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RESEARCH ARTICLE

EVALUATED EDUCATIONAL TECHNOLOGY AND INTEGRATION STRATEGIES: NEP 2020

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Abstract

The Technology has become a necessary part of the education system in the recent past, the National Education Policy 2020 has aptly recognized the importance of technology in education and brought the Digital India Campaign into the education domain as well. Technology integration in education has become a key factor in educational reform across the globe. The new educational policy of 2020 in the Indian context is a ground-breaking plan that anticipates a thorough change of the educational landscape with technology at its core. The National Education Policy 2020 acknowledges the numerous benefits of incorporating technology into education, while also recognizing the potential risks and challenges associated with it. The NEP 2020 mandates that technological infrastructure be constantly upgraded and set up across India. It is also cognizant of the requirement to grow digital skills, especially among teachers and educators, and the need for ensuring technological and online safety. This article aims to provide to comprehensive analysis of how technology can be effectively leveraged in education, addressing obstacles, and expanding the reach of existing digital platforms and ICT-based educational programs to ensure inclusive and high quality education for all.
The Human spirit must prevail over Technology------**Albert Einstein**

Introduction:-

Technology makes what was once impossible possible, the design make it real---**Michael Gagliano**

The National Education Policy 2020 is the first education policy of the 21st century and aims to address many growing development imperatives of our country. This policy proposes the revision and revamping of all aspects of the education structure, including its regulations and governance, to create a new system that is aligned with the aspirational goals of 21st century education, including SDG4, while building upon India's traditions and value system. NEP 2020 places a strong emphasis in the integration of technology, recognizing its pivotal role in fostering holistic development. NEP 2020acknowledges that different advancements in technology such as educational software, artificial intelligence, block chain, handheld computing devices, adaptive computer testing, etc. will play an important role in changing. What and how students learn at school and colleges. The relationship between technology and education at all levels in biodirectional. Thus, integration digital technology in education requires detailed research toward development of teachers, improvement of teaching and assessment processes, equity in technological access and administrative tasks.

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Importance of Technology Integration in Education

Technology integration is not an event. It should be an everyday part of classroom-like crayons and beatings.

1. The Recent occurrence of a pandemic has underline the importance of having alternative method for imparting education whenever the in person method is not possible.
2. Onlineprograms ensure Education and Training of teacher at a much faster pace to prepare them for remote teaching.
3. Online education makes it possible to teach the remotest of places as well as students with disabilities. However, the first necessities access to technology and connectivity networks across the country which is being made possible through campaigns such as Digital India.
4. Technology will help build Digital and Virtual Libraries and repositories, Facilitating access to course content irrespective of Language barriers between teacher and student.

Technology Use and Integration in Education

Technology by itself doesn't make leaders. Technology only amplifies true leadership.

1. India is a global leader in information and communication technology and in other cutting-edge domains, such as space. The Digital India Campaign is helping to transform the entire nation into digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational Processes and outcomes; thus, the relationship between technology and education at all levels is bidirectional.
2. Given the explosive pace of technological development allied with the sheer creativity of tech savvy teachers and entrepreneurs including student entrepreneurs, it is certain that technology will impact education in multiple ways, only some of which can be foreseen at the present time. New Technologies involving artificial intelligence, machine learning, block chains, smart boards, handheldComputing devices, adaptive computer testing for student development, and other forms of Educational software and hardware will not just change what students learn in the classroom but how they learn, and thus these areas and beyond will require extensive research both on the technological as well as educational fronts.
3. Use and integration of technology to improve multiple aspects of education will be supported and adopted, provided these interventions are rigorously and transparently evaluated in relevant Contexts before they are scaled up. An autonomous body, the National Educational Technology Forum (NETF), will be created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration, and so on, both for school and higher education. The aim of the NETF will be to facilitate decision making on the induction, deployment, and use of technology, by providing to the leadership of education institutions, State and Central governments, and other stakeholders, the latest knowledge and research as well as the opportunity to consult and share best practices. The NETF will have the following functions:
   1. Provide independent evidence-based advice to Central and State Government agencies on technology-based interventions.
   2. Build intellectual and institutional capacities in educational technology.
   3. Envision strategic thrust areas in this domain.
   4. Articulate new directions for research and innovation.
4. To remain relevant in the fast-changing field of educational technology, the NETF will maintain a regular inflow of authentic data from multiple sources including educational technology innovators and practitioners and will engage with a diverse set of researchers to analyze the data. To support the development of a vibrant body of knowledge and practice, the NETF will organize multiple regional and national conferences, workshops, etc. to solicit inputs from national and international educational technology researchers, entrepreneurs, and practitioners.
5. The thrust of technological interventions will be for the purposes of improving teaching learning and evaluation processes, supporting teacher preparation and professional development, enhancing educational access, and streamlining educational planning, management, and administration including processes related to admissions, attendance, assessments, etc.
6. A rich variety of educational software, for all the above purposes, will be developed and made available for students and teachers at all levels. All such software will be available in all major Indian languages and will be accessible to a wide range of users including students in remote areas and Divyang students. Teaching-learning e-content will continue to be developed by all States in all regional languages, as well as by the NCERT, CIET, CBSE, NIOS, and other bodies/institutions, and will be uploaded onto the DIKSHA platform. This platform may also be utilized for Teacher's professional Development through e-content. CIET will be strengthened to promote and expand DIKSHA as well as other education technology initiatives. Suitable equipment will be made available to teachers at schools so that teachers can suitably integrate e-contents into teaching-learning practices. Technology-

