary (general and vocational), High school or secondary level (High and senior secondary levels) and the college or higher level (including college, university levels). In all these levels of education ICT can be utilized for better teaching learning process and improving quality of education. Using multimedia in education results in the increasing productivity and retention rates, because people remember 20% of what they see, 40% of what they see and hear, but around 75% of what they see, hear and do simultaneously. Interactive whiteboard helps teachers to structure their lessons, supports collaborative learning, can help to develop student’s cognitive skills, critical thinking, can change the environment from traditional to a learner-centric classroom. Government of India has announced 2010-2020 as a decade of innovation. Reasoning and critical thinking skills are necessary for innovation. Foundation of these skills can be laid only at primary level of education. Students who enter school are very curious, creative, and capable of learning many things. At this level, explanation through picture is worth than thousand of words is very much true in case of teaching – learning process. Thus, ICT in the initial stages of education will help young people come to terms with what lies ahead. Students studying at this level take much interest in cartoons. They understand more through animated pictures. ICTs in the same environment is created into e-classrooms. Government of India and e-learning scheme through the Directorate of the Web site (edulive.gov.in) this includes information on admissions, mark sheets, teacher attendance, transfers, and pay slips etc. Certain initiatives like all correspondence may be done electronically, attendance of staff may be recorded daily online to the directorate, major notices, information regarding implementation of various Government schemes can be easily applied and can be shared by other departments as well for making improvement in the present system. Such types of initiatives provide transparency in the society which is the major requirement of the people in the present day. There may be many more examples of such initiatives but the aim of the article is to replicate related interoperable projects showing great impact on the society. United Nations Educational Scientific and Cultural Organisation (UNESCO) has published a summary of case studies conducted in nine countries in different parts of the world and most of these studies reflect the necessity of having multi-prong strategies for teacher education and to improve their expertise. Existing Open and distance education systems use different technology options for delivering content. EduSAT, other TV and Radio channels. All these options use ICT. A local area network at school level can enable automation of a variety of processes. Beginning with computer automation, followed by internet automation, office automation, maintenance of records, student tracking, resource planning, using the existing ICT infrastructure will increase efficiencies. At the same time benefits in savings of cost, time and effort will also be available.

5. ICT and teachers Training:

In the modern world of ICT there is decentralization of knowledge source. Technology is only a tool and it must be utilized only to remove the barriers and challenges present in the existing system. ICT provides opportunities to complement on the job training and continuing education for teachers in a convenient and flexible manner. Use of ICTs in education requires major shift in the way content is designed and delivered. New technologies cannot be imposed without enabling teachers and learners to understand these fundamental shifts. Ongoing training is necessary for the trainers in institutions and organizations that are engaged in the design of curriculum, testing and delivery of ICT-enabled education. ICT is applied in their teaching practices as well as for delivery for these trainings. In order to implement ICT-driven distance education programmes, the teachers must first understand and be comfortable with the technologies. They must then be given opportunities for acquisition of a new knowledge by promoting computer-training programmes for teachers. Use of ICTs for teacher training has been recognized by the governments of most South Asian countries and teacher training programs like Intel TeachAcross India, Pakist an, and Sri Lanka; Microsoft Shiksha in India; and several others in Nepal and Bhutan are focusing on ICTs and delivery of teacher training. The International Society for Technology in Education (ISTE) has created the most comprehensive set of ICT standards for teachers, students, and administrators.

Why to integrate?

Because changes in technology, demography, and internationalization are driving education system to evolve to an open flexible education (or learning) environment depicted in figure 1, which provides learners with quality services encompassing formal, informal, and non formal education. To this regard the Government of India is currently initiating UNSECO-ITE is a comprehensive approach to integrate ICT in education, renew pedagogy, and
What to integrate with ICT?

Technologies of digital learning platforms, conversation media and tools (SNS etc.), pedagogies for a new generation, open access to educational resources (OER, MOOCs, etc.), international standards, cloud computing, nurturing teacher’s competence, and open networking, policy making to meet societal change are targets for effective integration.

