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Role of ICT in education system in India

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Abstract

In this digital age, it is difficult to think of any event in our daily life that is not using information and communication technology. UNESCO has defined ICT as forms of technology that are used to transmit, process, store, create, display, share or exchange information by electronic means. It includes not only conventional technologies such as radio and television, but also modern technologies such as cell phones, Internet and Intranet, hardware and software, satellite systems, expert systems, teleconferences, etc., as well as the various services and associated applications. Within education, ICT have begun to have a presence, but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality education has traditionally been associated with strong teachers who have a high degree of personal contact with students. The use of ICT in education lends itself to more student-centered learning environments, and this often creates some tensions for some teachers and students. But as the world moves rapidly towards information and digital media, the role of ICT in education is increasingly important and this importance will continue to grow and develop in the 21st century. This document highlights the various impacts of ICT in contemporary higher education and explores possible future developments. The document argues the role of ICT in the transformation of teaching and learning and seeks to explore how this pact will be offered and delivered in the universities and colleges of the future.

Keywords: education, ICT, communication technology

Introduction

For meeting the needs of quality education, higher education has grown exponentially in the last five decades. Due to swift advancements in Information and Communication Technology (ICT), it has further gained momentum. Demand for skilled and proficient labor is ever increasing in the up to date globalised society. For achieving economic growth and development, there has been need to access the quality in higher education. In order to reach the remotest part of the country, there have been provisions of distance learning and open learning all across the country. It is a lifelong learning process and that too at affordable cost. From last two decades, there has been tremendous increase in ICT in higher education. Even then there is a challenge to develop a higher education system that is supple and self-motivated so as to holistically integrate the technology in the management and delivery of learning programmers is daunting. In first section the evolution of ICT has been discussed followed by the initiatives in the use of ICT. Role of ICTs in formal education and the areas in which they can be incorporated to play prominent role are discussed in the second section. For achieving development in the field of higher education, various challenges faced in the use of ICT have also been discussed in the last section.

Evolution of ICT

ICT came into existence with the development of mainframe computer which was seen as a major innovation in the field of scientific research and technology. In business also mainframe computers and robotics play a decisive role in all round development. From automation of business processes, IT was then applied to advanced value-adding, functions such as plan, resource planning, elegant manufacturing and mission critical functions the developments and applications of IT have extensive beyond imagination. ICT progress has conduct in many new business models and applications along with the swift development and advance in

telecommunication technology and the Internet. ICT true potential is partial only to the human mind but it can be harnessed in many ways as it is of vigorous kind. ICT helped in eliminating physical borders as the information is passed through digital medium. ICT have helped in accelerating globalization by making market bigger, accessible and stronger by enhancing capital & technology. At one click of mouse, transactions can occur all over the world in short span of time. ICT have made our life faster and easier in many ways. Thus ICT has become the backbone of Tec savvy Society combining with the digital environment pertaining today.

ICT enabled Education: an Overview

The Information and Communication Technology (ICT) is an umbrella term that comprises of any communication tool or application, encompassing: radio, television, smart phones, computer, and network hardware and software, satellite systems, Expert systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICT can be considered as a subfield of Educational Technology, as such technologies are used for enlightening purposes, namely to support and improve the learning of students and to develop learning environments. ICTs in higher 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.

In the current information society, people have to right to use knowledge via ICT to keep pace with the most recent developments. In such a scenario, education, which always plays a critical role in any economic and social growth of a country, becomes even more important. Education not only increases the creative skills of the individual but also his/her earn power. It gives them a sense of well being as well as ability to take up new ideas, increases their social communication, gives access to improved health and provides several more elusive benefits. Diverse kinds of ICT products are available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes (Bhattacharya and Sharma, 2007) [2].

