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Role of Information and Communication Technology (ICT) in Transforming Higher Education in India: A Review

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ABSTRACT

Information and Communication Technologies (ICTs) are being used now-a-days in very creative and effective way in higher education. Apart from making the learning and teaching more interesting, the ICTs offer opportunities to the teacher and taught to gain information, ICT not only make learning attractive and interesting, but also increase retention on part of listener. Through the integration of these technologies, the teaching turns out to be more target audience, learner's centric and two way communication. Usefulness of ICTs can be measured by way of its usage in making teaching and learning more appealing. At the same time, ICTs also provide challenge to teacher and students in terms of subject specific ICT resources for enhancing use of it in different kinds of activities. Moreover, ICT provide more interactive and less didactic approach, where the class can interact with the content and context of the lessons digitally through the ability to capture, combine and manipulate information from a brand of sources. The purpose of this review article is to discuss the benefits of ICT use in education, for the enhancement of teaching and learning. It also highlights the impacts and benefits of ICT in education, its limitations and challenges to education systems in the present scenario.

Keywords: ICTs, Higher Education, Impact and benefits of ICT.

INTRODUCTION

Higher education plays a pivotal role in the development of a country, as it is viewed as a powerful means to build knowledge-based society. In India, higher education imparted by universities is facing challenges in terms of access, equity and quality (Wadate, 2014). Use of information and communication technology (ICT) for promoting education and development has always been a part of policy and plan documents on education (Mdlongwa, 2012).

ICT is an acronym that stands for Information and Communication Technologies which includes all technologies for the manipulation and communication of information (Desai, 2010). In short, ICT is an umbrella term that includes technologies like; radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as video-conferencing and electronic mail (UNESCO, 2002).

According to Habib (2017), ICT is an information resource which offers a wide range of materials from around the world to the user. The availability of numerous online information resources from computer files, library catalogues, databases, organizations, newsgroups, industrial, and commercial sources, as well as from individuals, makes the ICT an indispensable tool for academia and research (Buabeng et al., 2016). When used appropriately, different ICTs are said to help expand access to education, reinforce the relevance of education to the increasingly digital workplace, raise educational quality and helping to make teaching and learning into an engaging, active process connected to real life (Umunnakwe & Sello, 2016). Moreover, ICT is an effective tool, which overcomes the issues of cost, less number of teachers and poor quality of education as well as to overcome time and distance barriers (McGorry, 2002).

According to Bindu (2016), ICT also influence the way students are taught and how they learn as now the processes are learner driven and not the teachers driven. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. But, it is found that the effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology-indeed, given sufficient initial capital, getting the technology is the easiest part-but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing among others, as 'Basic Education for All' 'Core Work Skills for All' and 'Lifelong Learning for All' (Tak, 2013; Moges, 2014 and Suresha & Narayanaswamy, 2017). Therefore, globally educational systems have a great deal to offer in pointing the way for increasing the use of New Information and Communication Technologies (NICTs) in the teaching and learning process, to prepare students with knowledge and skills they need in 21st century (Bingimlas, 2009).

Literature Review

The review of literature is made available from different countries about the usage of ICT in higher education and then critical analysis is done.

Tusbira and Mulira (2004) conducted a study on integration of ICT in higher education institutions: challenges and best practice recommendations based on the experience of Makerere University and other organizations and reported that infrastructure of African higher education is poorly developed and unevenly distributed. Moreover, major challenges faced by the respondents are lack of awareness and mindset, cost of bandwidth, a systematic method of ICT implementation, lack of top-level commitment for the progress in ICT integration and for its efficient utilization. To resolve these challenges, he recommended that it is necessary to define well planned ICT policy for successful mobilization of funds. Despite these difficulties, a large number of higher education institutions in Africa have made significant progress in building an ICT infrastructure and developing computer science and other ICT disciplines. Through the work, Peeraer and Petegem (2005) presented factors influencing integration of ICT in teaching practice in teacher education institution in higher education in Vietnam. The important factors necessary for successful implementation of ICT in teaching-learning are ICT skills, confidence to use computer, infrastructure and availability in hardware and software. He further indicated barriers for the usage of ICT like; lack of technical support, gender and age of teacher, insufficient knowledge and lack of motivation. Author also reported that enthusiastic nature of teacher towards the usage of ICT, budget, educational management, ICT policies and skillful training plays an important role in the integration process of ICT.

