

Information And Communication Technology (Ict): A Tool For Transforming Higher Education In India

By

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ABSTRACT:

In order to develop 21st century, technology takes an important place in society. People of new generation can't imagine their life without growing new technological devices. It has established its hegemony in every sphere of human being and the field of education is also not untouched by this. Information and communication technology (ICT) is an important component of it. For the development of any country, higher education plays an important role. Higher education ought to raise the multifaceted improvement of HR (human resources) by advancing the knowledge enabled population that will bring, harmony, socio economic and societal progress. Implementation of ICT is an asset for educational reform agenda, in most of developing countries. One of the most feasible ways to transform higher education in India is to use information and communication technology (ICT) in Education. In this paper, we discussed how the ICT help to promote and transform the higher education in India.

Keywords- Information and Communication Technology, Higher Education, Transformation, Internet, E-learning

Article Received: 18 October 2020, Revised: 3 November 2020, Accepted: 24 December 2020

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1. Introduction

Many studies proved that education is an only path to develop the human being as productive citizen and getting positive transformation in their lives (Idris F. et al 2012). Higher education can be incredible for a valued based, knowledge based, culturally empowered and peaceful society that can also accelerate to the nation in a right direction. It can also be helpful to turn India into a superpower nation. Education has undergone a drastic change in both the transmission and reception through ICT and digital revolution during last two decades. ICT is three in single word that has the doorway to the advanced information skills. ICT in education could be defining as technology for collecting, storing, processing, communicating and dissemination of information and data using computer and telecommunication (Mbakwem, 2006). Several studies and reports have emphasized the possibilities and future benefit of information and communication technology (ICT) for enhancing educational quality. According to UNESCO (2003) for building knowledge of societies, ICT considered as a major tool, and specifically, as a tool for rethinking and redesigning educational frameworks and procedures, leading in high-quality education for everyone. Gein, A et al. (2016), Loia, V. et al. (2016), Vásquez-Ramrez, R. et al. (2016), Warren, C.M. et al. (2016), Schwarz, A. et al (2010), McCardle, JR. et al. (2002), discussed the theoretical and methodological aspects of implementing information and communication technology into the higher education system. In this study author's work is based on ICT practices, which has implemented in higher education and the authors are also compare the virtual educational system with the elements of classical education. Particularities of various ICT tools in the higher education system have also been discussed by Gerova, N. et al. (2016), Gilbert, R. et al. (2010), Rai, A. et al. (2016) and Salah, A.M. et al. (2014). In the study of Hu, et al. (2018), he discusses about attitudinal factor of students for ICT and they can be approached from a variety of angles like availability, usability and attitude toward ICT. Blachowicz et al., (2009) say in his study that majority of research are centered on transformed education system, accessibility, applicability of technology and how technology can help to empower a student. In the initial level of research, it was observed that students' attitude towards ICT and education technology enhanced

the learning activities and has a huge potential for students' interest, motivation, active learning attitude for the course. It also works like asset in course performance (Ciampa 2014, Joosten 2010).

According to the Huett et al. 2008; and Jones et al., 2006, it has been seen that instructors can overlook the motivational enhancement in favor of instructional design, erroneously assuming that the novelty effect of mobile technology is sufficient to motivate students. After implementation of ICT in developed countries, many researchers did their research on individual teachers' characteristics like their beliefs and attitudes beyond the environmental barriers (Hermans et al, 2008; and Mueller et al, 2008). Many of the teachers' attitudes towards ICT is positive and they do assessment of learning outcome of students and identify the ways through which ICT could be beneficial for the students' learning (Jones, 2004). Cox (2008), also tried to identify the factors and measure them which motivate to teachers' beliefs and understanding the role of ICT in teaching of subjects. Mumtaz, (2000) concluded in a meta-analysis and found that teachers were enthusiastic to use ICT in teaching and even teachers developed new theories for using ICT with their central ideas of teaching. Many of the researchers and educationist have been suggested and recommended that teachers' educational beliefs can form the barriers in ICT integration with education. It is found that active user of computer, appears to adopt a constructivist position, despite inconsistent findings (Chen, 2008; and Mueller et al., 2008). ICT tools put the global world on a single platform and help to develop the concept of global village where people were highly connected with each other without any international boundaries (Salawu, 2008 and Spence & Smith, 2009). As a developing country, India still needs to do so many works in ICT and education because there is rising stage in education and a vital bridging among social, economic and political mobility is essential for this purpose (Amutabi & Oketch, 2003). There are numerous obstacles in terms of infrastructure, socioeconomic development, linguistic, and some physical barriers in front of people who want to access the education. Although, Indian higher education system is the world's second largest after that of the United State. There are several universities (central and state), and a large number of colleges are running in India but still, there is a long waiting list for admission in higher education, especially in professional education. Although