Today ICTs – including laptops wirelessly linked to the Internet, personal digital assistants, low cost video cameras, and cell phones have become reasonable priced, available and integrated in large sections of the society all through the world. It can reorganize organizations, promote alliance, increase democratic involvement of citizens, improve the lucidity and responsiveness of governmental agencies, make education and health care more extensively available, foster cultural creativity, and augment the development in social integration. It is only through education and the incorporation of ICT in education that one teaches students to be participants in the growth process in this era of rapid change. ICT also help in 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 (Bhattacharya and Sharma, 2007) [2]. Such facilities permit the networking of academics and researchers and hence sharing of scholarly material. This avoids photocopying of work.

In sight of ICT, education can be classified in three main categories:

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

E-Learning or Electronic learning is a broad 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 linked methodologies in learning using networked and/or multimedia technologies. It is also known as online learning. Distance education provided the base for e-learning's development. E-learning can be 'on demand'. It prevails over timing, attendance and travel difficulties. E-learning allows emancipation, discussion and feedback over the internets. E-education can provide contact to the best gurus and the best practices or knowledge available (UNESCO, 2002) [9]. It is possible to leverage the online environment to facilitate teaching techniques like role-play across time and distance. It can also facilitate the development of scenarios, which can be rarely witnessed in practice. ICT can play a precious role to supervise and log the progress of the students across time, place and varied activities.

E-learning allows higher participation and greater communication. It challenges the concept that face-to-face conventional education is superior to it (Bhattacharya and Sharma, 2007) [2]. The core ICTs are web and Internet which spread knowledge through e-learning. The components comprise e-portfolios, cyber infrastructures, digital libraries and online learning object repositories. All the above components create a digital personality of the student and unite all the stakeholders in the education.

Some of the advantages of e-learning are:

- ❖ To diminish the geographical barriers and eliminate time consumption among the teachers and learners.
- ❖ Enhanced group association made possible via ICT.
- ❖ New approaches in education are widely seen.
- ❖ It can provide speedy diffusion of education to target deprived groups.
- ❖ It offers the blend of education while balancing family and work life.
- ❖ It enhances the international aspect of educational services.

Blended Learning is the blend of multiple approaches to learning. It is usually used to define a condition where various delivery methods are combined together to deliver a particular course. This type of learning may comprise a mixture of face-to-face learning, self-paced learning and online classrooms.

Face to face Learning refers to learning that occurs in a conventional classroom setting where a faculty member delivers lessons to a group of learners. This could comprise of lectures, workshops, presentation, tutoring, conference and much more.

Self paced Learning provides the flexibility to learn according to the ease of use of learners' own time and pace. Different type of self paced learning includes: reading precise 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

Online Collaborative Learning involves communication between learners and teachers through the web; this interaction can occur in one of the following modes:

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 virtual classrooms and / or chat rooms. On the other hand, Asynchronous means 'not at the same time'; it enables learners to act together with their colleagues and faculty member at their own ease, such as interacting through email.

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, videoconferencing, chat rooms, instant messaging and other forms of computer-based communication. It is also known as open learning. Most distance learning programs comprise a computer based training (CBT) system and communications tools to produce a fundamental classroom. Because the Internet and World Wide Web are available from close to all computer platforms, they serve as the foundation for many distance learning systems. ICTs also allocate for the creation of digital resources like digital libraries where the learners, 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 distribution of scholarly material and leads to quality enhancement in teaching and learning.

Initiatives of Usage of ICT in Education

India is making utilize of honorable incorporation of ICTs such as open source software, satellite technology, regional language interfaces, simple to use human-computer interfaces, digital libraries etc. with a long-term plan to attain the farthest of the villages. Community service centers have been started to promote e-learning across the country (Bhattacharya and Sharma, 2007) [2]. Prominent initiatives of use of ICT in education in India include:

Indira Gandhi National Open University (IGNOU) utilizes radio, television and internet technologies.

National Programme on Technology Enhanced Learning: a concept related to the open courseware initiative of MIT. It includes internet and television technologies.

Eklavya initiative: Uses internet and television to encourage distance learning.

IIT-Kanpur has urban 'Brihaspati', an open source e-learning platform (Virtual Class Room).

