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Different Aspects of Use of Technology and Digital Learning in Higher Education: An Analysis in Light of NEP 2020

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Abstract

The National Education Policy 2020 (NEP 2020) positions digital learning and technology integration as central to transforming India's higher education landscape. This study examines three key dimensions aligned with the policy: digital access, technological resource distribution and technology-enabled teaching-learning practices across different categories of higher education institutions (HEIs). Adopting a qualitative research design, the study draws on a systematic review of research articles, government reports and policy documents to analyse institutional readiness and on-ground implementation. Findings reveal that despite NEP 2020's ambitious digital vision, access to reliable devices, broadband connectivity and essential ICT infrastructure remains highly uneven across institutional types, with rural, semi-urban and resource-poor colleges experiencing significant deficits. Technological resources such as Learning Management Systems, virtual labs, digital libraries and ERP systems are concentrated primarily in well-funded HEIs, creating disparities in academic opportunities. Technology integration in teaching-learning also varies widely, influenced by institutional support, faculty digital competencies and infrastructural strength. While NEP 2020 promotes blended learning, national digital platforms and digital governance, practical implementation remains inconsistent. The study concludes that bridging the digital divide, ensuring equitable resource allocation and enhancing faculty capacity are essential for realizing NEP 2020's transformative goals in higher education.

Keywords: *NEP 2020, Digital Learning, Higher Education, Technology Integration, Digital Divide, ICT in Education*

Introduction

In recent years, the role of technology in transforming higher education has gained unprecedented significance- a trend formally institutionalized in the National Education Policy 2020 (NEP 2020). The Policy envisions a comprehensive integration of digital learning, online education, and technology-enabled pedagogies to make higher education more accessible, flexible, inclusive and future-oriented (Ministry of Education, 2020). According to official guidelines, higher education institutions (HEIs) are encouraged to adopt online and open-distance learning (ODL) programs, leverage platforms such as SWAYAM and promote digital infrastructure, including digital libraries, virtual labs and learning management systems (Ministry of Education, 2025).

The impetus for this digital shift was accelerated by the COVID-19 pandemic, which exposed pre-existing disparities in access to technology and underscored the urgency of robust, equitable digital infrastructure (Kiran & Baidya, 2024). Studies focusing on higher education have documented a significant "digital divide" across institutions- differences in internet connectivity, availability of devices and digital competencies among faculty and students, often correlated with geographic, socioeconomic and institutional categories (Singh, 2025).

In response, NEP 2020 advocates investing in open, interoperable and scalable digital infrastructure to address equity and inclusion, ensuring that learners- including those from marginalized backgrounds- can access

quality education without location-based constraints (Patil & Kumar, 2024). Furthermore, the policy promotes technology-enabled learning (TEL), teacher capacity building, digital content creation (e-content, multilingual resources) and blended pedagogies that combine online and experiential learning.

Given this landscape, it becomes vital to systematically study how digital access, technological resources and teaching-learning practices vary across different categories of HEIs- whether public or private, urban or rural, large or small. Such analysis will not only shed light on the extent to which NEP 2020's vision has materialized, but also identify gaps and challenges that hinder equitable implementation.

The release of the National Education Policy 2020 (NEP 2020) marked a watershed moment in India's higher education reform. The Policy envisages a comprehensive integration of digital learning, open and distance learning (ODL) and technology-enabled institutional governance- aiming to make higher education more accessible, flexible, inclusive and future-oriented (Ministry of Education, 2025). Under this vision, higher education institutions (HEIs) are encouraged to adopt online and blended learning methods, open-access digital content, virtual labs, digital libraries and robust ICT infrastructure (Ministry of Education, 2025). The policy further recommends the establishment of a national-level umbrella body to guide educational technology adoption, fostering research, innovation, and collaboration across institutions. In principle, this digital push under NEP 2020 holds potential to democratize higher education- especially for learners from rural, remote or marginalized backgrounds- by transcending geographical, socioeconomic and infrastructural barriers (Viswanatha & Haritha, 2024).