there is a massive boom in the private-sector education system which are providing education to the youth of the country but, cost of private education is too high and most of the colleges do not meet the quality of standard education. In the current world scenario, new innovations, modern technology, rising economy, and competitiveness are the reality of the day. India is attempting to place itself as a knowledge driven economy in this growing global competition. ICT has transformed the way of knowledge and disseminated in India, especially in terms of how teachers connect and communicate with students. The emergent of ICT in higher education in India has increased the demand of higher education through distance learning mode and part time learning schemes. ICT based education has overcome the serious issues like cost, shortage in number of teachers, low quality in education as well as to barriers like time and distance. This paper aims to explore the significance of information and communication technology (ICT) in higher education and to identify the government initiatives for ICT in higher education in India. In this paper, it is also tried to explicate that how ICT transform the higher education system in India.

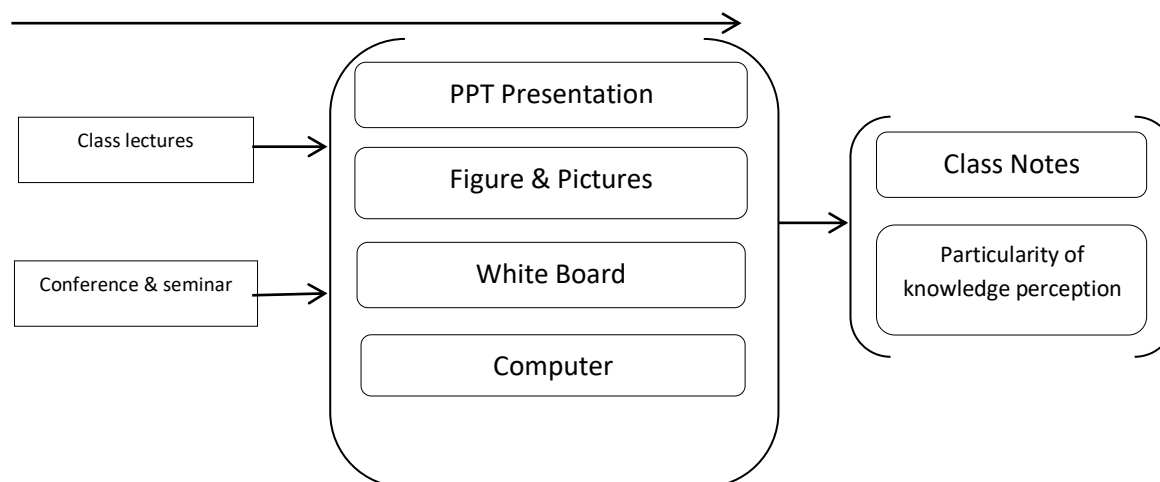
Method and Data Source

This paper is solely based on the descriptive research method. Data which are used in the study for analysis are extracted from the secondary data source which include ten-year annual report of AISHE (All India Survey on Higher Education), conducted under MHRD (Ministry of Human Resource Development) Government of India. Authors used the data from this report which are related to the enrolment of Female and Male Learner in Distance mode. Authors also used the various report such as Economic Survey Report, Annual report of Ministry of Statistics and Program Implementations. We did the trend analysis to check the pattern of enrollment of students in distance mode Education.

2. Role of ICT in Higher Education in India

2.1 Traditional Education System:

Education assumes as critical part in the improvement of human progress. Since the old days, the strategy for learning is continually developing with time is as yet experiencing various changes as a result of technological advancements. Traditional class rooms' structure is designed with furniture and teaching instruments such as podium, board and projectors etc. Since a long time, education has been focused on attending the classes every day, and people have discovered that school facilities can have an impact on learning. In traditional type of classroom, education is mostly focused on the teaching structure, which often emphasizes the curriculum rather than the learner abilities and learning skills. Simultaneously, learners are obligated to harmonies their own strategies and learnability. Traditional type of class doesn't invigorate the mind or the psyche, and actually, rouses repetition learning. On the basis of above it is clear that there are two mode of education; conventional and virtual. Traditional education refers to a collection of teachings which one' follows the determined basic structure of educational system. In traditional education system, a student required to align his own strategies and learning abilities with the teachers' styles, techniques, skills, and desires. We're all familiar with traditional learning methods, teachers teach within a typical classroom with a limited number of students. Currently, conventional education consists of lecture and seminar sessions, where the subject of initiation and regulation is being a decided by a lecturer of a higher education institution. As a result, educational communication process foundation is established which does not conform the growth requirements of modern higher education.

