ICT Initiatives and Tools in Higher Education

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Abstract—ICT has changed the picture of Indian higher education system as more and more technological intervention is being infused with the usual ways of teaching. ICT plays a vital role by making available the knowledge resources to every learner as per his/her convenience and just in time. ICT has tremendously upgraded the quality of education through various mechanisms like e – learning, blended learning and distance education. It has increased the access of and imparted equity in higher education through increasing digitization and quality teaching learning which benefits not just students' learning but also has open ways to build capacity of educational personnel. This paper is a descriptive analysis of the increasing use of and various initiatives in the field of education pertaining to the use of ICT in India and its contribution in imparting quality in education and its subsequent benefits.

I. INTRODUCTION

This As per MHRD's NMEICT Vision Document, the overall literacy rate in the country as per the Census of 2001 was 64.8%. This implies a lack of formal means to get to know about the potential of the remaining 35.2% of the population1. Development their talent is still a far cry. This point toward the massive underutilization of country's human resources. As per UGC's Annual Report of 2011, 14.6 million students pursued Higher Education in India as of 2011. The Report also states that the gross enrolment ratio in rural areas is expected to reach 12.84 % by 2020.2 The UGC report on Higher Education in India 2008 – 11th Five Year Plan Vol. II, states that an increasing number of women are expected to enroll in higher education institutes. The number is estimated to increase from 6.1 million to 12.15 million by 2020.3 Therefore, innovation and changes in curriculum are significant to meet this ever-growing demand. The globalized labour market requires students with new skills. With huge lay-offs in IT-industry becoming a trend now a days, people at a large scale, educational institutions and universities need impart skills to students as well as to enhance their learning.

Today, technological interventions are gaining importance in the field of higher education. ICT driven tools are increasingly helping students to learn, communicate, collaborate and study both on and off campus. Universities too have responded positively to new technological changes and are continuously transforming their learning processes. Digitization of higher education in India is gaining pace as clear from the growing popularity of digital libraries; increased mobile connectivity, cloud based data management, Wi-Fi enabled campuses etc.

II ICT IN HIGHER EDUCATION

A. e- Learning

e- Learning, that is, electronic learning is basically computer - enhanced learning. It may range from technology enabled learning (TEL), computer based instruction and training (CBI/T) or internet based training (IBT). It can be both synchronous, involving webinars and virtual learning environments leading to immediate feedback and asynchronous or self-paced where students do not have admission to instant messaging or they are not able to interact with teachers. According to industry experts, e- learning platforms are changing the Indian education landscape by matching the demand by the corporate sector with the supply of skilled students as these dispense personalized learning outcomes.

The demand for online higher education is dominated mainly by post-graduation courses such as MBA and MCA as per the KPMG's report on "Online Education in India: 2021" according to which 33% students in North, 39% in the West, a whopping 64% in East and 36% in South prefer pursuing MBA/PGDM courses whereas the ratios for the same region respectively for B.Ed./M.Ed./NTT are to 9%, 7%, 2% and 17%. Test Preparation through Online Education Not just the enrolment to predictable courses on e-learning platforms is on rise but there has also been a growing number of students diving to online preparation of various competitive national level tests.4

Table1: Tier- Wise Adoption of Test Preparation Courses

Tests	Tier 1	Tier 2
Engineering	32	26
Medical	23	13
BA/BSc/BBA	17	13
Law	16	6
CA	10	9

Source: KPMG Report: Online Education in India: 2021.

B. UGC - IUC

To support the Universities, the University Grants Commission (UGC) has also constituted the UGC InfoNetDigital Library Consortium being executed by INFLIBNET which is an autonomous, Inter- University Centre (IUC) of UGC entrusted with the task of creating infrastructure for sharing of library and information resources among academic and research institutes. The programme is wholly fund by the UGC. Apart from that, it has also established a CEC, that is, Centre for Educational Communication which is yet another IUC. The aim of the Centre is to address the

requirements of higher education through the use of the invincible medium called television based on the potential and power of television to act as a means of dissemination of knowledge. To the effect, the UGC started the Countrywide Classroom Programmes in the year 1984. At present, 22 Media Centers known as Educational Multimedia Research Centers (EMRCs) have been made operational towards achieving this goal under the umbrella of CEC, .These EMRCs disseminate knowledge through EDUSAT which is the first Indian satellite built exclusively for serving the educational sector . It very well highlights India's assurance to use space technology for national development. It mainly intends to meet the demand for an interactive satellite based distance education system for the country.