based education platforms, such as DIKSHA/SWAYAM, will be better integrated across school and higher education, and will include ratings/reviews by users, so as to enable content developers create user friendly and qualitative content.

7. Particular attention will need to be paid to emerging disruptive technologies that will necessarily transform the education system. When the 1986/1992 National Policy on Education was formulated, it was difficult to predict the disruptive effect that the internet would have brought. Our present education system's inability to cope with these rapid and disruptive changes places us individually and nationally at a perilous disadvantage in an increasingly competitive world. For example, while computers have largely surpassed humans in leveraging factual and procedural knowledge, our education at all levels excessively burdens students with such knowledge at the expense of developing their higher-order competencies.

8. This policy has been formulated at a time when an unquestionably disruptive technology -Artificial Intelligence (AI) 3D/7D Virtual Reality has emerged. As the cost of AI-based prediction falls, AI will be able to match or outperform and, therefore, be a valuable aid to even skilled professionals such as doctors in certain predictive tasks. AI's disruptive potential in the workplace is clear, and the education system must be poised to respond quickly. One of the permanent tasks of the NETF will be to categorize emergent technologies based on their potential and estimated timeframe for disruption, and to periodically present this analysis to MHRD. Based on these inputs, MHRD will formally identify those technologies whose emergence demands responses from the education system.

9. In response to MHRD's formal recognition of a new disruptive technology, the National Research Foundation will initiate or expand research efforts in the technology. In the context of AI, NRF may consider a three-pronged approach: (a) advancing core AI research, (b) developing and deploying application-based research, and (c) advancing international research efforts to address global challenges in areas such as healthcare, agriculture, and climate change using AI.

10. HEIs will play an active role not only in conducting research on disruptive technologies but also in creating initial versions of instructional materials and courses including online courses in cutting-edge domains and assessing their impact on specific areas such as professional education. Once the technology has attained a level of maturity, HEIs with thousands of students will be ideally placed to scale these teaching and skilling efforts, which will include targeted training for job readiness. Disruptive technologies will make certain jobs redundant, and hence approaches to skilling and deskilling that are both efficient and ensure quality will be of increasing importance to create and sustain employment. Institutions will have autonomy to approve institutional and non-institutional partners to deliver such training, which will be integrated with skills and higher education frameworks.

11. Universities will aim to offer Ph.D. and Masters programs in core areas such as Machine Learning as well as multidisciplinary fields “AI + X” and professional areas like health care, agriculture, and law. They may also develop and disseminate courses in these areas via platforms, such as SWAYAM. For rapid adoption, HEIs may blend these online courses with traditional teaching in undergraduate and vocational programs. HEIs may also offer targeted training in low expertise tasks for supporting the AI value chain such as data annotation, image classification, and speech transcription. Efforts to teach languages to school students will be dovetailed with efforts to enhance Natural Language Processing for India’s diverse languages.

12. As disruptive technologies emerge, schooling and continuing education will assist in raising the general populace’s awareness of their potential disruptive effects and will also address related issues. This awareness is necessary to have informed public consent on matters related to these technologies. In school, the study of current affairs and ethical issues will include a discussion on disruptive technologies such as those identified by NETF/MHRD. Appropriate instructional and discussion materials will also be prepared for continuing education.

13. Data is a key fuel for AI-based technologies, and it is critical to raise awareness on issues of privacy, laws, and standards associated with data handling and data protection, etc. It is also necessary to highlight ethical issues surrounding the development and deployment of AI-based technologies. Education will play a key role in these awareness raising efforts. Other disruptive technologies that are expected to change the way we live, and, therefore, change the way we educate students, include those relating to clean and renewable energy, water conservation, sustainable farming, environmental preservation, and other green initiatives; these will also receive prioritized attention in education.

