Research Title: Awareness and challenges of special teachers in Integrating Technology in teaching-learning practices in the Context of NEP 2020

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Abstract

The advent of the National Education Policy 2020 has brought a renewed emphasis on integrating technology into India's classrooms. This shift is particularly significant for special teachers working with learners who have Hearing Impairment or Intellectual Disabilities, as technological tools can promote accessibility, individualized instruction, and inclusive pedagogy. The present study examines the level of technological awareness among special teachers and identifies the challenges they encounter while embedding digital tools into their teaching-learning processes, in alignment with NEP 2020 objectives such as fostering digital literacy, blended learning, and innovation in pedagogy. A purposive sample of 60 special teachers (working with HI and ID learners) from Mumbai was selected. Data were collected using a structured questionnaire containing multiple-choice items administered via Google Forms. Analysis involved descriptive and inferential statistics to present a detailed understanding of participants' competencies and the barriers they face. The findings aim to inform policy, practice, and professional development initiatives that can strengthen technology integration in special education settings.

Key Words: Awareness, Challenges, Technology Integration, Teaching-Learning Practices, Special teachers.

Introduction

The National Education Policy 2020 marks a transformative moment in India's educational landscape, placing significant emphasis on technology integration across all levels of instruction (Ministry of Education, 2020). For special teachers teaching learners with Hearing Impairment or Intellectual Disabilities, the effective use of technology has the potential to enhance accessibility, provide personalized learning opportunities, and enrich the overall educational experience (Burgstahler, 2015; Smith, 2017). While the promise of technology in special education is widely acknowledged, its successful adoption depends largely on the competence, confidence, and preparedness of educators (Kumar, Sharma, & Sharma, 2019). Many teachers face challenges such as inadequate training, limited institutional support, and lack of access to

inclusive digital resources (UNESCO, 2018). Moreover, integrating technology in special education is not a one-size-fits-all process it requires adaptations to accommodate the diverse needs of learners.

Given these considerations, it is essential to examine not only the level of technological awareness among special teachers but also the specific barriers they encounter in applying digital tools within their teaching practices. Such insights can help identify the enabling factors for successful technology integration, inform capacity-building programs, and ultimately contribute to the NEP 2020 vision of inclusive, digitally empowered classrooms.

The present study focuses on special teachers in Mumbai who work with learners having HI and ID. It explores their technological competencies, identifies challenges in aligning classroom practice with NEP 2020 objectives, and aims to provide evidence-based recommendations for improving both access to and the quality of technology-enabled teaching-learning processes in special education contexts.

Theoretical Framework

The integration of technology into the teaching-learning processes of special teachers can be better understood through several established theoretical perspectives. These frameworks explain not only the awareness and attitudes of educators toward technology but also the challenges and strategies involved in adopting it for inclusive education.

The Technology Acceptance Model (TAM) proposed by *Davis (1989)* offers a foundational perspective by suggesting that educators' willingness to adopt technology is influenced by their perception of its ease of use and its usefulness in enhancing teaching outcomes. Within the context of special education, TAM stated that special teachers must both recognize the potential of technology and perceive it as beneficial for addressing the unique learning requirements of students with disabilities.

The Universal Design for Learning (UDL) framework (*Meyer, Rose, & Gordon, 2014*) advocates for flexible, adaptable learning environments that can accommodate diverse learner needs. For special teachers, UDL emphasizes the creation of instructional materials and approaches that provide multiple means of representation, engagement, and expression objectives that can be effectively achieved through appropriate technology integration.

Vygotsky's Social Constructivist Theory (*Vygotsky, 1978*) further contributes by highlighting the role of collaboration, social interaction, and scaffolding in learning. Technology, especially assistive and communication tools, can act as a mediator in these processes, enabling students with HI and ID to participate more actively in collaborative and interactive learning experiences.

The SAMR Model developed by *Puentedura (2010)* offers a staged framework for evaluating the depth of technology integration from substitution of traditional methods to redefinition, where technology facilitates learning experiences previously not possible. This model is particularly useful for special teachers aiming to move beyond basic usage toward transformative integration of technology in their teaching practices.