Premier institutions like Calcutta have entered into a deliberate alliance with NIIT for given that programmes through implicit Classrooms. Jadavpur University has been using mobile-learning centre. IIT-Bombay has initiated the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interface through the use of real time interactive satellite technology.

The UGC initiated scheme called "ICT for teaching and learning process" for achieving quality and distinction in higher education. Network facilities with the help of ERNET, Ministry of Information and Technology, Government of India were installed at UGC office to promote a healthy work culture. By the side of with this UGC launched a mega programme namely, 'UGC INFONET', a network of Indian Universities and Colleges, by integrating Information and Communication Technology (ICT) in the process of training, learning and learning management. The network is managed by ERNET India and many universities are its members. Information for Library Network (INFLIBNET), a self-sufficient Inter University Centre of UGC is the nodal agency

for harmonization and facilitation of the association between ERNET and Universities. Instruction programmers for the manpower were conducted to administer the ERNET facilities and other aspects of systems including electronic subscriptions. In addition. UGC is persuade formation of e-content / learning material for teaching learning process and supervision of learning in colleges and universities.

Role of ICTs in Formal Education

India has great formal education system which comprises of higher proportion of young generation among billion plus population. The demand for education in developing countries like India has skyrocketed as education is still regarded as a significant connection of social, economic and political mobility (Amutabi and Oketch, 2003). There exist communications, socio- economic, linguistic and physical obstacle in India for people who wish to way in education (Bhattacharya and Sharma, 2007) [2]. There exist drawbacks in general education in India as well as all across the world like lack of learning materials, teachers, inaccessibility of education facilities, high withdraw rate etc (UNESCO, 2002) [9]. Modern use of Information and Communication Technology can potentially solve this problem. Internet practice in home and work place has grown exponentially (McGorry, 2002). ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. It can be used as a tool to surmount the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers (McGorry, 2002).

Cognitive development

ICT change the characteristics of problems and learning tasks, and therefore play an important role as a mediator of cognitive development, improving the acquisition of generic cognitive skills as essential for life in our knowledge society. Students who use ICT for learning purposes immerse themselves in the learning process and, as more and more students use computers as sources of information and cognitive tools (Reeves and Jonassen, 1996), the influence of technology on Support for how students learn will continue to increase. Learning approaches that use contemporary ICT offer many opportunities for constructivist learning through their provision and support for student-centered and resource-based environments, and by allowing learning to relate to context and practice (Berge, 1998; Barron, 1998). The World Wide Web (WWW) also provides an international virtual gallery for student work (Loveless, 2003). ICT can involve and inspire students, and this has been cited as a factor that influences ready ICT adapters (Long, 2001; Wood, 2004).

Democratization of education

The increasing use of information and communication technologies (ICT) has brought changes to teaching and learning at all levels of higher education systems (HES), leading to quality improvements in the century XXI. Traditional forms of teaching and learning are increasingly becoming virtual and online environments. There are infinite possibilities with the integration of ICT in the education system. The use of ICT in education not only improves the learning process of teaching in the classroom, but also provides the ease of electronic learning. ICTs have improved distance learning in the 21st century. The teaching community can reach remote areas and students can access the qualitative learning environment from anywhere and at any time. It is

important to have teachers or trainers adopt technology in their teaching styles to provide pedagogical and educational gains to students. The successful implementation of ICTs to lead change has more to do with influencing and training teachers and supporting them in their commitment to students in learning instead of acquiring computer skills and obtaining software and equipment. ICT-based education will eventually lead to the democratization of education in the XXI century Role of ICTs in Pedagogy for Quality Teaching Learning

Another more important dimension of the higher education sector influenced by the integration of ICT is to improve the quality of teaching and learning. In addition, the changes that are taking place due to globalization and internationalization give great importance to knowledge and information. Therefore, the integration of ICTs would not only help to promote personal growth, but also to develop "knowledge societies". The call of the hour is the need to provide education to everyone, anywhere and at any time. Lifelong learning has become the driving force to maintain a contemporary competitive environment. Therefore, to strengthen and/or promote this growth driven by knowledge, new technologies, skills and capabilities are needed.

