



Digital equity for Janjatiya (Indigenous) peoples: Opportunities and challenges in the digital age- A qualitative study in Hooghly District, West Bengal

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Abstract

Digital equity has emerged as a crucial concern in the 21st-century education landscape, especially in rural and marginalized contexts. This qualitative study explores the opportunities and challenges faced by Janjatiya (Indigenous) learners and educators in achieving digital inclusion in the Hooghly district of West Bengal, India. Drawing upon in-depth interviews, focus group discussions, and field observations across three tribal-dominated villages, the study investigates the lived realities of digital access, skills, and cultural adaptation. Findings reveal that while the digital age offers unprecedented educational possibilities, inequities persist due to infrastructural limitations, socio-economic disparities, linguistic barriers, and the absence of culturally relevant digital content. The paper argues that digital inclusion must be viewed not merely as technological access but as a process of cultural empowerment and participatory education. Policy implications for digital literacy programs, teacher training, and community-based interventions are discussed to promote sustainable digital equity among indigenous populations.

Keywords: Digital equity, Janjatiya communities, digital divide, qualitative research, inclusion, West Bengal

Introduction

1. Background of the Study

The digital transformation of education has redefined how knowledge is produced, accessed, and shared. Yet, this transformation has not been equitable. In India, while national initiatives such as Digital India, PM eVidya, and Samagra Shiksha Abhiyan aim to democratize access, the reality of rural and indigenous community's remains marked by digital marginalization. The Janjatiya or indigenous peoples, representing over 8.6% of India's population (Census 2011), are among those most vulnerable to the digital divide due to socio-economic, geographic, and linguistic factors.

In West Bengal, indigenous groups such as the Santhal, Munda, and Bhumij inhabit districts like Purulia, Bankura, and Hooghly, where technological outreach remains uneven. The post-pandemic education environment, characterized by online and blended learning, exposed deep fractures in accessibility and digital readiness. This study investigates how indigenous learners in the Hooghly district experience digital education, negotiate challenges, and envision opportunities within their socio-cultural realities.

2. Rationale and Significance

Digital equity goes beyond mere internet connectivity; it encompasses equitable access to digital devices, skills, content, and participation in digital learning ecosystems. For indigenous peoples, achieving digital equity is intertwined with cultural identity, language preservation, and local knowledge systems. Yet, research on digital education among indigenous communities in Eastern India remains limited.

This study addresses this gap by documenting the lived experiences of Janjatiya learners, teachers, and parents in Hooghly district. It provides qualitative insights into how digital technologies are reshaping educational opportunities, aspirations, and cultural engagement.

3. Objectives of the Study

- To explore the current state of digital access and literacy among Janjatiya students and teachers in Hooghly district.
- To identify socio-cultural and infrastructural barriers that hinder digital inclusion.
- To examine how indigenous communities perceive and adapt to digital learning environments.
- To suggest educational strategies and policy directions for promoting digital equity.

4. Research Questions

- What are the existing opportunities for digital inclusion among Janjatiya learners in Hooghly district?
- What challenges do they face in accessing and utilizing digital education?
- How do indigenous communities negotiate cultural and linguistic dimensions in the digital space?
- What interventions could foster greater digital equity in indigenous education?

Review of Related Literature

1. Conceptualizing Digital Equity

Digital equity refers to the fair distribution of technological resources, digital literacy, and online participation opportunities (Robinson *et al.*, 2020)^[20]. Warschauer (2004)^[25] emphasizes that equity is not merely about hardware but involves the interplay of access, skills, and meaningful use. In the context of education, digital equity ensures that every learner, regardless of geography or background, can access quality digital learning experiences.

2. Indigenous Education and Digital Divide

Globally, indigenous communities have faced historical exclusion from educational reforms and digital transformation (UNESCO, 2022)^[24]. Studies from Australia (Kral, 2010)^[12], Canada (McMahon, 2014)^[15], and India

(Sahoo & Das, 2021) [22] indicate that digital inclusion initiatives often fail to consider indigenous epistemologies, local languages, and cultural learning patterns.

