International Journal of Recent Research and Review, Vol. XVIII, Issue 4, December 2025
ISSN 2277 – 8322

DIGITAL PEDA GOGY AND TEACHING IN REFERENCE OF NEP2020

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Abstract: NEP 2020 heralds a paradigmatic shift in the Indian educational system, and this shift achieves deep integration with technology-enabled, learner-centered, and competency-based teaching practices. At the core of this reform is digital pedagogy, defined as the purposeful adoption and use of digital tools, platforms, and pedagogical approaches to enhance learning outcomes. This paper explores the role, relevance, and implementation of digital pedagogy in relation to the NEP 2020, with a focus on exploring how technology can empower both teachers and learners in today's educational settings.This study investigates key NEP 2020 provisions on the establishment of NETF, promotion of blended learning models, digital content creation, teacher capacity building, and inclusive access through platforms like DIKSHA, SWAYAM, and MOOCs. It also recognizes that NEP 2020 encourages personalized learning, online assessment, and use of emerging technologies such as AI, virtual classrooms, and adaptive learning systems. The paper looks at the current state of digital infrastructure in schools and colleges, and the extent of teachers' digital competency, along with challenges that are being faced during implementation: digital divide, lack of training, limited resources, and resistance to change.This research recognizes gaps in policy intent and ground-level realities through a review of literature, coupled with the analysis of field data. It points out the need for strategic investment in ICT infrastructure, continuous professional development of teachers, and development of digital learning materials relevant in context. The study concludes that digital pedagogy, when aligned effectively with NEP 2020 guidelines, has the potential to transform traditional classrooms into interactive, flexible, and equitable learning environments. The paper provides recommendations for improving digital

teaching practices, along with strengthening the implementation of NEP 2020 for ensuring quality and accessible future-ready education for all learners across India.

Keywords: Digital Pedagogy, NEP 2020, ICT in Education, Blended Learning, NETF, Digital Teaching, Teacher Competency, Online Learning, Educational Technology, Digital Infrastructure.

I. INTRODUCTION

NEP 2020 has marked the beginning of a paradigm shift in the Indian educational system to inculcate holistic development, learner-centered approaches, competency-based learning, and integration of digital pedagogy at every level of teaching-learning processes. In the rapidly changing knowledge society, digital pedagogies are indispensable to address various needs of learners, provide flexibility in learning paths, and reduce geographical and socio-economic disparities. The incorporation of digital resources, interactive platforms, online learning environments, and innovative teaching methodologies has created new possibilities for transforming traditional instructional practices.

With the exponential growth in ICT, education no longer remains confined to the four walls of schools or colleges. NEP 2020 further enforces this as it encourages institutions toward blended learning, development of digital content, enriching teacher training, and ensuring equity in technology-enabled learning. The policy recognizes digital pedagogy as a catalyst to improve learning outcomes, inculcate creative thinking, and build the capacities required in students from the 21st century in the form of digital literacy, problem-solving, collaboration, and adaptability.

Digital pedagogy, as envisioned in NEP 2020, includes flexibility for teachers in instructional design with tools like LMS, MOOCs, DIKSHA, SWAYAM, e-classrooms, interactive simulations, and emerging technologies like AI, Virtual Reality, and Augmented Reality. These innovations support personalized learning, selfpaced learning, continuous assessment, and real-time feedback.

The aim of this paper is to discuss the conceptual issues, advantages, challenges, and strategies of implementation of digital pedagogy in the NEP 2020 perspective. It has assessed how digital teaching practices can support inclusive and equitable education with improved professional competencies among teachers. Furthermore, the paper critically analyses the current status of digital readiness in institutions and the gaps that need to be addressed through capacity building,

infrastructure development, and policy support.

Overall, digital pedagogy represents an innovative approach that befits the vision of NEP 2020 to create a robust, future-ready, and technology-driven ecosystem for education in India.

