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IMPACT OF ICT TOOLS AND TECHNOLOGIES IN THE TEACHING-LEARNING PROCESS TOWARD A DIGITAL EDUCATION SYSTEM IN INDIA

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Abstract

Integration of Information and Communication Technology has become an integral part of today's Education System. Extensive use of rich ICT tools and technologies in classroom teaching as well as in teachers' training programs for their professional development are gaining huge popularity day by day. Digital learning tools like Kahoot, Google Classroom, Mind map, Seesaw, Edu clipper have a great impact in making teaching-learning more interesting to the learners. Free online resources and several MOOCs platforms enable teachers and learners to enhance their skills continuously affordably and flexibly. With the easy availability of the internet, India has witnessed a huge growth of using digital tools and equipment in the educational system in a cost-effective manner over the last years. Zoom, Google Meet, Skype, Cisco WebEx, and other reliable video conferencing platforms rescued the education system throughout the world during the covid-19 days The present article describes the scope of using ICT tools and technologies for making the teaching-learning process more digital, systematized, inquiry-based and collaborative. It also gives a short description of the remarkable initiatives of GOI in the field of both School and Higher Education to move towards a digital education system. Here we have also analysed the growth of ICT-based education in India over the past years.

***Keywords**: ICT tool, Digital equipment, Online resource, MOOCs Platform, Teaching-learning process.*

INTRODUCTION

With the huge advancement of Information and Communication tools the education field of India has become much more digital over the past decade. ICT has made our life easier day by day. During the covid -19 pandemic period, it appeared as a savior of our education system unless of which the education system of the whole world might be stopped. In the higher education sector of India, the use of ICT helped in eliminating the physical border as the information is passed through the digital medium and it also helps in accelerating globalization by making the educational market bigger, accessible, and stronger by enhancing capital and technology (Pallavi et al., 2018). Though the use of ICT in Indian education system has started long before, but during the pandemic days, all Institution was bound to move to the online platform. According to UNESCO (2002) "ICT is a Scientific, Technological and Engineering discipline and management technique in handling information, its application and association with social, economic, and cultural matters (Bhattacharjee & Deb, 2016). ICT-enabled digital tools have made classroom teaching more interesting to the learners as well as to the teachers also. Apart from classroom teaching the inclusion of digital tools and technologies has also enriched the way of teachers' education in their professional development. Now a days Technological inclusion in Higher Education Institutions is gaining huge importance where digital tools are increasingly helping students to learn,

communicate and collaborate and study both on and off-campus (Arora & Yadav, 2020). Shortly Machine Learning and Artificial Intelligent enabled tools and technologies will play a vital role in minimizing the gap in India's Teacher-student ratio.

LITERATURE REVIEW OF INTEGRATING ICT IN CONTEXT WITH NEP 2020

Though previous Education Policy 1986/92 also stressed in employing educational technology to improve the quality of education, but it has been failed to provide ICT enabled teaching- learning due to inadequate infrastructure. ICT-based education has been the greatest blessing of the 21st century in the term of science and technology and all the societies over the world have been transformed into information intensive society (Alam, 2021). Through the "Digital India" campaign we are moving towards a digital society and knowledge, an economy where education plays a vital role and the use of ICT-based tools and technology will get the utmost importance (Inamdar, 2020). Nowadays blended learning is the need of the hour where teachers can blend their traditional face-to-face classroom teaching with the ICT learning tools to facilitate learners from remote areas. This pedagogical approach mixes the traditional and online activities and integrates the synchronous and asynchronous learning tools to provide an effective learning process (*Blended Mode of Teaching and Learning: Concept Note*, n.d.). According to (*Blended Mode of Teaching and Learning : Concept Note*, n.d.), in the realm of educational transformation, the Academic Block of Credit (ABC) gives sufficient elbow room for many things, especially keeping in mind such areas as flexibility and quality, interests and needs, student centricity, the real world of study and taking up examination when ready (Aithal & Aithal, 2020) has highlighted the salient features of school education, higher education, professional education, and teachers' education also. (Dabas, 2021) has discussed the necessity and effectiveness of online teachers' education program in respect of course design, degree of participation, mode of transaction, etc. to increase the teacher's competency. (Sharma, 2021) has given a detailed view of several initiatives which has contributed significantly to make it possible to reach education in every corner of the country with the help of technology-related tools.

OBJECTIVE

The objectives of this study are the following:

(i) To understand the effectiveness of different digital tools and technologies in the teaching-learning process.

(ii) To know the remarkable ICT initiatives of Govt. of India towards Digital Learning system.

(iii) To analyze the growth of ICT based education in India over the past years.

RESEARCH METHODOLOGY

A study was done in this context among the pre and post-pandemic research in the related field and also data was collected from several reports, articles, and news sources regarding NEP 2020 and ICT inclusion in teaching-learning process of the Indian Education System.

