Int. Jr. of Contemp. Res. in Multi.

ACCESS **PEER-REVIEWED JOURNAL** 

Volume 4 Issue 3 [May-Jun] Year 2025



**Review** Article

# International Journal of Contemporary Research In **Multidisciplinary**

## **Digital Transformation in Indian Education: Role of Computer** Science under NEP 2020

#### Naveen Kumar Gupta

Assistant Professor, DIVE, Department of Computer Application, Dr. Bhimrao Ambedkar University, Agra, India

#### Corresponding Author: \* Naveen Kumar Gupta

#### DOI: https://doi.org/10.5281/zenodo.15676785

#### Abstract

The National Education Policy (NEP) 2020 marks a paradigm shift in India's educational landscape, emphasizing holistic, flexible, and technology-integrated learning. One of the policy's key pillars is the digital transformation of education through the strategic integration of computer science and emerging technologies. This paper explores the pivotal role computer science plays in implementing NEP 2020's vision-ranging from the use of digital platforms for content delivery to the inclusion of coding, artificial intelligence (AI), and computational thinking from early grades. It examines initiatives like DIKSHA, SWAYAM, and NDEAR, and highlights how computer science is shaping teacher training, assessments, and personalized learning. The study also investigates the challenges of infrastructure, digital literacy, and accessibility in rural and underprivileged areas. By analyzing current efforts and proposing future directions, this research emphasizes the necessity of inclusive digital strategies to bridge the learning divide and ensure that technology becomes a true enabler of equitable and quality education across India.

#### **Manuscript Information ISSN No: 2583-7397**

- .
- Received: 28-05-2025
- Accepted: 12-06-2025
- Published: 16-06-2025
- . IJCRM:4(3); 2025:406-410
- ©2025, All Rights Reserved
- Plagiarism Checked: Yes
- **Peer Review Process:** Yes

#### How to Cite this Article

Gupta NK. Digital Transformation Indian in Education: Role of Computer Science under NEP 2020. Int J Contemp Res Multidiscip. 2025;4(3):406-410.

Access this Article Online



www.multiarticlesjournal.com

KEYWORDS: National Education Policy 2020 (NEP 2020), Digital Transformation, Indian Education, Computer Science, Emerging Technologies, Artificial Intelligence (AI), Computational Thinking Digital, Learning Platforms, DIKSHA, SWAYAM, Technology Integration, Personalized Learning, Digital Literacy, Educational Infrastructure, Teacher Training, Rural Education, Inclusive Education, Equitable Access, Quality Education

## 1. INTRODUCTION

The advent of the 21st century has brought rapid technological advancements, fundamentally altering every aspect of human life-including education. In response to these transformations and the growing demand for future-ready skills, the Government of India introduced the National Education Policy (NEP) 2020, which aims to redefine the Indian education system to meet global standards. A core component of this policy is the integration of technology and computer science into the educational process, making digital transformation not just an option, but a necessity.

NEP 2020 envisions an education system that promotes holistic development, flexibility, and multidisciplinary learning, supported by digital tools and platforms. It recognizes the transformative power of computer science and emerging technologies-including artificial intelligence (AI), machine learning, robotics, and data science-in equipping learners with 21st-century competencies. The policy also stresses early exposure to computational thinking, digital literacy, and coding, starting from school-level education, to prepare students for a technology-driven future.

To support this digital vision, several national initiatives have been launched, including DIKSHA (Digital Infrastructure for Knowledge Sharing), SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), and NDEAR (National Digital Education Architecture). These platforms aim to democratize access to quality educational resources and enhance the teaching-learning experience through personalization and interactivity.

However, despite these advancements, India faces significant challenges in terms of digital infrastructure, teacher readiness, and equitable access, particularly in rural and underserved areas. The successful implementation of NEP 2020's digital transformation goals depend not only on the deployment of technology but also on capacity-building, policy alignment, and inclusive strategies that address the digital divide.

This paper explores the critical role of computer science in driving digital transformation under NEP 2020. It analyses government-led initiatives, technological interventions, and the evolving role of educators. The study further investigates the opportunities and obstacles in embedding computer science education across different levels of the Indian education system. By evaluating ongoing efforts and proposing practical recommendations, this research aims to contribute to the realization of NEP 2020's vision for an innovative, inclusive, and technology-enabled educational ecosystem in India.

