

# **ICT as a Change Agent for Higher Education and Society**

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## **ABSTRACT**

For India to emerge as a knowledge super power of the world in the shortest possible time it is imperative to convert our demographic advantage into knowledge powerhouse by nurturing and honing our working population into knowledge or knowledge enabled working population. Human Resource Development would certainly be the key for it to happen. ICT (information and communication technology) has become within a very short time, one of the basic building blocks of modern society. Many countries now regard in understanding ICT and mastering the basic skills and concepts of ICT as a part of the core of education. With an ever expanding field of knowledge, the knowledge and skill sets required by an individual to successfully lead life has also expanded, throwing up challenges of learning more and more throughout one's life. Add to those challenges of pedagogy being faced by the teachers to package more and more for the uptake by the students within the same amount of time available. Fortunately the need of ICT as a tool in education is available to us at this juncture and we wish to fully utilize it. In the education sector the national mission on education is emphasizing on the role of ICT is more to enhance the current enrollment rate in Higher Education from 13.5% at present to 21 % by the end of the 12th Plan period. Through ICT provides enormous opportunity for all the teachers and experts to pool their collective wisdom for the benefit of every Indian learner. . It is obvious that emphasis on ICT is a crying need as it acts as a multiplier for capacity building efforts of educational institutions without compromising the quality and is also necessary to sustain a high growth rate of our economy through the capacity building and knowledge empowerment of the people and for promoting new upcoming multi-disciplinary fields of knowledge. With all parameters ICT act as a change agent in education and society by promoting a proper balance between content generations, research in critical areas relating to imparting of education and connectivity for integrating our knowledge with the advancements in other countries is to be attempted. The paper focus on evolution of ICT in Indian higher educational sector and to explore how ICT acts as an agent of powerful change in practices to which the institutions have been accustomed. In particular this paper draws the implications of impact of ICT to the students, teachers, research work, institutional and societal effectiveness. The methodology is an exploratory study based on data from various institutions effectiveness after implementation of ICT and the data considered which is available on various websites, magazines, journals and articles etc

## **Keywords**

Evolution of ICT in Indian education sector, role of ICT in higher education and society development, ICT as a change agent in higher education and society

## **1. INTRODUCTION**

Importance of education in almost all walks of life has increased with the support of information and communication technologies (ICT). During the past 20 years, the use of ICT has fundamentally changed the working of education. In the current environment-conscious world, the importance of education and acceptability of ICT as a social necessity has been increasing. Social acceptability of information and communication tools is necessary to improve the mobility in the society and increase the pitch for equity and social justice (Shah Md. Safiul Hoque, S. M. Shafiul Alam) The Indian higher education system is one of the largest in the world. With only 20 universities and 500 colleges with 0.1 million students at the time of independence, we now have about 611 universities and university-level institutions and 31,324 colleges as of August 2011. According to a report from Springboard Research, India's education sector will increase its IT spending to \$704 million in 2012. Despite the significant rise in numbers, when it comes to IT solutions in the education market, there is significant scope for improvement in India (Milind) Integration of ICT in Indian universities and colleges would respond to the twenty-first century demands. The contemporary higher education systems are aiming for acquisition of ICT skills as part of the core education system. Application of ICTs in managing higher education institutions and use of the technology to homogenize quality of education in the highly diverse scenario across the colleges and universities established in the country would benefit many students. (Neeru Snehi 2009). The Government of India has taken ICT initiatives in a big way and has laid down a National ICT policy, which is reflected and implemented through various Government Departments and Ministries. It is being implemented through vigorous activities of National Informatics Center (NIC) and encouragements from University Grants commission (UGC), All India council of Technical Education (AICTE) and Department of Science & Technology (DST) throughout the country. National Association of Services and Software Companies (NASSCOM) has also played a crucial role in the formulation of these policies (Dhirendra Sharma, Vikram Singh 2010). . ICT acts as a powerful agent to change many of the educational practices accustomed by the universities and colleges. As students and teachers gain access to technology, more direct forms of communication, and access to sharable resources, the capability to support these quality learning standards will continue to grow. ICT applications provide institutions with a competitive edge by offering enhanced services to students and faculty, driving greater efficiencies and creating enriched learning experiences.

