

Teachers' Digital Competency and ICT Readiness for Implementing NEP 2020 in School Education

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Abstract

The National Education Policy (NEP) 2020 represents a significant transformation in the Indian education system, with emphasis on learner-centred education, competency-based learning, equity, inclusion, multidisciplinary approaches, teacher professional development and the effective use of technology. Among these dimensions, teachers' digital competency and Information and Communication Technology (ICT) readiness are particularly important because teachers are the primary agents responsible for translating policy objectives into classroom practices. This review paper examines the existing literature and policy documents concerning teachers' digital competency and ICT readiness in the context of implementing NEP 2020 in school education. The review focuses on the meaning and dimensions of digital competency, ICT readiness, digital pedagogy, technology integration, teacher professional development, digital assessment, inclusive education and emerging technologies. The literature indicates that teachers' digital competency is broader than basic computer literacy and includes technological knowledge, pedagogical application, digital content creation, information literacy, communication, assessment, cybersecurity, digital ethics and the ability to use technology for diverse learners. The review also highlights persistent challenges, including inadequate infrastructure, unequal internet access, insufficient practical training, lack of technical support, teacher workload, digital anxiety and the rural-urban digital divide. The review suggests that successful implementation of NEP 2020 requires continuous and practice-oriented professional development, supportive school leadership, reliable infrastructure, accessible digital resources, multilingual content and systematic development of teachers' digital competencies. Digital platforms such as DIKSHA provide important opportunities for professional learning and resource sharing. The paper concludes that teachers' digital readiness should be treated as a central component of educational reform rather than merely as a technical requirement.

Keywords: NEP 2020, Digital Competency, ICT Readiness, Teachers, Digital Pedagogy, School Education, Teacher Professional Development, Digital Education, DIKSHA, Technology Integration.

1. Introduction

Information and Communication Technology has become an increasingly important component of contemporary education. Digital technologies have transformed access to information, communication, teaching-learning resources, assessment and professional development. Schools are increasingly using computers, smartphones, interactive displays, educational applications, online platforms, digital textbooks, videos and other multimedia resources to support learning.

In India, the National Education Policy (NEP) 2020 provides a comprehensive framework for transforming education and recognises technology as an important instrument for improving access, quality, equity and educational management. The policy gives importance to technology in teaching-learning, assessment, teacher education, professional development and educational planning (Government of India, 2020).

The implementation of technology-related provisions of NEP 2020 depends substantially on teachers. Teachers are expected to facilitate experiential, competency-based, inquiry-based and learner-centred learning. These expectations require teachers to possess appropriate digital knowledge and pedagogical skills.

However, possession of digital devices does not automatically result in effective technology integration. A teacher may know how to operate a computer or smartphone but may not know how to select appropriate digital resources, design technology-supported learning activities or conduct meaningful digital assessment. Consequently, digital competency must be understood as a combination of technological knowledge, pedagogical understanding and professional judgement.

This review therefore examines existing literature and policy perspectives on teachers' digital competency and ICT readiness and considers their significance for implementing NEP 2020 in school education.

4. Understanding Teachers' Digital Competency

Digital competency refers to the ability to use digital technologies effectively, critically, creatively, safely and responsibly. In education, digital competency involves not only technical skills but also the ability to apply technology to achieve educational objectives.

UNESCO's ICT Competency Framework for Teachers provides an important international framework for understanding teachers' ICT capabilities. It connects technology with pedagogy, curriculum, assessment, school organisation and professional development (UNESCO, 2018).

Similarly, the European Framework for the Digital Competence of Educators (DigCompEdu) identifies different areas of educators' digital competence, including professional engagement, digital resources, teaching and learning, assessment, empowering learners and facilitating learners' digital competence (Redecker, 2017).

Therefore, teacher digital competency may be understood through several dimensions:

- Technical skills
- Information literacy
- Digital communication
- Digital content creation
- Digital pedagogy
- Digital assessment
- Digital collaboration
- Digital inclusion
- Cybersecurity
- Digital ethics
- Professional digital learning

5. ICT Readiness of Teachers

ICT readiness refers to the extent to which teachers are prepared and willing to use ICT effectively in educational settings.

Teacher readiness has both **technical and psychological dimensions**. Teachers need access to devices and internet connectivity, but they also require confidence, motivation, positive attitudes and appropriate pedagogical knowledge.

ICT readiness can therefore be conceptualised as:

ICT Readiness = Skills + Knowledge + Confidence + Motivation + Infrastructure + Pedagogical Competence + Institutional Support

The literature suggests that technology integration becomes more successful when teachers perceive technology as useful, manageable and relevant to their teaching objectives.

Thus, ICT readiness should not be assessed solely by determining whether teachers possess computers or smartphones. It should also examine how effectively they can use technology for lesson planning, teaching, assessment, communication and professional development.