Methods for Enhancing the NEP 2020 School with Digital Technology in Education

In order to bring about the vision of full scale integration of technology with the education system, as required under the NEP 2020, thorough evaluation of new technological interventions such as software’s, smart boards, computing devices, etc. needs to be done from a technological and educational point of view. Let us see some of the methods and initiatives rolled out for achieving this.

The National Educational Technology Forum (NETF):
The NETF, an autonomous platform for free exchange of ideas to improve learning, planning, administrative activities, assessment for schools and educational institutions, will provide latest updates and knowledge to educational institutions and aid decision making for use of technology. It will also work in an advisory capacity to the central and state governments, identify strategic areas for technological penetration, research and innovation in the education domain. The National Educational Technology Forum shall also prescribe standards for online learning, content and pedagogy and conduct regional and national conferences to seek ideas and inputs from educational technology researchers and entrepreneurs. Lastly, the NETF will analyses and categories new innovations and technologies and present these to the Ministry of Education along with the time expected for implementation of such technology.

Diksha portal:
Educational software in all major Indian languages will be developed by states and made available and accessible to teachers and students, including those in rural areas. The Digital Infrastructure for Knowledge Sharing (DIKSHA) portal of the Government of India, created for teachers as infrastructure for the entire teaching lifecycle, will be used to house such software.

Equipment for teachers:
Teachers will be provided with required equipment to enable inclusion of digital technology in education. Use of technology in NEP 2020 requires that such initiatives be integrated across schools and colleges and undergo periodic qualitative updates through feedback from users.

Disruptive technology:
The National Research Foundation, along with higher education institutions (HEIs), will promote application-based research in the field of Artificial Intelligence (AI) for creation of online teaching materials and courses. Trainings and programs, made possible by adopting technology in higher education, will be set up to impart new skills required for jobs that may become redundant due to AI.

Key Provisions of NEP 2020 related to Technology in Classroom Content Delivery
Emphasis on digital literacy and digital learning:
Studies will be conducted by appropriate institutions to understand the benefits of integrating online with offline education and evaluate important aspects of it such as addiction to devices, preferred formats of e-content, etc.

Integration of technology across subjects and grade levels:
Digital technology in education will be introduced during the initial years of the school system itself to ensure availability and accessibility of education to all and improve enrolment rates. Special emphasis will be laid on availability of content for subjects in all Indian languages.

Use of educational apps, online resources, and digital platforms:
NEP 2020 recognizes the need for open, scalable, public digital infrastructure that can be used across various platforms and cater to India's size and diversity. Such solutions will have to be robust and keep up with rapid advances in the technological realm. Existing platforms such as DIKSHA will be made available to teachers to assist with online delivery of education.

Promoting blended learning and flipped classroom models:
While online education has become a necessity today, NEP 2020 also acknowledges the importance of face-to-face teaching and learning and mandates blending of the two effectively. With flipped classrooms, reading/recorded course material can be shared in advance with students for preparation and classroom time utilizedfor discussion and application of knowledge gained from the course material. This gives more time to students to assimilate theinformation and resolve queries and makes class time truly interactive.

Examples of Technology Tools and Platforms for Classroom Content Delivery.
Learning management systems (LMS) and online platforms:
To implement use of technology in NEP 2020, existing online systems such as SWAYAM, DIKSHA and SWAYAMPRABHA will be used to provide access to practical and experiment-based learning experience to all

students and maintain records of students' performance. SWAYAMPRABHA, for instance, has 32 DTH channels for telecasting quality educational modules which are available 24×7.

Interactive whiteboards and smart projectors:
Digital whiteboards and projectors help teachers for collaboration with students, incorporating videos, brainstorming in online classrooms and storage of digital content. They can also be connected with multiple remote screens, thus providing interactive displays at various locations. Extra marks Smart Class Plus is a prime example, providing quick access to teachers to interactive content through its whiteboard, as well as tools required for delivering it.

Educational apps and software:
Unlike physical classrooms, apps and software, such as extra marks Smart Class Plus, provide an individualized learning experience to students, especially in terms of pace of learning. Teachers can then adapt their classes to focus on slow learners. Also, smartphones allow easy access to learning apps and for interaction between teachers and parents for feedback

Online assessment and feedback systems:
Bodies, such as the recently formed PARAKH, will develop assessment templates. Such templates shall encapsulate competencies of students addressed under NEP 2020 and skills required in the 21st century.

Challenges and Considerations in Using Technology in Higher Education:
Given the constantly evolving nature of technology and the unique character that the Indian diversity presents, overcoming below challenges will be an ongoing process for both, the government authorities and schools, alike.