Wee and Bakar (2006) throws a light on obstacles towards the use of ICT tools in teaching and learning of information systems in Malaysian Universities and found that the most significant obstacles are fast change in

ICT tools, poor network connectivity, extra time and effort needed to integrate ICT tools in teaching, improper evaluation in integration of ICT tools in teaching etc. He further revealed that it is necessary to remove these obstacles for successful implementation of ICT in higher education. In the paper Adoption of technology mediated Distance Education: A longitudinal Information and Management, Ozdmemir and Abrevaya (2007) asserted that ICT is reducing the cost per student and expanding the enrolments and makes the provisions for employers and supports enduring learners. Lopes (2007) prepared a model to evaluate the e-learning readiness in Porto's allied health sciences higher education institution which showed the importance and usage of ICT for medical students and faculties for teaching-learning purpose. Abbasi et al. (2008) conducted a study on ICT status and development strategy plan in Iran and revealed that Iran needs to base its national ICT strategy for much greater consideration of local, cultural and social issues. He also stated that national IT strategy will need to address the issues of resistance to change due to cultural, personal and infrastructural factors. The government has a major role to play if the country wants to stand in the Information Arena like regulator, promoter and diffuser for successful implementation of ICT in higher education. Mostert and Quinn (2009) highlighted the usage of ICT in teaching and learning on professional development of academic staff in South Africa and revealed that there is a need in professional development for lecturers to use ICT in teaching and learning. Since technology has revolutionized teaching and learning method and academic staff members face the challenge of introducing effective ways of engaging technology.

In the paper ICT in Indian Universities and Colleges, Snehi (2009) reported transformation of higher education in the country in terms of access, equity and quality due to usage of ICT in education. Shabya (2009) carried out a research on the changing role of ICT for delivery of instructions in higher education institutions in Kenya and showed that ICT explore and simulate abstract concepts while encouraging self-learning, ability to address complex problems, encouraging team-work and allow for critical thinking. Qudais et al. (2010) identified the constraints which affect the attitudes of senior faculty members in Jordanian Universities towards using ICT in their teaching activities. Constraints identified are lack of motivation to use ICT in teaching-learning purpose, availability of hardware and software, lack of technical skills, insufficient and inadequate infrastructure etc. He further stated that to succeed utilizing technology in a pedagogically meaningful way, there must be reorganizations in different levels like individual actions, attitudes and at pedagogical levels. Allah Nawaz et al. (2010) reported that factors like; age, gender, qualification, perceptions, experience and organizational characteristics plays an important part in implementation of ICT in teaching-learning purpose. Further, e-learning efforts reported to be associated with problems in the construction, use and progress of the e-learning environments in the institutions for teaching, learning and administrative purposes.

Krishnaveni and Meenakumari (2010) indicated the usage of ICT for administration in higher education institutions in terms of general administration, payroll and financial accounting, administration of students data, personnel records maintenance and library system. The various factors that contributed to these functional areas were identified and a theoretical model is developed. In the paper challenges of e- Learning in Nigerian University Education Based on the Experience of Developed Countries, Oyel et al. (2011) showed the importance of governments role to increase funds for education in order to face challenges of e-learning in Nigerian university education and explore the strategy to increase training, motivation and awareness programs for successful implementation of e-learning in higher education. Lalitbhushan et al. (2014) highlighted the role of ICT in higher education: learners perspective in rural

medical schools and indicated that there is a need to foresee the role of technology in education and take appropriate measures to equip the stakeholders for adequate and optimum application of the same. Pegu (2016) revealed that ICT enabled education will ultimately lead to the democratization of education and it has the potential for transforming higher education in India. Further, Mahisa (2018) also revealed that ICT played a vital role as a strong agent for change among many educational practices. Malik (2019) presented a study on usage pattern of ICT among students of CCS Haryana Agricultural University. The general picture highlighted that the level of usage pattern of ICT tools was found to be of 'medium' level. He further indicated the major constraints affecting the usage of ICT among students i.e. lack of training facilities to learn ICT, lack of expertise to use ICT and slow functioning of internet/server breakdown. As far as suggestions are concerned, the author suggested that teaching should be through ICT followed by improved internet connection.

Major ICT Initiatives in Higher Education
Various initiatives in the recent past portrayed the significant role that ICT plays in the realm of higher education development. Several projects have reduced the costs, and it also has increased transparency. India has taken up major initiatives in terms of content delivery and furthering education through Information and Communication Technology. For example, Gyan Darshan was launched in 2000 to broadcast educational programs covering a variety of subjects and catering to a wide range of viewers. These includes pre-school, primary, secondary and higher secondary students, college/university students, youth seeking career opportunities, homemakers and working professionals. Similarly, Gyan Vani was another such important step which broadcast educational programs contributed by the institutions such as IGNOU and IITs. Moreover, it serves as an ideal medium for niche audience addressing the local educational, developmental and socio-cultural requirements of the people. Under the UGC country wide classroom initiative and

educational programs are broadcasted on Gyan Darshan and Doordarshan's National Channel (DD1) everyday. E-Gyankosh which aims at preserving digital learning resources is a national knowledge digital repository launched by IGNOU in 2005. Almost 95% of IGNOU's printed material has been digitized and uploaded on the repository.