Finally, Bronfenbrenner's Ecological Systems Theory (*Bronfenbrenner, 1979*) provides a holistic view, recognizing that technology adoption is shaped by multiple layers of influence personal attitudes, institutional culture, policy frameworks, and societal access to resources. Understanding these multi-level factors is essential for supporting special teachers in adopting and sustaining technology use.

Taken together, these theories illustrate that technology integration in special education is a multidimensional process, requiring not only individual readiness but also institutional support, resource availability, and inclusive pedagogical strategies.

Need for Study

The integration of technology into modern classrooms has emerged as a critical component of effective teaching and learning, a priority reinforced by the National Education Policy (NEP) 2020. The policy envisions the creation of digitally literate, technologically confident educators capable of employing innovative pedagogical approaches to meet diverse student needs (Ministry of Education, 2020).

In special education settings, the importance of this integration is amplified. Educators working with students who have Hearing Impairment or Intellectual Disabilities must often adapt teaching materials, delivery methods, and assessment strategies to ensure equitable learning opportunities. Technology when appropriately selected and applied can support personalized instruction, enhance engagement, and bridge accessibility gaps (Burgstahler, 2015).

However, effective integration is not without challenges. Barriers may include limited technological training, inadequate institutional infrastructure, financial constraints, attitudinal resistance, and difficulty keeping pace with rapidly evolving tools (Binghimlas, 2009; Kumar et al., 2019). Furthermore, research exploring the specific awareness levels and challenges faced by special teachers in the Indian context remains limited.

This study seeks to address this gap by investigating the technological knowledge and integration challenges among special teachers in Mumbai working with HI and ID learners. The findings are expected to inform targeted professional development programs, guide policy recommendations, and contribute to strengthening NEP 2020's vision of inclusive, technology-enabled education for all learners.

Explanation of Key Terms:

- **Awareness –** In the context of this study, awareness refers to the extent of special teachers' knowledge, understanding, and recognition of the significance of integrating technology into their teaching-learning practices. It includes familiarity with various digital tools, online platforms, software applications, inclusive pedagogical approaches, and technological resources that can be used to meet the educational needs of learners with Hearing Impairment (HI) and Intellectual Disabilities (ID).
- **Challenges –** Challenges denote the barriers and difficulties encountered by special teachers when incorporating technology into teaching and learning. These may include technical issues, limited time, communication barriers, psychological resistance, inadequate pedagogical skills, financial constraints, administrative hurdles, and the need to keep pace with continuous technological advancements.
- **Integration of Technology –** For this study, integration of technology refers to the systematic incorporation of technological devices, platforms, and resources into the instructional process. This includes the use of digital tools, educational software, online content, and innovative teaching aids to enhance student engagement, participation, and learning outcomes.
- **Teaching-Learning Practices –** This term refers to the strategies, methods, and approaches employed by special teachers to address the learning needs of students with HI and ID. It encompasses lesson planning, instructional delivery, classroom management, assessment, and feedback practices adapted for diverse learners.
- **Special teachers –** Special teachers are teachers with specialized training and expertise in working with students with disabilities, including those with HI and ID. They design, adapt, and deliver educational programs tailored to the unique needs, abilities, and learning styles of their students.

Aim of Study

To assess the technological knowledge of special teachers working with students with Hearing Impairment and Intellectual Disabilities in Mumbai, and to identify the challenges they face in integrating technology into the teaching-learning process, in alignment with the National Education Policy 2020's goals of fostering digital literacy, blended learning, and innovative pedagogy.

Objective:

1. To study special education teachers' awareness level of integrating technology in teaching-learning practices, in line with NEP 2020 goals.
2. To identify challenges faced by teachers in integrating technology into teaching-learning practices, in alignment with NEP 2020 goals.

Research Question

1. What is the current level (High /mid /low) of awareness among special education teachers regarding the integration of technology in teaching-learning practices as per the goals of NEP 2020?
2. What are the primary challenges faced by special education teachers in integrating technology into their teaching-learning practices in alignment with NEP 2020?