III. DIGITAL INITIATIVES IN HIGHER EDUCATION

Government of India has, under its 'Digital India' drive, launched various initiatives to make education in India accessible and equitable. Prominent among them include:

i) SWAYAM, that is, Study Webs of Active Learning for Young Aspiring Minds is a programmed that seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy. The platform endeavors to host courses in four quadrants viz., video lecture, specially prepared reading material available for downloading/printing; quizzes and tests for self assessment of students and an online discussion forum for doubt sessions. Through the portal, an attempt has been made to make the learning enriching via audio-video and multimedia and state of the art pedagogy/technology.

ii) SWAYAM PRABHA, a group of 32 Direct To Home Channels to telecast high-quality educational programmers, the contents of which are provided by NPTEL, IITs, UGC CEC, IGNOU and NCERT, 24 × 7 basis using GSAT - 15 satellite.

iii) National Digital Library of India (NDL India) is a single-window search facility for accessing digital content like books, articles, videos, audios, thesis and other educational material relevant for users belonging to different educational levels and capabilities.

iv)Virtual Labs Project is an initiative of Ministry of Human Resource Development, Government of India below the aegis of National mission on Education through Information and Communication Technology. The project is a

Consortium activity of twelve participating institutes; IIT Delhi being the coordinating institute. The aim of the project is to widen the reach of labs related to various disciplines of Science and Engineering to students living in remote areas reading at undergraduate level, post graduate level as well as to research scholars. The project is a revolution as far as making higher education affordable to students as it strives to share costly tools and resources, which are otherwise available to a limited number of users due to constraints on time and geographical distances.

v) A- VIEW (Amrita Virtual Interactive e-Learning World) is a multimedia e-learning platform and part of the

'Talk to a Teacher' program coordinated by IIT Bombay that aims to present an immersive e-learning experience on a real-time basis. The Programme is funded by the Ministry of Human Resource Development (MHRD) under the Indian Government's National Mission for Education using Information and Communication Technology (NME-ICT) along with various other projects in Virtual Labs and Natural Language Processing. A-VIEW is now deployed at several IITs, NITs and other leading educational institutions across the nation.

IV TECHNOLOGY IN TEACHING

ICT leads to innovative and effective ways of teaching-learning and research. Indian higher education will see a plethora of technology trend and effects of technology adoption. Of course, most of the global technology trends may not be seen implemented in the near future. But definitely many global technologies are trending in India too. Technology has a great say in defining the way higher education is imparted. Here are some of the trends in technology in Indian higher education system:

i) Open Education Resources (OER): These refer to openly licensed text, media, and other digital assets which can be accessed free of cost. These include teaching, learning and research material which can be accessed publicly at no cost and allows users to access and redistribute the material under some licenses. AICTE, IGNOU and UGC are taking efforts to explore and create open education sources prominent among which include Digital Library, SWAYAM, A –VIEW and NPTEL, Shodhganga, CEC, Project Eklavya, Project OSCAR, NMEICT and NIOS. Various technologies like telephony, internet, audio video etc. are being used.

ii) Meta University / Virtual Technical University: Based on the premise 'Whole is Greater than the Sum of Parts', Meta University concept marks a shift in higher education in India by allowing students to move between various universities. Students have the freedom to study different subjects at any of the two universities as faculty and resources are shared. It entails the use of India's growing IT tools, thus, combining traditional systems with new opportunities for enhancing knowledge. The idea relies on the National Knowledge Network. To begin with, Delhi University and Jamia MiIlia Islamia University have come together to set up a Meta university with a course called Masters in Mathematics Education.

iii) Virtual Technical University: As part of the NMEICT, seven of the Indian Institutes of Technology (IITs) namely IIT Mumbai, Delhi, Guwahati, Chennai, Kanpur, Kharagpur and Roorkee have collaborated with Indian Institute of Science (IISc) to set up India's first home-grown virtual technology university. The proposed Virtual Technical University (VTU) offers programs in various fields like science, technology, management, architecture, pharmacy and other areas of applied knowledge. The university uses video courses, web-based learning material and live lectures using satellite and internet-based technologies. The VTU has an archive containing expert-created video courses and a website that hosts learning material. VTU envisages having at least 300 courses for the school of engineering sciences and engaging a large pool of talented faculty from Indian Institutes of Technology (IITs),

