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Awadh International Journal of Information Technology and Education

Volume 14 **Issue 2** **September 2025**

Contents

1. *Exploring the Knowledge, Perspectives and Attitude of B.Ed. Learners towards the Utilisation of ChatGPT as an Educational Resource* 1
Mr. Shankha Shekhar Rakshit, Dr. Sharmila Yadav & Dr. Pritam Rajak

2. *AI for Inclusive Education: Preparing Trainee Teachers to Support Hearing-Impaired Students through HearSim and Rogervoice* 14
Dr. Geeta Pathak

3. *Digital Literacy to Achieve Inclusion in India* 27
Ms. Preeti Sharma

4. *Technology in Empowering Marginalized Communities and Children with Special Needs (CwSN)* 30
Dr. Parul Maheshwari & Dr. Abhinav Kumar PT

5. *Post-humanist View of Inclusion: Rethinking Learner Identities and Agency with AI and Digital Tools* 35
Dr. Arti Bhatnagar & Dr. Fozia Roohi

6. *From Support System to Pedagogical Partner: The Role of Artificial Intelligence in Reshaping Teaching and Faculty Engagement in Higher Education* 42
Ms. Hema Rani

7. *Role of AI to Enhance Educational Experience* 56
Ms. Panya Sharma

8. *Strategies and Action Plans for Implementing Technology Integration Initiatives in the Indian Education System* 62
Mr. Himanshu Yadav

INSTITUTE OF VOCATIONAL STUDIES
PRINCIPAL

Awadh International Journal of Information Technology and Education
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Pp. 30-34

4

Technology in Empowering Marginalized Communities and Children with Special Needs (CwSN)

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ABSTRACT

Technology plays a vital role in empowering marginalized communities and Children with Special Needs (CwSN) by enabling access to information, services, education, and social participation, ultimately fostering greater inclusion and socio-economic development.

Digital literacy initiatives, ICT platforms, and emerging technologies help marginalized groups enhance their skills, confidence, and social engagement. These technologies bridge the digital divide, provide employment opportunities, and improve access to essential government and social services. Ethical digital design and digital inclusion programs give participants the tools to overcome barriers such as limited infrastructure and socio-economic challenges, ensuring long-term impact.

Assistive technologies such as screen readers, speech-to-text tools, adaptive learning software, and educational apps support children with special needs in overcoming unique learning and accessibility challenges. These tools facilitate communication, develop cognitive and perceptual skills, and promote inclusion in mainstream education. Universal Design for Learning (UDL) principles, along with teacher training and policy support, are crucial for effective integration of technology with CwSN. Many digital solutions, from customized software to robots and devices, are increasingly available to help students with physical, sensory, and cognitive disabilities achieve success and independence.

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Key challenges include limited access to reliable infrastructure, resistance to change, and lack of training for effective technology use. To address these, policymakers should focus on inclusive design, sustainable funding, and community-driven programs. Collaboration among governments, educational institutions, and local organizations is essential for developing appropriate solutions and ensuring technology benefits all.

The transformative potential of technology integration and assistive devices is pivotal in empowering marginalized groups and CwSN, making digital inclusion and accessibility a foundational part of broader socio-economic advancement.

Keywords: Children with Special Needs (CwSN), Technology, Marginalized.

INTRODUCTION

The 21st century is defined by rapid technological advancement, which has become both an enabler and a divider. While mainstream populations increasingly benefit from digital solutions, marginalized communities and children with special needs (CwSN) often remain excluded from these opportunities. Marginalization stems from social, economic, geographic, or physical barriers, while children with disabilities face systemic exclusion from education and participation. Technology, when effectively integrated, has the power to dismantle these barriers, promoting social justice, inclusivity, and equity.

This paper explores the transformative role of technology in empowering marginalized groups and CwSN, with a focus on educational access, skill development, and social participation.

