
DIGITAL EDUCATION: A REVIEW

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Abstract:

The National Policy on Education 1986, stressed the need to employ educational technology to improve the quality of education. The National Education Policy 2020 brings out significant educational technology imperatives at a crucial juncture when Covid-19 pandemic has upped the integration of technology into all levels of education. This paper started with an overview of the role of technology in teaching-learning, administration, governance and for divyangs. This paper depicts the digital initiatives of GOI in educational domains. Role of future technologies like AI in educational sector. The NEP 2020 proposes setting up of an NETF with the objective to offer a space to share ideas about use of technology for learning, administration, planning and assessment of learning for students and teachers.

Keywords: NEP 2020, Digital education, ICT

Introduction :

The NEP-2020 brings out significant educational technology imperatives at a crucial juncture when the Covid-19 pandemic has upped the integration of technology into all levels of education. Two revolutions have brought out significant transformations in the education sector: the 4th Industrial Revolution, and the 4th Education Revolution. New developments like learning analytics, mobile learning technologies, learning design, virtual tutoring, personalized learning and instruction, and formative feedback for complex learning are providing new dimensions to educational communication and technology and assisting teachers to create engaging learning experiences. In this paper, we discussed how digitalization could contribute to technology-enabled teaching-learning, learners support, and educational administration. The present paper depicts the changing role of digital techniques in educational domains. Digital initiatives for teaching-learning by the Government [1-7].

Role of Technology in Teaching-Learning, Administration, and Governance :

The role of technology in education is without a doubt immensely huge. Technology applications and tools allow education systems to collect, process, incorporate, store, maintain and distribute data. Data is the new oil, is a famous quote. Suitable data helps us in making the right and timely decisions. Technology assists us in policy analysis and formulation, task planning, project monitoring, and educational management. By using appropriate business intelligence tools, we can keep track of the progress of activities and projects. The student information systems help us in managing students' data and information from the enrolment stage till graduation and beyond. There are various information systems



that are very useful for academic and administrative activities, like [3-7]:

- i. Enterprise Resource Planning - for business operations within the organization.
- ii. Student Information System -for managing student data.
- iii. Accounting Information System - used for accounting procedures.
- iv. Office Automation System - to enhance office productivity like document creation, duplication, and distribution.
- v. Human Resource Management System - for managing personnel operations like employee data, increments, promotions, etc.
- vi. Marketing Information System - for managing marketing operations.
- vii. Transactions Processing System - for processing business operations like ticket selling, merchandise selling, etc.
- viii. Decision Support System - for providing data to senior leadership to make timely and suitable decisions.
- ix. Supply Chain Management - for managing and integrating manufacturers, stockists, suppliers, retailers, and customers.
- x. Customer Relationship Management - for managing current and potential customers for sales, services, feedback etc.

These systems increase organizational efficiency as they reduce time in making things operational. Communication becomes faster, more secure, and addressed to the intended audience. Organizations can make a better SWOC (strengths, weaknesses, opportunities, challenges) analysis of their processes and operations so that employee performance can be enhanced, better products (in the case of education it is course content), etc.

The prime attributes for Indian educational institutions for TEL are:

- i. Development of an ICT Policy.
- ii. Development and usage of Digital Resources for teaching and learning.
- iii. Adoption of IT Hardware and Software, preferably Free and Open-Source Software.
- iv. Usage of Learning Management Systems and Web-Conference Systems.

Educational technology has been used by institutions for a long time. Recent developments and advancements in hardware and software have augmented the adoption of technology-enabled learning in institutions in a varied manner. Both formal and open and distance education institutions have incorporated technology in teaching and learning transactions.

