



IMPACT OF TECHNOLOGY AND DIGITIZATION ON INDIAN EDUCATION SYSTEM: A CRITICAL ANALYSIS

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RESEARCH ARTICLE



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Abstract

The digital technologies that have swiftly advanced in nature and utility during the last decade have removed time and location constraints from the field of education. Each student can now choose their own learning style rather than being limited to the one used by the teacher. There is a wide variety of study resources and content available on many platforms, ranging from classic literature to modern, interactive videos, software, and e-content. High-quality education is one of the core tenets of the UN's 2030 plan for sustainable development. It aspires to guarantee inclusive and equitable high-quality education for everyone. Digital technologies have emerged as an essential tool to achieve this goal. The impact of these technologies on the educational system is significant. The use of digital technologies in education has become even more institutionalized in the wake of the recent COVID-19 pandemic. However, these innovations are not without limitations, and given the degree of the digital divide India has, it is challenging to guarantee their penetration into the different sphere of education at different level. Yet, this paradigm shift in the teaching and learning process has the potential to completely revamp the Indian educational system. Examining the effects of technology and digitalization on Indian education system and learning is the main objective of this study. It will also look into several policy initiatives taken in this direction by the Indian government, with an emphasis on ensuring inclusivity and accessibility, the challenges that will arise in the successful implementation of these will also be addressed.

Keywords: *Technology, Education system, Learning, Digitalization, Policy Initiatives.*

Introduction

Technology has swept and continues to sweep all sectors of life, and practically everything is reliant on the use of technology and the application of ICT, ranging from communication to visual and auditory entertainment, electrification, security, transport, to name a few. Even education is undergoing a rapid transformation from a traditional chalk-and-talk and book-based study model to an online learning environment. Smart classrooms with audio and visual systems and PPT presentations are replacing traditional classrooms with blackboards. Online tutoring and teaching resources offered by a multitude of online learning tools, such as BYJU'S, E-Path Shala, Google Classroom, etc., which give students immediate assistance, are second to teachers as a source of teaching support, E-books are replacing text books in classrooms (Rastogi, 2019). Because of the convergence of new technologies, global use of the Internet, and increasing demand for a workforce trained on a regular basis for the ever-changing digital economy, online education in its different forms has been gradually developing worldwide. By 2025, online learning will likely be commonplace. Online education is on track to become mainstream by 2025 (Shailendra Palviaa, 2018). The use of educational technology and information communication technologies (ICTs) in education is critical. It has the ability to achieve scale and speed while reaching every nook and cranny of the nation and bridging the digital divide by offering solutions for teaching, learning, evaluation, and continuing professional development whenever and wherever it is needed. With these viewpoints in mind, the National Education Policy (2020) places a strong emphasis on the use of educational technology to expand access to educational opportunities, raise educational standards, address issues of inclusion and diversity, and enhance the country's educational system's accessibility, quality, equity, affordability, and accountability. Therefore, careful application of educational technology and information and communication technologies (ICTs) can liberate the system and assist in achieving high standards of education in the country's schools, higher education institutions and teacher training programmes (Kumar). India has a significant role to play in the international e-learning services sector. It remains one of the top providers of IT services globally, and it now strives to rank among the top providers of IT-enabled services as well. One of the top e-learning service providers in the world thanks to the engagement of top-tier educational technology and training specialists. Numerous e-

learning initiatives have been launched on the domestic front by both the governmental and business sectors. Although these ideas have received favorable feedback and user approval, their market potential is still being taken into account. The Indian government has made a number of beneficial regulatory and budgetary moves to improve the country's e-learning environment (Shaikh, 2021).

Objectives:

- a) To study the impact of technology and digitalization on Indian education system and learning pattern.
- b) To look into various policy initiatives taken by the Indian government for digitalization in Education.
- c) To identify the challenges in the successful implementation of digitalization and technology in the field of education.

Research Methodology: The research work is qualitative in nature. The impact of technology and digitalization in education has been analyzed based on secondary data obtained from various sources such as government reports, research papers, and articles published in journals, books, newspapers, etc.

Impact of technology and digitalization on Indian education system: With the penetration of ICT in Education there has been a paradigm shift in the Teaching -Learning Process. With digitization and introduction of technology in the field of education it has become more student friendly and flexible. However, it does have negative connotations attached to it. But, if we look at the positive side of it, definitely there has been considerable changes in the way students learn. And during the COVID-19 pandemic, it was the technology and e-learning which has ensured the continuity in the field of education. The impact of digitalization can be studied from the following points:

Improved Access to education: In India, technology has increased access to education. Students can now access instructional materials at any time and from any location. This is because of the online learning platforms, digital classrooms, and e-books. More people are joining the education system as a result of the digitalization of education.

