

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

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Abstract:

It has been commonly accepted and proven that information and communication technology (ICT) is the engine of the 21st century. The use of the Internet and the web as well as the emerging of different communication channels have brought the world closer and contributed to the concepts of globalization. This paper examines the use of emerging information and communication technology tools in teaching and learning of higher education. Higher education systems have grown exponentially in the last five decades to meet the demands of quality education for all. This aspect has further gained momentum due to swift advancements in Information and Communication Technology (ICT). The focus of this paper is to examine the role of Information and Communication Technology (ICT) in higher education in India in the 21st century. 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 in the 21st century.

Key Words: *ICT, Higher Education System, Communication Channels, Internet, Quality Education*

Introduction:

The educational sector at large has been one of the beneficiaries of the use of different information and communication technology tools and techniques. Information is a key resource for student teaching, learning, research, and publishing. Traditional forms of teaching and learning are increasingly being converted to online and virtual environments. There are endless possibilities with the integration of ICT in the education system. The use of ICT in education not only improves classroom teaching learning process, but also provides the facility of e-learning. ICT has enhanced distance learning in the 21st century. Education at a college or university where subjects are studied in great detail and at an advanced level. A higher education qualification at degree level takes a minimum of three years to complete, more typically four. It will have a theoretical underpinning, it will be at a level which would qualify someone to work in a professional field and it will usually be taught in an environment which also includes advanced research activity. Shortly, Higher education mainly and generally means university level education. These degrees mark the highest one can earn, though they are divided into two levels. A master's degree, for instance, is awarded for a particular course of study beyond the baccalaureate degree. They come in various

categories, such as a Master of Arts, Master of Science, and Master of Theology. The amount of time it takes one to earn a master's degree depends upon the program one is enrolled in, but one should usually expect to study at least for 2 years. The second type of graduate degree, and one considered higher than a master's degree, is a doctoral degree. These are awarded for a particular course of study beyond the master's degree. Higher Education sector has witnessed a tremendous increase in the number of Universities/University level Institutions & Colleges since Independence. The number of Universities has increased 34 times from 20 in 1950 to 677 in 2014. The sector boasts of 45 Central Universities of which 40 are under the purview of Ministry of Human Resource Development, 318 State Universities, 185 State Private universities, 129 Deemed to be Universities, 51 Institutions of National Importance (established under Acts of Parliament) under MHRD (IITs - 16, NITs – 30 and IISERs – 5) and four Institutions (established under various State legislations). The number of colleges has also registered manifold increase of 74 times with just 500 in 1950 growing to 37,204, as on 31st March, 2013. The quantum growth in the Higher Education sector is spear-headed by Universities, which are the highest seats of learning.

˘ In India, "University" means a University established or incorporated by or under a Central Act, a Provincial Act or a State Act and includes any such institution as may, in consultation with the University concerned, be recognized by the University Grants Commission (UGC) in accordance with the regulations made in this regard under the UGC Act, 1956. Every year, millions of students from within the country and abroad, enter these portals mainly for their graduate, post graduate studies while millions leave these portals for the world outside. Higher Education is the shared responsibility of both the Centre and the States. The coordination and determination of standards in Universities & Colleges is entrusted to the UGC and other statutory regulatory bodies. The Central Government provides grants to the UGC and establishes Central Universities/Institutions of National Importance in the country. The Central Government is also responsible for declaring an educational institution as "Deemed-to-be University" on the recommendations of the UGC. At present, the main categories of University/University-level Institutions are: - Central Universities, State Universities, Deemed-to-be Universities and University-level institutions.

Development of any nation solely depends on the quality of human resources; and good human resource is produced through quality education. Education provides people with an opportunity to reflect on the social, cultural, moral, economic, and spiritual issues and contributes towards the development through propagation of specialized knowledge and skills. India, even after 70 years of its independence, is far away from the goal of universal literacy. The fact that India's higher education system is churning out millions of graduates who are unemployable speaks of the need to improve the quality of education in the country. However, on a positive note, India is engaged in the use of higher education as a powerful tool to build a knowledge-based information society of the 21st Century. Indian professionals are considered among the best in the world and are in great demand. This signifies the inherent strength of the Indian educational system. Education in India dates back to its early civilization time where teaching and learning process revolved around the 'Gurukul System'. It was a residential concept wherein the students were educated under the guidance of a

“Guru” in different areas of religion, philosophy and science. The higher education system in India grew rapidly after independence. By 1980, there were 132 universities and 4738 colleges, enrolling around five per cent of the eligible age group in higher education. The number of institutions in India is four times more than the number of institutions both in the United States and the entire Europe.

