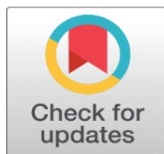
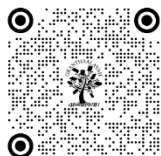


PROMOTING TECHNOLOGY ENABLED LEARNING IN THE LIGHT OF NEP 2020

Dr. Sandeep Patil ¹, Pintu Kumar ²

¹ Assistant Professor, Department of Education, Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Wardha (Maharashtra), India

² Research Scholar, Department of Education, Mahatma Gandhi Antarrashtriya Hindi Vishwavidyalaya, Wardha (Maharashtra), India



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ABSTRACT

National Education Policy (NEP) 2020 is a transformational walk towards amalgamating technology into education, endeavoring to promote an inclusive, equitable, and innovative learning ecosystem. This paper investigates how NEP 2020 fosters technology-enabled learning (TEL) approach to address the challenges in education, augment access to education along with preparing the learners for a digital future. NEP 2020 lays emphasis on the incorporation of digital tools, online platforms, and ground-breaking techno-pedagogies to promote better access, quality, and relevance of education across varied socio-economic contexts. The paper explores how NEP 2020 advocates the teacher training emphasizing digital competence development, personalized learning through adaptive technologies, and the use of Artificial Intelligence (AI) and data analytics enhancing educational outcomes. It also deals with the challenges like digital divides, infrastructure limitations, as well as the need for vigorous cyber security measures while implementing TEL. The paper highlights the possible challenges as well as opportunities presented while promoting TEL in the light of NEP 2020.

Keywords: Technology Enabled Learning, National Education Policy 2020, Personalized Learning, Artificial Intelligence



1. INTRODUCTION

1.1. PROLOGUE

NEP 2020 marks a significant shift in India's education landscape, particularly for higher education, by setting ambitious enrolment targets, establishing new regulatory and research bodies, standardizing norms for all institutions, and reforming the structure of undergraduate studies to be more flexible and holistic (Mani, 2021). Government of India launched National Education Policy (NEP) 2020 seems to be a paradigm shift in Indian education system designed and implemented to create an inclusive, equitable, quality ensured and future-ready education system. The NEP 2020 is a visionary policy of the Government of India that promises to transform education for all. NEP 2020 lays impartial to potential of each and every individual and to cultivate ingenuity and skills development (Abraham et.al., 2022). NEP 2020 which is driven by the vision of complete transformation of Indian education system emphasizes the amalgamation of technology as a basis for superior learning outcomes, innovation, and the cutting out the education disparities. It visualizes envisions Technology enabled learning (TEL) as a means for democratizing quality education through empowering the educators, and creating the learners with competencies to successfully thrive in an evolving digital age.

NEP 2020 acknowledges the significance of technology for reengineering education to address conventional challenges of access, equity, and quality. NEP 2020 seeks to develop participative and active learning environment through the promotion of digital infrastructure, digital tools, digital resources as well as cutting-edge technologies like Artificial Intelligence (AI), Machine Learning (ML), Virtual Reality (VR), and Augmented Reality (AR). The policy emphasizes upon the development of robust digital infrastructure through promoting digital initiatives in education such as SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), DIKSHA (Digital Infrastructure for Knowledge Sharing), etc. Such platforms provide access to quality learning resources for facilitating personalized learning, and to support teacher training. It has also laid emphasis on the establishment of National Digital Education Architecture (NDEAR).

The policy focus on Technology enabled learning (TEL) approach which focused upon the integration of technology for revolutionizing pedagogic approaches. NEP 2020 has also advocated blended learning model, combining traditional classroom learning with e-learning, to offer flexible and learner centered education. This is predominantly momentous in a diverse country like India having geographical, socio-economic, as well as cultural diversities. NEP 2020 aspires to provide equal opportunities for the learners in rural and urban India, through the use of technology in education. Moreover, NEP 2020 categorizes digital literacy and computational thinking as fundamental skills for the preparation of learners for a technological economy.

Although the realization of Technology enabled learning (TEL) through NEP 2020 is hindered due to digital divide, insufficient infrastructure, and lack of teacher capacity. These issues need to be addressed effectively through collective efforts from policymakers, institutions, and private firms to make sure the inclusive and sustainable adoption of technology. Accomplishment for this policy in facilitating TEL will depend upon how successfully the learning environment will be created where technology is effortlessly and efficiently incorporated into pedagogy, through the support of superior infrastructure and continuous professional development of teachers.