In India, tribal education policies under Eklavya Model Residential Schools (EMRS) and Samagra Shiksha Abhiyan emphasize inclusion but rarely integrate digital pedagogies meaningfully. The challenge is not only infrastructural but also epistemic the need to bridge indigenous knowledge systems with modern digital learning (Jha & Shah, 2020) [10].

3. Digital Learning in West Bengal

West Bengal's digital literacy campaigns, such as Utkarsha Bangla and Sabooj Sathi (providing bicycles and tablets), have aimed to reach rural youth. However, studies (Roy, 2022; Ghosh, 2023) [8, 21] reveal persistent gender gaps, device-sharing issues, and poor connectivity in tribal belts. The digital shift during COVID-19 accentuated these inequities, particularly for first-generation learners from indigenous families.

4. Theoretical Framework

This study adopts the Digital Inclusion Framework (Robinson *et al.*, 2020) [20] combined with Cultural-Historical Activity Theory (CHAT) (Engeström, 2001) [7]. It views digital equity as an outcome of social practices mediated by tools, community norms, and cultural identities emphasizing that indigenous learners' digital engagement must be understood within their socio-cultural ecosystems.

Methodology

The study employed a qualitative exploratory approach within an interpretivist framework to understand participants lived experiences in tribal-dominated rural settings. Research was carried out in three villages of Hooghly district, and data were gathered through semi-structured interviews, focus group discussions, and field observations. Thematic analysis guided the interpretation of data, which were transcribed, coded, and organized into meaningful categories.

Findings

1. Theme 1: Unequal Access, Uneven Opportunities

Despite widespread awareness of smartphones, ownership remains limited. Most households possess a single mobile device shared among members. Internet connectivity fluctuates, especially during monsoons. One student remarked: "When the network disappears, the class also disappears."

Teachers confirmed that many assignments go unsubmitted due to device scarcity or battery issues. The promise of *Digital India* remains aspirational in these contexts.

2. Theme 2: Digital Literacy and Cultural Capital

Students display curiosity about digital tools but lack structured guidance. Teachers themselves struggle with digital pedagogy. The community's oral learning traditions and collective practices contrast sharply with the individualized digital model. Digital literacy, therefore, is not just technical but cultural involving the adaptation of collective learning to solitary online spaces.

3. Theme 3: Language and Cultural Disconnect

Most digital learning materials are in English or standard Bengali, alienating indigenous learners whose home

language may be Santhali or Kurmali. A teacher noted: "Even if we give them YouTube lessons, they cannot follow the accent or examples." This linguistic mismatch limits comprehension and engagement. The absence of localized, culturally resonant digital content reproduces epistemic marginalization.

4. Theme 4: Gender and Generational Gaps

Girls face additional restrictions on device use, often due to parental anxieties about online exposure. Older community members express suspicion toward digital media, associating it with cultural erosion. Thus, digital equity intersects with gender norms and generational divides.

5. Theme 5: Emerging Opportunities and Aspirations

Amid challenges, digital exposure also inspires aspiration. Students who access online tutorials express motivation to pursue higher education. Teachers see potential in blended learning if provided with training and infrastructure. Some community youth have begun assisting elders in online form filling, symbolizing emerging digital citizenship.

6. Theme 6: Towards Culturally Responsive Digital Inclusion

Participants proposed integrating indigenous stories, songs, and oral histories into digital lessons. This reflects an emerging desire for culturally sustaining pedagogy — where technology serves as a bridge, not a barrier. This aligns with Dewey's (1938) [6] principle of learning through experience and Vygotsky's (1978) socio-cultural theory emphasizing contextual learning.

Discussion

The findings of this study underscore that digital inequity among Janjatiya communities is not merely a technological gap but a complex interplay of social, economic, linguistic, and cultural dimensions. The digital divide, as observed in Hooghly district, reveals the persistence of structural marginalization that mirrors broader patterns of educational exclusion in India's tribal regions.