Direction of educational information dissemination**Figure 1. Form of Knowledge Dissemination**

Above figure 1 explains the traditional forms of education (lectures and seminars) which do not fulfill the requirement of modern society; students' levels of experience and speed of information perception are not quantified. As a result, learning effectiveness decreases, students' interest in the subject is reduced, and cognitive and academic functions also decrease. Due to these drawbacks, the remote method of education began the process of mastering traditional education's skills and knowledge.

2.2 Implementation of ICT in Higher Education

Nowadays, due to implementation of ICT in business, government system and individual's life are changing enormously. Most of communication and information sharing is done through ICT in whole world. Some countries are totally depending on ICT for various kind of activities. Technology, educational tools and learning have been used by human being since long years ago. However, education may be never confronted magnificent changes due to start of ICT in education and use of Internet, CD, and multi-media frameworks. Primary purpose of ICT is promoting and supply the quality educational services to everyone and expanding the number of individuals in registration. Telecommunications networks have had a rapid impact on information transmission. (Broadcasting, cable, Internet, World Wide Web, email, and so on) (Abeles, 1998) The integration of ICT into the higher education system

necessitates the development of electronic education platforms based on top-priority criteria for knowledge mastery. Platforms for integrating smart technology are being developed to promote transparency and widespread use of information resources in a variety of fields i.e., behavioral finance, management of public opinion and economy. As a result, smart technology platforms are capable of shaping a new model of online higher education and stimulating the growth of the digital economy in all direction. Students from different universities across the world learn knowledge and skills on an individual model of competence mastery, teacher and the student together create a customized plan for mastering educational expectations in which the student chooses his own path of progress, sets final goals, and employs the smart technology which he requires to achieve them. In the concept of integrating smart technology into the educational framework of a higher educational institution.