1.2. NATIONAL EDUCATION POLICY 2020

India adopted National Education Policy (NEP) 2020 with the aspiration of transformaing Indian education system rooted in Indian knowledge system and competent for new millennium. to make ew millennium. NEP 2020 envisions an India-centric education system that contributes directly to transforming our nation sustainably into an equitable and vibrant society filled by knowledge and by providing high-quality education to all (Tomar, 2022). National Education Policy 2020 envisions an India-centric education system that contributes directly to transforming our nation sustainably into an equitable and vibrant knowledge society by providing high-quality education to all (Mani, 2021). National Education Policy (NEP) 2020 is the pioneering reform in Indian education aimed at transforming and modernizing the education system to enable Indian education to live up to the needs and aspirations of the evolving global landscape. NEP 2020 is founded on the five guiding pillars of Access, Equity, Quality, Affordability and Accountability. It aims to prepare our youth to meet the diverse national and global challenges of the present and the future (Kumari & Kumari, 2023). NEP 2020 is a wide-ranging framework that addresses all the facets of education from early childhood education to higher education and teacher training as well as vocational training, with the vision to make India Vishwa Guru (global knowledge superpower) through promoting flexible, holistic, and multidisciplinary learning. NEP 2020 addresses key aspects of the current education system, such as quality, affordability, equity, access, and accountability (Laxmi, 2023). This policy accentuates inclusiveness, equity along with innovation aimed at transforming India's education system to one that is rooted in Indian knowledge system and value system while being globally competitive. Its striving goals are deliberated to prepare the learners of 21st century through the promotion of critical thinking, creativity, as well as lifelong learning. NEP 2020 also meticulously addresses long lasting challenges in Indian education like access, quality, as well as employability. The new policy, NEP-2020, is anticipated to be an extensive revamp with less content but more problem-solving abilities, inventiveness, and multidisciplinary and holistic thinking for unity and integrity (Sethi, 2023).

NEP 2020 envisages transforming Indian education system to be equitable, inclusive, and aligned with the aspirations of modern India. This policy seeks to foster the learners to be academically proficient as well as ethically grounded, culturally aware. NEP 2020 aspires for such an education system which will empower our learners to be well equipped with 21st century skills like critical thinking, collaboration, and digital literacy. NEP 2020 focuses upon teacher empowerment to revolutionize the education system. The NEP-2020 aims to completely transform the teacher education system to produce higher quality and more effective teachers. This implies a need for significant changes in curriculum, pedagogy, and training methodologies within Teacher Education Institutions (TEIs) (Verdu, 2022). It aims at making

India a global knowledge hub for the creation and dissemination of knowledge through cavernous foundation in Indian values along with employing best practices in education that are globally reckoned. On the other hand, the accomplishment of NEP 2020 relies upon effectual execution, passable funding, and synchronization between central government and all the state governments.

Early Childhood Care & Education (ECCE)	• Universal Access to ECCE • Foundational Literacy and Numeracy (FLN) • Anganwadi Integration
School Education Reforms	• New Pedagogical & Curricular Structure (5+3+3+4) • Emphasis upon Holistic Development • Multilingual Education • Emphasis on Inclusive Education • Assessment Reforms • Promotion of Vocational Education
Higher Education Reforms	• Multidisciplinary Education • Multiple Entry & Exit • Choice Based Credit System • National Research Foundation • Increased Access • Regulation & Autonomy • Globalization of Higher Education
Teacher Education & Professional Development	• Rigorous Teacher Training • Continuous Professional Development • Recruitment & Working Conditions
Technology Integration	• Significance on improving Digital Infrastructure • Emphasis of Blended Learning • AI & EdTech leading the way
Promotion of Indian Languages, Arts, & Culture	• Indian Knowledge System as the Foundation of Education • Promoting Sanskrit & Classical Languages
Governance & Implementation	• Coordination & Funding • State School Standards Authority • Implementation Framework
Adult Education & Lifelong Learning	• Accent upon Adult Education • Community Involvement

Table 1 Various Transformations aspired in Indian Education by NEP 2020

Despite its noble objectives, the policy faces substantial execution challenges that need to be addressed consistently over many years to realize its full potential. The success and pace of implementation depend on how effectively the government can scale key challenges (Taghizadeh-Hesary, 2023) Hence the success of NEP 2020 will solely depend on how well it is implemented. Technology enabled learning is one of the pioneering approaches which needs to be utilized for the effective transformation of education in the light of NEP 2020.