Personalized learning: Students can now learn things at their own pace as they can record any lecture, watch the content as many times they want. And with the help of this the learners can work according to their own strengths. It gives individual an opportunity to adjust based on the availability of time.

Communication has become Easy: Technology has made it easier for students and teachers to interact and communicate. Students can now communicate with friends and teachers irrespective of the geographical barriers, now they can easily communicate with the help of video conferencing, and messaging apps and other learning tools.

Cost-effective education: Digital tools have improved education cost-effectiveness. For instance, online courses are frequently less expensive than conventional classroom-based courses. Students from lower-income households now have easier access to school because to this.

Enhanced learning experiences: Technology has improved learning experiences by making them more interactive and engaging. Simulators, animations, and games are examples of digital tools that can be used to improve and make learning more engaging.

Flexibility in Learning: The e-Learning Provide Students and teachers with flexibility and convenience, and reference material could be accessed anytime and from anywhere. Even during the COVID -19 Pandemic it was the online classes which sustained the whole education system worldwide. Students prefer online learning because they are more comfortable with it and can learn at their own speed. The learning materials are conveniently accessible and storable. Real-time, simultaneous video conferencing is believed to help teachers give a more dynamic distant learning experience (Snigdha Jindal, 2022).

Policy initiatives taken by the Indian government for digitalization in Education

Various initiatives have been taken to promote digital learning under 'National Mission on Education through Information and Communication Technology' (NMEICT). Some of the initiatives by Government of Indian in this direction are:

SWAYAM: The 'Study Webs of Active Learning for Young Aspiring Minds' (SWAYAM) is an integrated platform for providing online courses and covering school (9th to 12th) till Post Graduate Level. Around 1.02 crore people have enrolled in a variety of courses through SWAYAM's current offering of 2769 MOOCs (Massive Open Online Courses). The usage of online courses for lifetime learning extends beyond students to include teachers and non-student learners. For classes IX–XII, the NCERT (National Council of Educational Research and Training) has been creating course modules for MOOCs in 12 subject areas (accounting, business studies, biology, chemistry, economics, history, geography, mathematics, physics, political science, psychology, and sociology).

SWAYAM Prabha: SWAYAM Prabha aims to offer 32 High Quality Educational Channels via DTH (Direct to Home) on a round-the-clock basis throughout the entire nation. It offers curriculum-based instruction in a variety of subjects. This is primarily intended to increase access to high-quality educational materials in rural locations where internet accessibility is still an issue.

National Digital Library (NDL): The National Digital Library of India (NDL) is a project to provide a virtual library of learning resources with a single-window search feature. Through the NDL, more than 3 crore digital resources are accessible. Nearly all significant educational fields are covered, as are all significant learning levels, including lifelong learners. With over 20 lakhs

active users, the NDL has more than 50 lakh students who have registered. A smartphone app is now available for accessing the NDL.

Spoken Tutorial: These are 10-minute audio-video tutorials on open-source software designed to increase students' employment possibilities. It is designed for self-learning, has audio dubs in all 22 languages, and an online version is available. The languages include Open FOAM, Libre, C++, Java, PHP, Python, PERL, and many others. Without the assistance of a physical teacher, the Spoken Tutorial courses successfully train a novice user.

Free and Open-Source Software for Education (FOSSEE): FOSSEE is a project that promotes the use of open-source software in educational institutions. It accomplishes this through educational materials like spoken tutorials, documentation like textbook supplements, awareness programmes like conferences, training workshops, and internships, and instructional materials like these.

Virtual Lab: The goal of the Virtual Labs Project is to provide a fully interactive simulation environment where users can conduct experiments, gather data, and respond to questions about the knowledge they have learned. The development of virtual laboratories using cutting-edge computer simulation technologies to produce real-world surroundings and problem-solving abilities is vital to achieving the goals of such a large-scale endeavour. About 225 of these labs are currently in use, have conducted more than 1800 experiments, and have benefited more than 15 lakh students.

E-Yantra: The goal of the e-Yantra project is to make embedded systems and robotics education more efficient throughout Indian engineering institutes. Workshops that teach the fundamentals of embedded systems and programming are used to train teachers and students. Through this effort, more than 275 colleges in India have benefited

Study materials developed by NCERT in the form of eResources: audio, video interactive lessons have been shared with stake holders through web portals (Study Webs of Active-Learning for Young Minds-SWAYAM, ePathshala, National Repository of Open Educational Resources (NROER) and mobile applications (ePathshala) (Bureau, 2019)

E-Gyankosh: The Indira Gandhi National Open University launched an initiative in 2006 to create a national digital repository of educational materials. Utilising DSpace free-source software, the repository was created with the goal of storing, indexing, preserving, disseminating, and sharing the digital learning resources offered by the nation's open and distance learning (ODL) schools. It provides assistance to a significant collection of learning materials in many formats, including audio-visual programmes, archives of live interactive radio and television broadcasts, and self-instructional study materials (Imran, 2012).