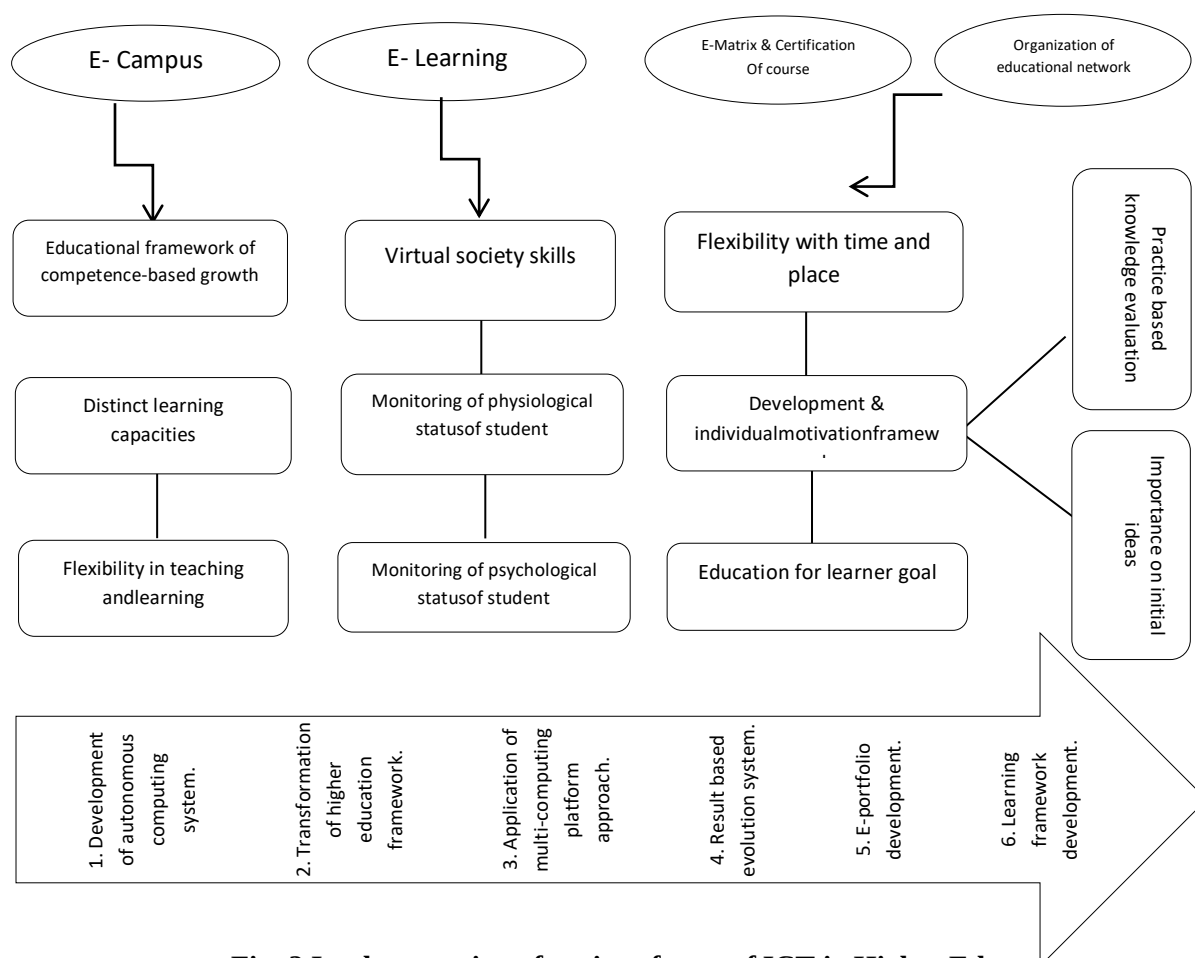


Fig: 2 Implementation of various forms of ICT in Higher Education

Important aspect of integration of information and communication technology (ICT) in higher education is their significance as flexible and intellectual tools. Tools of ICT infrastructure create such flexible environment which makes the availability of easy access of information. Adoption of ICT infrastructure in higher educational institutions enhances the knowledge in many ways. From the figure 2 we can see that digital campus (E-Campus) develops a new educational framework which leads to competence-based growth of student and teachers. E-Campus provides the variety of Platform to explore the information. It provides the flexibility to teacher and learner in easy access of teaching and learning. E-learning tools open the door of the ocean of knowledge, where student explore the information at wide range. Through E- learning student as well as teachers learns the various virtual societal skills which not only help them acquiring the knowledge but also make them prepare for the virtual world of job market. A Teacher also Monitor the physiological and

psychological status of student. Government has provided the various platform of knowledge and offers various E- Certificate courses to strengthen the skills of students. Student can enroll the various certification programme according to their individual interest and to meet their need of academics or research ICT helps student as well as teachers to build their educational network related to their research interest. ICT also provide the platform to researchers, scientists and academia to collaborate their research work with other educational organizations with all over the world.

3. Government Initiatives for ICT in Higher Education in India

Considering the importance of ICT in higher education Ministry of Human Resources and development (now ministry of education), Government of India has launched many National and state specific schemes and initiatives for the successful delivery of ICT in higher education. In this regard, government sets a budget aside each year for the development of ICT infrastructure.

3.1. National Mission on Education through Information and Communication Technology (NMEICT)

In 2015 MHRD (Ministry of Human Resources and Development) launched NME-ICT (National Mission on Education through Information and Communication Technology). The local area everywhere, including younger students, undergrads, working experts, resigned experts, educators, mentors, research researchers, programming clients, and engineers are targeted by that. The Spoken Tutorial Project has so far educated more than 12 lakh students. Students may also take online exams and receive certificates via Spoken Tutorial. National Mission in education through information and communication technology has proposed by eleventh five-year plan to expend ICT exposure in all higher institution in India (378 Universities & 18064 institution). The main focus of this mission are digitalization and networking of all institutions of education and developing more accessible and consuming device and make a transmission capacity for educational purposes.