2. TECHNOLOGY ENABLED LEARNING

Technology enabled learning (TEL) is one of the most influential phenomenon in modern times which has been making positive impact on education. a broad term that is used to describe a teaching and learning process that is supported by technology, either locally (on campus and synchronous) or remotely (off campus and asynchronous). It can include, but is not limited to, Learning Management Systems (LMS), mobile learning applications, virtual and augmented reality, social networking applications, and robotics (Daniela et al., 2018).

Technology enabled learning (TEL) is the assimilation of technology into the learning process for better educational outcomes. It is the approach which utilizes hardware, software and networking for developing flexible, accessible, interactive, as well as learner centered learning environments. This approach enables personalized and collaborative learning custom-made for varied learner needs. Technology Enabled Learning effectively improves academic achievement compared to the lecture method (Nirmala et.al., 2022). TEL approach is rooted in the view that technology can transform the educational process via making it more accessible, inclusive and interactive, and effective. Technology Enabled Learning can support and enable pedagogy, with a framework for analyzing and supporting innovations to ensure their success in classrooms with smart phones and internet access (Ferguson, 2019).

TEL approach amalgamates digital technology with the pedagogical principles to enable efficient learning, skill-development, and to promote critical thinking among the learners.

Primary principles of Technology enabled learning are;

- 1) **Accessibility:** To offer learning opportunities anytime, anywhere and anyone.
- 2) **Personalization:** To customize the e-content and pace to meet up to the needs and capabilities of every individual learner.
- 3) **Collaboration:** To promote communication cum collaboration through online platforms.
- 4) **Interactivity:** To facilitate active participation of the learners through multimedia, simulations, as well as gamification.
- 5) **Data-Driven Insights:** To utilize analytics to monitor progress as well as to guide instructional strategies.

TEL is about digitizing conventional teaching-learning process as well as about reimagining education for preparing the learners for a technology driven era. Technology enabled learning environments enhance educational institutions' ability to create and enhance quality learning experiences for students (Manzoor, 2016).

Here are some the prime features of TEL approach;

- 1) **Digital Learning Platforms:** TEL approach utilizes Learning Management Systems (LMS) like Canvas, Moodle, etc. and Massive Open Online Courses (MOOCs) platforms like EdX, edX, etc. for better and more enhanced access of learning resources, assessments.
- 2) **Multimedia and Interactive Content:** This approach assimilates various types of e-content like audio, videos, simulations, animations, and interactive quizzes for enhancing learner engagement. Such types of diversified and interactive elements indulge diverse learning styles, making learning easier and efficient.
- 3) **Personalized Learning Pathways:** This approach promotes use of adaptive learning technologies which use algorithms to customize e-content anchored in a learner's performance and preferences. This enables learners' advancement at their own tempo, receiving besieged support where required.
- 4) **Mobile Learning:** TEL approach also facilitates learning through smart phones and tablets, enabling seamless access to resources anytime anywhere. This increases flexibility for the learners in their learning.
- 5) **Collaborative Tools:** TEL utilizes tools which assist group projects and communication. It encourages peer learning and collaboration beyond geographical borders across the world.
- 6) **Learning Analytics:** TEL approach platforms gather data on learner engagement, learner performance, and learner's learning progress. It enabled the educators gain insights to modify instructional process along with learners receiving immediate feedback for their continuous improvement.
- 7) **Gamification of learning and Immersive Technologies:** TEL integrates game-based elements, Virtual Reality (VR), and Augmented Reality (AR) for making the learning process more and more engaging. It enhances motivation and offers experiential learning opportunities to the learners to learn on themselves.
- 8) **Open Educational Resources:** TEL approach advocates the use of Open Educational Resources (OERs). OERs are freely accessible more predominantly digital materials such as e-books, videos, simulations, etc. The use of OERs will reduce the costs of education and it also promotes extended access to quality education.
- 9) **Blended and Flipped Learning Models:** This approach integrates online and face to face instruction together to derive better learning opportunities and environments. This maximizes in-person interaction while leveraging digital resources in more efficient manner.
- 10) **Use of Artificial Intelligence and Automation:** This approach promotes use of AI-driven tools like chatbots, automated grading, and intelligent tutoring systems. It provides instantaneous feedback and enables the educators to focus on other tasks.

