



USE OF TECHNOLOGY IN BRIDGING SOCIAL INDIFFERENCES IN EDUCATION: A COMPARATIVE STUDY OF INDIA AND THE GLOBAL LANDSCAPE

¹Ms. Swati Garg, ²Ms. Asmiti Krishan

¹Assistant Professor, Mahalakshmi College for Girls, Duhai, Ghaziabad

²Student(M.Ed), Mahalakshmi College for Girls, Duhai, Ghaziabad

Email- drxswatigarggoel@gmail.com

Abstract

Researcher analyses the dual role of educational technology (EdTech) in mitigating social indifferences within the global and Indian educational sectors. By contrasting India's Digital Public Infrastructure (DPI) model with the market-driven frameworks of the West and resource-constrained strategies of the Global South, the research identifies critical themes of digital inclusion. The study highlights how technology can either reinforce existing social stratifications or act as a catalyst for substantive equity. Focus is placed on AI-driven personalization, linguistic democratization through vernacular translation, and the risks associated with the "Second-Level Digital Divide." The paper concludes by proposing a framework for a "Global Digital Social Contract," arguing that treating technology as a public good is essential for achieving educational justice and bridging gaps rooted in socioeconomic, geographic, and physical disparities.

Keywords: Educational Technology, Social Indifferences, Digital Divide, Bridging Gaps, Global and Local Inclusion.

Introduction

Education is essential for social mobility, yet disparities rooted in socioeconomic status, geography, language, gender, and physical ability lead to unequal outcomes. The rise of educational technology (EdTech) offers the potential for democratized learning, but its effectiveness depends on social and institutional contexts. Despite expanded access, the "digital divide" highlights inequality in device access, connectivity, and use. Regions adopt EdTech differently; Western markets often prioritize efficiency, while the Global South seeks low-cost solutions. India exemplifies a model that treats technology as a public good, aiming for inclusion

through initiatives like open digital platforms. The study analyzes these approaches, arguing for a "Global Digital Social Contract" to ensure technology aligns with social justice and equity in education.

Global Gap

The “global gap” in education signifies the persistent disparities in access, quality, and outcomes across regions and social groups, exacerbated by economic, technological, governance, and sociocultural factors. Traditionally viewed in terms of access, the gap now extends to technological inequalities, where high-income nations leverage digital tools while low- and middle-income countries face barriers such as limited connectivity and inadequate resources. This gap includes the “second-level digital divide,” highlighting the importance of meaningful technology use in education, alongside linguistic and cultural challenges that marginalize non-dominant language learners. The phenomenon is multifaceted, revealing economic, technological, institutional, and cultural inequities. Understanding this gap is crucial for developing equitable educational policies and exploring successful models like India’s Digital Public Infrastructure approach.

Technological Inflection Point

The technological inflection point in education signifies a pivotal moment where advancements in digital connectivity, AI, cloud computing, and mobile technologies are fundamentally reshaping educational practices and governance. Unlike previous digital phases, this transformation is characterized by scale, speed, and intelligence, enabling widespread access to learning beyond traditional classrooms, particularly in developing economies. AI systems facilitate personalized learning, addressing diverse needs; however, the benefits are concentrated in areas with strong digital infrastructure and skilled educators. This reality risks amplifying existing inequalities, known as the "second-level digital divide," related to digital competence and governance. Furthermore, the shift in control over EdTech towards private entities raises concerns about data privacy and commercialization of education. While the inflection point offers opportunities for inclusive education, it could also deepen social divisions without intentional focus on equitable design and governance.

Digital divide: Global vs. National Frameworks

The digital divide highlights the unequal access to, usage of, and benefits from digital technologies, particularly in education. It results in disparities concerning access to digital learning resources and their effective utilization, impacting learning outcomes. This issue varies globally and nationally, necessitating a nuanced understanding for developing appropriate educational technology policies.

● **Digital Divide in a Global Framework**

The global digital divide illustrates structural inequalities between the Global North and Global South, where high-income countries benefit from advanced infrastructure and connectivity, while low- and middle-income nations struggle with inadequate broadband, high costs, and limited investment in digital education. This divide is exacerbated by imbalances in technological production, with most educational technologies originating from advanced economies, leading to a reliance on imported tools and stifling local innovation. Furthermore, disparities in digital skills and teacher training impede effective technology integration in education, making the digital divide a complex issue involving access, capability, governance, and cultural relevance.