Here are some unique examples of the use of TEL in Indian educational institutions



[3-7]:

- eBidyā: LMS of KKHSOU (<http://www.lmskkhsou.in/web/>)
- National level TEL initiatives: National Digital Library, ePG Pathshala, NME-ICT, SWAYAM, Spoken Tutorial by IIT Mumbai, Amity University Online (<https://amityonline.com/amity/blog/technologyenabled-online-learning>), Assessment of learners' competencies, DIKSHA (Digital Infrastructure for Knowledge Sharing) Portal for teachers (<https://diksha.gov.in/about/>), Artificial intelligence enabled Chatbot, Radio technology, Krishna Kanta Handiqui State Open University eSLM Repository (<http://digitalkkhsou.in/kkhsou.ac.in/eslm/>), Blockchain Technology to issue e-documents, Centre of Excellence for Smart Devices and IoT Applications at Uttaranchal University, Uttarakhand, QR Codes: <https://ncert.nic.in/textbook.php?keph1=0-8>. IIT Madras's Centre of Excellence on Virtual Reality and Haptics: <https://opengovasia.com/indian-institute-of-madras-launches-virtual-reality-course/>, Natural Language Processing (NLP) Lab at Tezpur University, India: <http://www.tezu.ernet.in/~nlp/>, Robot Teachers in Schools (<https://analyticsindiamag.com/integrating-aicurriculum-cbse-international-schools-humanoid-robots/>), Samarth is the national platform for educational organization and management. (<https://samarth.edu.in/>)

Role of Technology in Facilitating Divyangs:

Divyang students have special needs in terms of what they will study and how they will learn. Special provisions need to be created for divyangs. Assistive technology is a big boon for them, in the form of hardware and software. Hardware like hearing aids, mobility aids, walkers, and wheelchairs make up for certain disabilities, similarly, software like screen readers, text-to-speech systems using Optical Character Recognition (OCR), braille screen, and display magnifiers allow divyangs to listen to content on the screen or it makes the font or information on the screen in big size for easy reading. Technology giants like Microsoft, Google, Facebook etc have created tools that are being used by divyangs. Microsoft has created a service called Windows Narrator which allows divyangs to control pitch, volume, and reading speed and offers facilities to read the text which is in bold, capitalized, underlined, and italicized format [6,8].

Some other famous assistive technologies for divyangs are:

- JAWS or Window-Eyes as computer screen readers for visually impaired individuals. Non-Visual Desktop Access (<http://www.nvaccess.org/>) is another such application.
- Ava (<https://www.ava.me/>) is helpful for persons with hearing impairment as it transcribes the spoken words captured by microphones.
- Dragon Naturally Speaking (<http://www.nuance.com/dragon/index.htm>) is a popular speech recognition software.
- X-AR (<http://www.equipoisinc.com/products/xAr/>) is useful for persons with upper body limitations due to some sort of dexterity.
- Designers and software's allow alt tags for images or graphical illustrations.
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1. Digital Initiatives of GOI:

Digital technologies are great vehicles for transformation in education serving various purposes of improving quality, up-skilling of teachers, increasing access, the massification of education, generating quality content and training faculty, etc. The government of India has launched various digital initiatives. Some of them are described hereunder [3-8].

- ❖ National Mission on Education through ICT (NMEICT) <https://nmeict.ac.in/>
- ❖ Study Webs of Active Learning for Young Aspiring Minds' (SWAYAM) <https://www.swayam.gov.in/>.
- ❖ Swayam Prabha <https://swayamprabha.gov.in/>.
- ❖ National Digital Library of India (NDL) <https://www.ndl.gov.in/>.
- ❖ e-Yantra <https://new.e-yantra.org/>.
- ❖ Virtual Lab <https://www.vlab.co.in/>.
- ❖ FOSSEE (Free/Libre and Open-Source Software in Education) <https://fossee.in/>.
- ❖ National Academic Depository <https://nad.gov.in/>.
- ❖ Annual Refresher Programme in Teaching (ARPIT)
- ❖ National Digital Educational Architecture (NDEAR) <https://www.ndear.gov.in/>.
- ❖ DIKSHA (Digital Infrastructure for Knowledge Sharing) <https://diksha.gov.in/about/>.
- ❖ PM eVIDYA: One Nation One Digital Platform <https://pmmodiyojana.in/pm-evidya/>.
- ❖ Indian Research Information Network System (IRINS) <https://irins.org/irins/>.

2. Future Technologies:

Types of Artificial Intelligence Based upon the kind of outcomes, AI can be categorised into three types:

- Artificial Narrow Intelligence: Here the intelligence equals or exceeds human intelligence or efficiency at a specific task.
- Artificial General Intelligence: Here the system is capable of applying intelligence to any problem, going beyond applying to a specific problem or task
- Artificial Super Intelligence: here the system is significantly intelligent than the human intelligence in almost every field and can deal with general wisdom, social skills or scientific creativity.