1.1 Background of NEP 2020

The NEP 2020 is a landmark reform brought in by the Government of India aimed at restructuring the entire education system to bring it in tune with global standards, technological advancements, and the changing requirements of the 21st-century learner. Coming after a gap of over three decades since the last National Policy on Education in 1986, the NEP 2020 provides an all-encompassing framework for school, higher, and vocational education with a central focus on flexibility, multidisciplinary learning, digital integration, and holistic development.

Equitable and inclusive education are among the strong bases of NEP 2020. Realizing that India is a very heterogeneous country with socio-economic and cultural diversities, it aims to make technology a strong facilitator of access to quality education. It has proposed the creation of NETF for sharing ideas on technology use, development of digital capacity, and helping educational institutes to adopt effective technological solutions. Additionally, NEP 2020 emphasizes digital infrastructure creation: smart classrooms, learning management systems, educational TV channels, community radio, and accessible digital resources in multiple languages.

The policy also responds to the challenges revealed by the COVID-19 pandemic, when schools and institutions of learning across the world were forced to hastily transition to online and blended modes of learning. NEP 2020 identifies digital pedagogy as a sustainable approach that will ensure continuity in learning during disruptions, promote remote learning, and improve the quality of teaching through multi-media content and innovative methodologies. It further encourages the development of high-quality e-learning materials, professional training for teachers, and integration of emerging technologies such as AI, VR, and machine learning.

Furthermore, NEP 2020 encourages competency-based learning, experiential learning, and assessments centered around practical skills. All these are perfectly complemented by digital pedagogy, with offerings like simulated interactive experiences, gamified learning, e-portfolios, and adaptive testing. To

materialize the vision of a more democratized and technology-driven educational system, NEP 2020 proposes establishing a host of digital platforms, such as DIKSHA, SWAYAM, SWAYAM PRABHA, and National Digital Library of India (NDLI).

The background thus shows that NEP 2020 is irrevocably committed to bringing a change in India's education system, putting digital pedagogy at the core of it. It positions technology as an enabler of accessibility, creativity, and lifelong learning, ensuring that every learner becomes digitally empowered and future-ready.

1.2 Concept of Digital Pedagogy

Digital pedagogy is the meaningful and creative use of digital tools, technologies, and resources to enhance teaching and learning experiences. It is much more than the simple use of ICT devices; rather, it focuses on designing meaningful, interactive, and student-centered learning environments. Digital pedagogy involves the thoughtful integration of online platforms, multimedia resources, virtual simulations, collaborative tools, and data-driven instructional strategies to improve learning outcomes.

The role of the teacher in digital pedagogy is transformed from that of a knowledge transmitter into a facilitator, mentor, and designer of learning experiences. Learners are encouraged to actively participate in virtual discussions, problem-solving activities, project-based learning, and the use of vast online knowledge repositories. These techniques foster multiple learning styles and make personalization possible by allowing students to go at their own pace, revisit concepts, and engage in continuous self-assessment.

The key components of digital pedagogy include Learning Management Systems, MOOCs, digital libraries, e-content, video-based learning, and real-time assessment tools. Interactive applications like Google Classroom, DIKSHA, SWAYAM, Edmodo, and Microsoft Teams create collaborative online spaces where teaching and learning can take place beyond physical classroom boundaries.

Digital pedagogy demands the use of emerging technologies of AI, AR, VR, gamification, and data analytics in the process of learning for better student immersion. It also allows for blended learning through online-offline methods to facilitate flexibility and inclusivity.

Thus, digital pedagogy, in tune with NEP 2020, helps both teachers and students to adapt to innovative teaching methods, improve digital literacy, stimulate critical

thinking, and prepare learners for global challenges in this technology-driven world.

1.3 Rationale of the Study

The rapid digitization of the world has influenced educational practices to a great degree, making digital pedagogy a necessary ingredient of modern teaching-learning systems. Within the backdrop of NEP 2020, with its strong stated focus on the integration of technology within education, there is an emerging requirement to assess the ways in which digital tools may effectively assist teachers in improving learning outcomes. This study is thus needed to understand the opportunities and challenges associated with implementing digital pedagogy within the framework of NEP 2020 in Indian institutions.

