

Integration of Digital Technologies in Teaching & Learning

Dr. Sanjay Kumar Pandagale
Associate Professor in Education
Regional Institute of Education, NCERT, Bhopal

Introduction

- Education in the digital age requires **rethinking teaching practices**.
- NEP-2020 recognizes that technology, when integrated thoughtfully, can **transform teaching and learning**, making it more **interactive, inclusive, and learner-centred**.

NEP 2020: Vision for Digital Education

- Technology as an **enabler of quality and equity**
- Promotion of **blended and online learning**
- Digital support for **teacher professional development**
- Creation of **NDEAR – National Digital Education Architecture**

NEP 2020: Key Initiatives

- **DIKSHA** – Teacher training and resources
- **SWAYAM / SWAYAM PRABHA** – Online courses & TV channels
- **Virtual Labs & Digital Libraries**
- **Multilingual digital content**

Why Integrate Digital Technology?

- Enhances engagement
- Supports learner-centred pedagogy
- Develops 21st century skills

Meaningful Technology Integration

- Pedagogy-driven use
- Purposeful selection of tools
- Learning-focused approach

SAMR Model: Overview

- Framework by Dr. Ruben Puentedura
- Four levels of technology integration
- Enhancement & Transformation

SAMR Levels

- Substitution
- Augmentation
- Modification
- Redefinition

Substitution

Technology acts as a **direct substitute**, with no functional change.

Examples:

- PowerPoint instead of chalkboard
- Typing assignments instead of writing
- PDF textbook instead of printed book

NEP Alignment:

Initial exposure to digital tools; improves access.

Augmentation

Technology substitutes with **functional improvement**.

Examples:

- PPT with images, animations, videos
- Google Docs with spell-check & comments
- Online quizzes with instant feedback

NEP Alignment:

Improves **learning efficiency and engagement**.

Modification

Technology allows **significant task redesign**.

Examples:

- Collaborative projects using Google Classroom
- Students creating digital presentations or blogs
- Peer feedback through online platforms

NEP Alignment:

Promotes **experiential, collaborative learning**.

Redefinition

Technology enables **entirely new learning tasks** previously impossible.

Examples:

- Virtual labs and simulations
- Global collaboration with students from other regions
- Student-created videos, podcasts, digital portfolios

NEP Alignment:

Supports **innovation, creativity, and 21st-century skills.**

SAMR & NEP 2020 Alignment

- Supports experiential learning
- Encourages innovation
- Promotes creativity

Classroom Example: Mathematics

SAMR Level	Classroom Practice
Substitution	PPT explaining concept
Augmentation	PPT with animations & quizzes
Modification	Students solve problems collaboratively online
Redefinition	Students create tutorial videos or simulations

Classroom Example: Language Teaching

SAMR Level	Classroom Practice
Substitution	Digital text instead of book
Augmentation	Audio-visual reading
Modification	Collaborative story writing
Redefinition	Podcast / blog creation

Role of Teacher

- Facilitator & mentor
- Select appropriate SAMR level
- Ensure meaningful learning

Link with TPACK

Effective integration requires balance of:

- **Content Knowledge**
- **Pedagogical Knowledge**
- **Technological Knowledge**

SAMR helps teachers **progress from enhancement to transformation.**

Blended Learning Approach

- Face-to-face + online
- NEP 2020 recommended model
- Flexible & inclusive

Inclusive Education through Technology

- Support for diverse learners
- Assistive technologies
- Multilingual content

Challenges in Integration

- Digital divide
- Lack of training
- Over-dependence on tools
- Infrastructure issues

Way Forward (NEP 2020)

- Continuous **teacher professional development**
- Blended learning models
- Context-based technology use
- Ethical and responsible digital practices

Suggested Activity

- Redesign one lesson using **all four SAMR levels**
- Share in groups and reflect

Conclusion

- Technology integration should be **pedagogy-driven**
- SAMR helps teachers **evaluate and improve digital use**
- NEP-2020 encourages **transformational learning**
- Teachers remain the **central change agents**

Thank You

- Integration of Digital Technologies
- NEP 2020 & SAMR Model