AI applications are being increasingly used in education in the form of chatbots, engagement platforms, self-directed learning, automated assessment systems and sentiment analysis etc. Let us have a look at some of the real case applications [3-8].

AI Applications in Education:

Conversation technology, Personalised learning, Automation of tasks, AI-powered writing assistant, Location-based technologies, Smart infrastructure, Image recognition and processing Chatbots, Sentiment analysis, Student engagement platform, Digital learning scorecard, Digital learning scorecard, Self-regulated learning, Internet of behaviour (IoB), Speech recognition.

ICT in education:

ICT is a scientific, technological, and engineering discipline and management technique used in handling information, its application, and its association with social, economic, and cultural matters (UNESCO, 2002). This calls for a suitable skills development framework for students and teachers [6-8].

Skills for cognitive flexibility:

These skills empower the learners to become better and fast learner.

- Developing foresight (enables students to identify future challenges)
- Identify Self-learning needs (for what is useful to them)
- Set self-learning goals (learning how to learn helps them)
- Effective Decision making (helps in staying rational)
- Research competence (to identify problems and issues and finding solutions)
- Ability to teach others (enhances self-learning with better clarity)
- Ideas: their creation and dissemination (fosters creativity)
- Computational Thinking (empowers for digital world operations)
- Skills for technology adoption: These skills make the learners to become successful users of digital devices and technology tools.
- Using concept maps (allows having a big picture of concepts)
- Learning agility: learning, unlearning and re-learning (discarding outdated and adopting new and useful knowledge)
- Google search skills (be able to stay focus while retrieving information)
- Using AI apps for better learning: text to speech, speech to text, machine translation
- Learning from YouTube (learning a skill through demonstration)
- Using an app to get the text of an audio or video narration
- Learning from MOOCs and mobile apps Self-learning: Motivation, engagement and volition are skills in staying focused and positive, inculcating values as highlighted in NEP 2020.
- Creative & Critical thinking
- Fact checking (identify fact from false)
- Effective learning techniques & Time Management
- Avoiding/overcoming procrastinate on Enhancing the span of attention (focus)
- Grit: determination to overcome one's barriers to learning
- Open mindedness.

Role of National Educational Technology Forum (NETF):

The NEP 2020 proposes setting up of an autonomous body, the National Educational Technology Forum (NETF). The objective of this proposed autonomous Forum would be to offer a space to share ideas about use of technology for learning, administration, planning and assessment of learning for students and teachers. It would facilitate induction, deployment and effective management of technology in education. The Forum will provide thought

leadership empowered with recent research, consultancy and a knowledgebase of best practices [8].

The functions of the forum would be [8]:

- provide independent evidence-based advice to Central and State Government agencies on technology-based interventions.
- build intellectual and institutional capacities in educational technology.
- envision strategic thrust areas in this domain.
- articulate new directions for research and innovation.
- To lay down standards of content, technology, and pedagogy for online/digital teaching-learning.
- To maintain regular flow of authentic data from multiple sources.
- To conduct multiple regional and national conferences, workshops etc.
- To Identify technological interventions for the purpose of improving teaching-learning and evaluation process, teacher preparation, professional development, educational access, and educational planning, management, and administration etc.

i) To categorise emergent technologies based on their potential and estimated frame for disruption, and periodically present this analysis to MoE.

Conclusion:

Technology has made inroads in all walks of our life. Applications of AI, ML, Computer vision, AR/VR, Blockchain, 3D printing, IOTs, and other smart technologies are being used in all business activities. NITI Aayog of the Govt. of India also released India's National Strategy for Artificial Intelligence (NSAI) in June 2018 with the purpose to create a vibrant AI ecosystem in India. With the power of AI, teachers have the tools to offer personalized instructions, can create quality content, and offer it to needed students as ubiquitous technology. Self-learning is one of the best advantages for students. NEP 2020 has laid serious stress on making students "Learn how to learn". Technology is a great support to achieve this aim. NEP 2020 has laid due emphasis on the use of technology and it is hoped that our students and teachers would reap the benefits to maximum potential.

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