● Digital Divide in a National Framework

National digital divides reflect societal inequalities influenced by factors like income, geography, gender, and ethnicity, affecting access to digital education. Urban populations typically enjoy better resources, while marginalized groups face limitations. The "second-level digital divide" highlights disparities in technology usage quality, with privileged students benefiting from more interactive and personalized learning tools. In diverse societies like India, language plays a crucial role, as the prevalence of English in digital content marginalizes those who speak regional languages. Effective policies must focus on creating vernacular content and inclusive designs to bridge these divides.

● Bridging Global and National Perspectives

Global frameworks highlight cross-country inequalities, while national frameworks focus on intra-country disparities in educational experiences. These perspectives are linked, as global technological hierarchies affect national policies, and national inequalities impact technology adoption. To bridge the digital divide, strategies must integrate international cooperation with robust national policy. Comparative models like India's Digital Public Infrastructure demonstrate how treating educational technology as a public good can address global and internal inequities, thereby using technology to mitigate social disparities in education.

Three Levels of the Digital Divide

The digital divide is no longer understood as a single gap in access to technology; rather, it is a multilayered phenomenon that operates across distinct but interconnected levels. Contemporary scholarship commonly conceptualizes the digital divide in three levels: access, usage and skills, and outcomes. This framework provides a more nuanced understanding of how digital inequalities persist and evolve, particularly within educational contexts.

The **first-level digital divide** refers to disparities in physical access to digital infrastructure and devices. This includes availability of internet connectivity, affordability of data, access to computers or smartphones, and reliable electricity. In education, first-level divides determine whether learners can participate in online or technology-enabled learning at all. Globally, this level reflects inequalities between countries with advanced digital infrastructure and those with limited connectivity. Nationally, it manifests in urban–rural disparities, income-based access differences, and uneven distribution of digital resources across schools and communities. Although increasing mobile penetration has narrowed this gap in many regions, access remains uneven and fragile for marginalized populations.

The **second-level digital divide** focuses on differences in digital skills, usage patterns, and the ability to engage meaningfully with technology. Even when access is available, learners may lack the competencies required to navigate digital platforms, critically evaluate information, or use technology for higher-order learning. In educational settings, this divide is shaped by factors such as teacher preparedness, institutional support, language barriers, and home learning environments. Students from privileged backgrounds are more likely to use technology for interactive learning, research, and skill development, while disadvantaged learners may be limited to passive consumption. This level is particularly significant because it often remains invisible in policy discussions that equate access with inclusion.

The **third-level digital divide** concerns unequal outcomes and benefits derived from technology use. This includes disparities in academic achievement, employability, lifelong learning opportunities, and social mobility resulting from digital engagement. At this level, technology may inadvertently reinforce existing social hierarchies, as those with greater resources and digital capital are better positioned to translate technological access and skills into tangible advantages. In education, this divide is evident when similar technological tools produce vastly different learning outcomes across social groups, regions, or institutions.

Together, these three levels highlight that bridging the digital divide requires more than expanding infrastructure or distributing devices. Addressing first-level access without tackling second-level skills and third-level outcomes risks creating an illusion of inclusion while perpetuating inequality. A comprehensive approach must therefore integrate access, capacity-building, and equitable outcome-focused policies. Understanding the three levels of the digital divide is essential for evaluating the role of educational technology in either reproducing or reducing social indifferences within both national and global educational systems..

Mechanisms for Global and Local Inclusion

Mechanisms for global and local inclusion in educational technology aim to reduce social indifferences and foster equitable participation in learning. Inclusion transcends mere access to digital tools and includes meaningful engagement, cultural relevance, and equitable outcomes for diverse populations. Effective mechanisms operate on both global and local levels, considering the interplay between transnational structures and community-specific realities.

Globally, inclusion is bolstered by scalable technology that offers cross-border access to educational resources through tools like Open Educational Resources (OER) and cloud-based platforms. These resources mitigate global knowledge disparities by lowering costs and enhancing availability. International collaboration in curriculum development and ethical AI standards further promotes inclusion by establishing norms for accessibility and data protection. Addressing linguistic and cultural diversity is crucial; multilingual platforms and localized content help learners engage in their native languages, particularly benefiting those in the Global South who may not be represented in dominant educational frameworks. This fosters active participation in global knowledge systems rather than passive consumption of content.

