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DIGITAL TECHNOLOGY FOR MAKING THE EDUCATION SMART & INCLUSIVE: FRAMEWORKS AND PRACTICES

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ABSTRACT

The impact of digital technology can be experienced in all spheres of our daily lives. These digital developments have been making metamorphic changes in the education sector also. The present paper focuses on the technological aspects of the education and emergence of digital tools for the modern and inclusive education system. Modern education while removing the traditional teacher-centric, replica, marking based education to the student-centric and more informative & fascinating focusing on the co-curricular activities and student's interests apart from the curricula and a grading-based education system. The augmentation of the information and communication technology turned this modern education into a smart education that is online, lively, audio-visual based, personalized, and performance-based evaluations, therefore, opening a new paradigm of teaching and learning. Apart from its framework and utilization, the paper also highlights some limitations of this technology and proposes some alternatives for inclusive and effective online education.

***KEYWORDS**: Digital, Education, Information Technology, Smart, Modern, Blended Learning.*

Introduction

The foundation of social and economic development lies in the growth of education and its access to all sections of society. Education not only enhances the scope of livelihoods but also helps in improving the standard of living and helps to establish a matured and modern society. Gettingan education at the right time is the right of every citizen of the country regardless of caste, religion, and social status. Quality education has a positive spread out effect on the family as an earned skill, knowledge, techniques, moral and ethical values pass through generations. The digital developments in the education sector have been changing the entire landscape rapidly. The issue is the accessibility to the public at minimum cost-efficiently with authenticated information, subject-wise multimedia tutorials, facilitating distance learners with online libraries, and continuous development in the course can be materialized through inline mode. Information technology grows as a solution to such demands that act like a mediocre between the learner and educator and offer all-time availability to the material with comfort due to expansions in networking, storage, development, and computing facilities (Figure1). Currently, many educational websites are available that are providing flexibility in learning with affordable charges or free of cost. There is a range of software solutions available in open source or with minimum cost to short out the operational, educational as well as research problem while sitting at home.

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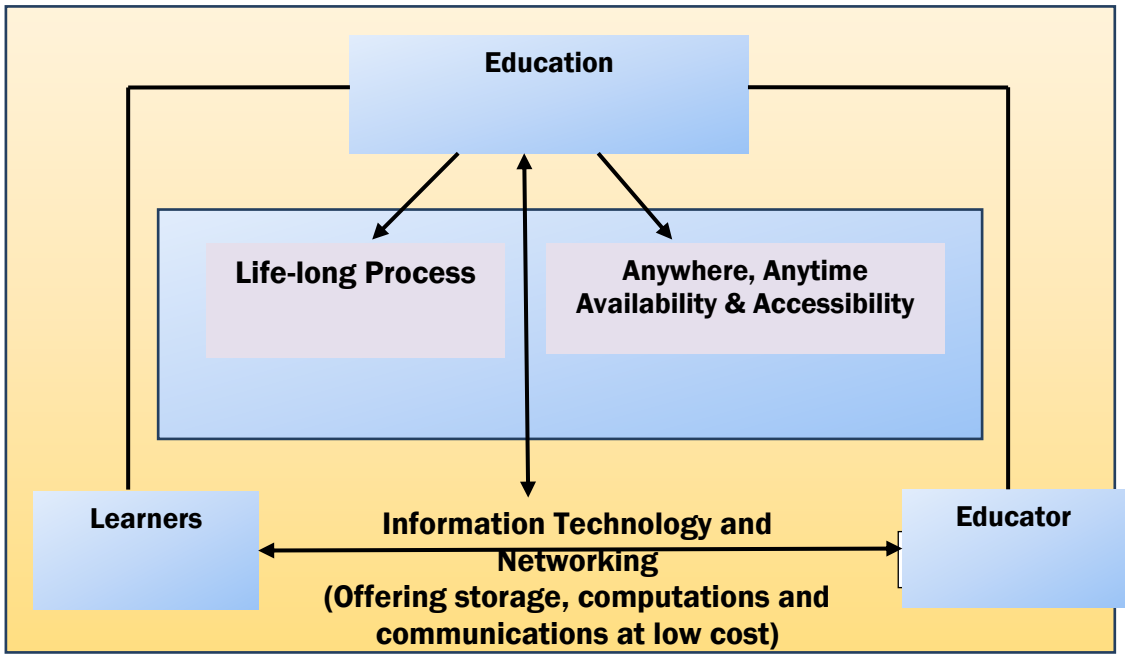
Figure 1: Education and Information Technology as a Facilitator