## **2. OBJECTIVES**

To determine the Evolution of ICT in Indian education sector

To determine the role of ICT in teaching, learning, administration, research and society development

To draw implications of impact of ICT on students, teachers, research work, institutional and societal effectiveness

To explore how ICT as a change agent in higher education and society

To determine the problems and prospects of ICT integration in higher education

## **3. EVOLUTION OF ICT IN INDIAN EDUCATION**

Involvement of ICTs in different dimensions of the Indian education system is taking place at a fast pace. Use of audio visual aids, radio, TV to support education and dissemination of information for national development is not new. The use of satellite in education started as Satellite Instructional Television Experiment (SITE) in 1975-76. This led to the establishment of CIET-SIET studios for production and transmission of school oriented programs, initiation of the country-wide classroom of the UGC with CEC as the nodal agency by creating educational media resource centers (EMRCs) and audio-visual resource centers (AVRCs) in several universities. Presently these programmes are continuing as Vyas Channel supported by the CEC and various EMRCs, Gyandarshan II of the IGNOU, Open School and NCERT broadcast channel. EDUSAT was conceptualized to meet the communications requirements of the education sector. The Eleventh five year plan is further giving impetus to use of ICTs in education by setting up a National Mission in Education through ICT. In this regard, use of ICTs would contribute significantly to enhance the access and quality of education but at the same time it may generate situations, which warrant attention. For instance to promote technology driven education and open and distance learning the country launched a dedicated satellite EDUSAT on September 20, 2004. It was expected that EDUSAT would bring both quantitative and qualitative revolution in education. However, the quantitative expansion appears to have been achieved in being able to reach out to large numbers, yet the qualitative revolution envisioned due to introduction of new services and better quality teaching with learning materials, has not been quite visible (Bhatia, 2009). In higher education sector also, a National Mission in Education through ICTs is planned to be launched to increase ICT coverage in all the 378 universities and 18064 colleges. The Mission will focus on digitization and networking of all educational institutions, developing low cost and low power consuming access devices, and making available bandwidth for educational purposes. These initiatives would provide significant opportunities and pose new challenges as well for effective use of ICT in programmed delivery (11th FYP). Notable initiatives like various universities and colleges use of

ICT in education in India include Indira Gandhi National Open University (IGNOU) uses radio, television, and internet technologies. National Program on Technology Enhanced Learning is a concept similar to the open courseware initiative of MIT. It uses Internet and television technologies. An Eklavya initiative uses Internet and television to promote distance learning. IIT-Kanpur has developed 'Brihaspati', an open source e-learning platform

(Virtual Class Room). And Premier institutions like IIM-Calcutta have entered into a strategic alliance with NIIT for providing programmes through virtual classrooms. Jadavpur University is using a mobile-learning centre. IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real time interactive satellite technology. ERNET & EDUSAT (GSAT-3) systems provide support to Tele-education system of Distance learning to reach the un-reached people of India in every nook and corner. INFONET and CEC (Consortium for Educational Communication) services of University Grants Commission supporting E-content, E-learning and E-course systems. Information and Library Network (INFLIBNET) Centre is an Autonomous Inter-University Centre (IUC) of University Grants Commission (UGC) involved in creating infrastructure for sharing of library and information resources and services among Academic and Research Institutions. (Neeru snehi 2009)

## **4. ROLE OF ICT IN HIGHER EDUCATION**

ICT role in higher education is solicited for improving quality, widening access and enhancing operational efficiency across all functions in higher education sector and to create new dynamics in higher education both at micro and macro levels (J.Meenakumari, krishnaveni) Introduction of ICTs in the higher education has profound implications for the whole education process ranging from investment to use of technologies in dealing with key issues of access, equity, management, efficiency, pedagogy, quality, research and innovation. ICT applications provide institutions with a competitive edge by offering enhanced services to students and faculty, driving greater efficiencies and creating enriched learning experiences.

### **4.1 ICT in Teaching and Learning**

While for Higher Education sector is planned to build a knowledge repository of multidisciplinary subjects, as a strategy to counter the shortage of faculty in higher education, EDUSAT will be used to share the available expertise through modular programmes. This will be done by networking institutions, creation of virtual laboratories, creation of database, access to expert lectures and technological developments in Industries and Research organizations etc. Teaching and learning can further be improved by replacing of conventional teaching instead of the usual age old method of chalk and talk for teaching by innovative methods like Power point presentations and animations, modeling and simulations, video clips and using AV aids, LCD projectors etc. This enhances the learning ability of the student and also helps the teacher to elaborate the difficult concepts effectively within a short time span. Seminars of the students can also be arranged allowing the references to be done using internet and the presentations using high tech display devices as LCD projectors. Different online courses of the foreign universities are made available for the students in the internet centre in collaboration with the universities. (Savita Desai, Prashant Shah). ICT in higher education change the view of learning from teacher centered to student centered learning system and the teachers are the facilitators, coaches and mentors were ICT support the learning environment to students.