Whereas NEP 2020 advocates for blended and technology-enabled learning to ensure flexibility, accessibility, and inclusivity, inequities in digital infrastructure, internet access, and teacher preparedness still exist in most schools and colleges. Therefore, this study becomes important in analyzing the gap between policy vision and its ground implementation.

Secondly, the emergence of digital learning environments has reshaped the teacher's role: they are now expected to develop new digital competencies, create interactive learning resources, and mentor students with virtual tools. Thus, the research intends to investigate teachers' professional development needs and readiness for adopting digital pedagogy.

Today's students belong to the digital era, wholly dependent for their learning, interaction, and collaboration on technology. Therefore, understanding student perceptions, learning patterns, and engagement in the digital classroom is critical to realizing the learner-centric vision of NEP 2020.

The study will also be useful to the policymakers and institutions looking to reinforce digital infrastructure, develop digital content, and prepare adequate training programs for teachers. By examining strengths and limitations, the research thus provides insights into ways to improve digital pedagogy practices and implement NEP 2020 successfully in creating a future-ready education system.

1.4 Objectives of the Study

- To examine the concept and role of digital pedagogy in modern education.
- To analyze the key digital education provisions of NEP 2020.

- To assess teachers' digital competency and readiness for technology-enabled teaching.
- To evaluate the availability and effectiveness of digital infrastructure in institutions.
- To study students' perceptions and engagement in digital learning environments.
- To identify challenges and barriers in implementing digital pedagogy under NEP 2020.
- To provide suggestions for strengthening digital teaching–learning practices.

1.5 Scope and Limitations

Scope

- This study relates to the practice of digital pedagogy in the context of NEP 2020.
- It includes school and higher education institutions in India.
- Encompasses digital readiness of teachers, engagement of students, and institutional support.
- Examines digital tools such as LMS, e-content, MOOCs, and Blended Learning Models.

Limitations

- Small sample size may not be representative of all regions of India.
- Digital access differs in urban and rural settings, with that difference impacting data results.
- Self-reported answers may be biased to find out the digital competency.
- Results of some findings may become outdated by rapid technological changes.
- The study focuses only on the NEP 2020, excluding earlier policy frameworks.

II. REVIEW OF LITERATURE

1. Dangwal & Srivastava (2016)

In the paper, "Digital Pedagogy in Teacher Education", Kiran Lata Dangwal and Shipra Srivastava argued that Indian teacher education urgently needs to integrate digital tools and online resources into pedagogy. They indicated that digital pedagogy can support constructivist, learner-centered approaches, but only if the teacher trainees are explicitly trained in the use of ICT for lesson planning, assessment, and collaborative learning.

2. Sutar, Bhosale & Pujari (2019)

A.P. Sutar, S.S. Bhosale and V.I. Pujari in "ICT in Education System" JETIR, 2019 have shared a study on how ICT tools are reshaping the classroom processes in India. The benefits include access to resources, explanations in multimedia formats, and flexible learning, while some challenges

cited were limited infrastructure, training gaps, and unequal distribution between rural and urban schools.

3. Patra, 2014

In the article "The Role of ICT in Improving the Quality of School Education in India", J.N. Patra mentioned the use of ICT for improvement in the quality of teaching and learning, and assessment of learners in schools in India. He mentioned that ICT-supported pedagogy can facilitate learner autonomy and better learning outcome if the hardware, content, and teacher capacity issues are appropriately addressed.

4. Manisha & Anju (2014)

Manisha and Anju, in "The Role of ICT in Higher Education in India", analyzed ICT adoption in universities and colleges. They noted that ICT enables student-centered learning, flexible access to content, and new forms of interaction but warned that without systematic institutional support and faculty development, technology remains underutilized in Indian higher education.