#### 2. REVIEW OF LITERATURE

Naveen, H. M. (2022) to analyses the National Education Policy (NEP) 2020 aims to ensure that at least 50% of students in school and higher education gain exposure to vocational education by 2025. To achieve this, vocational education will be gradually integrated into secondary school curricula, with collaboration from ITIs, polytechnics, and local industries. The University Grants Commission (UGC) has proposed a framework to align general and vocational education based on skill gap analysis and local opportunities. The policy emphasizes a credit-based system to facilitate mobility between education streams and supports the recognition of prior learning. NEP 2020 promotes inclusive, flexible learning pathways-formal, non-formal, and informalwith assured quality and transferability of outcomes. The article discusses the significance of vocational education and the UGC's framework for its integration within general education. Paschal, S., & Srivastav, N. (2022) examine the job satisfaction reflects how content individuals are with their jobs and includes cognitive, emotional, and behavioural aspects. The National Education Policy (NEP) 2020 aims to transform India's education system to improve future employability by focusing on skill development. It emphasizes job satisfaction as a key outcome of education and aligns with the UN's 2030 Agenda for Sustainable Development, promoting quality, inclusive education and lifelong learning. NEP 2020 calls for educational reforms to support these goals and ensure meaningful employment opportunities.

Muralidharan, K., Shanmugan, K., & Klochkov, Y. (2022) to analyses the democratic welfare government aims to provide not only universal access to education but also ensure it is qualitydriven, fair, and equitable, aligning with SDG 4's goal of lifelong education for all. India is focused on reforming its education system through NEP 2020 in response to major socio-economic and scientific changes. While NEP 2020 is recognized as a vital reform, its implementation faces challenges, especially regarding digitalization and improving quality of life. However, adopting flexible lifelong education and training that integrates skills and experience can help overcome labour market rigidity and enhance employment opportunities.

Dar, R. A., & Jan, T. (2023) to describe the Education is crucial for national development, with teacher quality playing a key role. Factors like knowledge, dedication, and motivation impact student success, but training capable teachers remains a global challenge. The evolving educational landscape demands innovative teacher education programs that are regularly reviewed and updated. The Government of India emphasizes quality education through reforms like NEP 2020, which highlights the changing roles of teacher educators and teachers. This study analyses these roles and offers solutions to challenges in teacher education, drawing on various credible sources. Clinton's 1996 call stresses the importance of having talented and dedicated teachers in every classroom.

Mondal, G. C., Kamila, S., Sarkar, S., & Mondal, P. (2023) to explain the New Education Policy (NEP) approved by India's Union Cabinet in July 2020 is a landmark reform emphasizing online and digital learning. It promotes curricular and pedagogical innovations, supports open online courses through various portals, and highlights the need for alternative education methods in Higher Education Institutions, especially during pandemics when traditional classroom teaching is not possible. NEP 2020 acknowledges the vital role of digital education in modernizing the education system.

Meena (2023) examine the National Education Policy 2020 (NEP 2020) marks a significant step in advancing higher education in India by emphasizing the integration of Information and Communication Technology (ICT). It focuses on transforming teaching, learning, administration, and governance through personalized education, digital resources, e-governance, and data-driven decision-making, aiming to drive a comprehensive digital revolution in higher education.

Singh, G., & Choudhary, R. N. To define The National Education Policy (NEP) 2020 is a major reform in India focusing on technology-driven learning to address challenges of equitable quality education. It recognizes technology's role in closing educational gaps, enhancing teaching, and expanding learning opportunities. EdTech offers innovative, borderless solutions, and its integration in India aims to democratize knowledge and empower all learners.

Vats, S., & Malik, N. examine the National Education Policy 2020 (NEP 2020) seeks to revolutionize Indian education through digital initiatives such as ePathshala, DIKSHA, SWAYAM, and virtual labs. These platforms provide accessible and engaging learning resources, promote interactive and inclusive classrooms, and support curriculum delivery through Information and Communication Technology (ICT). While digital learning enhances education quality and equity, challenges like inadequate infrastructure and insufficient teacher training persist. The study emphasizes the need for continuous investment and strategic planning to overcome these barriers and maximize NEP 2020's potential in transforming classrooms into dynamic, technology-enabled learning spaces.

Singh, G., & Choudhary, R. N. to explain The National Education Policy (NEP) 2020 is a major reform in India, emphasizing technology-driven learning to address challenges in providing equal access to quality education. It highlights the role of EdTech in closing educational gaps, enhancing teaching, and expanding learning opportunities. By integrating technology into education, NEP 2020 aims to democratize knowledge and empower learners across all sections of society.

PANWAR, D. V. to analyses The National Education Policy (NEP) 2020 highlights the vital role of technology in transforming education. This study explores how NEP 2020 encourages digital learning, virtual classrooms, and personalized education, while enhancing the curriculum with interactive tools and coding. It also addresses challenges like the digital divide, infrastructure gaps, and teacher readiness. The paper concludes with recommendations for effective implementation and emphasizes technology's potential to revolutionize education in India.