1. Multidimensional Nature of Digital Inequity

While national digital education programs emphasize device distribution and connectivity, this study shows that meaningful access involves far more it requires digital literacy, contextual content, and cultural legitimacy. As Warschauer (2004) [25] and Robinson *et al.* (2020) [20] note, digital equity encompasses access, ability, and agency. Without agency the capacity to use technology to express cultural identities and aspirations the benefits of digital inclusion remain superficial.

For Janjatiya learners, the absence of linguistically inclusive and culturally resonant digital resources leads to alienation and disengagement. The dominance of mainstream languages in online platforms widens epistemic gaps, reinforcing what McMahan (2014) [15] calls cultural invisibility in the digital space.

2. Local Knowledge Systems and Technological Mediation

Indigenous knowledge systems are deeply experiential, rooted in oral transmission, observation, and community participation. The digital model of education, in contrast, tends to privilege textuality, abstraction, and individual

learning. This ontological mismatch challenges learners' cognitive and affective engagement. As Kral (2010) [12] observed in Australian Indigenous youth contexts, technology can either fragment cultural coherence or become a bridge when embedded in local narratives and visual storytelling traditions.

In Hooghly, teachers and students expressed a desire to blend traditional learning practices such as storytelling, folk songs, and local ecology with digital storytelling tools. This aligns with the Cultural-Historical Activity Theory (CHAT) perspective (Engeström, 2001) [7], which views learning as a mediated activity shaped by tools, rules, and cultural context. Digital technologies, when re-appropriated within indigenous value systems, can become instruments of cultural continuity rather than assimilation.

3. Socio-Economic and Gender Dimensions

The findings reveal that socio-economic deprivation amplifies digital inequity. Shared devices, low network reliability, and electricity shortages limit regular participation. Moreover, gender norms create an additional barrier: girls' access to mobile phones is often restricted under the pretext of safety and morality. This reflects what Gurumurthy & Chami (2019) [9] term the 'gendered digital divide', where patriarchal anxieties women's and girls' access to digital spaces.

Furthermore, generational differences in technology use highlight tensions between elders and youth. While younger members perceive technology as empowering, elders fear cultural erosion. This generational negotiation underscores that digital inclusion in indigenous contexts is a social dialogue rather than a mere policy intervention.

4. Post-Pandemic Realities and Resilience

The COVID-19 pandemic acted as a stress test for India's digital education system. For tribal learners, it revealed both vulnerability and resilience. Despite infrastructural scarcity, some indigenous youth demonstrated adaptive strategies such as collective learning under trees, device sharing, and peer tutoring. These practices reflect communal resilience grounded in indigenous collectivism (Mishra, 2022) [16]. Thus, digital equity policies should build upon such community strengths rather than imposing top-down solutions.

In sum, the discussion suggests that achieving digital equity requires a relational and cultural paradigm one that respects indigenous epistemologies, ensures participatory content creation, and acknowledges the socio-emotional realities of learners.

Educational Implications and Recommendations

The findings yield a range of educational and policy implications relevant to teachers, policymakers, and community stakeholders. Digital equity for indigenous learners cannot be achieved through infrastructure alone; it must be embedded in context-sensitive pedagogical, linguistic, and community strategies.

1. Infrastructure Development with Cultural Sensitivity

While expanding broadband and electricity remains foundational, infrastructure initiatives should align with local ecological and cultural conditions. Establishing Community ICT Hubs in village schools can serve as shared

digital learning spaces. Such hubs should include locally trained facilitators ideally from indigenous backgrounds to ensure trust and relevance. Solar-powered devices and offline digital repositories (e.g., RACHEL servers) could mitigate power and connectivity constraints (Pandey, 2021) [18].

2. Development of Culturally Responsive Digital Content

There is an urgent need to decolonize the digital curriculum by integrating indigenous histories, folk wisdom, environmental ethics, and local languages. Collaborations between educators, linguists, and community storytellers can generate bilingual learning materials in Bengali-Santhali or Bengali-Kurmali formats. UNESCO (2022) [24] emphasizes that linguistic diversity in education enhances comprehension, self-esteem, and cultural pride. Educational technology should thus evolve from content delivery to cultural dialogue.