Sources: Authors

The present work is attributed to the study of the role and progress of information technology in the changing paradigm of education. The paper attempt to find out the possible benefits of information technology in modern education and various alternates of education serving society. Along with this, the study also put emphasized the limitations of modern education. Now education is turning into modernized knowledge, from education to commerciality, from physical to online; there be various downsides also that in place of collaboration, are more vulnerable to create more deviations. So the probable threats are also required to study and observe. Recommendations are also made for the smart education system, to make it more effective, and efficient while maintaining the Indian ethical and moral values. The work is focused on the analysis of usability and applicability of various tools in enhancing the education standards. The study has analyzed various reports and work done by scholars in this direction.

Modern Education and Smart Shaping

Modern education does not only focus on prominent academic disciplines of Management. Commerce, Medical, Engineering, Science, and Arts also aim to foster critical thinking, life skills, value education, analytical skills, and decision-making skills in students. Modern education not only focuses on the subject areas and their curriculum, but it also concentrates on the cognitive skills, behavioural and socio requirements of the learner, extracurricular activities, and physical exercises as well to make the mind fresh, education more exciting, and effective, and outcome-based. Modern education proposes a multidisciplinary learning approach based on the intellectual skills of the students. The various tools like presentations, multimedia tutorials, podcasts, e-libraries, and YouTube enabled modern education more effective and retentive. Key features of the modern education system are the learner's centric, skill-based, interactive, practical, and multi-way transfer of information & knowledge replacing the memorized, replicated, and recitation based education system with a modern system that targeted the practical approach, better understanding of the concepts, accessibility, and curiosity for a topic. The modern approach is more student-centric, considering the cognitive abilities, and imaginations, and offered activity-based learning & testing and collaborative tasks. Information and communication technology magnifies the powers of the modern education system by accumulating online tools, and software. The modern system with smart tools of education makes it clear that now education is knowledge-based and not age-based. (Team Leverage EDU,2021). It computes the performance of a student based on the grades, not the percentiles. The progress report is now chart based for example bar charts showing a comparative statement of the test

records and weak and excellent performances on their dashboards. Technological advancements, e-platforms, and opening to the global online for education create a global engagement of all kinds of learners. The tools further benefit language translation or course offerings in many languages. There is a range of course material that can be accessed and downloaded in different languages.

Digital Technology in Modern Education and Making a Smart Education System

With the diversity of learning and individual behaviours, it is necessary to create an education system that meets all requirements of the learners and a well-established knowledge avoiding the recitations of confusing literature and theories. The various online tools and software applications are available that help in developing a practical choice-based approach even facilitating micro-learning. The modern education system offers a range of learning areas like web designing, gaming, animation, CAD, CAM in a virtual reality environment, dance, drama, music, and interdisciplinary subjects apart from the selected papers (Watson, 2017). Following are the unique features and benefits of information technology in modern education, making it smart and that may be helpful for the successful implementation of new education policy:

E-learning Platforms

E-learning platforms can be classified into two categories, one is from the learner's point of view and another is the educator or the developers' point of view i.e. supplier side. A common example is the LMS (learning management system) used by various educational institutions for providing an environment of online learning, blended learning, classrooms, attendance system, study materials, assignments, grading, etc. An ID is provided to every student as well as the teacher and personalize the teacher's window so that he can customize it subject-wise for dissemination of knowledge to the students.(Watson,2017) The learning platforms for the students are further divided into private and government platforms offering courses. Private platforms are Udemy, Coursera, Edx whereas Indian government platforms for learners are Swayam, Diksha, E-shodh Sindhu, E-Shodhganga, E-PG-Pathshala, Swayam Prabha, NPTEL offered for academic courses as well as training and skill development courses categorized by weeks for short duration or the long duration so that corresponding credits can be assigned for such courses by the educational institutions under the new education policy. Microsoft, IBM, and other certifications are globally accepted for the jobs and coursed from Harvard University and Oxford are taken as a matter of prestige with a small affordable amount of fees. The major advantages of e-learning platforms are the low cost or freely available courses and accessibility to that section who cannot afford the high cost of regular classes.