Chawla, B. (2024) to describe The National Education Policy (NEP) 2020 introduces a major reform in India's education system, focusing on holistic, flexible, and technology-driven learning. It emphasizes multidisciplinary studies, vocational training, and equitable access to quality education. Key reforms include curriculum restructuring, early childhood education, innovative assessments, and strengthening research in higher education. The policy also aims to bridge the digital divide by integrating emerging technologies like AI. Successful implementation depends on addressing challenges such as funding and governance. If executed effectively, NEP 2020 could position India as a global leader in education by 2030. Sharma, D., & Jain, V. K. (2025) to emphasizes the importance of skill development in today's fast-paced world, highlighting its role in fostering innovation and creativity. The National Education Policy (NEP) 2020 aims to equip students with essential skills such as computer programming, problem-solving, self-management, and communication. It promotes experiential, skill-based learning to prepare a future-ready generation. The study explores NEP 2020's approach to practical skill-building and suggests strategies for effective implementation, stressing the policy's potential to shape a confident, innovative, and capable population.

Kumre, S. P. (2023) to examine the Education is vital for personal growth, social justice, and national development. India's focus on improving education has strengthened its global standing. The National Education Policy (NEP) 2020, the country's first major 21st-century education reform, aims to create an inclusive, flexible, and holistic education system. It emphasizes equitable access, skill-building, critical thinking, creativity, and the use of technology to promote innovation. This paper analyses the opportunities and challenges associated with implementing NEP 2020.

## **3. RESEARCH OBJECTIVE**

To analyse the role of computer science in skill development, Vocational, e-assessment, and personalized learning under NEP 2020

## 4. METHODOLOGY

This study employs a qualitative research approach supported by secondary data analysis to examine the impact and implementation of computer science and digital technologies in Indian education within the framework of the National Education Policy (NEP) 2020. The methodology involves a systematic review of policy documents, academic publications, government reports, and digital education initiatives. The research is designed as a descriptive and analytical study, focusing on the role of computer science in shaping India's digital education landscape, without involving primary data collection such as surveys or interviews. Data collection relies on secondary sources, including the NEP 2020 official document and related policy briefs; government portals and initiatives like DIKSHA, SWAYAM, and NDEAR; reports and statistics from the Ministry of Education, NITI Aayog, UGC, and NCERT; academic journals, research articles, and conference papers on computer science education, digital learning, and educational reforms; as well as news articles, white papers, and case studies related to digital infrastructure and implementation outcomes. The collected data undergo content analysis and thematic categorization, identifying key themes such as policy support for digital education, the role of computer science in curriculum reform, the implementation status of digital platforms, challenges related to digital access and equity, and innovations in technology-enhanced teaching and learning. These themes are critically analysed to provide insights into the progress, gaps, and opportunities for strengthening the contribution of computer science to education under NEP 2020. The study focuses on the period from 2020 to 2025, corresponding to the early implementation phase of NEP 2020, and is limited to Indian educational institutions across both school and higher education levels. It does not include empirical field data from institutions or individual learners but relies solely on officially published materials and existing research literature. Since the research is based entirely on secondary data, no human subjects were involved, eliminating the need for ethical clearance related to human participation. All data sources are appropriately cited and used exclusively for academic purposes.

#### **Opportunities**

The digital transformation of Indian education under NEP 2020 offers many opportunities through computer science. It helps bridge the urban-rural education gap by providing equitable access and enables personalized learning using adaptive technologies. Emphasizing coding and computational thinking equips students with vital 21st-century skills for global job markets. Innovative tools like AI, virtual labs, and gamification enhance teaching methods, while data analytics support informed educational decisions. Digital platforms encourage collaboration and research, and ICT improves administrative efficiency. Online courses and digital libraries promote lifelong learning. Overall, NEP 2020's focus on computer science prepares India to compete globally by fostering skilled, innovative graduates.

#### Challenges

Despite the promising opportunities, the digital transformation of Indian education under NEP 2020 faces several significant challenges. One major issue is the persistent digital divide, where inadequate internet connectivity and lack of access to devices in rural and remote areas limit the reach of digital education. Infrastructure constraints, including unreliable electricity supply and insufficient technological resources in many schools, hinder effective implementation. Another challenge is the need for extensive teacher training and capacity building to ensure educators are proficient in using digital tools and integrating computer science concepts into their teaching. Resistance to change and lack of digital literacy among both teachers and students can slow adoption. Privacy and data security concerns also arise with the increased use of digital platforms and data analytics. Additionally, there is a risk of widening educational inequalities if marginalized groups are unable to benefit equally from digital initiatives. Ensuring quality and relevance of digital content, along with effective monitoring and evaluation mechanisms, remains a challenge. Lastly, the financial constraints of scaling digital transformation across India's vast and diverse education system pose a significant hurdle to achieving the full potential of NEP 2020's vision.