Empirical research on the ground, however, presents a mixed- often challenging- picture of actual digital readiness and implementation across Indian HEIs. A comprehensive national survey titled *"Digital Divide in Indian Higher Education: A National Survey of Access and Equity"* found that despite overall growth in institutional adoption of technology, disparities in access to digital tools, internet connectivity and readiness remain stark, particularly among institutions varying by region, type (public/private) and resource base (Singh, 2025). The study documented substantial unevenness in digital infrastructure: many colleges still lack reliable broadband, campus-wide Wi-Fi or sufficient computers per student, which undermines equitable access. Furthermore, even where infrastructure existed, factors such as inadequate maintenance, intermittent electricity or bandwidth, or lack of institutional support often limited utility (Singh, 2025).

Studies conducted immediately after the COVID-19 pandemic, which forced higher education into emergency remote teaching, highlighted institutional unpreparedness, lack of robust ICT systems and low digital literacy among faculty and students. A study on physics teaching during the pandemic underscores that the sudden shift to online modalities disproportionately disadvantaged students from underprivileged socioeconomic or rural backgrounds: lack of devices, poor internet connectivity and inadequate institutional support seriously hampered both access and quality (Madhurima et al., 2022). This raised serious questions about the feasibility of large-scale online education without addressing structural inequities.

In coping with these challenges, some HEIs and researchers have advocated for a gradual, hybrid adoption of technology, combining traditional in-person pedagogy with digital interventions, rather than a wholesale shift to online-only modes. For instance, a recent country-wide bibliometric review (2014–2024) of online education research in India shows a surge in scholarly interest post-pandemic, with a 16.7% annual growth rate in publications addressing online learning, blended pedagogy, digital inclusion and equity (Discover Education, 2025). The review indicates three phases: pre-pandemic stability; a rapid surge during COVID-19; and a continuing post-pandemic consolidation as institutions attempt to stabilize and integrate digital practices.

In terms of pedagogy, studies reveal that when institutions are able to muster resources and training, digitalization positively influences teaching-learning processes. In a recent investigation titled *"Impact of Digitalization of Higher Education on Pedagogy in India"*, researchers found that ICT-enabled tools, such as virtual classrooms, recorded lectures, e-resources and interactive e-content, supported student-centered learning, allowed

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self-paced learning and accommodated diverse learner needs (Dwivedi, 2025). The author argues that NEP 2020's emphasis on flexibility, learner autonomy, and multilingual, multimodal content can lead to enriched, inclusive learning experiences if properly implemented. Similarly, a study on Open Educational Resources (OER) adoption among university students in Karnataka revealed that, overall, students perceived OERs as useful and easy to use; although there was some initial gender variation in registration/enrolment, once enrolled, both male and female students reported similar ease and intent to use OERs (Shettigar et al., 2023). This suggests that digital gender divide may be less about attitudes and more about access and exposure.

Beyond higher education, a scoping review of digital education among health professionals in India (BMC Medical Education, 2023) points out that, while digital learning shows promise in building skills, bridging geographic shortage of faculty, and offering continuing professional education, many programs struggle due to limited contextual research. The authors emphasise the need for systematic studies to determine what kinds of digital pedagogies work best in Indian socio-cultural contexts, highlighting that results from technical or urban institutions may not generalize to rural or resource-poor settings. This gap mirrors larger patterns of unequal access and resource distribution across HEIs.

Crucially, literature on the "digital divide" emphasizes that access to devices, stable internet, and institutional support remains uneven and such inequities are often tied to socioeconomic status, geography (rural vs urban) and caste/social identity. A recent article titled "*Digital Inequity and Knowledge Divide among Intersectional Identities"* showed that even before the pandemic, only a small fraction of students nationwide had reliable access to computers with internet; in many regions, especially among disadvantaged caste, gender or income groups, access was severely limited (Kumari et al., 2024). These systemic disparities challenge the egalitarian ambitions of NEP 2020 and risk reinforcing existing inequalities under the guise of digitalization. Scholars argue that digital transformation alone, without addressing structural inequality, may perpetuate exclusion rather than overcome it.