Digital literacy - Digital literacy is one of the core components of Digital India where all ministries and departments shall offer their own services to the public education. Advisory group of this scheme will be chaired by the Ministry of Communications and IT. Collaborative efforts of agencies such as Ministry of education and the Department of Information Technology and Telecommunications (DoT) would be utilized to ensure fully electronic universities and digital campuses. However, advanced computational facilities will be available in a limited number of institutions. Indian higher education has grown dramatically and become the world's largest, with 70+ million students enrolled. Without the extensive use of ICT resources, such extension would not have been possible.

National Digital Library (NDL) - The National digital library of India (NDL India) project was launched by MHRD as part of its NME-ICT to create a system for a virtual repository of learning resources with a single window search facility. Filtered and united search are utilized and encouraged focused searching so students can discover the correct asset with the least exertion and time. The framework of NDL holds the substance of any language and gives student interface support in popular Indian dialects. It will

cater to all levels of academic, including researchers and lifelong learners, as well as all disciplines, common access devices, and differently-abled learners. It is being created to assist learner with planning for entrance and for competitive examination also, to empower individuals to study and get prepare from best practices from all over world, and to encourage researchers to perform inter-linked exploration from numerous sources. The Indian Institute of Technology in Kharagpur is working on the pilot project. In this pilot project a framework is developing that will be scaled up regarding volume and diversity in content to accommodate learner of all level and disciplines.

- A. E PG Pathshala** - Third initiative of MHRD's E-PG Pathshala is being carried out by the UGC as part of its NME-ICT). Three separate platform of ICT are being operated under this scheme.
- B. E-Adhyayan** - Under this platform more than seven hundred E-Books offer for PG Courses. All the E-Books are based on the E-PG Pathshala courses. At this platform students are facilitated by video playlist also.
- C. In SWAYAM**, one of the verticals to produce courses on Post Graduate subjects is the UGC-MOOCs, SWAYAM. UGC is working as a national coordinator and technical partner.
- D. E- Pathya** is one of platform of E-PG Pathshala. It provides software-driven course content that helps students pursuing at PG level in both distance and campus learning modes. It is also made offline accessible.

Shodhganga platform - Shodhganga Platform is the database of electronic thesis, and dissertations in India. The aim of this platform is to easy accessibility and availability of electronic thesis to students and raising the research quality. As per the Regulation, 2016 for compulsory submission of electronic thesis/dissertation on centrally-maintained digital repositories. At this platform information and library network (INFLIBNET) centre established. The work of INFLIBNET is hosting of responsibility, making and maintaining the digital repository of electronic thesis/dissertation and makes them accessible to all universities and institutions. This platform does not only maintain the electronic thesis and dissertation

(ETD) repository, it also provides a server for universities and institution to use the database from all ETD.

E-ShodhSindhu Platform - Basically, it is the merger of three government initiatives, named as UGC INFONET Digital library consortium, National library and information service infrastructure for scholarly content (NLIST) and Indian National digital library in engineering sciences and technology (INDEST) consortium. The E-ShodhSindhu Platform is a database of journals and e-learning resources which provides access of 15,000+ journals (core and peer-reviewed) for helping the academia and researchers from different fields. In large quantity of bibliographic, citation and factual data of various Publishers, research institutions and universities from various disciplines are available in this platform. The aim of the E-ShodhSindhu Platform is to make the availability standard e-resources at low cost of subscription.

E-Yantra - E-Yantra mainly focuses on embedded systems and Robotics education across engineering colleges in India. E-Yantra organizes various workshops and training programs for teachers and students to provide the knowledge of basics of embedded systems and programming. E-Yantra conducts competition events and uses the various innovative methods to engage teachers and students in hands-on experiments. E-Yantra also promotes the institutions and colleges to develop the Robotics labs in their campus to make it a part of their routine training curriculum. Around 275 colleges get benefited with this scheme across the India.

FOSSEE - The aim of “free and open-source software for education” (FOSSEE) project is to promote the use of “free libreopen-source software” (FLOSS) tools to make the higher education qualitative in India. This project also helps to reduce the dependency on single software in various institutions of higher education. This project does various activities to promote the use of FLOSS tools and try to replace the commercial software by equivalent FLOSS tools. Under this project, new FLOSS tools were developed to meet the need of academicians and researchers.

Spoken Tutorial Portal - Spoken Tutorial is a multi-lingual online learning platform which provides the various courses in multi languages. With the help of internet, anybody can access the

courses offered by this platform. Through this portal anyone can learn the various free open-source software.