It is only through education and the integration of ICT in education that one teaches students to be participants in the growth process in this era of rapid change. ICT also allows for the creation of digital resources like digital libraries where students, teachers and professionals can access. Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work. In view of ICT, education can be classified in three main categories:

- E-learning
- Blended Learning, and
- Distance Learning

E-Learning or Electronic learning is a general term used to refer to computer-enhanced learning. It is commonly associated with the field of advanced learning technology (ALT), which deals with both the technologies and associated methodologies in learning using networked and/or multimedia technologies. It is also known as online learning. Distance education provided the basic for e-learning's development. E-learning can be 'on demand'. It overcomes timing, attendance and travel difficulties. E-learning has the following advantages:

- Eliminating time and geographical barriers in education for learners as well as teachers.
- Enhanced group collaboration made possible via ICT.
- New educational approaches can be used.
- It can provide speedy dissemination of education to target disadvantaged groups.

It offers the combination of education while balancing family and work life.

- It enhances the international dimension of educational services.

Blended Learning is the combination of multiple approaches to learning. It is usually used to define a situation where different delivery methods are combined together to deliver a particular course. These methods may include a mixture of face-to-face learning, self-paced learning and online classrooms.

Face to face Learning refers to learning that occurs in a traditional classroom setting where a faculty member delivers instruction to a group of learners. This could include lectures, workshops, presentation, tutorial, conference and much more.

Self-paced Learning provides the flexibility to learn according to the availability of learners' own time and pace, it occurs in a variety of ways such as reading specific chapters from text book, studying course material presented through web-based or CD based course, attending pre-recorded classes or sessions, reading articles referred by faculty member, working on assignments & projects, and searching & browsing the internet.

Online Collaborative Learning involves interaction between learners and faculty members through the web, this interaction can occur in one of the following models:

- Synchronous interaction.
- Asynchronous interaction.

Synchronous, means ‘at the same time’, it involves interacting with a faculty member and other learners via the web in real time using technologies such as email, chat rooms, video conferencing, classrooms and/or online classes. The other hand, Asynchronous means ‘not at the same time’, it enables learners to interact with their colleagues and faculty member at their own convenience, such as interacting through e-mail.

Distance Learning:

It is a type of education, where students work on their own at home or at the office and communicate with faculty and other students via e-mail, electronic forums, video conferencing, chat rooms, instant messaging and other forms of computer-based communication. It is also known as open learning. Most distance learning programs include a computer based training (CBT) system and communications tools to produce a virtual classroom. Because the Internet and World Wide Web are accessible from virtually all computer platforms, they serve as the foundation for many distance learning systems. ICTs also allow for the creation of digital resources like digital libraries where students, teachers and professionals can access research material and course material from any place at any time. Such facilities allow the networking of academics and researchers and hence sharing of scholarly material and leads to quality enhancement in teaching and learning.

6. Challenges and solutions of applying ICT for learning:

Certain challenges also exist for the ICT based teaching learning. One of the great challenges for quality control in education is lack of standards for parameters to measure the quality of education. For the solution of this all the accreditation and quality assurance like NAAC, AICTE, COSME, ARCTE, GAAC, ISTE etc., must set together and circulate a standard list of parameters to decide the quality of education.

Development of ICT has changed the epic centre of knowledge and hence in many of the cases student is more informed than the teacher. Teachers lack adequate qualification and training and their losses are not always offset by the gains that are most often outdated or irrelevant. Setting up the ICT devices can be very time-consuming. It is also hard for teachers to afford it is hard for teachers to use with a lack of experience using ICT tools. These reasons destroy the availability of quality of education. ICT enabled distance education, to a great extent, can combat this problem. One of the important barriers is lack of trained teachers to exploit ICT proficiently. Most of the teachers and principals are not willing to introduce new technologies to themselves first and subsequently to their students. There is resistant from teachers, basically from older teachers as compared to younger ones, to apply ICT in their subject. Hence teachers need to update their knowledge and skills as per change in technology and communication.