Present-day Scenario of higher education in India

India is dashing headlong towards economic success and modernization. It is counting on high-tech industries, such as IT and Biotechnology, to propel the nation to prosperity. Currently, Indian higher education system has many favorable factors to its advantage. India has a large higher education sector, the third largest in the world. It uses English as a principal language of higher education and research and has an extensive academic tradition. Academic liberty is appreciated and there are a small number of high-quality institutions that can form the foundation of quality education. The fact that State Government, rather than Central Government, maneuvers vital responsibility for higher education, creates a rather cumbersome structure, but the system allows for a diversity of policies and approaches. Yet the weakness clearly outweighs the strengths. India educates approximately 10 per cent of its youths in higher education. Even though, none of its universities occupy a solid position at the top. A few of the best universities have some excellent departments and centers, and there are a small number of outstanding undergraduate colleges. UGC recently released a report describing the current scenario of the Indian Higher Education System. It shows that despite the growing numbers of colleges and enrollments, it is not adequate enough to cater to the educational needs of the increasing young population. One of the most efficient ways of tackling the problem of poor educational quality is by sharing the resources between private and public schools. It is vital to remember that the quality of education is directly linked to the resources available and it is important for the government to improve the resource allocation to bring about qualitative changes in the field of education.

To enable the higher education sector to take on the emerging competition from the Asian countries, there is a need to loosen the hold of the government over the higher educational institutions. Following World War II, higher education expanded throughout the world remarkably, though there have been different degrees. If one looks at increases in enrollment rates, one sees that the increase for higher education was greater than that for primary and secondary education. From 12 million students in 1960, the number of higher education students rose to 88 million in 1997, an approximate seven-fold increase. Universities in developing countries had been small in scale and extremely intended to train elite persons, but from the time colonies became independent, higher education underwent rapid expansion. One of the reasons for this rapid expansion was that the demand for human resources who had underdone higher level education or training grew with the increasingly complicated society and economy and the earlier- mentioned changes in the social environment. Furthermore, over the past 50 years, developing countries which had put their energy into expanding basic education produced a result whereby the expansion of primary and secondary education led to an increased need for higher education. In other words, as

there is a relative increase in the schooling of a country's citizens, the middle class starts to demand a higher level of education in order to secure success in the society. Education is a basic pillar for human rights and democracy, sustainable development and peace; higher education in particular is necessary for solving the various problems we find as we approach the 21st century.

Missions and functions of higher education:

- 1) Mission to educate, to train and to undertake research
- 2) Ethical role, autonomy, responsibility and anticipatory function

Shaping a New Vision of Higher Education:

- 3) Equity of access
- 4) Enhancing participation and promoting the role of women
- 5) Advancing knowledge through research in science, the arts and humanities and the dissemination of its results
- 6) Long-term orientation based on relevance
- 7) Strengthening co-operation with the world of work and analyzing and anticipating societal needs
- 8) Diversification for enhanced equity of opportunity
- 9) Innovative educational approaches: critical thinking and creativity
- 10) Higher education personnel and students as major actors

Role of higher education in India

(1) Development of human resources necessary for economic and social development

For a long time higher education has fulfilled the role of producing government and private sector leaders. Developing high-level human resources with the necessary knowledge and skills for economic and social development has been the most important role of higher education. Added to this, in the current knowledge society where an entire society's knowledge level is at issue, higher education cannot just develop a small number of leaders. It is becoming important to expand higher education so that a wide range of human resources can be developed and the entire society's level of knowledge can be raised.

(2) Creation and diffusion of knowledge

In the creation and transmission of knowledge in a knowledge society, higher education is demanded to play a central role. In particular, the ability to apply knowledge and technical skills is extremely important to economic development. Thus, higher education must not merely teach new technology, but must develop human resources who can evaluate the need for these technologies and apply them. With the rise of a knowledge society, consciousness that higher education is no longer a luxury item and indispensable to a nation's social and economic development has increased. Higher education is required to be re conceptualized as a common intellectual asset. As a common intellectual asset, higher education needs to be not an entity isolated from society, but to be connected with society and to actively respond to society's request. To make it possible, higher education is first of all required to concern itself in the development and diffusion of technology closely connected with society's needs. In

addition, in order to respond to diversifying needs, one must diversify educational content and the ways to provide services. One of the examples is the realization of distance education which can accompany the development of information technology.

(3) Development of a healthy civil society and cultivating social cohesion

A role in reforming the social system and cultivating social cohesion is also demanded of higher education. This may be accomplished through the production of the common asset of new knowledge, including the spread of democratic values and respect for multiculturalism, the promotion of political participation, the strengthening of civil society and promotion of democratic governance.

4) Means of Self-realization

For a nation, higher education is a means of developing the human resources necessary for economic development. At the same time it is a means to achieve self-realization for individuals. Concretely, people can improve their income and quality of life through increasing knowledge or skills and then expand on their own choices available in life, including those related to work life. In addition, lifelong education, which constantly renews individual knowledge and skills, needs to be guaranteed throughout the lifetime to respond to individual learning needs. Therefore, just as one should guarantee basic education for all, one should guarantee opportunities for higher education equally, based on individuals' hopes and abilities.