Review of Literature

The National Education Policy (NEP) 2020 represents a landmark reform aimed at transforming India's education system. One of its central pillars is strengthening teacher education, given the critical role educators play in shaping learners' academic and personal growth (Ministry of Education, 2020). The policy outlines the need to modernize teacher preparation programs to equip educators with the competencies required for 21st-century teaching, including technological proficiency and adaptive pedagogical skills.

Teacher competence directly influences student success. As Binghimlas (2009), Koehler et al. (2007), and Schoepp (2005) have noted, integrating technology into educational practice is a complex and evolving process that demands both technical skill and pedagogical insight. Adoption is often shaped by teachers' prior experiences, attitudes, and even biases toward technological tools (Belland, French, & Ertmer, 2009; Galvis, 2012; Kaya & Yilayaz, 2013). Research has shown that technological innovation can be a powerful equalizer in classrooms, enabling students with special needs to access learning opportunities on par with their peers. According to the U.S. federal definition cited by Hasselbring and Williams Glaser (2000), assistive technology encompasses any device or system whether commercially produced, modified, or custom-built designed to increase, maintain, or improve the functional capabilities of individuals with disabilities.

Integration of Technology: NEP 2020 emphasizes technology integration at every level of education, from instructional delivery and assessment to planning and administration. Recommended applications include artificial intelligence, machine learning, blockchain, smart boards, handheld devices, and adaptive testing platforms. Such tools have the potential to make

learning more personalized, interactive, and accessible for all learners, including those with Hearing Impairment and Intellectual Disabilities.

Teacher Training: To facilitate this transition, NEP 2020 promotes continuous professional development through platforms such as DIKSHA and SWAYAM, offering educators training in emerging pedagogical strategies and educational technologies. These initiatives aim to ensure that teachers can confidently integrate digital tools into their daily practice.

Technological Competence of Special teachers: While many special teachers recognize the benefits of Information and Communication Technology, their levels of confidence and proficiency vary. Karunamoorthy (2021) found that although most special teachers report feeling competent using ICT, some prefer working with such tools independently to avoid making errors in front of others. This suggests that confidence may be influenced by anxiety about technology use or the perception that students are more adept with digital tools than their teachers.

Challenges in Technology Integration: Barriers to effective technology use in special education settings include resistance to change, inadequate training and support, infrastructural limitations, attitudinal constraints, and resource shortages (NEP, 2020). Overcoming these barriers requires targeted interventions, such as specialized training, institutional support, and the provision of accessible and context-appropriate technological resources.

Overall, the literature highlights both the promise and the complexity of integrating technology into special education. While NEP 2020 provides a clear policy direction, the success of its implementation depends on bridging gaps in awareness, competence, and institutional support for special teachers.

Methodology

This study employed a descriptive research design, which is appropriate for examining the existing levels of awareness and the specific challenges faced by special teachers in integrating technology into their teaching practices. The approach allowed for the systematic collection, organization, and analysis of data to identify patterns, trends, and areas for improvement in technology integration.

Research Instrument

A self-constructed questionnaire was developed exclusively for this study to gather comprehensive information on participants' technological awareness, the barriers they face in technology integration, and their perspectives on teaching-learning practices. The instrument comprised both closed-ended and multiple-choice items, enabling quantitative analysis while capturing specific insights from respondents.

The questionnaire underwent content validation by a panel of six experts in the fields of special education and educational technology to ensure relevance, clarity, and alignment with the study

objectives. Their feedback informed refinements to the wording, structure, and scope of the tool, thus enhancing its validity.

Population and Sample

The study targeted special teachers working with students with Hearing Impairment (HI) and Intellectual Disabilities (ID) in Mumbai. The purposive sampling method was adopted to ensure the inclusion of participants who met the following criteria:

- Possession of professional qualifications in special education.
- A minimum of five years of teaching experience.
- Proficiency in both Hindi and English for effective participation.

A total of 60 participants meeting these criteria were selected for the study.