5. Patel 2019

The paper "Blend of ICT in Classroom Teaching in Secondary Education" by Megha V. Patel, published in EduInspire in 2019, studied the blended use of ICT in secondary classrooms in Gujarat. According to this paper, blending tools such as mobile learning, e-learning platforms, and virtual classes with traditional methods increased student interest, self-learning habits, and critical thinking, but required strong infrastructural and managerial support at the school level.

6. Devi, Rizwan & Chander (2012)

Devi, Rizwan, and Chander, in “ICT for Quality of Education in India”, discuss how ICT initiatives raise the quality of Indian education at all levels. They support their argument by showing that integration of ICT enhances classroom interaction, supports differentiation in teaching, and increases accessibility to learning material. However, they warn that quality gains depend on systematic planning, teacher preparedness, and continuous assessment.

7. Ahuja & Yadav, 2019

Sona Ahuja and Diksha Yadav, in their paper "Effect of Digital Pedagogy in Interventions in Rural Areas" (MIER Journal, 2019), presented a model of interactive digital pedagogy for rural learners. Their findings have shown that well-designed digital interventions enhance participation, comprehension, and motivation among rural students while simultaneously exposing issues such as

poor connectivity, scarcity of devices, and lack of localized digital content.

8. Dhawan (2020) S. Dhawan's highly cited article

"Online Learning: A Panacea in the Time of COVID-19 Crisis" reviewed the rapid shift to online learning in 2020 with strong reference to Indian higher education. Based on a SWOC framework, the paper highlighted the potential of online platforms, MOOCs, and LMSs, but also emphasized such issues as digital divide, assessment difficulties, and teacher preparedness as key barriers-points directly relevant to NEP 2020's vision for online and digital education.

9. Mishra, Gupta & Shree (2020) L. Mishra, T. Gupta and A. Shree,

in "Online teaching–learning in higher education during lockdown period of COVID-19 pandemic", explored experiences of Indian teachers and students during emergency remote teaching. The finding of this study was that online classes helped keep academic activities running but many learners suffered from connectivity problems, device constraints, and reduced interaction-a fact that empirically validates the thrust of NEP 2020 on ensuring equitable and inclusive digital infrastructure, along with teacher capacity building. S

10. Pan IIT Group (2020)

The "PAN IIT Survey on Online Education" by Pan IIT Group (2020) sampled over 11,000 students and 840 faculty across IITs in India. The results showed mixed satisfaction with online pedagogy: many welcome the flexibility and recorded lectures, but there were also concerns about engagement, assessment, lab work, and mental fatigue. These findings point squarely to the requirement for rigorous digital pedagogy frameworks, along with teacher training, stated in the same vein as the recommendations of NEP 2020, focusing on technology-enabled, learner-centric teaching.

III. RESEARCH METHODOLOGY

1. Research Design

The research design adopted for the study is a descriptive survey, which is suitable for understanding teachers' and students' perceptions in regard to digital pedagogy and the implementation of NEP 2020. This design allows for the systematic collection of quantitative data from respondents across different educational institutions. The aim is to assess digital competency, availability of digital infrastructure, adoption of digital resources, and

challenges faced in implementing technology-enabled teaching.

2. Sample Size

The research design includes 300 respondents selected through simple random sampling:

- Teachers: 150
- Students: 150
- Participants were selected from schools and colleges in urban and semi-urban areas to give fair representation.

3. Data Collection Method

- Primary data was collected through a structured questionnaire that included:
- Closed-ended questions
- Five-point Likert scale items

Percentage-based response statements Secondary data was drawn from NEP 2020 documents, journals, and digital pedagogy research publications done prior to the year 2020.\