Locally, inclusion mechanisms must be context-specific, requiring public investments in infrastructure, such as broadband access and affordable devices. Capacity-building initiatives that enhance digital literacy for students, teachers, and administrators are vital. Programs focusing on diverse learning needs, along with adaptive technologies, ensure marginalized groups are reached effectively. Governance frameworks like Digital Public Infrastructure (DPI) illustrate how to harmonize global capabilities with local inclusion goals, ensuring technology serves as a public good. Ultimately, integrating technological openness, policy commitment, and contextual sensitivity forms the basis for advancing inclusive and equitable education, bridging global divides while addressing local needs through principles of equity and social justice.

1. AI and Personalized Tutoring: Breaking the "One-Size-Fits-All" Model

Traditional education often disadvantages marginalized learners due to standardized curricula and lack of individualized support. The use of artificial intelligence (AI) in education presents a solution by facilitating personalized tutoring and adaptive learning, which can analyze student strengths and weaknesses to adjust instructional methods dynamically. This personalization has the potential to bridge gaps caused by socioeconomic, geographic, and linguistic differences, while also assisting students with disabilities.

However, the effectiveness of AI depends on the quality of training data and the design of these systems, as biases can perpetuate inequities. Access to high-quality AI and digital infrastructure is not universally available, highlighting the need for equitable policies and inclusive design to ensure AI-driven educational resources serve all learners. Ethical oversight and integration into educational frameworks are essential for achieving inclusive education that meets diverse learner needs.

2. Open Educational Resources (OER): Knowledge Without Borders

Open Educational Resources (OER) are freely accessible teaching, learning, and research materials that allow for retention, reuse, revision, remixing, and redistribution without cost or legal barriers. OER promote global and local inclusion by breaking down barriers related to affordability and geography, positioning education as a public good. They help reduce international educational disparities by providing universal access to high-quality content, particularly benefitting students in resource-constrained contexts. Additionally, OER can be culturally adapted to align with local curricula, making them relevant in diverse societies. They also contribute to reducing digital divides and foster active participation in learning. However, challenges such as unequal internet access, limited awareness, and the need for supportive policies hinder their adoption. Overall, OER play a crucial role in creating inclusive and equitable learning environments by facilitating knowledge flow while adapting to local needs.

3. Assistive Technology: A Universal Human Right

Assistive Technology (AT) encompasses tools and software designed to support learners with disabilities or special needs, facilitating their full participation in education, which is increasingly viewed as a universal human right. AT plays a vital role in removing barriers to access and ensuring equitable educational opportunities, aligning with global goals for inclusion.

Globally, AT reduces educational disparities by providing accessible curricula through tools like screen readers and AI-powered platforms, exemplified by Microsoft's Immersive Reader and Google's Live Transcribe. International agreements like the UNCRPD and the Sustainable Development Goals underscore the right to inclusive education and the need for assistive technologies.

Locally, AT must be tailored to cultural and infrastructural contexts, as seen in India's Sugamya Bharat

Abhiyan initiative, which promotes access for learners in marginalized communities. Effective integration of AT into education fosters inclusive classrooms, addressing the digital divide and enhancing educational equity.

While challenges such as costs and stigma persist, overcoming these requires policy support and public investment in inclusive digital infrastructures. Ultimately, AT embodies the belief that education is a universal right, bridging gaps between global advancements and local needs, fostering an equitable education system.

Global Case Studies vs. Indian Initiatives

Understanding the role of technology in bridging social inequities in education involves examining global EdTech adoption examples alongside initiatives specific to India. Comparative case studies reveal how governance models, resource distribution, cultural contexts, and technological strategies impact inclusion and learning outcomes. Analyzing these cases helps identify best practices, challenges, and insights for creating equitable educational technology frameworks.

Global Case Studies

In the analysis of global education technology (EdTech) adoption, three distinct approaches are observed, shaped by different economic priorities, governance structures, and market dynamics.

EdTech in the U.S. is shaped by private companies offering AI-driven personalized tutoring and learning systems, such as Khan Academy, Duolingo, and Coursera. This market-driven approach boasts high-quality content and robust data-driven personalization but faces challenges like socioeconomic access disparities and difficulties in language and cultural adaptation for non-English speakers.