This portal is authorised and licensed under the CC BY SA to publish the contents on this website. This portal offers the courses for beginner level to the specialisation level to meet the growing need of the learners. This portal provides the courses of software for all discipline including science, engineering, commerce, arts and management. This portal also provides software for students to subjects related to school education such as maths and science. This is also used by the teachers for enhancing their teaching skills.

Various institutions use this portal to teach particular software course to their students for the entire semester. These portals also run the various certificate courses of software for strengthen the skills of students.

Virtual lab project - Virtual labs project is an ICT based Initiative which is launched by MHRD, under the NME-ICT. It is a platform for group activity where twelve institutions are participating under the co-ordinating institute IIT Delhi. This project did a paradigm changed in the research and education and gives more emphasis on ICT based education. This is a first initiative of remote based experimentation consisting more than hundred Virtual Labs and over seven hundred web enabled experiments have been created for remote operation. Students, faculty members of Science and Engineering background are the intended beneficiaries of the project.

VIDWAN Portal - VIDWAN Portal is a database and National network of research which contains the profile of faculty members, scientists, researchers, who work and lead the academic institutions, and research centers. This portal provides experts background, contact details, publications etc. at single platform for guidance students and teachers. VIDWAN Portal is administered by the Information and Library Network Centre and funded by NME-ICT.

3.2. Others Initiatives

- IGNOU (Indira Gandhi National Open University) uses the various ICT platform such as TV, radio channels etc. for teaching-learning process.

- National Programme on Technology Learning (NPTEL) also uses the ICT platform similar to the initiatives taken by MIT. NPTEL run the various online courses and they provide all of their course material online to make widely available to everyone.”
- Eklavya Initiatives uses the television and internet-based learning accessible for everyone. Eklavya Technology Channel is a joint initiative by the IIT and IGNOU for ICT based learning. Prof. Murli Manohar Joshi, Honourable Minister, HRD, inaugurated this on 26 January 2003.
- To provide programme through ICT in virtual classroom, IIT Kanpur and IIM Calcutta has developed an open-source E-Learning platform Brihaspati and other premier Institutions also have entering into a strategic alliance with NIIT.
- “Talk to Teacher” is a recent initiative of the Spoken Tutorial Project for enhancing the teaching-learning process.

Transformation of Higher Education through ICT in India:

Rise of ICT in India is approaching to the needs of higher education and making it more accessible to every citizen of the nation and providing a skill-based learning at a minimum cost. The aim of ICT in higher education is to make individuals empowered in various dimension such as economically, socially, and psychologically for acquire a sustainable society. Higher education in distance mode can strengthen and transform to those individuals, who are not able to take admission in popular institutions and make them

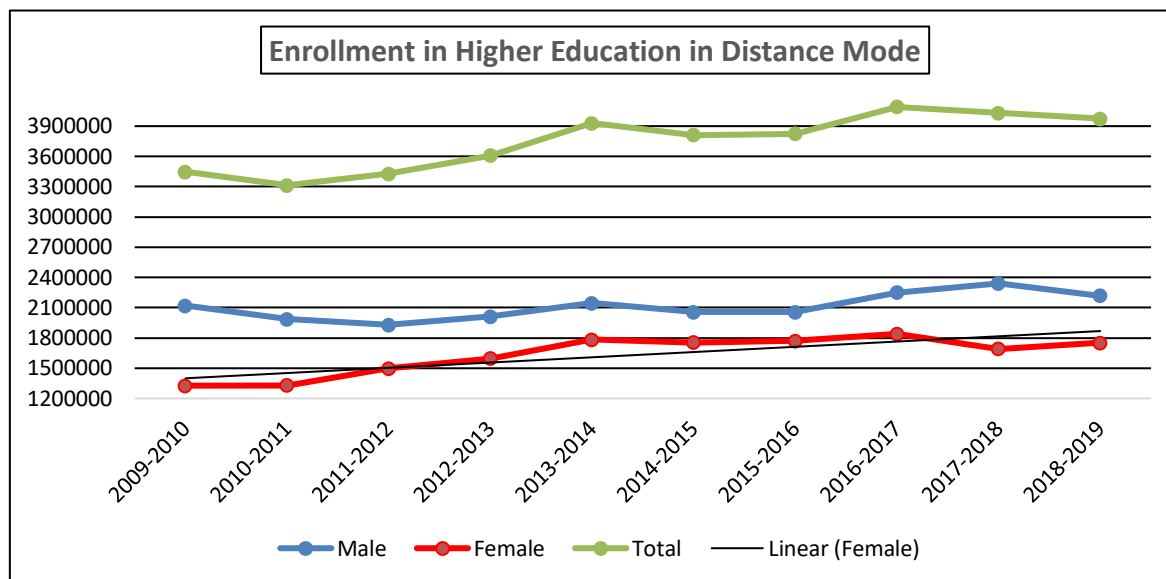
empowered in an effective manner. Thus, ICT promote an option Educational Institution set up alongside to the ordinary arrangement of higher education and decrease the dissimilarity regarding admittance to general and particular individuals. Number of people in millions can achieve the goal of higher education in terms of access, equity, quality, innovation and research through the use of higher education. Finally, ICT in higher education work as asset to enhance the capability of people for making them more productive and empowered citizens. After implementation of ICT in higher education, accessibility availability and affordability of quality education has been increased. During past years digital technologies has changed the conventional method of teaching and forced to academia to introduce the technology in teaching and learning at all the ends. India is the witness of substantial growth in use of technologies to improve the quality and accessibility of higher education in distance mode.