**Some of the supporting environments are:**

**Tele-Education System**-It is the application of space technology in education. An integrated network system comprising of EDUSAT, Broadband and V-SAT networks

helps in bringing virtual class rooms in a multi class environment with seamless two-way interaction between the teachers and students in a collaborative environment.

**Virtual Learning Campus (VLC)**-Virtual Learning Campus or VLC is an approach that divides the responsibility of building, commissioning and running the different systems and Information Infrastructure for education like Broadband, EDUSAT and ERNET services, Synchronous class room environment, Asynchronous knowledge interaction environment, Servers and Portals, E-learning & Digital library, ERP management solutions etc. under centers of specializations in different Institutions in different disciplines. Students in any college may access the services over the web. The college itself needs to maintain basic e-learning and library portals for convenience and providing convenient access to information.

**Virtual libraries and digital learning**-Teachers and students must be able to get information quickly and conveniently. Distance education requires virtual libraries. It provide text, video, audio, and other formats for teaching and learning and support digital learning. They collect and organize information and help the users to use the right information at the right time. (Schmitz, 2004) Digital education creates changing patterns for students, teachers, librarians, and others. This new pattern will increase the role of curators in this process. In a virtual library, librarians become curators who do not merely collect, organize, and lend material, but are also leaders, researchers, information gatherers and information analyzers. A virtual library curator is a powerful person in managing a great volume of data Husler 1996).

**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

**Wireless connectivity (wifi)**- wireless campus benefit both students and teachers. Wireless environment will help faculties to mould the future workforce, improve campus efficiency, streamline operations and enable real time connectivity through any device. Students will benefit through expose to technology and expect services such as video conferencing, virtual class rooms and social media access through high speed internet connections. Furthermore the students adopting tablets and other devices, many educational institutions are embracing the concept of bring your own device to enhance learning and teaching. Going wireless helps as it address the need to be connected constantly and provide seamless networking, ensuring improved student engagement with technology.

## **4.2 ICT in Administration**

ICT in administration of educational institutions play a major role in efficient utilization of existing resources and simplifies

the administration tasks by reducing the paper work and replaces the manual maintenance of record keeping to electronic maintenance of records which helps in easy retrieval of any information of students, staff and general with in a fraction of seconds can access the required information. In administration ICT helps in three ways :

**In student administration** ICT helps in maintain the student's personal profile, academic track record, placement participation, student alumni record student assessment etc. And it helps in student learning activities like assignment uploading and course material downloading, attending quiz & online test and preparing classroom and project presentations and access the information for career enhancements, attendance record in some institutions biometric attendance facilities, communicating academic details of students to parents via mail and sending text message ,availability of time tables and course schedules in electronic form , etc

**In staff administration** ICT helps in maintaining the staff personal profile like personal details , pay scale , grade, performance record common for teaching and nonteaching staff and for teaching administration ICT plays a pivot role in assessment of teaching performance , research work , preparation and presentation of learning materials, duties and responsibilities etc.

**In general administration** ICT helps in office administration and managerial administration like maintaining financial records of the institutions social networking with other institutions, companies and agencies for business transactions and dealings, issue notifications, facility of fee payments on online, scheduling of examinations, and allocation of e-hall tickets to students' online student admissions process and communicating people for events and programs etc.

## **4.3 ICT in Research**

Integration of ICT in higher education promotes research to move forward, as known to all that Indian research work is lagging behind and very less percentage of initiatives in research field due to lack of supporting systems and the quality of the research also not on par with other nations. With the integration of ICT in Indian higher education enhances the quality of research work and more number of individuals enrolled in the research work in various fields. ICT facilitates the links to across the world in all subject matter and made social networking. It saves time, money and effort to the researchers in their research studies like they can collect a data of large population with a single e-mail and retrieve data in a fraction of seconds and through the availability of various software the analysis of the research work become much easier to the researcher. The unprecedented growth in bandwidth and computing power provide opportunities for download huge amount of data and can perform complex computations on them in a fast manner to get a accurate and reliability of data. The researchers have a provision of online access of thousands of journals, articles, eBooks and publications etc. for their research work, and researcher have a provision to submit online publications.