6. NEP 2020 and Digital Transformation

NEP 2020 recognises technology as an important tool for educational transformation. The policy encourages appropriate use of technology for teaching-learning, teacher development, assessment and educational administration (Government of India, 2020).

The policy also promotes flexible, experiential and competency-based approaches to learning. Technology can support these approaches through digital simulations, multimedia, virtual resources, interactive activities and online collaboration.

The policy's technology-related vision therefore creates a need for digitally competent teachers.

The relationship can be represented as:

NEP 2020 Vision → Technology Integration → Teacher Digital Competency → Digital Pedagogy → Improved Learning Opportunities

Teachers are therefore central to converting policy objectives into actual classroom practice.

7. Digital Pedagogy and Technology Integration

One of the most important findings from the literature is that technology should not be separated from pedagogy.

Mishra and Koehler (2006) proposed the concept of Technological Pedagogical Content Knowledge (TPACK), which explains that effective technology integration requires the interaction of technological knowledge, pedagogical knowledge and content knowledge.

This perspective is particularly relevant to NEP 2020 because the policy promotes learner-centred and competency-based education.

For example, merely showing a video during a lesson does not necessarily constitute effective digital pedagogy. The teacher needs to determine:

- Why the video is being used.
- What students should learn from it.
- How students will interact with the content.
- How learning will be assessed.
- How the activity supports learning outcomes.

Digital technology is therefore most effective when it is intentionally integrated into pedagogical design.

8. Digital Content Creation

Teachers increasingly need to become creators as well as users of digital content.

Digital content may include:

- Presentations.

- Educational videos.
- Digital worksheets.
- Interactive quizzes.
- Infographics.
- Audio resources.
- E-books.
- Digital lesson plans.
- Online activities.

The ability to evaluate existing resources is equally important. Teachers need to determine whether digital content is accurate, age-appropriate, curriculum-aligned, inclusive and reliable. Digital content should also be adapted to local contexts and, where appropriate, Indian languages.

9. Role of Digital Platforms

Digital educational platforms provide opportunities for teachers to access teaching resources and participate in professional learning.

DIKSHA is an important national digital platform supporting school education in India. It provides digital resources and teacher-oriented learning opportunities and has been developed as part of India's digital education ecosystem.

Such platforms can support:

- Digital textbooks.
- Teacher training.
- Educational videos.
- Learning resources.
- Professional communities.
- Assessments.
- QR-linked resources.

The effectiveness of these platforms, however, depends on teachers' digital skills, internet access, awareness and ability to integrate available resources into classroom teaching.

10. Teachers' Digital Competency and Professional Development

Continuous professional development is essential for improving teachers' digital competency.

Traditional one-time ICT workshops may provide basic exposure but may not be sufficient to produce sustained changes in classroom practice. Teachers require continuous opportunities to experiment, collaborate, reflect and receive feedback.

Effective professional development should include:

1. Basic digital literacy.
2. Digital lesson planning.
3. Digital content creation.
4. Online assessment.
5. Digital classroom management.
6. Cybersecurity.
7. Digital ethics.
8. Inclusive technology.
9. Artificial intelligence awareness.
10. Peer collaboration.

UNESCO's ICT Competency Framework emphasises the importance of integrating ICT competencies into teacher preparation and professional development (UNESCO, 2018).

11. Digital Assessment

The changing educational environment also requires teachers to develop digital assessment competency.

Technology can support:

- Online quizzes.
- Formative assessment.
- Instant feedback.
- Digital portfolios.
- Online assignments.
- Interactive assessment.
- Learning analytics.

However, teachers must ensure that digital assessment is aligned with learning outcomes. Excessive dependence on automated assessment may not adequately measure creativity, critical thinking, collaboration and other complex competencies.

Digital assessment should therefore supplement, rather than automatically replace, appropriate forms of teacher judgement.

12. Digital Inclusion and Equity

Digital education can improve access to learning resources, but it can also increase inequality if access to technology is uneven.

The digital divide may occur because of:

- Lack of internet connectivity.
- Lack of devices.
- Electricity problems.
- Economic differences.
- Rural-urban disparities.
- Language barriers.
- Disability-related accessibility barriers.

Therefore, implementation of NEP 2020 should ensure that technology contributes to educational equity rather than creating new forms of exclusion.

Teachers need to be trained to provide alternative learning opportunities for students who have limited digital access.

13. Challenges to Teachers' ICT Readiness

The literature identifies several barriers.

13.1 Inadequate Infrastructure

Schools may lack sufficient computers, smart devices, reliable internet or technical facilities.

13.2 Limited Training

Teachers may receive insufficient opportunities for practical technology training.

13.3 Lack of Confidence

Digital anxiety and fear of technological failure can discourage teachers from experimentation.