The conventional teaching-learning processes are undergoing a paradigm shift. The focus of instruction is now on education programs/practices that promote competence and performance. Such curricula tend to require access to a variety of information sources, forms and types of information; student-centered learning settings based on access to information and research; Activities focused on learning or focused on problems and based on inquiry, environments and authentic examples; and teachers as coaches and mentors instead of content experts (Neeru, 2009) [7]. The shift towards the development of educational programs is well supported and encouraged by emerging instructional technologies.

In addition to improving the learning experience of students, the role of ICT in the development of skills / training of educational staff has great potential. Institutes at the national level can provide a leadership role in improving the technical and management workforce in different disciplines through ICT networks and collaborations. Technology-facilitated learning would result in the preparation of staff regarding innovative pedagogical methods, new ways of learning and interacting, easily sharing new practices among the teaching community and expanding opportunities for their participation. Competent and trained academic / proficient teacher capacities can be available to larger audiences / students through flexible and virtual environments.

Innovative approaches to teaching

ICTs have the potential to promote innovative and effective forms of teaching-learning and research. Smart phones, handheld computers, digital cameras, and MP3 players are revolutionizing the education system to a great extent. As the demand for technology continues to rise, colleges and universities are moving all sorts of student services, from laundry monitoring to snack deliverance online. The enclosure of learning tools, the easier use of replication or multimedia tools, the trouble-free and almost instant access to data and information in digital form that allows calculations and data processing generates possibilities that otherwise would not be feasible. The possibility of disseminating these innovations and complementing the content of learning to improve the quality in higher education through innovative pedagogical methods is high. The focus on ICTs to support quality research through the use of a rigorous research

methodology and in-depth analysis is the call of the hour.

Challenges of ICT in higher education

First is the high cost of acquiring, installing, operating, maintaining and replacing ICT. Although potentially of great importance, the integration of ICT in education is still in its infancy. The introduction of ICT systems for education in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries, while, in contrast, alternative investments (for example, buildings) are relatively less expensive. The use of unlicensed software can be very problematic, not only legally but also in maintenance costs, especially if the pirated software varies in standard formats. Although students can greatly benefit from well-produced learning resources, online teaching has its own unique challenges since not all faculties have ICT skills and can teach the use of ICT tools. The four most common errors in the introduction of ICT in education are:

- Install learning technology without reviewing student needs and content availability;
- Implant technology systems from the top down without involving teachers and students;
- Use inappropriate content from other regions of the world without appropriately customizing it; and
- Produce low quality content that has a poor instructional design and does not adapt to the technology in use. The other challenge he faces is that in many developing countries the basic requirement of electricity and telephone networks is not available. In addition, many colleges do not have adequate rooms or buildings to adapt to technology. Another challenge is that teachers need to develop their own capacity to make efficient use of different ICTs in different situations. They should not fear that ICTs replace teachers. English is the dominant language. The majority of the online content is in English. This causes problems, since in many nations people are neither familiar with English nor comfortable. Skill development is another important area in which ICT could be used effectively. Attempts are being made to strengthen the ICT framework for technical and vocational education (TVET). The emerging discourse on the role

Conclusion

There has been tremendous increase in the quality of education, due to rapid use of ICT tools day by day. Learning methods which were earlier conventional or traditional are now online and practical. With the assimilation of ICT in the education system, there have been great changes occurring in the education system in our country. In the education process, it has not only improvised classroom teaching learning process, but also the students are well equipped with the knowledge of ICT tools and e-learning process. ICT has also improved distance learning. The Extension worker or the teaching community is now able to reach every doorstep through e-learning process and learners are able to gain knowledge without visiting school or learning center. Teachers or trainers should be made to take on technology in their teaching styles to provide academic and educational gains to the learners. Teachers should be more involved in encouraging students towards the use of ICT rather than equipping themselves with different ICT tools. Democracy in education can be achieved through the use of ICT enabled education.

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