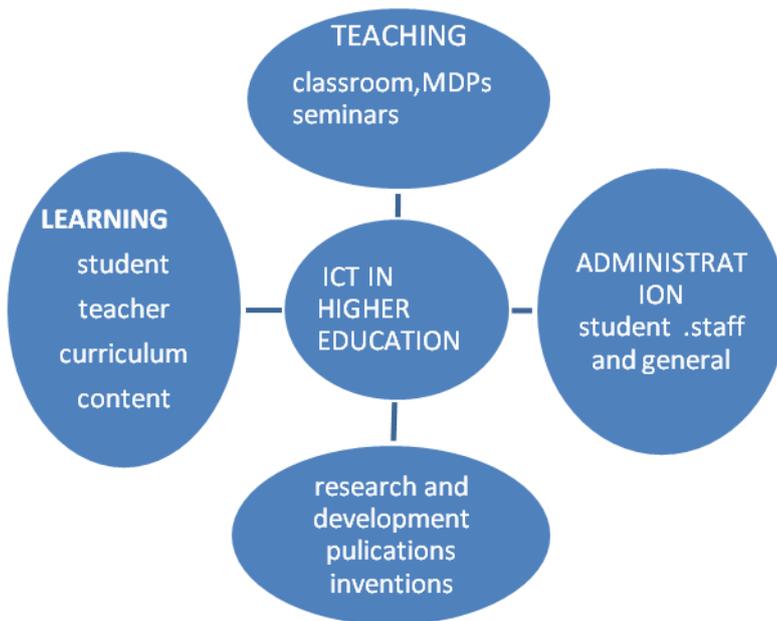


Fig 1: Integration of ICT in higher education

## 5. ICT AS A CHANGE AGENT IN HIGHER EDUCATION

The evolution of higher education in India combined with the need to sustain and be competitive in a global scenario requires decisions to be taken quickly and effectively. This has enhanced the scope and complexity of administration, thus making it necessary to adopt different methods of higher education administration

- The increasing student population in higher education accelerated the need for ICTs to process, store and retrieve data in a fast, systemic and accurate fashion. The focus of e-administration in higher education is on the creation of an efficient electronic administration by handling existing resources economically. It aims at adding value to the educational sector by simplification of a lot of diversified management and administrative tasks. According to Sanat Kaul (2006), the usage of ICT in higher education institutions starts from the early stages of receiving e-notifications regarding admission, course schedules, and billing procedures and continues till the end of the course including online publication of results
- The concept of moving the traditional classroom of desks, notebooks, pencils, and blackboard to an online forum of computers, software, and the Internet intimidates many teachers who are accustomed to the face-to-face interaction of the traditional classroom(Sukanta Sarkar 2012)
- ICT change the concept of teacher centered learning to student centered learning and teachers acts as coaches, mentors and knowledge facilitators and the learning environment focus on a real time problem solving methods

- learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy & Cunningham, 1996).the use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become(Ron Oliver)
- ICT applications provide many options and choices and many institutions are now creating competitive edges for themselves through the choices they are offering students. These choices extend from when students can choose to learn to when and where they learn (Ron oliver)

- ICT according to a number of commentators, enhance teaching, learning, and research, both from the constructivist and instructive theories of learning. However the change in professional practices in which teachers are now enabled to design to incorporate more complex real world projects using ICT tools and resources
- In many countries, demand for higher education far outstrips supply and Governments and institutions are turning more and more to the use of ICTs to bridge the access gap. It is too early to say whether the role of ICTs in the teaching function of higher education is truly transformative, or whether it is simply a repackaging of previous pedagogy.
- ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number (Sukantha Sarkar 2012)
- ICTs in the form of Management Information Systems are increasingly universal. The wide adoption of ICT calls for mindsets and skill sets that are adaptive to change. An attitude of resistance to change is often caused by the lack of appreciation of the benefits brought by ICTs and the fears about the displacement of people by technology. However this encompass in very rare situation, at present scenario by changing life styles and emerging new

cultures the people forced to change and should adopt new technology in order to sustain in the new changing world

- Integration of ICT in education institutions may lead to drop-out rate amongst distant learners enrolled with the institute has decreased, Student data related to academics, fees and administration can be tracked accurately and real-time, accurate MIS reports to management on various aspects of academia, administration and finance are readily available relevant data to assist management in taking key strategic and policy decisions from time to time can be easily provided (Swati Mujumdar 2010)

Researchers search information more on web and digital library rather than the library book shelves and computer became a mandatory for research work. Information technology changes the concept of traditional method of research work and made the researchers to do more feasibility and reliability studies. With the evolution of ICT researchers can complete their research work in a short period of time and motivates many upcoming researchers to handle more research works

