

Infusion of ICT in Higher Education: An Overview in the Indian Context

Dr. Aarti Trehan

*Associate Professor, Chemistry Deptt.,
Arya Kanya Mahavidyalaya, Shahabad (M), Kurukshetra-136135, India
aartitrehan218@gmail.com*

Dr. Rajesh Trehan

*Associate Professor, Chemistry Deptt.,
Dr. Y. S. Parmar Govt. P. G. College, Nahan (H.P.)-173001, India
trehanr@hotmail.com*

ABSTRACT

Impact of ICT in higher education from holistic point of view can be observed not only for the academics but also for global and integrated working of the institutions. Educational framework in India is also being fortified by implementation of ICT since 1986, for which infrastructure, usage, knowledge, and cost are the decisive factors for its complete integration in educational system. Effective utilisation of ICT is inevitably required since through it not only students can develop cognitive, social, cultural and technological skills but is also significant for the professional competency of teachers and effective governance of the institutions. Since through technology, stakeholder is able to receive education without diluting its quality, it may prompt scholastic improvement and also lead to progress of the nation. Therefore, to transform educational practices, it is vital to monitor and promote positive beliefs about the role of ICT in its framework. This study examines how ICT has infused in Indian education system along with challenges and barriers being faced in the present scenario in diverse contexts.

Key Words: *ICT, IT, Education, Technology.*

Introduction

The inclusion of developments of ICT in higher education system has been observed all around the world during more than past four decades. As world is on the verge of a pervasive revolution comprising huge progress in genomics, artificial intelligence, materials and manufacturing technologies, the present curricula, research and skilling programmes in education system are going to be outdated. Nations whose education system will cope with and master this paradigm shift would only thrive and would lead to sustainable development. Mooij (2007) said that differentiated ICT based education can be expected to provide greater reliability, validity efficiency of data collection and greater ease of analysis, evaluation and interpretation at any educational level. Youssef & Dahmani (2008) showed the connection between the utilisation of ICT and under study execution in advanced education. Richard (2015) explained that the selection and utilisation of ICT in instructions positively affect educating, learning and research. Cargo et al. (2017) in their study found that there is no dissemination of successful teaching experience on the use of ICT in the teaching learning process. According to Pfeffer (2002) ICT is not only important for academia but also for growth of institution at global level.

Infusion of ICT in higher education system in India has also led to its growth which is gaining

momentum exponentially. ICT which includes internet, wireless technology, mobiles and other communication media like audio, video and animations have totally changed and improved the field of education. Enfranchisement and transformation potential of ICT in higher education in India has helped to increase the country's requirements' in the field of education through number of schemes in the economic and social growth processes. In the era of rapid change, integration of ICT in education is not only helping in promoting personal growth but also in developing knowledge societies. Baruch & Ungar (2019) assert that conventional teaching learning processes are undergoing paradigm shift and focus should be now on education programs and practices that promote competency and performance. To strengthen or advance the knowledge driven graph, India is rapidly embracing ICT in its educational system which would endeavour to master capabilities needed to adapt to this technological shift in offing and this study analyses the challenges and barriers in its way which are being faced. Zentel et al.(2004) inferred that ICT implementation in higher education should have clear objectives on how to integrate and implement ICT in education sector.

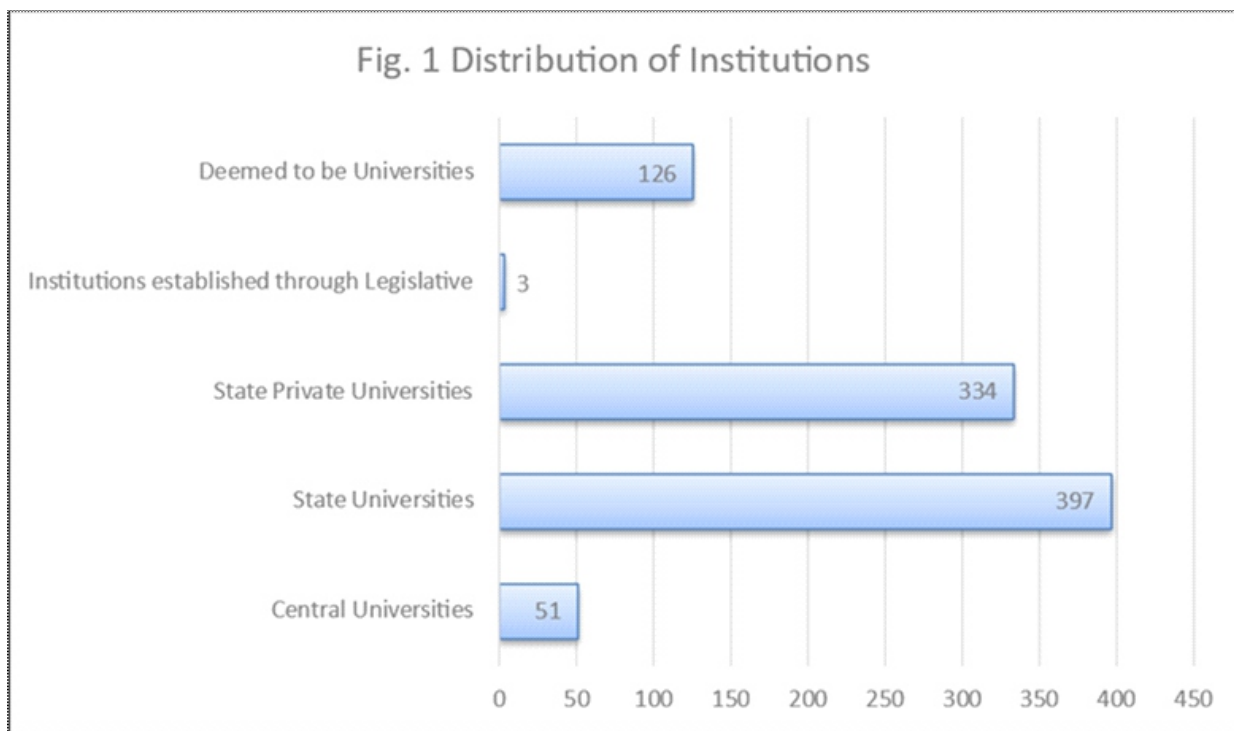
Background of technology usage in higher education institutes in India