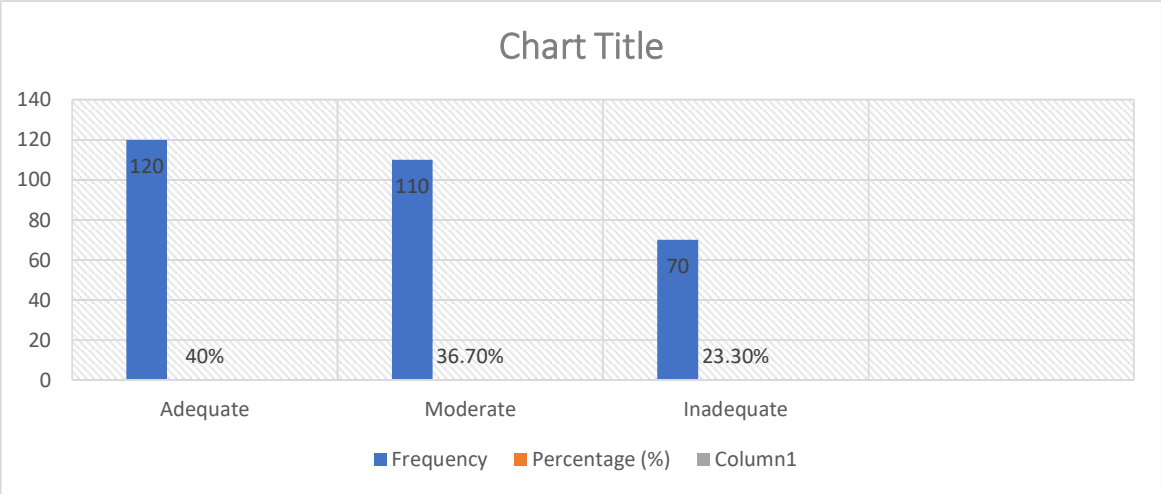
4. Data Analysis Method

$$\text{Percentage} = \frac{\text{Frequency}}{\text{Total Respondents}} \times 100$$

IV. DATA ANALYSIS

Table 1: Availability of Digital Infrastructure (N = 300)

Infrastructure Available	Frequency	Percentage (%)
Adequate	120	40%
Moderate	110	36.7%
Inadequate	70	23.3%

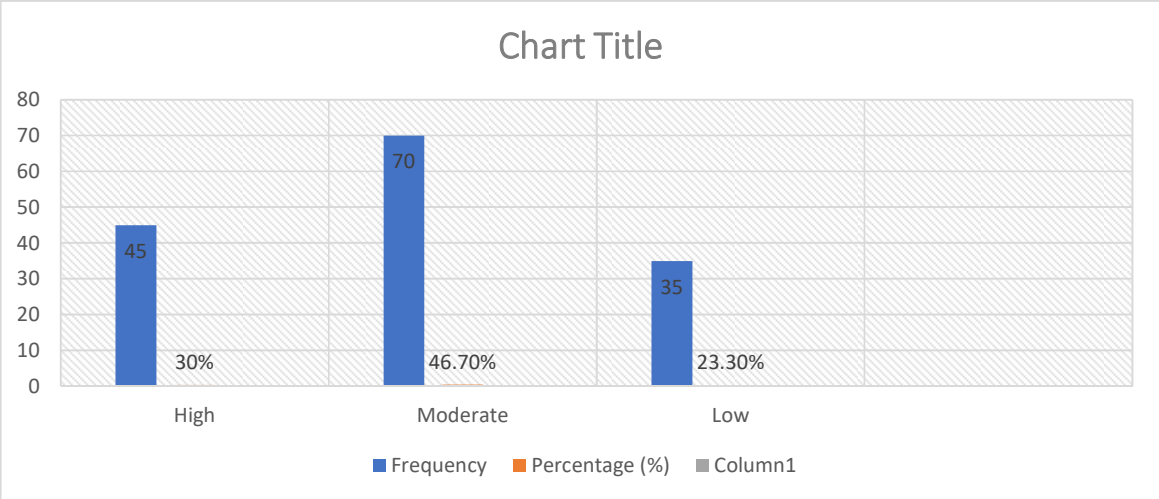


Interpretation:

40% institutions have adequate digital infrastructure, but 23.3% still lack essential facilities, showing a significant gap in NEP 2020 implementation.