#### Objective

The objective of this research is to undertake a comprehensive and critical examination of the transformative role that computer science and digital technologies play in reshaping the Indian education system within the framework of the National Education Policy (NEP) 2020. The study aims to explore how the integration of computer science—through subjects such as coding, artificial intelligence, computational thinking, and data science—is influencing curriculum development from foundational levels to higher education. It further seeks to analyze the impact of digital tools and platforms on pedagogical practices, particularly in enabling personalized learning, online assessments, and technology-enhanced teaching methods.

Additionally, the research focuses on the development and deployment of digital infrastructure, including national initiatives like DIKSHA, SWAYAM, and NDEAR, and their contribution to creating a robust and inclusive digital learning ecosystem. A key component of the study is to assess whether the benefits of digital transformation are equitably reaching all sections of society, especially marginalized and rural communities, by evaluating factors such as accessibility, digital literacy, and teacher readiness.

By addressing these dimensions, the research aims to provide actionable insights and recommendations that can support policymakers, educators, and technologists in aligning educational practices with the broader goals of NEP 2020 and in preparing students for a technology-driven future.

#### 5. CONCLUSION

The National Education Policy (NEP) 2020 has set a visionary roadmap for reimagining India's educational landscape, where digital transformation and the integration of computer science are central to achieving its goals. As this research highlights, computer science is no longer a peripheral subject but a foundational discipline essential for developing 21st-century skills such as problem-solving, logical reasoning, innovation, and adaptability. Its inclusion in the curriculum from the foundational stage, alongside support from digital platforms like DIKSHA, SWAYAM, and NDEAR, signifies a shift towards a more inclusive, flexible, and learner-centric education system.

The digital transformation brought about by NEP 2020, driven by computer science and emerging technologies, has enhanced content delivery, teacher training, and personalized learning experiences. However, challenges such as inadequate digital infrastructure, uneven access in rural and marginalized areas, and the need for teacher capacity-building continue to pose barriers to full-scale implementation.

To ensure that the digital revolution in education becomes equitable and effective, it is imperative for stakeholders government bodies, educators, institutions, and technology providers—to work collaboratively. Investment in infrastructure, digital literacy, and inclusive policies is essential to bridge the digital divide.

In conclusion, computer science under NEP 2020 is not just a subject of study but a powerful enabler of transformation. It holds the potential to democratize access to quality education and prepare a generation of learners who are not only academically strong but also technologically empowered, ready to thrive in a rapidly evolving digital world.

#### REFERENCES

- 1. Naveen HM. NEP, 2020: General Education Embedded with Skill and Vocational Education. Int J Sci Res Sci Eng Technol. 2022;9(1):65-75.
- 2. Paschal S, Srivastav N. NEP 2020–Narrowing the Skills Gap and Equipping New Skills through Job Satisfaction. Int J Adv Res Sci Commun Technol. 2022;2(1).
- 3. Muralidharan K, Shanmugan K, Klochkov Y. The new education policy 2020, digitalization and quality of life in India: Some reflections. Educ Sci. 2022;12(2):75.
- 4. Dar RA, Jan T. Changing role of teacher educators in view of NEP 2020. J Xi'an Univ Archit Technol. 2023;15(1):144-56.
- Mondal GC, Kamila S, Sarkar S, Mondal P. National Education Policy 2020: Initiatives for Reforming Curriculum and Pedagogy in Online and Digital Education. Int J Res Anal Rev. 2023;10(2):389-400.
- 6. Meena D. NEP 2020 and the Transformative Role of ICT in Higher Education: A Comprehensive Analysis.
- 7. Singh G, Choudhary RN. NEP 2020 and Technology-Enabled Learning: Transforming Education in India.
- 8. Vats S, Malik N. Exploring the Integration of Technology through Digital Initiatives as per NEP 2020. J Int J Res Publ Rev. ISSN:2582-7421.
- 9. Panwar DV. Role of Technology in Enhancing Education under NEP-2020.
- 10. Chawla B. Transforming Indian Education: An Overview of NEP 2020. Int J Innov Sci Eng Manag. 2024:75-80.
- 11. Sharma D, Jain VK. Transforming Through NEP 2020: A Vision for Skill-Based Experiential Learning. 2025.
- Kumre SP. NEP 2020-Opportunities and Challenges. Int J Multidiscip Res. 2023;5(3):1-6.

#### **Creative Commons (CC) License**

This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



Naveen Kumar Gupta is an Assistant Professor of Computer Science with a Master's in Computer Applications. Since 2018, he has been teaching courses such as Operating Systems, DBMS, AI, and Mobile Development. Passionate about integrating modern technologies in education, he focuses on practical learning. His research interests include AI, Data Analytics, and Digital Education, with active involvement in academic events and mentoring students. Committed to lifelong learning and academic excellence.