From the institutional-policy angle, analyses of NEP 2020 implementation note that while the government has ambitious plans, including promoting ODL/online programmes, encouraging adoption of national platforms like SWAYAM, launching ERP systems such as SAMARTH for institutional governance and enabling flexible credit transfer- the success of these depends heavily on institutional capacity, resource allocation and sustained commitment (Viswanatha & Haritha, 2024; Ministry of Education, 2025). The policy's push for "Digital Learning" as a key pillar in higher education reflects an understanding of India's demographic, geographic and economic diversity; but as many researchers caution, implementation gaps remain significant, especially in under-resourced HEIs in rural or remote areas (Sharma, 2025; Dwivedi, 2025).

In sum, the literature builds a nuanced, often dual, narrative: on one hand, NEP 2020 and recent governmental efforts offer a visionary blueprint for a digitally empowered higher education system with potential for greater access, flexibility and innovation. On the other hand, institutional studies and empirical research repeatedly point to persistent gaps in infrastructure, digital access, resource distribution, human capacity (faculty/students) and systemic inequalities, which significantly constrain the realization of that vision.

This study, therefore, aims to examine the nature and extent of digital access, the availability and distribution of technological resources and the technology-integration practices in HEIs- thereby contributing to an evidence-based understanding of digital learning in Indian higher education under NEP 2020.

Research Gap

Although existing literature has documented policy frameworks under NEP 2020, institutional readiness, resource availability and early experiences of digital learning initiatives, there is limited empirical research that systematically compares different categories of HEIs (e.g. public vs private, urban vs rural, large vs small) on all three dimensions simultaneously: digital access, technological resource distribution, and pedagogical integration. Most studies focus either on open-university/ODL settings or general higher-education broadly, but do not

disaggregate findings by institution type. Similarly, while some studies examine infrastructure or teacher readiness, fewer explore how resource availability translates into actual teaching–learning practices. This gap leaves unclear the extent to which NEP 2020's digital initiatives have been equitably implemented across diverse types of institutions. Consequently, there is a need for a comparative, structured empirical study that analyses digital access, resource availability and technology-integration practices across different categories of HEIs, to assess both policy uptake and on-ground realities in a comprehensive manner.

Objectives of the Study

1. To analyze the nature and extent of digital access across different categories of higher education institutions as outlined in NEP 2020.
2. To explore the availability and distribution of technological resources across various higher education institutions in accordance with NEP 2020 recommendations.
3. To explore the approaches and practices of technology integration in the teaching-learning process as recommended by NEP 2020.

Methodology

This study adopted a qualitative research design, relying on a systematic review of literature and policy analysis. Relevant research articles, government reports, NEP 2020 documents and scholarly publications were collected from digital databases and official portals. The materials were analyzed thematically to identify patterns related to digital access, technological resources, and technology integration in higher education. The study emphasized interpretative analysis to evaluate NEP 2020 directives in light of existing empirical evidence.

Result and Discussion

Analysis Objective 1

To analyze the nature and extent of digital access across different categories of higher education institutions as outlined in NEP 2020

Digital access remains highly uneven across institutional categories

NEP 2020 emphasizes equitable access to technology as a prerequisite for digital learning, yet the existing scenario shows deep inequalities among HEIs. Sharma and Gupta (2023) noted that urban universities possess advanced digital infrastructures such as reliable broadband, campus-wide Wi-Fi, and fully functional learning management systems, whereas many rural and semi-urban colleges lack even the foundational connectivity required for online education. This disparity contradicts NEP 2020's vision of a uniform digital ecosystem and reinforces an institutional digital divide that restricts equal learning opportunities across institutions (Sharma & Gupta, 2023).