The second category of the e-learning platform is the designing and development of e-platforms and creating a customized environment to create courses, dashboards, uploading text, data, videos, and other study materials, and designing assignments and tests or the project report submission, labs plus the discussion boards or the feedback system. Such kind of environment can be helpful for the service providers offering different courses to organize the course contents and structure based on the demographic conditions of the learners. These platforms are Teachable, Open-Edx, Thinkific, Learn Worlds, Kajabi, Podia, SAP Litmos, Blackboard, Lifter LMS, and Moodle (Raouna,2022, Nita Samantaray, 2021). Such e-learning systems help in mitigating the dependencies on the formal system of educational institutions. Availability and accessibility of a variety of e-learning resources like blogs, forums, e-libraries and e-books, podcasts, chatbots, and audio-visual education open a series of options to select the best solution to a problem on any topic.

Diversified Learners and Flexibility of Accessibility to e-Learning Platforms

India is a country with diversified culture, economic conditions, demographics with a large population. Thus, the requirement of education starts from the schooling to the professional courses, skill development, training & research, etc. the learners are youngsters to senior citizens, household to office going employees, daily wage workers or own small businessman, higher education with different specializations and sub-categories under the course umbrella. Thus, information technology having smart tools provides accessibility to each person e.g. advantage the part-time workers and house-makers etc. and flexibility of learning hours.

Reduction in Infrastructural Overheads and Locational Cost

As information technology with wireless communication removes the establishment of physical classrooms, buildings, and other fundamental facilities like water tanks, canteen, board rooms, security cameras, transportation, etc. This heavy cost is replaced with small, affordable PCs,

wireless tools, small cost-effective accessories, low communication costs, etc. The major benefit is the removal of locational costs. Suppose to open a training center or an institute, NCR region or the spot areas are selected to attract the urban students that is much higher than the opening of institutes in rural areas though issues of transportability are there. The e-learning platforms automatically resolve this as the system can be set anywhere and is accessible to everyone. So the cost of infrastructures is reduced in terms of physical settings, and various arrangements moreover, minimizing the locational cost.

Lab Simulators

The different lab simulators where the students can do practical, project works and check the outcomes are easily available. These simulators are AI-based that give a real-world touch to the practical practices for science and mathematics, for instance, PhET, Labster, OLabs, virtual labs, etc. IoT simulator for automation testing is Azure, IoTIFY, and SimTalkwhich helps in the behavioural investigation and accurate implementations of IoT. (Xin,2017)

Micro-learning

Micro-learning is trending currently which means learning in parts replacing the traditional long syllabi with small modules or a few units based on some topic or subject area. The modules offered are for both kinds of learners say beginners as well the experts working on complex tools or tough coding. This stepwise learning enhances the ability of learners to grasp things easily. It is the choice of today's learners and working persons to watch videos for a small duration and do exams (Andriotis,2016).

Special Persons and Stimulation to their Learning

The modern language includes all the learners 'specifically underprivileged and special persons. There is a range of multimedia tools that are there to help such persons during classes like real-time captions during webinars or meetings, Transcriptions onside the bar of e-learning courses. Others can be Braille Touch, Voice Over, and Audio Exam Player(Cassidy,2014)used to make attractive videos and graphics with different sounds for the understanding of special learners. For example, deafness may cause a delay in the learning process due to the inability to audio lectures ultimately slowing down their academic progress; such issues may be sorted out through visual learning-based methods, sign language, and chromatic graphical demonstrations.

Long Retention of Information

As visual presentation is more remembered than the text including the data flow of the course work and its outcomes. Therefore, the standardized framework of the learning platforms, course design, the attractive placing of context, and reachability for revisions anytime, discussions, interactive sessions, or the creator's motivational message build the data retaining and attractiveness of the course.

Enhance the Communication Skills and Work Productivity

With the advent of information technology, a range of tools to read aloud the text, auto typing, and speech to text conversion are available online that increase the writing speed. Apart from this writing can be improved with autocorrect options and online dictionaries, Grammarly app auto checks the sentence and do suggestions to improve writing skills. Transcripts along with videos enhance the speaking and pronunciation abilities of listeners and adaptations in own practices.

Standardized Education by Top Tutors

Collaborations with high-profile tutors enhance the practical approach and learning standards. The professor of global repute with current affairs and advanced tools aid the learner to get better and practice well. The answers to the doubts are also provided with practical examples to upsurge knowledge levels and global competitiveness.

Blended Learning

IT-based learning merges the physical as well as the online mode and is more effective in developing countries while providing the benefits of traditional methods plus the online approach. The physical interaction, as well as the advanced modes of teaching, make the classroom lively and individual-centric. Projectors, smart boards, whiteboards, presentations, video lessons, practical simulators, experiments, live locations, and data make the class more informative and academic (Watson,2017).