## **6. ICT AS A CHANGE AGENT IN SOCIETY**

- The last two decades have seen a critical examination of the role higher education institutions in economic growth and social development. In addition to teaching and research, contributing to regional economic growth through innovation is now perceived as the third role of universities. The university-industry-government linkage as a triple-helix model through which effective transfer of technologies leads to economic growth. (Balasubramanyam 2009)
- The developmental role of a higher education institutions can be seen from its initiatives and impacts in addressing social issues such as poverty, inequality, gender, environment and empowering the poor and marginalized sections of the society to play a major role in the developmental process
- The Government is proposing the creation of a high speed knowledge network providing connectivity across education institutes. The same should be created at the earliest and connectivity should be provided to all recognized institutes to supplement the current networking initiatives being undertaken, Intra and Inter-disciplinary networks to enhance research collaboration between students and teachers should be promoted. This can also be supplemented by creation of online communities of practice
- Current business world connected by networks and perform operations very flexible at any place in the world. It adds the economic value to the nation and develops the society in large extent
- ICT promotes the generation of new business and occupations opportunities for a large number of population. The business from software development to travel agency and the insertions of new occupations like IT developers, IT assistant etc. the generation of new business and employments will generate the economy,

reduces unemployment and enhances the standard of living of society

- ICT is a connectivity agent as it connects the people at any place of the world .connecting the people through various devices initially information passes from one person to another by pagers and faxes and later with the increasing technology people connected through telephones, mobiles, emails and social networks etc. perhaps it changes the people to utilize the resources as with the changing environment and develops new trends in the society
- ICT adds value to the processes of earning, and in the organization and management of learning institutions. The Internet is a driving force for much development and innovation In individuals, business organizations, educational institutions and society at large

## **7. PROBLEMS AND PROSPECTS OF ICT IN HIGHER EDUCATION**

### **Problems**

- Implementation of ICT in educational institutions is one of the big challenge due to high cost incurred for acquiring, instilling and replace of latest software and addition to that various opportunity cost to institutions for infrastructure development. This is not possible to tire 3 or self financing institutions until unless they have financial aid from government and sponsors etc.
- Speed of change reduces the comprehensive planning and researches the effects of new technologies in the education and society. And it is one the drawback for the successful implementation of the ICT in education in the initial periods because the stakeholders are not trained to accept the change
- Establishment of ICT infrastructure is not sufficient to achieve the goals of successful integration of ICT in educational institutions. However the development of e-content , its dissemination, selection and evaluation requires large scale networking among the users and producers and intellectual property rights among the stake holders is the major concern for the holistic integration ICT in education
- Besides the lack infrastructure to accommodate the technology ,problems in electricity , network availability, lack of awareness towards technology and utilization technology with improper knowledge were adding complexities for the successful implementation of ICT in educational institutions
- Despite of increase access the availability of advance technology and various opportunities to educational institutions to move forward in a competitive environment but many institutions are still in a nascent stage in the integration of ict in education because many institutions are still accustomed with traditional learning practices and lack of motivation and knowledge among teachers to adopt ICT in teaching tool are the other challenging factor for the potential benefit of the ICT in higher education

## Prospects

- The increasing use of information and communication technologies (ICTs) has brought changes to teaching and learning at all levels of higher education systems (HES) leading to quality enhancements.
- ICT change the concept of learning within the four walls as the introduction of technology learning breaks the boundaries of universities and colleges and offers the learners can learn irrespective of place and time. The individuals can access the data whenever they want and from where ever they may be learning occurs.
- The change in professional practice in which teachers are now enabled to design to incorporate the more complex real world projects by using ICT tools and resources and develops new educational approaches
- It provides a new concept of learning environment in the institutions and enhances the quality of education to produce a quality products
- During the last decade, higher education has gained importance in India's changing policy landscape as the government realizes that India's strength lies in education. The gap between demand and supply of higher education has necessitated the governments and institutions to formulate the policies for the better use of ICT. And, in order to bridge the gap, it is necessary to evolve the cooperation between the public and private sectors for the successful implementation of ICT in higher education (R.Nayak Indian Express ,2011)
- The evolution of ICT into universities clearly changes the way education is conducted. Not only is it possible to work with distance learning and achieve a closer collaboration between different universities, but also paving the way for a new pedagogical approach where there is unparalleled ability to spread knowledge and disseminate information. The pace of change brought about by new technologies has had a significant effect on the way people live, work and play worldwide (Rev. Dr. Obiora Nwosu)

## 8. CONCLUSION

Education is the driving force of economic and social development in any country. Considering this, it is necessary to find ways to make education of good quality, accessible and affordable to all, using the latest technology available Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems. ICT integration in higher education brings a change in student and teacher learning behavior and the

Collaboration of all stakeholders in the universities and colleges by sharing the information for mutual benefit. Thus the successful integration of ICT in higher education depends

on the collaboration of national policies and institutional policies. The actions taken for the implementation of ICT needs to be a proper action plan and training to all stakeholders involved in the integration and bring change on them. In addition to this there should be proper controls and licensing, quality assurance and accreditation of technology must be compulsory to reduce the complexities of implementation.

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