Digital literacy initiatives, ICT platforms, and assistive technologies bridge the digital divide and promote equity. However, challenges such as infrastructural barriers, resistance to adoption, and lack of training persist. This paper critically examines the role of technology in enhancing empowerment and inclusion, highlighting case studies, challenges, and recommendations for sustainable digital equity.

LITERATURE REVIEW

Technology and Marginalized Communities

Studies highlight that digital literacy programs and ICT-based interventions improve access to government services, healthcare, and employment opportunities (UNESCO, 2022). Community-driven initiatives such as mobile banking and e-governance platforms have empowered rural and underserved populations (Sen, 2020).

Technology for Children with Special Needs

Assistive technologies, including screen readers, speech-to-text tools, augmentative communication devices, and adaptive learning platforms, enhance learning outcomes and independence for CwSN (WHO, 2021). Research on Universal Design for Learning (UDL)

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demonstrates that inclusive educational technologies improve participation for students with diverse learning needs (Rose & Meyer, 2019).

Gaps and Challenges

Despite progress, limited access to infrastructure, affordability, and insufficient teacher training hinder effective technology integration (World Bank, 2023). Scholars also note resistance from communities due to cultural and social perceptions of disability or technology (Kumar & Bansal, 2021).

METHODOLOGY

This research is conceptual in nature, drawing from secondary data, case studies, and policy analyses. A qualitative approach is applied to synthesize findings from reports, educational frameworks and grassroots projects.

TECHNOLOGY EMPOWERING MARGINALIZED COMMUNITIES

Bridging the Digital Divide

Community ICT centers, low-cost smartphones, and public Wi-Fi programs have enabled disadvantaged populations to connect with education and employment. For example, India's "Digital India" initiative has created digital access points in rural areas.

Enhancing Social and Economic Participation

Mobile applications for telemedicine, digital agriculture advisories, and micro-finance platforms empower communities with timely information and services. ICT-enabled vocational training provides marginalized youth with employable skills.

Ethical Digital Design

Inclusive technology must address barriers of language, literacy, and accessibility. Designing apps with multilingual support, offline capabilities, and simple interfaces ensures sustainability and usability.

TECHNOLOGY EMPOWERING CHILDREN WITH SPECIAL NEEDS

- Assistive Devices and Software
- Visual impairments: Screen readers, Braille displays.
- Hearing impairments: Captioning tools, speech-to-text apps.
- Cognitive disabilities: Adaptive learning platforms, gamified educational tools.

Universal Design for Learning (UDL)



UDL principles encourage multiple means of representation, engagement, and expression, ensuring equitable learning experiences. For example, e-learning platforms offering text, audio, and video options help diverse learners.

Teacher Training and Policy Support

Teachers play a crucial role in technology integration. Professional development programs must train educators to use assistive tools effectively. National education policies (e.g., NEP 2020 in India) stress inclusive digital pedagogy.

CHALLENGES

- Infrastructure: Limited internet connectivity and electricity in rural areas.
- Economic Barriers: High cost of devices and assistive technologies.
- Capacity Building: Lack of training for teachers, caregivers, and community leaders.
- Cultural Resistance: Stigma surrounding disability and skepticism about technology adoption.

RECOMMENDATIONS

1. Inclusive Design: Develop affordable, user-friendly, multilingual technologies.
2. Capacity Building: Provide training for teachers, parents, and community workers.
3. Policy Integration: Governments should integrate digital inclusion into mainstream education and social welfare policies.
4. Public–Private Partnerships: Collaborations between technology firms, NGOs, and governments can fund and scale solutions.
5. Sustainable Infrastructure: Investments in rural internet connectivity, solar-powered devices, and low-cost assistive tools.

CONCLUSION

Technology is not a panacea, but when designed inclusively, it is a powerful tool for empowerment. For marginalized communities, it bridges digital and socio-economic divides. For CwSN, it enables independence, communication, and inclusion in mainstream education. Ensuring access, equity, and sustainable adoption requires multi-stakeholder collaboration, inclusive policies, and context-sensitive innovation.



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