Although education system is very old in India, but modern higher education began only in 1817 by the establishment of Hindu College in Calcutta and this growth continued as by 1947, India was having 19 universities, 496 colleges with 2,40,000 students. University Education Commission (1948-49), also known as Radha Krishan Commission, emphasised the need for setting up an apex body to coordinate the growth and development of education to maintain the standard in higher education. In last 7 decades there has been commendable, quantitative expansion of higher education in terms of student's enrolment, number of teachers, colleges and universities. The number of higher learning institutes has increased in India and are depicted in Table1 and Figure 1 shows the distribution of these institutes as per UGC annual report (2018-19).

Table 1 Higher Learning Institutes in India

S.No.	Institution	Number
1	Central Universities	51
2	State Universities	397
3	State Private Universities	334
4	Institutions established through Legislative	3
5	Deemed to be Universities	126

In above institutes of higher learning 373.99 lacs students; 26.3% GER (gross enrolment ratio)are showing a significant rise in enrolment as compared to 21.5% in 2012-13 and therefore, it becomes utmost important to keep pace with the institutions worldwide regarding the quality and standard of education. In view of exponential growth in higher education in India, it has become very essential to integrate ICT with education; rather we will have to take this integration as a movement to keep pace with world.The use of ICT for promoting education and development has been part of policy and plan of government since the National Education policy of 1986 which was later modified in 1992. This policy with a vision of sustenance and growth of a knowledge society had a mission to device catalyse support and sustain ICT and enabled activities and processes in education. Followed by this a policy on integration of ICT in education was framed, which would work towards achieving the goals by:



- Creating an environment in the states to develop IT/ICT knowledgeable community
- Creating an IT/ICT literate community who can deploy, utilize, benefit from IT/ICT and contribute to nation building
- Create an environment of Collaboration, Cooperation and Sharing, conducive to the creation of demand for an optimal utilization of and optimum returns on the potentials of IT/ICT in school/higher education
- Promote universal, equitable, open and free access to state-of-the-art IT/ICT enabled tools and resources to all students and teachers
- Promote development of localized quality content and enable students and teachers to partner in the development and critical use of shared digital resources
- Promote development of professional networks of teachers, continuing education of teachers; guidance, counseling and academic support to students
- Promote research, evaluation and experimentation in IT/ICT tools and enabled practices in order to inform, guide and critically utilize the potentials of IT/ICT in education
- Motivate and enable wider participation of all sections of society in strengthening education

Scenario of ICT in higher education

Rational behind integration of ICT in education is that India needs to tap the opportunity to change 373.99 lacs young minds in the age group of 18 to 23 years to tech savvy force through learning and teaching with the help of ICT in the knowledge-based economy. We have to equip our youth with latest technology to unfold hidden talent of young population and develop latest skills in them to meet emerging trends (Sharma et al., 2011). India is making use of powerful combination of ICTs such as

opensource software, satellite technology, local language interfaces, easy to use human-computer interfaces, digital libraries etc. with a long-term plan to reach the remotest of the villages. Community service centers have been started to promote e-learning throughout the country (Bhattacharya & Sharma, 2007). A scheme named "ICT for teaching and learning process" was initiated by UGC for achieving quality and excellence 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. Along with this a mega program namely, 'UGC INFONET', a network of Indian Universities and Colleges, by integrating Information and Communication Technology (ICT) was launched by UGC in the process of teaching, learning and education management. The network is managed by ERNET India and almost all the universities are its members. Information for Library Network (INFLIBNET), an autonomous Inter University Centre of UGC is the nodal agency for coordination and facilitation of the linkage between ERNET and Universities. Training programs for the manpower were conducted to manage the ERNET facilities and other aspects of systems including electronic subscriptions. In addition, UGC is encouraging creation of e-content/learning material for teaching learning process and management of education in colleges and universities.