INITIATIVES TAKEN BY GOVT. OF INDIA IN PROMOTING ICT IN THE EDUCATIONAL FIELD

ICT is the most used term which has an extensive meaning, where all the technology comes under this umbrella. However here we are emphasizing some digital tools and technology platforms which has re-defined the teaching-learning process that is convenient to both the teachers and learners. Digital India is a flagship program of GOI to transform India into a digitally empowered

society and knowledge economy (digitalindia.gov.in). Under this scheme, various ICT initiatives were taken by the Government of India, which has changed the scenario of today's education system.

A) The remarkable initiatives in the Higher Education sector are:

SWAYAM (Study Webs of Active Learning for Young Aspiring Mind): SWAYAM is a specially designed digital initiative of Govt. of India to provide the best teaching-learning resources. Courses on SWAYAM consist of four-quadrant, video lectures, study materials, an online assessment platform, and an online discussion forum. Nine National coordinators ensure the best quality content in SWAYAM. They are:

- AICTE:
- NPTEL
- UGC
- CEC
- NCERT
- NIOS
- IGNOU
- IIMB
- NITTR

SWAYAMPRABHA: It is a group of free DTH channels which telecast high-quality educational programs. INFLIBNET maintains the web portal and contents are provided by NPTEL, IITs, UGC, CEC, and IGNOU (swayamprabha.gov.in).

PM e-Vidya: It is a unique and innovative venture by the Ministry of Education, GOI to provide multimode access to digital content to teachers and students through the internet, radio, community radio, podcast, and TV (https://www.swayamprabha.gov.in)

National Academic Depository: It is an initiative of the Ministry of Education, GOI. NAD is a digital database of academic awards containing all digital certificates, mark sheets of degrees, diplomas, etc.

e-PG Path Shala: It is an initiative of the MHRD under its National Mission of education under ICT (NME-ICT) being executed by UGC (http://epgp.inflibnet.ac.in).

Shodhganga: It is a reservoir of Indian Thesis. The Shodhganga@INFLIBNET Center provides a platform for research students to deposit their Ph.D. thesis and make it available to the entire scholarly community for open access (https://shodhganga.inflibnet.ac.in)

e-Shodhsindhu: e-Shodhsindhu is an initiative by MHRD, GOI, being executed by INFLIBNET to provide access to e-resources to Universities, Colleges, and centrally funded Technical Institutions in India.

e-Yantra: It's a robotics outreach program funded by MHRD to provide technical facilities to young talented engineers.

Virtual lab: It's an initiative of MHRD, GOI under the National Mission of education through ICT to facilitate the science and Engineering Institutes which does not have good lab infrastructure can access it virtually through the internet (vlab.co.in).

National Institutional Ranking Framework: NIRF is approved by MHRD to outline a methodology to rank institutions across the country (nirfindia.org).
Source: education.gov.in/ICT Initiatives

B) The remarkable initiatives in the School Education sector are:
e Pathshala: To read NCERT e-books on mobile phones.

DIKSHA: It's a national platform for our teachers to access NCERT e-resources of NCERT and other Organization

NISHTHA: It's a national initiative for School head's and Teacher's holistic advancement, from Elementary to secondary stage.

ICT curriculum: Govt is taking various initiatives to train teachers and to provide an enhanced exposure to design a high-quality resource-based ICT curriculum.

SWAYAMPRABHA: It is a group of free DTH channels which telecast high-quality educational programs. Access to the Swayam Prabha channel is also available through a smartphone.
Source: ncert.nic.in

Table 1: SWAYAM National Coordinators and their applicable Areas (School/Higher Education)

Sl No	Name of Digital Initiative	Area
1.	UGC	PG Non-Engineering
2.	IIMB	Management
3.	NIOS	Open School 9th to 12th
4.	CEC	UG Non-Engineering
5.	IGNOU	Certificate & Diploma
6.	NCERT	School 9th to 12th
7.	NPTEL	UG & PG Engineering
8.	NITTR	Teacher Training
9.	AICTE	Annual Refresher Course in Teacher (ARPIT)

Source: education.gov.in/ ICT Initiatives

ICT TECHNOLOGIES USED IN TEACHING-LEARNING
Most popularly used ICT technologies that have made the teaching-learning process more interesting, innovative and inquiry-based are:
Smart Classroom: Smart classrooms are a classroom with some special ICT components like desktops or laptops, LCD/LED displays, digital cameras, smart boards, projectors, etc.
ICT Labs: ICT labs are also an advanced form of smart classroom, equipped with desktops and laptops, webcam, projector with high-speed internet connections.

E-books and E-content: E-content or e-books are some study material or educational information in digital form stored in the webserver.

Educational TV: Govt. has taken special initiatives to facilitate learners over some specially dedicated TV channel. Teachers can record their lectures previously or can take live classes also through these channels.

Interesting Online Resources: Any type of e-content, e-books or educational objects come under e-resources. Both teachers and students get advantages from it.

E-learning portal: E-learning portals are websites that offer e-learning content, presentation, test platforms, etc. The most popular e-learning portals in India are Khan Academy, Coursera, W3school, TedEd, Open Culture, Code academy, Academy Earth, etc.

Mobile application: large numbers of mobile applications are available in the market to help learners and teachers to get connected and enjoy the teaching-learning process.