Students' personal access to digital devices remains severely limited

NEP 2020 stresses the importance of learner-centric access to digital tools, but real-world data reveal significant student-level deprivation. Verma (2022) reports that only 9% of students own a computer with internet access, and overall digital access through any device is merely 25%. Such low levels of personal device ownership undermine NEP 2020's goal of universal access to digital resources. Verma (2022) adds that this deprivation intensifies socio-economic inequalities, widening the knowledge divide and limiting participation from marginalized groups.

The COVID-19 pandemic highlighted the digital divide more sharply

The pandemic acted as a stress-test for NEP 2020's digital transformation agenda, exposing major gaps in readiness. Singh et al. (2022) found that students from rural and economically weaker households struggled due to poor bandwidth, unstable connections, and shared devices. These obstacles severely disrupted academic continuity and demonstrated how fragile digital participation is for disadvantaged learners. Such experiences

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reaffirm NEP 2020's call for strengthening foundational digital infrastructure as a matter of educational equity (Singh et al., 2022).

Infrastructural gaps extend beyond devices and connectivity

NEP 2020 recognizes electricity reliability, technical support and maintenance as essential components of digital access. Joshi and Menon (2023) observed that frequent power outages, limited technical manpower and high maintenance costs continue to obstruct technology-enabled learning in many HEIs. Even when government-supported digital platforms like SWAYAM or Virtual Labs are available, institutions with poor infrastructure cannot utilize them effectively. Joshi and Menon (2023) therefore argue that sustainable digital expansion, consistent with NEP 2020, requires long-term, holistic infrastructural planning.

Digital learning platforms benefit students only in well-equipped institutions

While NEP 2020 promotes extensive use of online platforms and OERs, their benefits are unevenly realized. Patel and Sinha (2023) found that students in technologically strong institutions benefited significantly from recorded lectures, asynchronous learning opportunities and diverse digital resources. However, institutions with inadequate digital ecosystems failed to provide similar advantages, undermining NEP 2020's principle of inclusive digital access. Patel and Sinha (2023) emphasize that technological equity must be achieved for digital learning to truly support all learners.

Implementation of NEP 2020's digital vision faces practical constraints

Although NEP 2020 encourages virtual labs, online courses, and digital repositories, the effectiveness of these innovations depends on ground-level accessibility. Khan (2023) notes that lacking affordable devices, subsidized internet and stable campus Wi-Fi significantly restricts the implementation of NEP 2020's digital strategies. The result is a persistent gap between policy aspirations and institutional realities, especially in resource-poor regions (Khan, 2023).

A dual digital divide across institutions and within student groups still persists

Rao (2023) identifies two layers of digital inequality that hinder the NEP 2020 framework. At the institutional level, centrally funded and autonomous universities have superior digital environments compared to state-run and private unaided colleges. At the individual level, students' digital access varies greatly depending on income, caste, gender and rural-urban location. Even in digitally strong institutions, disadvantaged students face technological barriers, perpetuating inequity despite NEP 2020's inclusive agenda (Rao, 2023).

A visible gap persists between NEP 2020's digital aspirations and ground realities

The cumulative evidence shows that while NEP 2020 envisions a digitally empowered, accessible, and equitable higher education system, significant gaps remain in digital access across regions and institutions. Persistent challenges in affordability, connectivity, infrastructure and personal device availability limit the widespread adoption of technology in higher education. As a result, the transformative digital vision of NEP 2020 is only partially realized, with equitable digital access still a distant goal for many institutions.

Analysis of Objective 2

To explore the availability and distribution of technological resources across various higher education institutions in accordance with NEP 2020 recommendations

Technological resource availability varies widely across different categories of HEIs

A consistent pattern across the reviewed literature shows that technological resources, such as digital classrooms, Learning Management Systems (LMS), virtual labs and digital repositories are unevenly distributed across institutions. Sharma and Gupta (2023) report that central and state universities generally exhibit better technological preparedness compared to private unaided colleges and rural government institutions. These variations indicate that NEP 2020's objective of establishing a uniform digital ecosystem is challenged by

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disparities in institutional funding, administrative capacity and infrastructural development (Sharma & Gupta, 2023).