Current technology initiatives in higher education: case studies

Some significant initiatives of use of ICT in education in India include:

- Indira Gandhi National Open University (IGNOU) uses radio, television and internet technologies. It has created a cooperative radio network known as Gyan Vani all over the country.
- The National Mission on Education through Information and Communication Technology is a centrally sponsored scheme to harness the potential of ICT in teaching and learning process.
- Consortium for Educational Communication has been tasked with the creation of e-content.
- National Program on Technology Enhanced Learning (NPTEL), a joint initiative of the IITs and IISc: a concept similar to the open courseware initiative of MIT. It provides e-learning through online Web and Video courses.
- *Eklavya* initiative: Uses internet and television to promote distance learning.
- *Brihaspati*, an open source e-learning platform (Virtual Class Room) has been developed by IIT-Kanpur.
- Premier institutions have entered into a strategic alliance with NIIT for providing programs through virtual classrooms.
- Jadavpur University is using a mobile-learning centre.
- The program of CDEEP (Centre for Distance Engineering Education Program) has been started by IIT-Bombay as emulated classroom interaction through the use of real time interactive satellite technology.

Current impact on stakeholders

ICT based learning is a complementary tool to meet the objectives of comprehensive learning and is not a replacement technology. Through it, specific requirements of learner can be met depending upon one's diverse background and abilities and moreover, he/she is able to receive individualized and self-paced learning also. Although, then role of teacher will be more challenging and different from what is presently the traditional class room teaching, but relevance of class will be more significant. Sharp increase in motivational level of learners is also observed along with successful consolidation and recollection of data, highlighting impact of infusion of ICT in student's life. Penetration of ICT in student's life can be judged by

going through Table2 (Trehan & Trehan, 2017). Now the teacher will have to act like a facilitator. Therefore, new methodologies of learning and teaching will have to be adopted at a very fast pace to meet the objectives of integration of ICT in education system.

Table 2: Impact of ICT on Stakeholders .

Technology	Activity	Outcome
Animated videos and graphics	Enjoyable watching	Absorbance and critical thinking
e-Books	Convenient use anytime anywhere	Environmental friendly and time saver
Broadcast media	Mass communication	Better perception, enhancement of memory and mass literacy
Online education	Learning at will	Self paced education with no bar
Internet	Access information with ease	No isolation
Personal computers and laptops	Interactive sessions	Positive use of addiction to digital media
Power point presentations	Assignments and projects	Deep understanding and enjoyment
Audio/video lectures	Listening and watching the contents at will	Better understanding and retention of the content
Video conferencing	Group discussion	Collaboration and problem solving
e-Mail, social media and blogs	Better and quick connectivity	Satisfaction of queries quickly
Intelligent testing system	Interactive sessions	Individualised evaluation

Current challenges and Barriers

ICT holds the potential to transform the education system of a country; therefore, we also need to access challenges or roadblocks and prospects to its implementation. Pegu (2014) said that ICT is indispensable support system for higher education but its infusion in the system presents enormous challenges. Even, National Knowledge commission Report (2007) asks for ensuring access of ICT for all deserving stakeholders. No doubt it can improve India's higher education system by providing greater equity, better access and improve quality but it is in nascent stage and therefore, large numbers of ICT based initiatives are being taken in higher education, but we have to keep in mind the following challenges also:

- Poor access to internet.
- Low awareness on IT literacy.
- Insufficient infrastructure (Ernst & Young Report, 2009).
- High cost of acquiring, installing, operating, maintaining and replacing of systems of ICT.
- Imposition of technological systems from top to bottom without involving faculty or students.
- Before installation, there is no review of needs of students or content availability.
- Use of low quality or inappropriate content.

- Poor instructional design not adapted to technology in use (UNESCO, 2009).
- Teachers and students not adapted to technology.
- To train teachers for the use of ever evolving technologies, upgrading their skills and to keep them abreast with latest development is of major concern.
- Can increase transactional distance being only a communication tool instead of face-to-face conversation.
- Shifting of primary goal of learning to acquisition of ICT skills.
- Linguistic barriers to dissemination of knowledge.

Conclusion

In India integration of ICT in education can make it more accessible and affordable and hence, then the framework of higher education system can be expanded and improved with respect to design and content of instructional materials, delivery, assessment and feedback. We will have to monitor and promote positive belief about the role of ICT in its framework so that it prepares the future generation more tech savvy who possess more technical competencies to stand apart in this competitive world. By addressing the challenges, we have in India along with innovative use of ICT, we can build a real instructive higher education frame-work which is progressive in nature and can be an achievement factor for the development of the nation.

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