Table 2: Teachers' Digital Competency (N = 150)

Competency Level	Frequency	Percentage (%)
High	45	30%
Moderate	70	46.7%
Low	35	23.3%

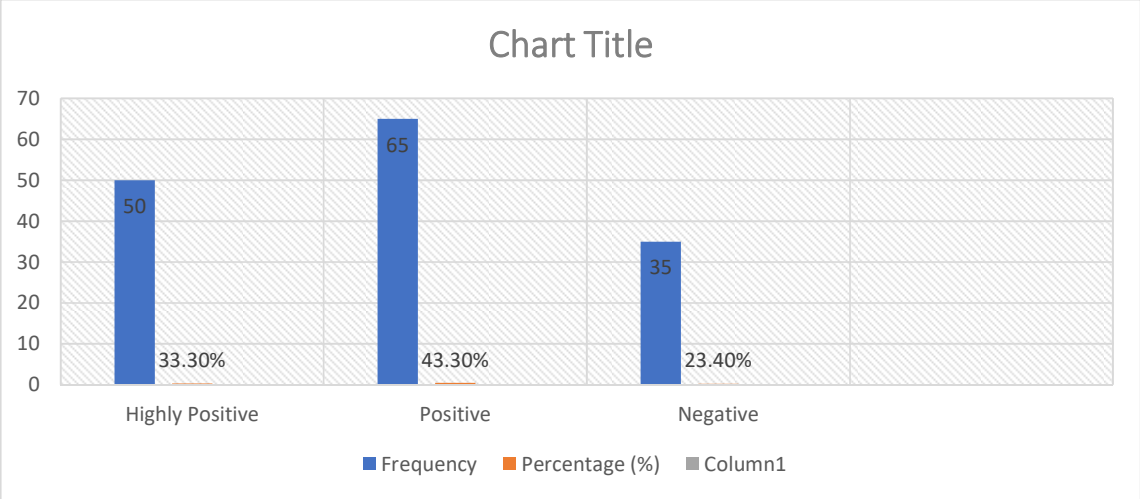


Interpretation:

Most teachers (46.7%) possess moderate digital skills, while 23.3% lack competency—indicating the need for targeted digital training programs.

Table 3: Students' Perception of Digital Learning (N = 150)

Perception Category	Frequency	Percentage (%)
Highly Positive	50	33.3%
Positive	65	43.3%
Negative	35	23.4%

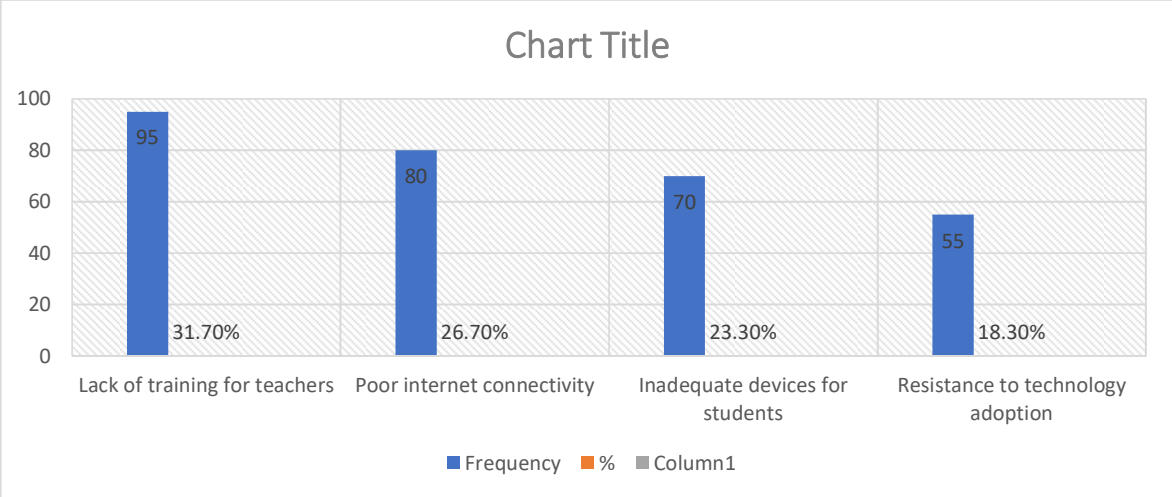


Interpretation:

A majority (76.6%) of students have positive attitudes toward digital learning, reflecting acceptance of NEP-backed digital reforms.