Technology enabled learning approach has emerged as the essential approach for education in new times. Technology Enabled Learning has significantly impacted curriculum, pedagogy, and assessment practices, providing new tools for assuring and verifying learning gains (Deng & Benckendorff, 2020). Technology Enabled Learning spaces can encourage group work, self-directed learning, and facilitate deeper learning through collaboration (Verdonck, 2018). Technology Enabled Active Learning Environments positively influence college students' cognitive learning outcomes (Shi et al., 2019). Therefore it has become inevitable for all to adopt this approach across all stages of education.

There are various constraints in the implementation of TEL approach. Patra & Upadhyay (2022) stated major constraints in the realization of technology enabled learning. They are infrastructural constraints, diverse learners, digital divide constraints, technological constraints, instructional constraints, skill based constraints, economic

constraints, diverse academic community, interaction concern, teachers' authenticity concern, ethical concerns, attitudinal constraints.

Technology enabled learning through National Education Policy 2020:

One of the prime emphasis of NEP 2020 is to the harness of use of technology for improving learning outcomes, minimizing inequities in access, and drive innovations. Technology-enabled learning (TEL) in the light of NEP 2020 focuses upon utilizing e-resources, online learning platforms and cutting edge technologies to develop a firm, flexible, and learner centered educational ecosystem.

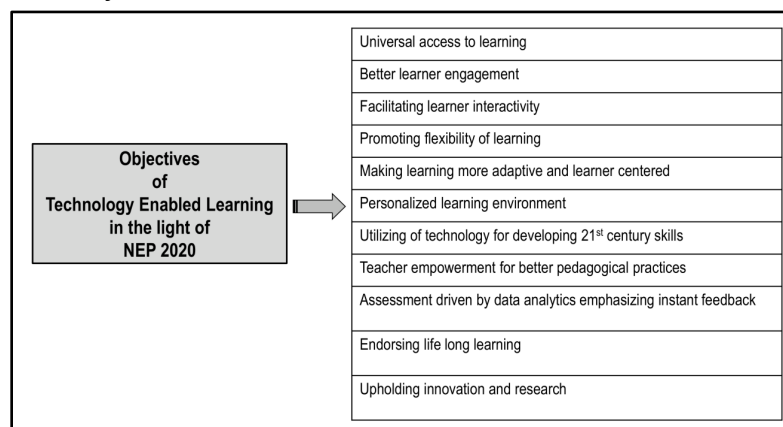


Table 2 Objectives of TEL in the light of NEP 2020

Here are some of the prime Initiatives under NEP 2020 for promoting Technology-Enabled Learning;

1) Development of Digital Infrastructure:

- **National Educational Technology Forum:** NEP 2020 has proposed the establishment of National Educational Technology Forum (NETF), devoted to promote technology integration in education. NETF will facilitate research, offer policy inputs, and cultivate collaboration amid stakeholders of education to extend innovative tech solutions.
- **Alignment with Digital India Alignment:** NEP 2020 aligns with Digital India initiative of Government of India to increase internet connectivity, supply inexpensive devices, and to create digital infrastructure in schools and higher education institutions in the country.
- **Operation Digital Board:** Digital boards will be launched in schools to facilitate interactive teaching through the use of multimedia.

2) Promotion of Digital Education Platforms:

- **PM e-Vidya Programme:** PM e-Vidya Programme was introduced to amalgamate digital education efforts across the country. It embraces includes various online learning platform, TV channel like Swayam Prabha, radio channel, community radio, along with various online resources to make sure multi-modal access to education across all the parts including rural, tribal areas as well remote areas.
- **SWAYAM:** It offers free online courses to the learners from school education to higher education. NEP 2020 aims to inflate SWAYAM's offering of courses, comprising credit-based courses and vocational training.
- **DIKSHA:** It is a national platform offering various types of e-content, teacher training programmes, and interactive resources in several languages especially for school education. NEP 2020 plans to expand DIKSHA's outreach to all learners and educators.

3) Multilingual and Inclusive Education:

Emphasis will be given on use of technology for developing e-content in regional languages to cater to the linguistic diversity of the country.

- **Assistive technologies:** Assistive technologies like speech-to-text, text-to-speech as well as screen readers will be deployed to assist the learners with disabilities.

4) Integration of Cutting-edge Technologies:

NEP 2020 has laid emphasis upon the use of AI, Machine Learning, AR, VR, and blockchain technologies in education for more effective learning.