IGNOU (Indira Gandhi National Open University) offers multi-channel, multi-media teaching learning packages for instructional and self-learning education. Informative radio and TV slots like Gyan Darshan, an entirely advanced 24-hour limiting Educational TV channel, Gyan Vani, a special Radio Service of IGNOU, have assumed an integrated part in enhancing the teaching learning measure in India. The different platform of education governed by the government of India additionally epitomizes the possibility of utilizing ICTs to upgrade the student's support services in India. Consequently, the utilization of ICT has a model effect in transforming the higher education framework.

Table: 1- Total Enrollment in Higher Education in Distance Mode in Last 10 Year

Sr. No.	Year	Male	Female	Total
1.	2009-2010	2119364	1326290	3445654
2.	2010-2011	1986852	1327602	3314454
3.	2011-2012	1930202	1496035	3426237
4.	2012-2013	2013065	1596193	3609258
5.	2013-2014	2146257	1783837	3930094
6.	2014-2015	2057178	1754545	3811723
7.	2015-2016	2055254	1769647	3824901
8.	2016-2017	2249858	1839923	4089783
9.	2017-2018	2340816	1690778	4031594

10.	2018-2019	2219564	1752504	3972068
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Fig: 3. Trend of Enrollment in Higher Education in Distance Mode

Above Figure 3 represents the trend of student's enrollment in higher education through distance mode during last ten years in India. In Figure graph represent the pattern of enrolment in distance mode is expanding and it can spur the students and provide the scope for accessible higher education to anyone, anywhere and anytime. As previously said, that, the constantly increasing enrolment trend in distance mode has opened up unparalleled opportunities to carry education to the unreached. In figure we also can see that enrollment of male student in distance education is higher than female students.

Discussion and Conclusion

ICT is spreading in all the dimensions of work life as well as in our personal life. All the world is moving around to the information and communication technology and utilizing its benefits. Education is also one of them where ICT is playing an important role. Higher education, especially in distance mode become much popular among those who are unable to get admission in courses of their interest. ICT make these courses more accessible and affordable to common people at a very low cost. It is also able to provide the live classes to students in the effective manner. However, there are some challenges before the students during the beginning of classes but these can overcome later. ICT in higher education proved that millions of people can get its benefits and improve their lives by getting better job or

employment after higher education. Traditional education system was good but its reach to common people was limited due to several factors. So many talented persons could not get a quality education and their life become unsuccessful. Teachers and students both were depending to physical meeting for exchanging the teaching learning process. Time management was also a big challenge for everyone. If a student missed a class, there was no chance to recover it properly. Lack of sufficient teaching learning material was another challenge for them. After implementation of ICT in higher education, whole the system has been changed. Now the thing is online mode and any one can access the teaching learning material at any time. Time management is easily possible without any hurdle. Working people can also get their enrollment for higher education and make their future more successful. Teacher and students are more comfortable to each other regarding teaching learning process. It is also good for developing the strong and skilled manpower in the country. As it is discussed that a huge number of enrollments has been increased since 2010 to 2019. Number of enrollments is proving that ICT in higher education is functioning very well and creating new heights in education system. In the concluding remark, it can say that ICT transformed the higher education system and its future is very bright.

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