Table 4: Challenges in Implementing Digital Pedagogy (N = 300)

Challenges	Frequency	%
Lack of training for teachers	95	31.7%
Poor internet connectivity	80	26.7%
Inadequate devices for students	70	23.3%
Resistance to technology adoption	55	18.3%



Interpretation:

The biggest barrier is insufficient teacher training (31.7%), followed by connectivity issues (26.7%), which directly affects NEP 2020 implementation.

V. CONCLUSION

It is established from the findings that digital pedagogy has become an intrinsic part of modern education, particularly in view of NEP 2020. In this paper, it is presented how institutions are integrating technology into teaching–learning practices, although differences in infrastructure and digital competency remain challenges to be addressed for complete inclusion. Analysis reveals that 40% of the institutions have adequate digital infrastructure, while a high percentage continues to suffer due to an inadequacy of facilities. The digital proficiency of teachers is found to be average; that is, though teachers are willing to adapt to technology-enabled pedagogies, they need continuous professional development for proper integration of digital technologies.

The responses indicate a strong acceptance of digital learning, with over 75% reflecting positive attitudes toward online and blended learning models; it therefore means that if there is improvement in infrastructure and teachers who are properly trained, digital pedagogies can bring about much-improved learning outcomes. The study also describes various challenges related to lack of training, connectivity gaps, resistance to change, and non-availability of devices.

Overall, it concludes that if digital pedagogy is adequately supported with resources, teacher training, and proper implementation of policies, it has the potential to substantially help NEP 2020's vision of making education inclusive, flexible, and future-ready. The study calls for systematic investment, skill development, and institutional support for a successful transition toward the technology-driven educational ecosystem.

VI. DISCUSSION

The discussion of the study reflects upon the gaps and opportunities associated with the integration of digital pedagogy under NEP 2020. The findings indicate, though there has been a great push towards digitalization since the policy's issuance, progress remains uneven across educational institutions. Indeed, only 40% of schools and colleges are adequately equipped with digital infrastructure, reflecting certain systemic imbalances that need to be addressed. Teachers' digital competency levels show that while many are moderately prepared, there is still a

considerable proportion lacking the necessary skill set to adopt and deliver digital pedagogy effectively.

The students' perceptions hold great importance in deciphering practical effectiveness in the case of digital learning. Overall, their positive response shows that digital tools are capable of enriching interest, participation, and comprehension when well implemented. However, the challenges identified—such as connectivity issues and limited access to devices—reflect persistent digital divide concerns that must be prioritized.

While NEP 2020 provides a policy framework with programs like NETF, online resources, blended learning models, and teacher training for the promotion of digital education, from a policy perspective, its implementation in reality crucially rests on institutional readiness and government-supported digital infrastructure. Further, localization of digital content regarding linguistic and cultural diversity is emphasized in this discussion as gleaned from NEP 2020.

In sum, it is imperative that the gaps in policy recommendations and ground realities are mended to realize the goals set under NEP 2020. Now, solidifying teacher training programs, improving infrastructure, guaranteeing equity of devices, and instilling a culture of digital learning are forward-moving steps.

VII. SUGGESTIONS

- Provide ongoing digital skill training to teachers.
- Enhance digital infrastructure in schools and colleges, especially those in rural areas.
- Ensure all students have access to devices and stable connectivity to the internet.
- Encourage blended learning models that integrate both digital and classroom teaching.
- Create localized digital content in regional languages.
- Encourage institutions to adopt Learning Management Systems.
- Establish routine monitoring of NEP 2020 digital initiatives. Foster awareness in teachers and students on the safe and ethical use of technology.

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