- **Use of AI-driven tools:** AI-driven tools will be preferred for personalized learning and automated assessments.
- **Use of AR, VR:** AR, VR will be used for immersive learning experiences in various subjects.
- **Blockchain technology:** Blockchain technology will be used for protected credentialing and certification.
- **Pilot projects:** Pilot projects will be launched for testing such technologies in selected institutions before maximizing their use at large scale.

5) Use of Open Educational Resources:

- **Creation and Dissemination of OERs:** NEP 2020 has promoted development and propagation of OERs, such as e-books, audios, videos, simulations and interactive learning modules, to provide premium e-content freely accessible to all.
- **Collaboration for curation and localization OERs:** NEP 2020 has encouraged collaboration with global institutions and platforms to curate and localize OERs for Indian learners.

6) Teacher Training and Capacity Building:

- **NISHTHA:** NISHTHA programme will be extended to embrace training of digital pedagogy, to enable the educators to effectively integrate technology in the classrooms.
- **Promotion of Online Learning Platforms for Teachers:** Online learning platforms will offer continuous professional development (CPD) for the educators, focusing upon blended learning models, e-assessment tools and strategies, as well as integration of technology in classrooms.

7) Assessment Reforms:

- **e-Assessment Tools:** NEP 2020 has promoted use of digital tools for assessment which will facilitate competency-based assessments, beyond rote learning. Adaptive assessment platforms will evaluate the conceptual understanding as well as skills of the learners.
- **PARAKH:** NEP 2020 has proposed a National Assessment Centre named PARAKH to standardize assessments, using technology as the key constituent in data analysis and immediate feedback.

3. CHALLENGES AND OPPORTUNITIES

Despite of its patronizing ambitions, NEP 2020 is dealing with various types of challenges in promoting TEL in education. Henderson et al., 2015 have proposed 13 conditions for successful Successful technology enabled learning in higher education which include reliable and high quality technology infrastructure, technologically flexible and friendly teaching spaces, individual skills and attitudes, institutional policy making (Henderson, 2015).

Some of the major challenges are as follows;

- 1) **Digital Divide:** Inequalities in access to digital devices, internet connectivity, as well as electricity, specifically in rural, tribal and economically backward regions which prevent equitable adoption.
- 2) **Resistance to change:** Traditional mindset of parents, teachers, and institutions is a encumbrance to the adoption of technology in learning.
- 3) **Relevance and Quality of e-Content:** A big challenge lies in providing good quality, culturally relevant e-content in various languages.
- 4) **Teacher Competency:** There is a big question mark on the overall competency of teachers. Majority of the teachers aren't well equipped with, the pedagogical use of technology.
- 5) **Realization Cost:** It needs massive funding to establish and sustain digital infrastructure which India lacks at the moment.
- 6) **Data Privacy and Cyber security:** There are serious concerns regarding the privacy of data these days. Cyber security is one the major concerns in the digital era of today which needs to be addressed.

NEP 2020 has recommended following solutions to overcome the challenges in the realization of TEL approach in education;

Offering subsidized hardware/ devices, increasing internet reach through BharatNet, as well as creating community learning centers with community e-resources.

Provision of adequate and sustainable Funding through CSR funds, foreign grants, and Public Private Partnerships for funding technology initiatives.

Recruiting educators and experts for the development of pertinent OERs in local languages along with promoting permanent educators to do so.

Running awareness campaigns and outreach programmes to promote the utility of TEL and minimize the resistance towards change.

Offering practice certifications, incentives, and providing user-friendly tools to encourage the educators to adopt technology.

Deploying well-built data policies to enhance cyber security. It involves implementing strict data privacy regulations and cyber security measures.

4. EPILOGUE

National Education Policy 2020 is a path breaking revolution in Indian education system which emphasizes adopting technology to the core of learning. NEP 2020 has aspired to transform teaching-learning process across all the stages of education through the meaningful and efficient integration of technology in pedagogy via promoting Technology enabled learning. NEP 2020 through promotion of learning platforms and programmes aspires to develop an inclusive, innovative, and future-ready educational ecosystem in the country. Although there are several challenges in the process right from traditional mindset of Indian community, poor digital infrastructure to insufficient teacher competency, etc. Strategic interventions, commitment of all the stakeholders along with concerted efforts can pave way towards success. Indian education can reach to new heights through realization of Tel approach which will ensure universal access, innovation and quality assurance in Indian education to make India a global knowledge super power...Vishwa Guru.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

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