3. Teacher Professional Development

Teachers in the study expressed anxiety about digital teaching, often relying on limited smartphone functions. A structured Digital Pedagogy and Inclusion Training Program should be institutionalized under Samagra Shiksha Abhiyan with a focus on low-cost, open-source tools, culturally adapted visuals, and experiential learning design. Teacher training must also emphasize critical digital literacy understanding algorithms, data ethics, and misinformation, as highlighted by Livingstone & Helsper (2020) [14].

4. Community-Based Digital Literacy

The success of digital inclusion hinges on community engagement. Intergenerational workshops can introduce parents and elders to safe technology use, thereby reducing suspicion and building trust. Community youth could be trained as Digital Sahayaks or local mentors to assist with online education, documentation, and e-governance. This participatory model has been effective in tribal education projects in Jharkhand and Odisha (Choudhury & Mohanty, 2022) [3].

5. Gender-Inclusive Digital Policies

Educational institutions and NGOs should implement Girls' Digital Clubs and mentorship programs to encourage female participation. Providing personal devices to adolescent girls through schemes like Kanyashree Digital Sakti could transform gendered access patterns. Moreover, gender-sensitive media education can help families understand online safety and promote equitable digital confidence (Gurumurthy & Chami, 2019) [9].

6. Curriculum Integration and Assessment

Digital learning for indigenous students should not be treated as an add-on but woven into the mainstream curriculum. The inclusion of digital storytelling, visual ethnography, and community mapping projects can connect classroom learning to real-world community knowledge. Assessment practices must also evolve to recognize creative digital expression, not merely textual reproduction (Kumar & Das, 2021) [13].

7. Policy Recommendations

At the policy level, convergence among ministries Tribal Affairs, Education, and Electronics & IT is essential. Local

bodies should be empowered to design micro-level digital inclusion plans. The National Education Policy (NEP) 2020 envisions inclusive digital education however, implementation must ensure that indigenous perspectives are represented in curriculum councils and digital content committees. Moreover, partnerships with organizations like Common Service Centres (CSCs), Pratham Digital, and Indigenous Media Networks can scale culturally inclusive content and build sustainable ecosystems.

Conclusion

This study reaffirms that digital equity for Janjatiya peoples in Hooghly district and by extension, across India remains a multifaceted challenge, rooted in history, culture, and socio-economic realities. While the Digital India mission has expanded the technological landscape, its benefits are unevenly distributed. The research reveals that indigenous learners navigate the digital world with a mixture of curiosity, resilience, and caution. Their experiences urge a rethinking of digital inclusion as a process of cultural participation rather than mere access provision. As one teacher aptly said, “They don’t just need devices; they need their own stories inside those devices.”

1. Toward a Transformative Vision

Digital equity must be reframed as a transformative educational justice agenda ensuring that indigenous voices, languages, and epistemologies shape the future of digital learning. Policies and pedagogies should shift from a charity-based model (“bridging the gap”) to a rights-based approach emphasizing digital dignity and self-determination (Couldry & Mejias, 2019) [4]. Moreover, the digital era offers an unprecedented opportunity: by integrating local culture into global networks, indigenous youth can preserve heritage while gaining new skills. When community elders record folklore as podcasts or when students map their village resources digitally, they engage in digital decolonization reclaiming their agency in the knowledge economy.

2. Future Research Directions

Future studies should adopt participatory action research designs, involving indigenous youth as co-researchers to ensure authenticity and empowerment. Comparative studies across districts and states could illuminate regional variations in digital inclusion. Additionally, longitudinal research could assess how sustained interventions transform digital literacy, gender norms, and community cohesion over time. Ultimately, this study concludes that digital equity is not an endpoint but a journey one that requires empathy, inclusivity, and sustained partnership among educators, policymakers, and indigenous communities. As the digital age deepens, ensuring that Janjatiya voices are not only heard but also lead the digital dialogue remains both an ethical and educational imperative.

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