In Sub-Saharan Africa, countries like Kenya, Ghana, and Rwanda are utilizing offline-compatible educational software and mobile learning platforms, such as radio and SMS, to effectively reach rural learners. This method is cost-effective and sensitive to local contexts, addressing access challenges in low-infrastructure areas. However, it suffers from limitations such as a lack of content diversity, constrained personalization, and dependency on donor funding for growth.

In China, the government-led digital education model integrates AI-driven platforms such as Squirrel AI, offering strengths in scalable personalization and extensive monitoring aligned with national curricula. However, this centralized approach may hinder cultural adaptation and raise data privacy concerns.

Overall, the diverse adoption strategies in these regions reflect the interaction of economic factors, governance, and the unique educational requirements of their populations.

Indian Initiatives

India's approach to Digital Public Infrastructure (DPI) and public-private partnerships emphasizes a unique balance between scalability and inclusivity in education. Key initiatives include:

Diksha Platform is a national educational platform providing open-access content aligned with various curricula in multiple languages, focusing on reducing linguistic and regional disparities, and optimized for low-bandwidth devices.

SWAYAM is a government-backed initiative offering free MOOCs, aimed at promoting lifelong learning and enhancing access to higher education for marginalized communities, including certification options.

National Digital Education Architecture (NDEAR) aims to unify educational resources and platforms to enhance interoperability, ensure equitable access to education, and promote public accountability.

Comparative Insights

Comparative insights into governance models highlight that the Global North, particularly the U.S., favors market-driven solutions, while India prioritizes publicly funded, interoperable infrastructure like Diksha and NDEAR. In scalability versus personalization, AI-driven methods in China and the U.S. enhance adaptive learning but may exacerbate inequities. Conversely, India's Digital Public Infrastructure (DPI) focuses on broad access and inclusion. Furthermore, India's multilingual platforms offer valuable lessons in culturally

relevant digital education, contrasting with many Western EdTech limitations. Innovations in resource-constrained environments, such as Africa and India, show that inclusion can be achieved through tailored adaptations rather than advanced technologies.

The Gendered Digital Divide: A Social Bottleneck

In many developing societies, technology exhibits gender bias, with women globally being 15% less likely to use mobile internet than men. In India, households with a single phone often prioritize the son's education, leaving daughters to handle domestic chores, resulting in a "digital dark age" for girls even in villages with 5G access. This situation poses a risk, as without focused social intervention, technology may further entrench patriarchal control over information.

Algorithmic Bias and “Data Colonialism”

Data Colonialism risks arise from AI models trained on Western datasets being adopted in the Global South. This situation may lead to Linguistic Erasure, as AI tutors that evaluate based on Midwestern American standards contribute to a disregard for local dialects, including Indian English. Additionally, AI-driven curriculums often lack local context, alienating rural students and exacerbating the Cognitive Tax issue.

The Privacy Gap: Surveillance vs. Incognito Learning

Access to "free" educational platforms often compromises personal data. Wealthy students can afford premium, privacy-protecting platforms, while marginalized students depend on "free" apps that track their behavior and location, exacerbating the economic divide in digital privacy.

The "Friction Gap" and Hardware Maintenance

While "Digital India" has improved 4G access nationwide, maintenance infrastructure is inconsistent. In urban areas like Bangalore, technical issues are easily resolved, whereas in rural Odisha, they hinder education due to a lack of repair facilities. Additionally, unreliable electricity exacerbates the situation, making digital learning inaccessible for those affected by energy poverty.

Recommendations: Building the Global Bridge

Bridging social indifferences in education requires more than deploying technology—it demands integrated strategies across **policy, pedagogy, and infrastructure**. Drawing from global case studies, Indian initiatives,

and digital equity frameworks, this section outlines concrete recommendations to ensure that technology serves as a bridge rather than a barrier to inclusive education.

1. Policy: The “Connectivity as a Right” Framework

Access to the internet and digital learning resources is essential for equitable education, framed as "Connectivity as a Right." Key principles include universal access, where governments must provide affordable internet in schools and marginalized areas; prioritizing digital public goods over commercial solutions, as seen in India's Digital Public Infrastructure; regulatory oversight to protect privacy and prevent monopolization in EdTech; and global collaboration to support under-resourced regions, aligning with Sustainable Development Goals for quality education. Recognizing connectivity as a right fosters both initial access to devices and skills for meaningful digital engagement.