Centrally funded universities show higher digital readiness than state-run and rural institutions

Rao (2023) highlights a distinct gap between centrally funded institutes and state-funded colleges. Institutions like IITs, NITs, and central universities possess substantially more technological infrastructure, including high-capacity servers, multimedia-enabled classrooms, institutional ERP systems and advanced laboratory equipment. In contrast, many rural and semi-urban colleges lack even basic digital teaching tools such as smart boards or stable computer labs. Rao (2023) argues that this structural disparity restricts uniform digital transformation across the Indian higher education system.

Digital infrastructure expansion remains slowed by funding constraints

Resource allocation plays a crucial role in determining technological readiness. According to Joshi and Menon (2023), many state-funded colleges operate with limited funds for upgrading ICT facilities, resulting in outdated hardware, insufficient digital classrooms and inadequate technical staff. The authors emphasize that while NEP 2020 provides a robust digital vision, poor funding architecture in many regions prevents institutions from procuring essential digital tools. Thus, the distribution of technological resources continues to mirror long-standing financial inequalities among HEIs (Joshi & Menon, 2023).

Lack of Learning Management Systems and digital academic tools persists in many HEIs

Several studies report that a majority of colleges still do not use structured LMS platforms such as Moodle, Canvas or institution-specific systems. Sharma and Gupta (2023) found that only around 29% of surveyed HEIs had adopted a formal LMS, despite NEP 2020's emphasis on digital learning platforms. This leads to fragmented digital teaching practices, where faculty rely on informal tools such as WhatsApp or email to share materials. Without LMS-based learning ecosystems, institutions struggle to implement blended learning, online evaluation, and digital coursework effectively.

Digital laboratories, virtual labs and simulation tools remain limited

Verma (2022) notes that virtual labs, critical for STEM programmes, are rarely available beyond top-tier institutions. Although NEP 2020 advocates for the integration of virtual labs to ensure continuity of practical learning for all students, most institutions lack both the hardware and software required for running simulations. Verma (2022) states that students in rural colleges are especially disadvantaged, as they often lack exposure to digital lab environments, reducing their preparedness for technologically advanced careers.

Library digitalization is progressing but unevenly implemented

While many universities have transitioned to digital libraries, smaller colleges continue to rely heavily on traditional physical libraries. Khan (2023) points out that universities with e-resource subscriptions, such as INFLIBNET, Shodhganga, e-ShodhSindhu and N-LIST, provide significantly better academic access compared to resource-poor institutions. However, subscription costs and maintenance issues prevent many colleges from fully adopting digital library systems, thereby restricting students' and teachers' access to scholarly materials (Khan, 2023).

Availability of trained technical staff remains a major concern

Patel and Sinha (2023) assert that technological resources alone are insufficient without skilled personnel to maintain and manage digital systems. Many HEIs do not have dedicated IT teams or system administrators. Such gaps lead to poor maintenance of hardware, slow troubleshooting support, and frequent system breakdowns. Patel and Sinha (2023) conclude that without adequate human resources, technology adoption remains inefficient and inconsistent across institutions, regardless of the availability of digital tools.

Institutional ERP and administrative digitalization show mixed progress

NEP 2020 recommends the use of Enterprise Resource Planning (ERP) systems such as SAMARTH to streamline governance. However, Rao (2023) reports that only a limited number of universities have implemented

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full ERP integration, while many others continue to rely on manual administrative processes. This results in inefficiencies in admissions, examinations, record keeping and communication. The uneven adoption of ERP systems highlights an administrative digital divide parallel to the pedagogical one.