At present, ICT in school education is strictly limited to a handful of elite schools. Beyond that, it's just a computer lab that's held apart from the conventional educational process. Though computers came to Indian classrooms in the 1980s, the level of adoption of modern technology in the teaching and learning process has been limited and uneven. Various ICT tools must be available and it must be accessible at demand. Many schools have limited resources for buying, stationery, furniture and other classroom materials. Role of private sector providing services in such sectors may be taken into account. Rural population may not be able to pay hefty amount to utilize such ICT resources for education. One of the major challenges in the implementation of ICT in education is the initial thinking that is based on the technology. ICT hardware and software are not designed as per educational purposes rather they are designed for general purpose. One first thinks about the available technology and then a try is being made to apply it into education field, but if we look at the real possible outcomes may be more useful and may give good results. As per latest tradition only special subject like IT or ICT is available and that is also optional one there is need for to have basic knowledge of computers and IT to utilize various ICT tools to be used for teaching. Only computer teachers would not be able to carry this important mission of being agents of change. To sort out infrastructure problems for providing ICT education in schools one can split the screen in half vertically and at two sets of an application can be displayed and used by two users (students) simultaneously. Because one student may use the keyboard and another may use mouse, each student can work independently of the other. The survey done in 2007 in two high ICT enabled states Gujarat and Karnataka says that Access to government school students to ICT tools outside schools is in general low. The access of private school students to such devices is comparatively better. It also shows that ICT of the changes other barometers, most not the least, is digital divide in private and Government schools and moreover in rural and urban schools also. Major challenge for educators and trainers is how to develop learning materials for delivery on available ICT tools including mobile devices. The learning materials should be in manageable learning chunks and should make use of multimedia. There are many advantages of using learning objects in mobile delivery including: they can be re-used and changed without affecting other learning objects, and they can be stored in an electronic repository for remote access at any time. Barriers include costly supportive infrastructure, developing online material can be expensive and time consuming, quality, validity of online material, lack of flexibility in already prepared materials. A list of information available online may dissuade student learning. Students can feel isolated in absence of classroom like environment. Computer Programmes at various levels of quality parameters can be used to control, manage and put strict discipline in the campuses in the case of computer application for different stages of development, Teaching and learning. Research and extension, Governance and leadership, infrastructural facilities and use of expert system in suggesting intelli-
Potential Drawbacks—cum-Challenges to Using ICT in Education:

While using ICTs in education has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, mainaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. Introducing ICT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g., buildings) are relatively less costly (UNESCO, 2009).

The four most common mistakes in introducing ICTs into teaching are:

i) Installing learning technology without reviewing student needs and content availability;

ii) Imposing technological systems from the top down without involving faculty and students;

iii) Using inappropriate content from other regions of the world without customizing it appropriately;

iv) Producing low quality content that has poor instructional design and is not adapted to the technology in use (UNESCO, 2009). Although ICT offers a whole lot of benefits there are some risks of using ICT in education which have to be mitigated proper mechanisms.

7. CONCLUSION:

Quality in education through ICT and its awareness among stakeholders will have positive impact on the society. ICT can be helpful in quality and standards of education by implementing it in various phases of education. ICT can be employed in formal and Non-formal types of education and would eventually make the learners employable and socially useful part of the society. By employing ICT in teacher training can save a lot of money of the Government. Moreover a lot of qualitative improvement can be seen as resource persons for the training can be best of the world. By employing ICT in administration can help in solving the problem of Absenteeism of students and teachers. Good quality content is one of the major issues and directly affects the standards of education and quality. By overcoming the certain challenges involved in the process of education can help a lot in this side. Conclusively a lot of quality improvement is possible after careful and planned implementation of ICT in education by various stakeholders.

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