2. Pedagogy: Focusing on the “Second Level”

To bridge the second-level digital divide, addressing differences in digital skills and usage is pivotal alongside providing devices and internet access. Effective strategies include implementing digital literacy programs for both students and teachers, utilizing AI-assisted personalized learning platforms, designing inclusive curricula in various languages and accessible formats, and training educators to meaningfully integrate technology into their teaching. This focus on skill-oriented pedagogy enhances learning outcomes, ultimately reducing inequality in achievement and opportunity.

3. Infrastructure: Interoperability

Equitable technology integration necessitates robust and interoperable infrastructure to facilitate seamless communication between diverse digital systems. Key recommendations include implementing universal standards for easy integration of platforms, promoting open-source solutions for flexibility, ensuring data portability and security for learner information, and fostering sustainable infrastructure for long-term efficiency. This interoperable framework enhances digital education's reach and effectiveness, supporting personalized learning and broader access to resources across various contexts.

Building a global bridge in education necessitates an integrated approach involving policy, pedagogy, and infrastructure. Policy guarantees connectivity as a universal right, while pedagogy addresses the second-level digital divide to promote meaningful learning and equity. Infrastructure ensures interoperability and sustainability of digital tools. Together, these elements can transform technology from a reinforcing tool of

social stratification into a catalyst for educational justice, addressing disparities in socioeconomic, geographic, linguistic, and physical areas.

Conclusion

This paper examines the role of educational technology in addressing social differences within Indian and global education. It argues that technology's impact is determined by its design, deployment, and governance, and while tools like AI tutoring and Open Educational Resources can democratize learning, they risk reinforcing social hierarchies without inclusive policies and infrastructure. Case studies illustrate that market-driven models in the West often favor affluent learners, unlike resource-constrained innovations in the Global South that achieve inclusion with limited resources. India's Digital Public Infrastructure serves as a model, emphasizing scalable and multilingual frameworks. To create an inclusive educational ecosystem, the paper advocates for integrated strategies in policy recognizing connectivity as a right, pedagogy that promotes digital engagement, and infrastructure that ensures sustainability and access. The concept of a “Global Digital Social Contract” is introduced, promoting educational technology as a public good to enhance justice and inclusion. Ultimately, successful integration of these elements can transform education into an equitable experience for all learners.

References

1. Garg, S., & Saxena, D. (2025). Developing critical thinking through social Media: Opportunities for educators and learners. Shikshan Sanshodhan : Journal of Arts, Humanities and Social Sciences, Volume-8, Issue-3, 72
<https://shikshansanshodhan.researchculturesociety.org/>
2. भारत में पारंपरिक ज्ञान प्रणाली और उसका प्रबंधन – AD EDUXIAN PUBLICATION. (n.d.).
<https://educarepublication.com/articles/%E0%A4%AD%E0%A4%BE%E0%A4%B0%E0%A4%A4-%E0%A4%AE%E0%A5%87%E0%A4%82-%E0%A4%AA%E0%A4%BE%E0%A4%B0%E0%A4%82%E0%A4%AA%E0%A4%B0%E0%A4%BF%E0%A4%95-%E0%A4%9C%E0%A5%8D%E0%A4%9E%E0%A4%BE%E0%A4%A8-%E0%A4%AA/>
3. Garg, S & Singh, S. (2025); The Role Of Piaget’s Stages Of Development In Understanding The Cognitive Growth Of Children In The Digital Age, International Journal of Research Culture Society, ISSN(O): 2456-6683, Volume – 9, Issue – 4, Pp.48-55. Available on – <https://ijrcs.org/>

4. The leaders of digital education transformation. (2025). In International Education Studies (Vol. 18, Issue 3). <https://doi.org/10.5539/ies.v18n3p10>
5. Kumar, R. (2025). Bridging the Gap: AI and the Future of Learning in India and Beyond. International Journal for Multidisciplinary Research, 7(3). <https://doi.org/10.36948/ijfmr.2025.v07i03.46976>
6. Sindakis, S., & Showkat, G. (2024). The Digital Revolution in India: Bridging the Gap in Rural Technology Adoption. Journal of Innovation and Entrepreneurship, 13(1), 1–28. <https://doi.org/10.1186/s13731-024-00380-w>