Learner's Dashboards

Advantages of own dashboards, a personal work area where one can track learning process, interact with other participants, reread the visited and watched tutorials, audit trailing and support from the service providers, easy assessment, visual reports, and the feedback system increase the chance of further improvements in the course as well as the learner abilities.

Paper to PC for Efficiency and Environment

Work, attendance like google meet attendance, and notes are now shifted from papers to computers in a variety of means like Google drive, Dropbox, and Clouds with unlimited storage, full accessibility, security, and preservation for the long run. The performances, assignments or project work, and presentations are prepared and submitted electronically thus reducing the paperwork, so modern education is eco-friendly as digitalization reduces the paperwork and thus the cutting of trees (Team Leverage EDU,2021). The paperless education system has the potential to save the environment and help in achieving the Sustainable Development Goals.

Practical, Activity-based Learning, and Visual Learning

Commonly used in junior classes to make the students engaged in study and practical training for the professional courses for a better understanding of the concepts. Interactive sessions, questions between the sessions, and small tests make the student engaged and acquire more. Recently visual material has become a very significant part of online learning. Videos are more effective due to the perceptive course material based on past experiences in a well-organized manner with transparency in work and micro-learning replacing the confusing terminologies. Study material and websites are designed in such a way that can be easily opened on mobile too. With wireless communication facilities and low-cost internet, the learners can arrange to learn from anywhere while working in fields, or doing household tasks, during babysitting to free periods in classes (Zafar,2019).

Privacy, Security, and Availability of Authenticated Data

The various platform provides the educator to decide what to display and what not and at what time. Educator has both the choice to make the data public or private, the same way the dashboard of trainees and their scoring are not displayed to other users plus the personal information is not shared on the net without his permission. In terms of authenticity, Google is the best example where a range of authenticated sites are there and a list of supportive documents arises on the first page, the web crawler is more AI-based and automated to collect the information stored, indexed, and present those authenticated websites e.g. data from government official sites to search engine whenever any question is asked.

Creative and Innovative

Students can extend their practical learnings and experiments free of cost while sitting at home with low-cost instruments by watching video tutorials, blogs, chatbots, interactive discussions, and even documentation from the developers (Zafar,2019). There is a range of open-source products available free of cost to build attractive projects with customized features and screen recordings in presentations with whiteboard facilities during presentations. The OBS recording is a good choice for streamlining the recording on YouTube and Facebook or saving the file for later use.

Webinar based Learning

Many times we got invitations to attend the online webinar free of cost by the various field experts on various prevailing issues like health, family, career consultancy, stress management, language training, or other specific topics. Such webinars help to attain trustworthy information, various skill enhancements, ethical and safe to attend, and getting quality data based on the experiences of experts (Zafar,2019).

Limitations of Digital Education

The digital education system has some inherent limitations. Sometimes learners have no idea about copyrighted material and creative commons and the issues of plagiarism in reusing the predefined theorem and already published data create a lot of problems (Zafar,2019). The quality earning cannot be completed without the involvement of all people, however, the design, presentation & languages of courses overlooked the demographic factors and less popular languages. Thus failing to educate people who are in dire need. (Zafar,2019). This way the demographic deviations are increasing more. Apart from this, social deviation in terms of inaccessibility to technology and new education platforms again creates

inequalities. Dynamics in the learning and technological changes force the redesigning of curriculum and courses are quite difficult to manage. Smart education is more commercialized and profit-based as compared to the traditional system. The market-oriented education just focused on the business aspects rather than of inclusive approach. The online courses, electronic work, and micro learnings skill courses ultimately reduce the writing abilities thus reducing quality writing and retention qualities. Further, it is difficult to select the right course, the right information, and the right institute from a long list of suppliers. Due to continuous sitting on the system, certain health issues like eyesight, migraine, lack of focus irritation, stress, and anger are the outcomes that are the bad signal for creative work. Every time connection with the mobiles, networking spoiling the personal life socialization and family concerns. Creating presentations, and getting good rewards forced the students to look on to designing parts rather than content. Unwanted advertising, pornography, objectionable videos and photographs, vulgar material, and cheating in online exams are again great issues for the school students in networking sites and online data, therefore, destroying culture (Raja and Nagasubramani, 2018).