PM eVIDYA: This plan was introduced in 2020 to improve e-learning accessible for both students and teachers and to develop digital education in India. Over 3 crore higher education students in the nation now have improved learning chances because to the PMeVIDYA scheme, which allowed the top 100 universities to launch online courses.

Digital Infrastructure for Knowledge Sharing (DIKSHA): The government unveiled DIKSHA, a national platform for education, in 2017. Everyone, including students, teachers, and parents, has access to the portal's engaging educational materials that are based on school curricula and are available in more than 18 distinct Indian languages.

NISHTHA on DIKSHA: It is a government-sponsored national effort that focuses on the overall development of teachers by educating them to give quality education to students. Numerous courses were completed by thousands of teachers who received benefits from this project. (Digital India Empowers Digital Education, 2022).

Challenges in the successful implementation of digitalization and technology in the field of education

Even though technology has greatly improved the Indian educational system, there are still a number of challenges that must be resolved before the integration can be considered a success. Some of challenges that can hinder the integration of technology in the Indian educational system are as follows:

Infrastructure: The lack of infrastructure in many Indian institutions and colleges is one of the major problems. Many institutions lack the equipment needed to facilitate the use of technology, including computers, internet connectivity, and power backup.

Insufficient funds: Digital education entails the effective and efficient use of appropriate and cutting-edge hardware and software technology accessible on the market. Digital technology integration into educational systems is a challenging task in developing nations like India since it requires significant funding and infrastructure. The government promised to provide funds through the Digital India plan for the implementation of technology, however a shortage or insufficiency of funds results in redundant and outdated infrastructure and equipment in rural schools (Gond & Gupta, 2017).

Digital divide: In India, there is a sizable digital divide between urban and rural areas. Many rural locations lack internet and technology connectivity, which can make it challenging for students to take advantage of digital learning resources there. Even in places where internet connectivity is available, there exist a gap in utilization of this technology because there is considerable skill gap prevailing amongst students of rural area when compared to the students in urban areas.

Quality of content: The quality of educational content on digital platforms might vary. It is important to make sure that the information is accurate, current, and curriculum-relevant. And most of the times e-content is only available in English language only making it difficult for the students who prefer other languages.

Teacher training: Technology integration requires teachers who have been trained to use digital tools and platforms. And we know that many instructors in India lack the education or expertise needed to successfully integrate technology into their classrooms. So, there is immediate need to train these teachers how to use the technology to deliver the knowledge and content they have.

Limits Social interaction: Because online education may be accessed from home or any other convenient location, there is virtually little direct connection with the teacher and other students taking the course. There is very little peer conversation, especially in self-paced courses. The majority of the conversation happens via email, chat rooms, or discussion groups. No campus atmosphere exists to encourage social contact. Consequently, you are unable to create any social connections which are important part of learning and sharing idea, thoughts and knowledge (Jindal, 2019)

Cost of Learning: Many students, especially those from low-income households, may find it difficult to access digital materials and technology due to the cost of doing so. Some students may find it challenging to access digital learning tools due to the expense of devices, internet connectivity, and software.

Online safety and security: Concerns regarding online safety and security are also raised by the use of digital tools and platforms. It is important to make sure that students are protected from internet dangers like cyberbullying and harassment.

Poor maintenance and upgradation of digital equipment: One of the biggest issues in rural areas is keeping digital equipment updated and maintained. This is largely because of budgetary constraints of the Government. The digital education projects in rural schools are not self-sustainable. The government initially created a number of programmes to advance digital education, but subsequently they were not given the attention needed to maintain the technology, which has a negative impact on the growth of digital education in rural areas.

Conclusion

E-learning is developing as the dominating learning trend in India in the coming years. E-learning has expanded the scope of education both inside and beyond the classroom, and it is still seeking for ways to become more useful. Both the teacher and the student must adapt their teaching and learning strategies. The successful implementation of the e-learning process requires that educational institutions have appropriate procedures in place. However, there are a number of barriers to technological adoption in the Indian educational system. A few of issues include inadequate infrastructure, the digital divide between urban and rural areas, and the need for teacher education to successfully employ technology in the classroom. Overall, technology has had a considerable impact on the Indian educational system, and it is anticipated that it will continue to have a substantial impact on how the system evolves in the future. To overcome these difficulties, all concerned parties – including the government, educational institutions, and technology providers – must collaborate. It is essential to make sure that technology is included in a way that benefits all students and improves India's educational system as a whole.

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