Technology-enabled classrooms and smart infrastructure are concentrated in urban HEIs

Studies such as those by Singh et al. (2022) indicate that technology-enabled classrooms, equipped with projectors, smart boards, audiovisual systems and high-speed connectivity, are mostly found in urban campuses. Rural institutions often have only a few functional smart classrooms or none at all. As a result, teaching-learning practices remain traditional in many regions, limiting the practical implementation of NEP 2020's blended learning framework.

Overall patterns reflect persistent inequalities and slow progress toward NEP 2020 goals

Across the literature, a clear pattern emerges: although NEP 2020 provides a transformative blueprint for digital expansion, technological resource distribution across HEIs remains unequal, slow and regionally imbalanced. The availability of resources is heavily determined by institutional category, funding capacity and geographic location. These disparities hinder progress toward a fully digital and equitable higher education system.

Analysis of Objective 3

To explore the approaches and practices of technology integration in the teaching-learning process as recommended by NEP 2020

NEP 2020 emphasizes technology as a key enabler of teaching-learning transformation

NEP 2020 positions technology at the core of pedagogical reform, encouraging HEIs to adopt digital platforms, virtual learning tools and online resources to enhance teaching efficiency and learner engagement. The policy highlights the need to integrate ICT at every level of curriculum transaction. Studies aligned with NEP 2020 note that technology is no longer optional but an essential component for improving teaching effectiveness, expanding learning opportunities and supporting flexible pedagogy in higher education (Khan, 2023).

Blended learning emerges as the central pedagogical model envisioned by NEP 2020

A major technological practice recommended by NEP 2020 is the adoption of blended learning, combining face-to-face instruction with digital and online methods. Research shows that blended models help personalize learning, facilitate self-paced study and support varied learning styles. According to Patel and Sinha (2023), blended learning environments offer structured flexibility through recorded lectures, e-content modules and interactive tools. However, the effectiveness of blended learning depends on the availability of digital infrastructure and teacher proficiency in using technology.

NEP 2020 encourages the use of national digital platforms for teaching–learning

The policy promotes platforms such as SWAYAM, SWAYAM-PRABHA, Virtual Labs, National Digital Library (NDLI), and DIKSHA for enhancing learning access. The literature shows that these platforms provide high-quality, curriculum-aligned content that supports continuous learning beyond the classroom (Rathore, 2024). Yet, their full integration into institutional teaching practices remains uneven, as many colleges lack trained staff or structured mechanisms for incorporating these digital tools into pedagogy.

Technology-enabled assessments receive strong emphasis under NEP 2020

NEP 2020 highlights technology-based formative and summative assessments, including computer-based tests, online quizzes, digital assignments and analytics-supported evaluation. According to Rao (2023), institutions adopting digital assessment tools reported improved accuracy, reduced administrative burden and enhanced transparency in examinations. However, smaller HEIs still depend on manual examination processes due to technological and administrative limitations.

NEP 2020 promotes competency-based, personalized and adaptive learning through technology

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The policy encourages the use of AI-driven platforms and adaptive learning systems to meet diverse learner needs. Evidence shows that digital tools support personalized learning pathways, enabling students to learn at their own pace and receive targeted support. Alenezi (2023) states that adaptive learning environments significantly improve learner autonomy and motivation. However, most Indian HEIs are still in early stages of adopting such advanced systems due to cost and training barriers.

Teacher training and digital pedagogy development are critical components of NEP 2020

NEP 2020 stresses continuous professional development (CPD) through digital training portals and ICT-focused teacher orientation. Research by Joshi and Menon (2023) shows that although many faculty understand the importance of digital pedagogy, a large proportion still lack formal training in instructional design, LMS usage or interactive digital tools. Effective integration of technology in teaching thus remains constrained by insufficient capacity building.