Conclusion

The advent of digital technology has been changing the entire spheres of teaching and learning. The study emphasized the tools and applications used needed to address the objectives of society at large. The paper has identified some very important and useful advantages of information technology for improving the quality and impact of education. Digital technology has been helping to provide education in remote areas also. This technological revolution has some limitations and also needs proper attention. The study has also highlighted some undesirable results of technology and reckoned to take precautions while using them. In nutshell, the paper advocates that an inclusive education system is the need of the hour and digital technology has great scope and potential to achieve this target. Collaborations among various stakeholders can help to reduce the cost and increase the accessibility of education to all. There is a need to fill up the supply side gap especially in rural and remote areas so that the digital tools can be helpful to achieve the objectives of inclusive education.

References

1. Abduvakhidov et.al (2021) “Digital Developments of Education: Global Challenges of the Digital Economy”, International Journal of Instruction, Vol 14 (1), pp 743-760
2. Cassidy, Richard (2014). “5 Excellent Tools to Assist Visually Impaired Students with Mobile Technology”, Retrieved from: https://www.emergingedtech.com/2014/09/excellent-tools-help-visually-impaired-students-mobile-technology/
3. Dhawan, Shivangi (2020) “Online Learning: A Panacea in the Time of COVID-19 Crisis, Journal of Educational Technology Systems”, Vol. 49(1) 5–22, https://doi.org/10.1177/0047239520934018
4. Dutta, Indrajeet (2019) “Technology mediated learning: Learning from the case study of a government school”, Indian Journal of Educational Technology, Vol 1 (2), pp 14-23
5. Kyriaki Raouna (2022). “27 Best Online Learning Platforms,2022. Retrieved from: https://www.learnworlds.com/online-learning-platforms/
6. Lenka, Rabindranath and Avaneesh Tripathi (2020) “E-learning: Access and scope of digital education”, Kurukshetra- Journal of Rural Development, Vol 69 (2), pp 22-26
7. Lin, Y. W., Lin, Y. B., & Yen, T. H. (2020). SimTalk: Simulation of IoT Applications. *Sensors (Basel, Switzerland)*, *20*(9), 2563. https://doi.org/10.3390/s20092563
8. Miglani, Neha and Patricia Burch (2019) “Educational Technology in India: The Field and Teacher’s Sensemaking”, Contemporary Education Dialogue, Vol 16(1), pp 26–53, https://doi.org/ 10.1177/0973184918803184
9. Nagpal, Monica (2019) “Use of Free and Open Source Software (FOSS) in content creation”, Indian Journal of Educational Technology, Vol 1 (2), pp 55-61
10. Nikos Andriotis. “Everything you wanted to know about microlearning (but were afraid to ask)”. Retrieved from: https://www.efrontlearning.com/blog/2015/09/everything-you-wanted-to-know-about-micro-learning-but-were-afraid-to-ask.html
11. Nita Samantaray (2021). “Free e-Learning platforms developed by the Government of India”. Retrieved from: https://www.timesnownews.com/education/article/free-e-learning-platforms-developed-by-the-government-of-india/758567

12. Raja, R and P. C. Nagasubramani (2018). “Impact of modern technology in education”. Journal of Applied and Advanced Research, 2018: 3(Suppl. 1) S33–S35, https://dx.doi.org/10.21839/jaar.2018.v3S1.165 . Retrieved from (PDF) Impact of modern technology in education (researchgate.net)

13. Singh, Mayengbam Nandakishwor (2021), Inroad of Digital Technology in Education: Age of Digital Classroom, Higher Education for the Future, Vol 8 (1), pp 20-30, https://doi.org/10.1177/2347631120980272

14. Singh Vandana and Alexander Thurman (2019) “How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018)”, American Journal of Distance Education, Vol 33 (4), pp 289-306, https://doi.org/10.1080/08923647.2019.1663082

15. Team Leverage EDU (2021). “Modern Education: A Significant Leap Forward”. Retrieved from: Modern Education: Meaning, Purpose, Benefits, in India - Leverage Edu

16. Watson, Julian (2017). “Role of Information technology in education”. Retrieved from: Role of Information Technology in Education (dailyonweb.com)

17. Xin (2017). “Try Azure IoT with an online Raspberry Pi simulator”, Retrieved from https://devblogs.microsoft.com/iotdev/try-azure-iot-with-an-online-raspberry-pi-simulator/

18. Zafar, S. M. Tariq (2019) “Role of Information Communication Technology (ICT) in Education and its Relative Impact”, International Journal of Engineering Research & Technology, Vol7 (4).

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