1. Privacy and data security concerns.
2. Equipment costs and maintenance.
3. Inadequate and continuous training for teachers for online teaching as well as availability of the right resources to integrate technology in classrooms.
4. Lack of electricity and rigidity in attitude to adopt online education, especially in rural areas.
5. Limitations for delivering content for certain subjects and courses online.

How can Extra marks aid Schools in Implementing Technology-based Content Delivery as per the guidelines of NEP 2020?
NEP 2020 is bringing about significant transformations in Indian schools. The use of technology in education is at the forefront of these transformations. To enable schools to ensure quality content delivery to its students, we have introduced a 360 degree solution called Extra marks Smart Class Plus. This offering provides a cutting edge academic experience to schools through NEP-ready interactive and game-based content, interactive whiteboards, online and offline assessments and grading, student performance reports, classroom admin management options, etc. Additionally, all curriculum is regularly updated to reflect new interactive capabilities as well as changes in policy. The content is prepared by an in-house team of highly qualified subject-matter experts and is used by over 10,000 leading schools in India.

Extra marks also offers the TeachingApp which is an end-to-end solution for individual teachers to create and conduct classes online. With just three easy steps, it enables teachers to begin teaching for all classes and multiple boards.

Since the inclusion of kindergarten under NEP 2020, extra marks also offers a module for toddlers for fun, activity-based and game-based learning. With customized apps offered for students, teachers and parents, catering to their specific needs, under the same umbrella, extra marks is a top choice among all stakeholders.

Challenges for Implementation to Integration Technology into Education
Certainly, the National Education Policy (NEP) 2020 has made commendable stridesin integrating technology into education. However, there are significant challenges thatmust be addressed to successfully implement the policy. A survey on 'Household SocialConsumption: Education' conducted from July 2017 to June 2018, covering both ruraland urban households, sheds light on some critical issues:

Digital Divide:
Access to technology is a fundamental concern. To effectively integratetechnology into education, it is crucial for all students to have access to devices likesmartphones and computers with internet connectivity. Unfortunately, underprivilegedstudents often lack such access, creating a significant hurdle to overcome.

Infrastructure Challenges:
Network issues and power cuts are prevalent in variousparts of the country, especially in rural areas. Ensuring a stable and reliable digital infrastructure is essential for seamless technology integration.

Ethical Concerns:
Controlling unethical practices in the digital realm, such as cheatingand plagiarism, poses a challenge that must be addressed to maintain academic integrity.

Shift in Learning Paradigm:
Transitioning from a traditional rote-learning system to atechnology-driven model that emphasizes critical thinking and experimental learningnecessitates a change in the attitudes of various stakeholders. Continuous efforts arerequired to understand and implement this new vision effectively.

Teacher Competence:
To meet the demands of the evolving educational landscape,there is a pressing need for digitally competent teachers. Teachers should be well-versed in using technology for teaching and learning.

Digital Resources:
Many subjects face limitations when it comes to teaching throughdigital means. Developing comprehensive digital resources for all subjects is a challengethat must be addressed.

CollaborationBetweenCenterandStates:
The successful implementation of the policyrequires collaboration between the central and state governments. Coordinated efforts are essential for overcoming the challenges associated with policy implementation andtechnology integration.

Conclusion:-

The National Education Policy (NEP) 2020 presents innovative concepts andacknowledges the crucial role of technology in advancing education, particularly inenhancing teaching and learning. While some states have already implemented the newpolicy, othersare in the process of doing so, highlighting that there is still a considerablejourney ahead to fully realize its objectives. One of the noteworthy strengths of NEP2020 is its emphasis on fostering collaboration and cooperation between the centraland state governments. NEP 2020 recognizes that various advances in technology suchas educational software, artificial intelligence, block chain, adaptive computer testing,etc. will play an important role in changing what and how students learn in schools.This collaborative approach has the potential to equip learners with the essentialskills and technological competencies required for the future, ensuring that educationremains relevant in an ever-changing world. Technology offers teachers new ways totailor instruction to meet the needs of individual students. Adaptive learning softwarecan adjust the difficulty of content based on a student's progress, while data analyticstools can help identify students who may need additional support.Furthermore, the government has taken proactive measures to engage stakeholdersand acquaint them with the vision and mission of the National Education Policy 2020.This proactive engagement has sparked significant interest and participation amongvarious stakeholders, including educators, administrators, parents, and students,contributing to a shared understanding of the policy's goals and principles. Inconclusion, while NEP 2020 represents a significant leap forward in reshaping India'seducation system, its successful implementation will hinge on continued collaboration,effectivecommunication, and concerted efforts from both central and state authorities,as well as all stakeholders involved in the education sector.

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