The Government should undertake the following measures to improve the quality of higher education:

Encouraging individuality

Albert Einstein once said, *“Everyone’s a genius. But if you judge a fish on its ability to climb a tree, it will live its whole life believing that it is stupid.”* With the difference in ability, aptitude and interest of a student and the societal demands of expertise and specialization, the standardized testing and curriculum does not give much scope for the students to relate to the world of work and wages. Creativity that has nurtured our influences in almost all of life’s passions and interests drops dead at standardized tests. The current educational system expects conformity and rewards predictable behaviors, both intellectually and emotionally.

Tech-Savvy methods of teaching

The new technologies offer vast opportunities for progress in all walks of life. The focus should not be on installing hardware but creating new, high-quality content such as intelligent teaching systems and tools that will help students to hone basic skills like reading and mathematics, and developing content in multiple Indian languages. Free high-speed internet connections can be provided to all schools through a simple scheme by which the government could reimburse internet service providers directly.

Making the curriculum dynamic

Currently, the curriculum in higher education is outdated in most cases. It is stale, dogmatic and teaches things that the world has moved on with. To infuse dynamism, the curriculum

needs to be progressive in nature. Students need to be given the option of doing multiple courses. The spirit of curriculum should be projects-driven and not exams-driven.

High-tech libraries

The university libraries have a very good collection of books, but they are all in mess. A library must be online and helpful for serious study. Indian universities should concentrate more on providing quality education which is equivalent to that of the global standards. Instituting this notion in the education system will be of great help as anyone will be able to access the books and required study materials from anywhere with amazing effortlessness. Moreover, the E-libraries can be updated swiftly with new material and books.

The Power of alumni

One of the most unappreciated potentials in Indian education system is the power of the Alumni. Excluding the IIT's and a few other top institutes, the concept of Alumni networking is non-existent. Once you launch a sincere network which is transparent, it would give the avenue as well as the confidence for the alumni to contribute in terms of money or academic expertise. Keeping in perspective the rapid changes taking place in the society, higher education should possess various qualities like inculcation of confidence and ability to take responsibility and prepare students to be effective within the circumstances of their lives and work, and promote the pursuit of excellence in development and application of knowledge and skills.

Role of ICT in higher education

ICTs are making dynamic changes in society. They are influencing every aspects of human life. Application of ICT tools in Teaching-Learning Process has changed the total scenario of teaching learning process. Teaching-Learning Process is not now limited within the boundaries of classrooms. ICTS are making major differences in the teaching approaches and ways students are learning. 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. **ICT includes communication devices and applications like computer, hardware networks, software, mobile technology, satellite communication, video conferencing, RFID Technology, WI-FI zone, pen drives, Internet, www, Web2.0 and Social media etc.**

Satellite communication:

The age of satellite communication dawned in 1962 with the launching of Early Bird, the first communication satellite. The two big international satellite systems Intelsat and Intersputnik began operating in 1965 and 1971. India launched a satellite for communication called INSAT and for Education purpose EDUSAT was launched in the year 2004. INSAT -4CR was launched on 2 September 2007 by GSLV_F04. IT is a replacement satellite for INSAT -4C which was lost and destroyed.

Video conferencing:

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

World Wide Web:

The World Wide Web, known as www,w3or simply the web, is one of the several internet resources developed to help, publish, organize and provide access to information on the Internet. The web was first developed by Tim Berners Lee I 1989 while working at CERN, European Particle Physics Laboratory in Switzerland.

RFID technology:

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

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 programs. 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.

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 (e.g. in student administration, staff administration, general administration etc.) 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.

3. ICT in research

Integration of ICT in 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

across the world in all subject matter and made social networking. It saves time, money and effort to the researchers in their research studies. The collection and analysis of large data becomes easier through the availability of various software. 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.

4. 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

1. 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. 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
2. 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)
3. 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
4. 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).

5. ICT in classroom instruction

The systematic use of ICT tools in classroom instruction makes the teaching learning process more effective and highly interactive. It has shifted the teaching –learning process from teacher –centered learning to student centered learning. Research has shown that high level of student and instructor satisfaction can be produced in ICT enabled learning process. But the effective and efficient use of ICT depends on technically competent educators /teachers. They should be able to appreciate the potentiality of ICT and have positive attitude towards ICT. The effective and efficient use of ICT in classroom instruction depends on:

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

6. Teachers ensures best teaching through ICT

21st century teachers ensure teaching is enhanced through the use of technology developing learners' ICT capability. 21st century teachers use ICT to: • deliver greater flexibility and choice of lessons and teaching techniques • communicate information and concepts clearly with high quality lessons and resources • make learning exciting and engaging for all learners • provide adaptive solutions for learners with special needs • create a learning environment where learners feel safe and secure • extend learning and work in partnership with parents, families and the community

Problems faced in implementation of ICT in teaching –learning process in Indian context:

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

Conclusion:

The widespread adoption of information and communication technologies (ICT) has enabled the realization of technologically advanced tools for learning which dramatically and rapidly transforming the education at different levels in the world especially in India. This paper seeks to explore the likely changes brought about by ICT in Indian higher education environment. ICT has improved teaching learning process in India but yet more advanced ICT techniques needed in Indian higher education system.

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