National Institutes of Technology (NITs), Indian Institute of Science (IISc) and other institutions and retired faculty.

iv) Digitization of Books (E-Textbooks): There is a growing trend toward creation of a digital storehouse for books to make learning interesting and interactive for students. National Mission on Education through ICT strategy to spawn new online course content for UG, PG and Doctoral education. Efforts are now underway to practice course content for 130 courses (UG and PG).

v) Content Delivery using IT/ICT: Now days, there is an emerging trends in higher education institutes to deliver educational content through radio, television and Satellite. Increased proliferation of smart in colleges/universities is viewed as a means to capitalize on feature-rich phones by using those features to the advantage of education. Adoption of such devices that have internet access allows students and faculty to perform a wide range of assignments. Other tasks like administration, sharing class notes, downloading lectures, instant messaging, etc. are possible wherever the cell phone service is available. Mobile phones are as well individual used to right to use computer files from remote locations.

vi) Social Learning: The emergence of blogs and various other social media platforms as well as prevalence of YouTube, iTunes etc. is a leading trend in higher education. Mobile learning or m-learning is gaining reputation. These technologies have remarkably changed the ways in which content is structured and delivered.

V BENEFITS OF ICT IN EDUCATION

Use of ICT in education is indeed the need of the hour. It offers enormous benefits to students as it has a wider reach and offers low-cost education. There has been growing blend of ICT tools with the conventional teaching methods in order to impart quality in education. It offers the benefits of greater access, flexible content, learning while working and new-ways of interaction to students on one hand. On the other hand to employers get high quality, cost effective professional development, upgraded employee skills, increased productivity, a new learning culture, increased portability of guidance through the use of ICT-enabled tools in education.

Access and Equity in Higher Education. The demand for higher education is expected to shoot up in the coming years due to increasing Gross Enrolment Ratio at school-level as proposed by the Eleventh Five Year Plan Document which seeks to achieve the target of 15 per cent Gross Enrolment Ratio by 2012 via the dual mechanism of increasing both the intake capacity of existing institutions as well as enhanced institutional capacity.5 The use of ICT in higher education institutions tends to bridge this gap by supplementing the formal education system with distance learning.

The major role toward the fulfillment of the said goal is played by e-learning which is an emerging strategy for the provision of widespread and easy access to quality higher education. Although, at present the initiatives for development of e-learning in India are intermittent, UGC is advocating and making efforts to enhance the quality of higher education by framing policy guidelines for their integration in classroom and other activities.

VI ELEVENTH FIVE YEAR PLAN DOCUMENT

The use of ICT in higher education has tremendously improved the quality of teaching and thus, learning. Also, the increasingly globalized world is becoming an emerging knowledge economy where information is supreme. Therefore, the integration of ICT with traditional modes of teaching and learning leads not just to personal growth but also to the formation of knowledge societies. To survive in the fierce competitive environment, life-long learning is the only key. In order to strengthen and enhance this knowledge-driven growth, new technologies, skills and capabilities are needed. Conventional teaching-learning processes have transformed immensely. Now, the focus of eminent institutions and government is on such education plans and practices which improve competency. As such the curriculum requires access to diverse sources, forms and types of information; student centered learning environment based on access to timely and quality information and inquiry; problem-oriented and inquiry-based activities and teachers to act as coaches and mentors rather than content experts.

VII Conclusion

The emerging instructional technologies are becoming gateways for the development of education and are constantly refining its quality. Usage of ICT in education not only builds capacity of personnel involved in education but also enriches learning experiences of students. National level institutes to the likes of IITs and IIMs are largely becoming instrumental in building technical and managerial capabilities in various fields using ICT networks. Technology has facilitated cutting-edge pedagogic methods, unique and advanced ways of learning and interacting and easy sharing of new practices among teaching community, thereby leading to the development of capabilities and promoting competency. ICT enables availability of trained teachers/academic experts to larger set of audiences/students through flexible and virtual settings. ICT in education, particularly e-learning and distance learning is best suited to the needs of working professionals facing time constraints, enabling them to pursue professional courses at their convenience and thus adding to the already existing pool of knowledge- driven individuals leading to better communities. One of the biggest advantages of using ICT tools in education is that of increasing access of quality education to various groups as it leads to reduced costs, making education affordable.

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