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The Role of Information and Communication Technology (ICT) in Higher Education

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Abstract:

This paper attempts to highlight the role of Information and Communication Technology in higher education. Information and communication technologies (ICT) have become commonplace entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavor within business and governance. Within education, ICT has 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 having high degrees of personal contact with learners. It is evident from the study that use of ICT in education is increasing very rapidly in various states of India. One of the most common problems of using Information and Communication Technologies (ICTs) in education is to base choices on technological possibilities rather than educational needs. In developing countries where higher education is fraught with serious challenges at multiple levels, there is increasing pressure to ensure that technological possibilities are viewed in the context of educational needs. The use of ICT in education lends itself to more student- centred learning settings and often this creates some tensions for some teachers and students. Thus, the paper suggests that ICT in higher education is not a technique for educational development but also a way of socio-economic development of the nation.

Keywords: **Information and Communication Technology, *Higher Education***

Introduction:

Information and communication technology (ICT) is a force that has changed a lot of aspects of the life. If one compare fields such as education, banks, medicine, hotel and tourism, travel, business, law, and architecture, the impact of ICT across the past two or three decades has been massive. Importance of education in almost all walks of life has increased with the support of information and communication technologies (ICT). During the past two or three decades, 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. 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 800 universities and university-level institutions and 35,500 colleges as of June 2017. Despite the significant rise in numbers, when it comes to IT solutions in the education market, there is significant scope for improvement in India. 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 form 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.

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 programmers‟ 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).

ICT in Higher Education:

The major teaching and learning challenges facing higher education revolve around student diversity, which includes, amongst others, diversity in students' academic preparedness, language and schooling background. Education is perhaps the most strategic area of intervention for the empowerment of girls and women in any society and the use of information and communication technologies (ICTs) as an educational tool in the promotion of women's advancement has immense potential. The application of ICTs as a tool for effective enhancement of learning, teaching and education management covers the entire spectrum of education from early childhood development, primary, secondary, tertiary, basic education and further education and training. Integrating ICT in teaching and learning is high on the educational reform agenda. Often ICT is seen as indispensable tool to fully participate in the knowledge society. ICTs need to be seen as "an essential aspect of teaching's cultural toolkit in the twenty-first century, affording new and transformative models of development that extend the nature and reach of teacher learning wherever it takes place" (Leach, 2005). For developing countries like Vietnam, ICT can moreover be seen as a way to merge into a globalizing world. It is assumed that ICT brings revolutionary

change in teaching methodologies. The innovation lies not per se in the introduction and use of ICT, but in its role as a contributor towards a student-centered form of teaching and learning. The Information and Communication Technology (ICT) curriculum provides a broad perspective on the nature of technology, how to use and apply a variety of technologies, and the impact of ICT on self and society. Technology is about the ways things are done; the processes, tools and techniques that alter human activity. ICT is about the new ways in which people can communicate, inquire, make decisions and solve problems. It is the processes, tools and techniques for:

i. Gathering and identifying information

ii. Classifying and organizing

ii. Summarizing and synthesizing

iv. Analyzing and evaluating

v. Speculating and predicting

Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education. ICTs can improve the quality of education in a number of ways: By augmenting student enthusiasm and commitment, by making possible the acquirement of fundamental skills and by improving teacher training. ICTs are also tools which enable and bring about transformation which, when used properly, can encourage the shift an environment which is learner-centered. ICTs which can be in the form of videos, television and also computer multi- media software, that merges sound, transcripts and multicolored moving imagery, can be made use of so as to make available stimulating, thought provoking and reliable content that will keep the student interested in the learning process. The radio on the other hand through its interactive programs utilizes songs, sound effects, adaptations, satirical comedies and supplementary collections of performances so as to induce the students to listen and get drawn in to the training that is being provided. The use of online pedagogy within universities and management institutes is increasing. The introduction of the Wi-Fi system too has led to the growth of hi-tech education system, where accessibility and accountability of subject matter is made

readily available to the students. The students can now study and comprehend the related information at their own convenient time.

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 an 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.

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. 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.

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 accesses the data whenever they want and from where ever they may be learning occurs.

- It provides a new concept of learning environment in the institutions and enhances the quality of education to produce a quality products.
- 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.
- 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 un parallel 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).

Conclusion:

Education is the driving force of economic and social development in any country. As move into the 21st century, many factors are bringing strong forces to bear on the adoption of ICTs in education and contemporary trends suggest will soon see large scale changes in the way education is planned and delivered as a consequence of the opportunities and affordances of ICT. It is believed that the use of ICT in education can increase access to learning opportunities. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems. Extrapolating current activities and practices, the continued use and development of ICTs within education will have a strong impact

on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The continued and increased use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced. The integration of ICTs in higher education is inevitable. The very high demand for higher education has stimulated significant growth in both private and public provision. ICTs in the form of Management Information Systems are increasingly universal. The strength of computers in teaching is their power to manipulate words and symbols - which is at the heart of the academic endeavor. ICT has also led to the emergence of Open Educational Resources (OERs). The use of ICT creates an open environment which enables the storage and the reuse of information materials as also it enables the interface among the teachers as well as students. Apart from having enabling telecommunications and ICT policies, governments and higher education institutions will need to develop strategies for effective ICT and media deployment and sustainability.

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