The National Programme for Technology Enhanced Learning (NPTEL) was launched in 2001 is another joint initiative of IITs and IISc and funded by the Ministry of Human Resource Development, Government of India is an online curriculum development programme in sciences and engineering at university and research levels. Moreover, the ambitious National Mission on Education through ICT was launched in 2009 by the Government of India to harness ICT's potential throughout the length and breadth of the country. It is a centrally sponsored scheme submitted by the Ministry of HRD and approved by the Cabinet Committee on Economic Affairs (CCEA). The Mission has planned a variety of initiatives aimed at developing and standardizing digital content for Indian higher education segment. The Mission envisions catering to the learning needs of 500 million people in the country.

Benefits of ICT in higher education
ICTs are a potentially powerful tool, which extends educational opportunities to wide range of users i.e. primary, secondary and higher secondary students, college/university students, youth seeking career opportunities and working professionals (Nagda & Motwani, 2018 and Patra, 2014). The use of ICT is making key differences in the learning of students and teaching approaches (Cunska & Savicka, 2012). Several research studies reveals that users using ICT facilities mostly show higher learning gains than those who do not use, actually it acts as an assisting tool. It offers quicker and easier access to more extensive and current information. Moreover, ICT can also be used to do complex tasks as it provides researchers with a steady avenue for the dissemination of research reports and findings (Adeoye et al., 2013 and Yusuf, 2005).

Culp et al. (2003) advanced three major reasons for ICT in education. They suggested that ICT is a tool for addressing challenges in teaching and learning situation; a change agent and central force in economic competitiveness. As a change agent, ICT is capable of changing the content, methods and overall quality and quantity of teaching and learning, thereby reducing teacher's workload and ensuring inquiry-oriented classroom. Moreover, it is a central force in economic and social shifts that has technology skill, which is critical to future employment of today's student.

Role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy, if ICT is properly used; it holds great promise to improve teaching and learning in addition to shaping work force opportunities (Sajuyigbe et al., 2017). The use of ICT for teacher training has been recognized by the governments of India. Widening the availability of quality education materials in India, several initiatives are ongoing for creating digital repositories and learning objects; the Sakshat Portal of Government of India, initiatives like National Program of Technology Enhanced Learning (NPTEL), the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) seek to create quality digital content for different levels of education (Pallavi & Kumar, 2013). The main roles of ICT in education are (Desai, 2010 and Bhattacharjee & Deb, 2016):

- ✓ To develop variety of educational services and medium.
- ✓ To promote equal opportunities to obtain education and information.
- ✓ To develop a system of collecting and disseminating educational information.
- ✓ To promote technology literacy and support distance learning.
- ✓ To support sharing experience and information with others.
- ✓ Helps in improving innovative teaching skills and makes classroom teaching effective.
- ✓ Acts as an assisting tool for teaching and learning itself.
- ✓ It helps teachers to motivate students and develop interest in learning.
- ✓ It is store house of educational institution because all educational information can safely store through ICT.
- ✓ ICT helps teachers to communicate properly with their students. So, it bridges the gap between teacher and students and plays an important role in student evaluation.

Limitations of ICT use in Education

Every technology in the world is a like two sides of a coin, having both benefits as well as constraints. It is beyond any doubt that ICTs enabled education will ultimately lead to the democratization of education and it has the potential for transforming higher education in the universities, but optimal utilization of opportunities arising due to diffusion of ICTs in higher education system presents enormous challenges or limitations (Uttam, 2014). Limitations can be categorized as teacher related, student related, and technology related. Teacher's attitude/ behaviour towards use of ICT technologies is vital, many research studies shows that some teachers do not have clarity about how far technology can be beneficial for the facilitation and enhancement of learning due to their lack of competency to handle, while some teachers may have positive attitudes towards technology (Mondal & Jayanta, 2012) . Teacher resistance and lack of enthusiasm to use information and communication technology in education may also be another limitation (Sharma, 2015). Unless teachers develop some basic skills and willingness to experiment with students, ICT use in education is in a disadvantage (Stephenson, 2017). Lack of infrastructure and equipments are other problems for backwarding Indian education system.

CONCLUSION

The available literature reveals that ICTs are influencing all aspects of life, in which the impact of ICTs is significant in higher

education. It plays a vital role as a change agent for change among many educational practices i.e. conducting online exam, pay online fees, accessing online books and journals. Persistent application and development of ICTs in the education system will have a strong influence on teaching-learning process, accessibility of education, motivating learners, creating a congenial learning environment and improving academic performance. Furthermore, it enhances flexibility, so that students can access to learning irrespective of time and geographical limitations. It can also have an impact on the way students are taught in the classroom and the way they learn. It helps to motivate the learners by creating a rich learning environment by providing new opportunities for both teachers and students. These opportunities can have a significant influence on students' academic performance and educational achievement, which can definitely enhance the spread of best education system.

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