Online Assessment: Institutions are taking student assessment through online mode, during pandemics almost all schools and colleges adopted this technique.

Online Teachers Training: Online teacher training is an important ICT initiative to make teaching-learning more effective. Govt. of India has taken several initiatives for teachers at both School and Higher Education to update themselves in using ICT tools and technologies, developing e-contents, evaluating learners through online mode, etc.

ICT TOOLS USED FOR TEACHING-LEARNING

Though ICT tools include all the computer-related software and hardware also but, these days, a large collection of digital learning tools are there for providing solutions to learner's curiosity, to upgrade administrative works in a better and structured way, motivating teachers and learners to communicate and consort. Laptops, desktops, Tablets, Smartphones, online courses, e-resources, and other technological development apparently changes face of today's education system. The most popularly used ICT tools to enhance the teaching-learning are:

Google Classroom: Google Classroom is a free blended learning platform developed by Google for educational Institutions that aims to create, distribute, and grade assignments (Wikipedia).

Edmodo: It is a popular digital tool that provides a digital platform for teachers, students, and parents to communicate and share content, scatter quizzes, assignments, etc. from kg-12 standards.

ClassDojo: It is a powerful educational platform that connects primary school teachers and students. It helps teachers to set up their classrooms, and monitor their student's behavior, growth and communicates with their parents.

Animoto: Animoto is a free classroom tool for teachers, learners, and administrators through which anyone can make and share videos among the stakeholders.

Thinglink: It is a free interactive ICT tool used for sharing images, videos virtual educational tours with information, and many more which makes the classroom experience enjoyable.

Educlipper: This is a powerful ICT-based tool to enable educators and learners to share study materials.

ClassDojo: ClassDojo is a free classroom communication, community building, and behavior management tool.

Kahoot: Kahoot is an interesting interactive educational tool based on games and quizzes. Through this tool, teachers can create questionnaires, discussions, and surveys that complement academic lessons (elearningindustry.com).

Prezi: It is a powerful digital tool used by teachers and learners to make an interactive presentation.

Quizlet: It is a digital platform for both teachers and students to share their study content, flashcard, diagram, etc.

Seesaw: It is an-easy-to use learning tool that enables students to record, exhibit, and reflect on what they are learning at school.

Duolingo: It is a popular digital app to learn new languages. Interactive and easy contents help teachers and students to learn a new language very easily at home.

Dictionary.com: It is the world's leading online source for English definition, synonyms, word origin, audio pronunciation, etc. (dictionary.com)
Apart from the discussed one, more than hundreds of educational tools are there in the market which are making classroom teaching-learning more enjoyable both for teachers and learners.

ADVANTAGES OF USING ICT TOOLS IN TEACHING-LEARNING

ICT is the greatest blessing of the 21'st century. Some of the advantages are:
(i) ICT tools eliminate the geographical barrier between teacher and learner.
(ii) With the help of ICT tools, teachers can make their teaching more interesting and effective for the learners.
(iii) With the inclusion of ICT, the interaction between teachers and students also improves a lot.
(iv) It makes the environment more flexible.
(v) Helps to improve teaching skills and innovative teaching-learning methods.
(vi) Large collections of e-resources/knowledge are available to the teachers and learners.
(vii) Better involvement of Students, teachers, and parents: Incorporating digital tools in education promotes better involvement of teachers, students, and parents. Students are getting smarter and more accountable. (Pradesh & Campus, 2019).

GROWTH ANALYSIS OF ICT USES IN INDIAN EDUCATION

According to the news source thehindubusinessline.com, "with the estimated internet penetration rate of 55 percent by the end of 2025 in India digitization of education will be one of the topmost priorities of our Govt". The Union Budget FY23 has allocated Rs 1,04,278 crore for the education sector, which is an increase of 11.86% compared to the revised 2021-2022 gross allocation of Rs 93,223 crore while it is still lower than the NEP recommended 6% of GDP (financialexpress.com). As stated by the FM Sitharaman "One class one TV channel program of PM e-VIDYA will be expanded from 12 to 200 TV channel, which will help states to make up the losses from 1-12 during the pandemic. According to Nishant Agarwal, founder of proctor.com. According to (Hebbar, 2020) 85% of teachers and students are aware of digital technology. The e-learning market value of India was estimated to increase to 360 billion Rupees in 2024 from about 39 billion Rupees in 2018 (Statista, February 2022)

CONCLUSION

Though there are lots of digital tools available for teaching-learning our study describes the mostly used. Considering the current scenario, the role of ICT tools and technology in the recent education system is irresistible. With the huge rise of the internet and smartphones uses these tools and technologies provide teachers and students continuous educational support. Thus, ICT has become the doorstop of the new era of education in India. ICT tools and technologies. But more consequences should be given to touch up the digital infrastructure of the distant areas also, so that the notable ICT initiatives can reach in every corner of the country

GLOSSARY OF ABBREVIATIONS

1.	ICT	Information and Communication Tool
2.	GOI	Govt. of India
3.	DTH	Direct -to-home
4.	NEP	National Education Policy
	GDP	Gross Domestic Product

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