NEP 2020 calls for institutionalizing digital governance to support teaching–learning

Technological practices extend beyond the classroom to institutional governance. The policy recommends adopting ERP systems such as SAMARTH to manage admissions, examinations, curriculum delivery, student records and academic planning. Rao (2023) notes that institutions implementing ERP systems experienced improved coordination and efficiency, indirectly strengthening teaching-learning practices. However, many HEIs still rely on manual processes due to lack of investment or technical support.

NEP 2020 envisions the National Educational Technology Forum (NETF) as a driver of innovation

NETF is designed to support research, innovation, and the development of digital pedagogical strategies. Studies indicate that the establishment of NETF is critical for guiding institutions in integrating emerging technologies such as AI, VR, digital labs and simulation-based learning (Kadian & Rose, 2025). At present, however, NETF's operationalization is still evolving, limiting its immediate impact on teaching-learning practices.

Technology integration remains varied, showing progress but also uneven adoption

Overall, while NEP 2020 has stimulated institutional interest in digital teaching–learning practices, actual implementation varies widely across institution types. Urban universities and centrally funded HEIs exhibit quicker adoption of blended learning, LMS systems and digital pedagogy. In contrast, many rural institutions continue to follow traditional teaching models due to infrastructural, financial and capacity constraints (Sharma & Gupta, 2023). This uneven adoption suggests that policy aspirations are yet to be fully realized.

Recommendations

- ✓ Strengthen digital infrastructure in rural and semi-urban HEIs by ensuring reliable broadband, campus-wide Wi-Fi, and upgraded ICT facilities so that all institutions can meet NEP 2020's digital learning standards.
- ✓ Provide subsidized digital devices (laptops/tablets) and low-cost data plans for economically disadvantaged students to minimize personal-level digital deprivation and promote equitable access.
- ✓ Ensure uninterrupted power supply and technical maintenance support in HEIs through dedicated ICT units, trained technicians, and long-term infrastructural planning.
- ✓ Integrate Learning Management Systems (LMS) and digital academic platforms across all HEIs, accompanied by capacity-building programmes for faculty to effectively use digital tools.
- ✓ Expand the adoption and meaningful use of national digital platforms such as SWAYAM, Virtual Labs, DIKSHA, and NDLI by embedding them into curriculum and assessment practices.
- ✓ Develop structured digital literacy and ICT training programmes for faculty and students, focusing on digital pedagogy, online content creation, and effective virtual engagement strategies.
- ✓ Implement targeted interventions to reduce the dual digital divide, including additional support for institutions and students in rural, tribal, and marginalized communities to ensure alignment with NEP 2020's equity goals.

- ✓ Establish monitoring and evaluation mechanisms at institutional and state levels to track digital access, resource utilization, and progress toward NEP 2020's technology integration vision.

Conclusion

The analysis of digital access, technological resource availability and technology integration practices in higher education institutions reveals a significant gap between the aspirations of NEP 2020 and the realities on the ground. NEP 2020 envisions a technology-empowered, equitable and learner-centric higher education ecosystem, yet disparities persist across institutional categories, regions and socio-economic groups. Findings indicate that while urban and centrally funded institutions have made notable progress in digital preparedness, many rural, semi-urban and resource-constrained colleges continue to struggle with inadequate connectivity, limited digital infrastructure and insufficient technical support. Additionally, student-level digital deprivation, exacerbated during the COVID-19 pandemic, remains a major barrier to inclusive digital education.

Technological resource distribution is similarly uneven, with LMS adoption, virtual labs, and digital libraries concentrated mainly in well-funded institutions. Moreover, effective integration of technology into pedagogy requires continuous faculty training, reliable digital tools and supportive institutional mechanisms, which remain underdeveloped in many HEIs. Although NEP 2020 provides a strong policy framework for digital transformation, systematic implementation, targeted investments and capacity-building efforts are essential to realize its vision. Overall, the study underscores the need for coordinated efforts to bridge the digital divide, strengthen ICT ecosystems and ensure that technology truly enhances teaching and learning across all higher education institutions.

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