Data Collection Procedure: Data were collected using the validated questionnaire administered via Google Forms. This mode of collection facilitated timely responses, ensured accessibility for participants, and allowed for systematic organization of data for analysis.

Data Analysis: The collected data were analyzed using descriptive statistical methods, including the calculation of frequencies and percentages. This analysis provided a clear representation of the levels of awareness among participants and highlighted the most significant challenges they encounter in technology integration. The findings were subsequently interpreted in relation to the objectives of the study and existing literature.

Ethical Considerations: Ethical guidelines were strictly followed throughout the research process. Informed consent was obtained from all participants prior to data collection. Participants were assured of anonymity and confidentiality, with their responses used solely for academic purposes. No identifying information was disclosed in the reporting of findings.

Result and Discussion

Demographic Profile of Participants

The demographic analysis revealed that 73% of participating special teachers reported using technology regularly for teaching standard school subjects. This reflects a considerable level of integration, although not yet universal.

When examining the use of online teaching platforms, it was found that Zoom emerged as the most frequently utilized tool, reported by 66% of respondents. This preference may be attributed to its user-friendly interface, accessibility features, and widespread familiarity among both teachers and students.

Further, 70% of participants indicated that they had received some form of online teaching training provided by their respective institutions, suggesting institutional support in building educators' digital capacity, though the depth and quality of such training may vary.

Technology Awareness: A majority (69%) of respondents demonstrated awareness of various technological tools that could be incorporated into special education settings. However, 31% admitted limited or no familiarity with such tools, highlighting the need for targeted awareness and orientation programs.

Challenges in Technology Integration

Technological Challenges: A significant 66.7% of educators expressed feeling inadequately prepared to operate digital tools and platforms. This technological gap was linked to factors such as insufficient training, apprehension about using unfamiliar systems, the rapid pace of technological change, and limited available time for skill development.

Pedagogical Challenges: Among the pedagogical barriers, 79.2% of participants reported limited skills in operating and troubleshooting digital tools making this the most pressing instructional challenge. In contrast, the least reported (yet still notable) concern was the lack of alignment between technological tools and the traditional curriculum, identified by 43.8% of respondents.

Psychological Challenges: A lack of personalized tools to meet individual learning needs was reported by 70% of educators. They observed that many generic tools fail to address the varied learning styles and accessibility requirements of students with HI and ID. Additional concerns included accessibility issues, insufficient preparedness to use tools effectively, and language barriers in digital content.

Financial Challenges: A substantial 70% of educators identified financial constraints as a barrier to effective technology use. Common issues included the high cost of devices, internet service expenses, maintenance costs, and limited institutional financial support.

Discussion

The findings align with earlier research indicating that while special teachers recognize the potential of technology, significant challenges particularly in technical readiness, pedagogy, and resource access hinder optimal integration (Binghimlas, 2009; Kumar et al., 2019).

The dominance of Zoom as a teaching platform suggests a reliance on tools that are widely available and easy to operate, but it also raises questions about whether educators are exploring other platforms with specialized accessibility features tailored for learners with HI and ID.

The relatively high proportion of educators who have received training indicates a positive institutional trend. However, the persistence of confidence gaps and skill limitations suggests that training programs may need to be more hands-on, context-specific, and focused on special education needs.

Finally, the prevalence of financial and infrastructure-related barriers highlights the need for policy-level interventions, such as subsidized device provision, affordable internet access for educators, and institutional investment in accessible technology solutions.

Recommendations

Based on the findings of this study, the following recommendations are proposed to enhance technology integration in special education settings:

1. **Financial Support Mechanisms:** Provide targeted financial assistance to special teachers for acquiring devices, maintaining equipment, and ensuring affordable internet access. Government subsidies, institutional grants, and public-private partnerships can help bridge financial gaps.
2. **Development of Personalized Learning Tools:** Encourage the creation and dissemination of customized digital resources that cater to the diverse needs of students with Hearing Impairment (HI) and Intellectual Disabilities (ID). This includes designing tools with adaptable features, multilingual options, and built-in accessibility functions.
3. **Comprehensive Training Programs:** Implement regular, structured training sessions that combine theoretical knowledge with practical, hands-on experience. Training should be tailored to special education contexts, focusing on assistive technologies, adaptive software, and inclusive teaching strategies.
4. **Awareness Initiatives for NEP 2020:** Organize awareness campaigns, workshops, and orientation programs to familiarize educators with the provisions of the National Education Policy (NEP) 2020, particularly its emphasis on technology-enabled learning and inclusive pedagogy.
5. **Institutional Support Systems:** Strengthen institutional infrastructure by providing continuous technical assistance, establishing dedicated resource centers, and ensuring reliable internet and device availability within schools.
6. **Recognition and Incentives:** Establish recognition programs and incentives for educators who demonstrate innovative and effective use of technology in special education. Such acknowledgment can motivate wider adoption and encourage the sharing of best practices.

Conclusion

The integration of technology in special education holds transformative potential for improving learning accessibility, engagement, and outcomes for students with HI and ID. This study revealed that while a significant proportion of special teachers are aware of and use digital tools, considerable challenges persist ranging from technical preparedness and pedagogical adaptation to financial and infrastructural constraints.

Institutional training efforts and the gradual adoption of platforms like Zoom indicate a positive trajectory; however, the presence of skill gaps and persistent barriers states the need for more specialized, hands-on, and sustained professional development. Additionally, addressing financial limitations and creating personalized, accessible digital tools are essential for realizing the vision of the NEP 2020 in special education.

By combining policy-level support, institutional commitment, and targeted capacity-building initiatives, it is possible to empower special teachers with the skills, resources, and confidence required to fully leverage technology. Such efforts will contribute not only to enhanced teaching-learning practices but also to greater inclusivity and equity in education.

References

1. Anand, P. (2022, Education policy and politics in India. Paper presented at the National Education Policy Conference.

2. Belland, B. R., French, B. F., & Ertmer, P. A. (2009). Validity and problem-based learning research: A review of instruments used to assess intended learning outcomes. Interdisciplinary Journal of Problem-Based Learning, 3(1), 59.

3. Binghimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning: A review of the literature. Eurasia Journal of Mathematics, Science and Technology Education, 5(3), 235–245.

4. Burgstahler, S. (2015). Universal design in education: Principles and applications. In S. Burgstahler & R. Cory (Eds.), Universal design in higher education: From principles to practice (pp. 3–20). Harvard Education Press.

5. Bronfenbrenner, U. (1979). The ecology of human development: Experiments by nature and design. Harvard University Press.

6. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-339.

7. Galvis, H. A. (2012). Understanding beliefs, teachers' beliefs and their impact on the use of computer technology. Profile Issues in Teachers' Professional Development, 14(2), 95–112.

8. Kaya, Z., & Yilayaz, Ö. (2014). Technology integration models in teacher education and technological pedagogical content knowledge. Bati Anadolu Egitim Bilimleri Dergisi, 8(1), 1–10.

9. Kumar, S., Sharma, S., & Sharma, M. (2019). Integration of technology in special education: Challenges and opportunities. Journal of Special Education Technology, 34(2), 83–94.

10. Meyer, A., Rose, D. H., & Gordon, D. (2014). Universal design for learning: Theory and practice. CAST Professional Publishing.

11. Ministry of Education. (2020). National Education Policy 2020. Government of India.

12. Puentedura, R. R. (2010). SAMR: A brief introduction. Retrieved from

13. Schoepp, K. (2005). Barriers to technology integration in a technology-rich environment. Learning and Teaching in Higher Education: Gulf Perspectives, 2(1), 56–79.

14. Smith, D. W. (2017). Assistive technology for students with disabilities: A review of the literature. Journal of Special Education Technology, 32(2), 63–74.

15. UNESCO. (2018). Global education monitoring report 2019: Migration, displacement and education: Building bridges, not walls. UNESCO. Retrieved from (link unavailable)

16. Vygotsky, L. S. (1978). Interaction between learning and development. Readings on the development of children, 22-27.