13.4 Workload

Teaching, assessment and administrative responsibilities can reduce time available for learning new technologies.

13.5 Technical Support

Lack of technical personnel can make technology integration difficult.

13.6 Digital Divide

Unequal access to technology among students can limit the effectiveness of digital teaching.

13.7 Language and Content

Teachers may face difficulties finding suitable high-quality digital resources in local languages.

13.8 Cybersecurity and Privacy

Teachers need awareness of student privacy, passwords, cyberbullying, copyright and responsible online behaviour.

14. Artificial Intelligence and Future Digital Competency

Artificial Intelligence is changing the requirements for teacher digital competency.

Teachers increasingly need to understand:

- Generative AI.
- AI-assisted lesson planning.
- AI-generated content.
- AI-supported assessment.
- Personalised learning.
- AI ethics.
- Data privacy.
- Bias and reliability.
- Academic integrity.

UNESCO (2021) emphasises the importance of policy and ethical considerations in AI and education. UNESCO's subsequent work on generative AI also highlights the need for responsible and human-centred approaches.

Teachers therefore require sufficient AI literacy to guide students and evaluate AI-generated information critically.

15. Digital Ethics and Cybersecurity

Digital competency must include ethical and responsible technology use.

Teachers should understand:

- Copyright.
- Intellectual property.
- Data protection.
- Student privacy.
- Cybersecurity.
- Digital footprints.
- Cyberbullying.
- Responsible social media use.
- Ethical AI use.

Teachers also serve as role models. Students learn digital behaviour partly by observing their teachers' practices.

16. Review Synthesis

The reviewed literature indicates that teachers' digital competency is multidimensional.

Dimension	Importance for NEP 2020
Technical skills	Basic technology operation
Information literacy	Critical evaluation of information
Digital pedagogy	Learner-centred technology integration
Content creation	Contextual digital resources
Digital assessment	Continuous competency-based assessment
Communication	Teacher-student collaboration
Inclusion	Equitable access
Digital ethics	Safe and responsible technology use
AI literacy	Future-ready education
Professional development	Continuous improvement

The literature further indicates that infrastructure and teacher competency are interdependent. Providing digital infrastructure without preparing teachers may result in underutilisation, while teacher training without adequate infrastructure cannot produce sustained ICT integration.

17. Strategies for Strengthening Teachers' Digital Competency

Based on the literature reviewed, the following strategies are recommended:

17.1 Continuous Professional Development

Teacher training should be regular, progressive and practice-oriented.

17.2 Competency-Based ICT Training

Training should be organised according to different levels of teacher competency.

17.3 School-Based Support

Teachers should receive mentoring and peer support within schools.

17.4 Digital Resource Development

Teachers should be encouraged to develop locally relevant digital resources.

17.5 Infrastructure Development

Schools require reliable internet, devices, electricity and technical support.

17.6 Multilingual Resources

Digital content should be developed in Indian languages to support inclusion.

17.7 AI and Cybersecurity Training

Emerging technology, privacy and digital ethics should become part of teacher professional development.

17.8 Leadership Support

School leaders should encourage experimentation, innovation and collaborative learning.

18. Implications for NEP 2020 Implementation

Teachers' digital competency has implications for several objectives of NEP 2020.

Quality: Technology can provide diverse learning resources.

Equity: Digital resources can expand access when the digital divide is addressed.

Inclusion: Assistive technologies can support students with disabilities.

Competency-based education: Digital tools can support projects, simulations and interactive learning.

Teacher development: Online professional development can support lifelong learning.

Assessment: Digital assessment can facilitate timely feedback.

Therefore, digital competency should be integrated into teacher education, school leadership and institutional planning.

19. Conclusion

The review establishes that teachers' digital competency and ICT readiness are essential components of technology-enabled educational transformation under NEP 2020. Digital competency extends far beyond the ability to operate computers or mobile devices. It includes technological knowledge, digital pedagogy, content creation, information literacy, digital assessment, communication, inclusion, cybersecurity, ethics and emerging technology awareness. The literature also demonstrates that technology alone cannot transform education. The teacher remains the central factor determining whether technology contributes meaningfully to learning. Consequently, teachers require sustained professional development, adequate infrastructure, technical support and opportunities for collaborative learning.

NEP 2020 provides an important policy foundation for technology-enabled education in India. Initiatives such as DIKSHA and other digital platforms provide valuable opportunities for teachers and learners. However, effective implementation requires a coordinated approach in which infrastructure development, teacher preparation, digital resources and institutional support progress together.

The review concludes that teachers' digital competency should be considered a core professional competency for 21st-century school education. Preparing teachers to use ICT critically,

creatively, pedagogically, ethically and inclusively will be essential for translating the vision of NEP 2020 into effective classroom practice.

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