

Bridging the Digital Divide in Indian Education System: It's Progress and Challenges in 21st Century

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Abstract: Information and communication technology plays a crucial role in advancing modern civilization. The swift advancement and wide spread adoption of information and communication technologies has expedited economic growth and social transformation, but digital divide continuous to be a pressing global issue, as there are still inequalities in the availability and use of digital technology among different regions of the world. The digital divide is seen between urban and rural populations, it also exists across individuals with different level of education, between different economic strata and among nations with varying levels of industrial development. This paper offers a comprehensive analysis of the digital divide in India, specifically exploring important aspects such determinants, digital divide in India, Initiatives, significance of digital connectivity of contemporary society and recommendations.

Keywords: Digital Divide, Information and Communication technology, Education, Digital Connectivity, Digital Initiatives.

1. Introduction

The term Digital Divide consists of two words 'Digital' and 'Divide'. Digital refers to information and communication technology while divide refers to differences, gap or disparity. So Digital divide is a phenomenon where those who have access to ICT are benefitted by the use of it, apart from those who don't have access to information and communication technology. It further indicates the gaps between groups in their ability to use ICT's due to varying literacy and technical skills. The divide is usually considered as a socio-economic problem. Digital Divide is being used more frequently to describe the social ramifications of certain community segments, unequal access to information and communication technology and to acquiring the essential skills (Cronin, 2002). The Digital divide is not merely a technological issue but is influenced by socio economic and cultural factors. Access to reliable internet and appropriate gadgets for online learning is sometimes limited for students from lower socioeconomic backgrounds and distant places, resulting in a discrepancy in educational opportunities. Lack of digital skills among students and teachers has exacerbated the digital divide, reducing the effectiveness of online education (Christani, et al., 2024). The COVID-19 epidemic has hastened the shift to online learning,

leading to creative teaching methods. However, this transition has highlighted the digital divide, which impacts educational prospects due to discrepancies in access and utilization of digital technology (Christanti, et al., 2024). The digital divide is the inequality in access to and usage of digital technology, including computers and the internet (Willans, et al., 2024). The digital divide is a social issue created by unequal access to information and communication technology. The digital gap poses a risk to social and economic fairness, as well as education (Afzal, et al., 2023). According to Organization for Economic Cooperation and Development (OECD), digital divide refers to "The gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies and to their use of the internet for a wide variety of activities" (Inequality report 2022: Digital divide).

The world is increasingly witnessing digital transformations, Indian too has been accelerating. The government of India launched a flagship programe "Digital India" in 2015, aimed at making the country more "Digital" and to transform India into a digitally enabled society and knowledge economy. India ranks 105th out of 193 nations in the United Nations e-participation index (2022), which assesses three aspects of e-government namely online services, telecommunication connection and human capabilities. According to the report, India has made significant progress in human capital development and online services through digital India. However, infrastructural development remains a challenge (Inequality report 2022: Digital divide). According to Global Index on Digital Quality of Life, India ranks 47th on Internet Affordability among 110 countries. According to IAMAI-Kantar report, India's Internet users are projected to grow by 45% in the next five years, reaching 900 million by 2025 from 622 million in 2020 (Inequality report 2022: Digital divide).

2. Determinants of Digital Divide

The burgeoning issue of the digital divide in education system is receiving attention from all the stakeholders of the society. As per UNESCO report, only 8% of homes possess a

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computer in Indian homes, while only 15% have internet connectivity. This limited availability of technology in this digital world significantly affects the education system, resulting in a disadvantaged situation especially for students who belong to lower income families. The absence of infrastructure is a significant element that contributes to the digital divide, particularly in rural parts of India. Schools in these areas face challenges in providing assistive technology due to the lack of basic facilities such as electricity. Moreover, the exorbitant expense of technology poses a challenge for educational institutions for providing necessary digital requirements to students (Education for all in India). India being a developing country is facing significant economic disparities which often leads to limited access to electronic gadgets, the internet, high-speed broadband databases and other services. The communities residing in remote areas have been isolated from mainstream civilization due to geographical considerations due to which they have limited access to ICT. Due to the excessive population governments also face many challenges in providing essential digital infrastructure and education to the people. (Digital Divide Knowledge Society).

3. Digital Divide in India

In contemporary society, information and communication technology infrastructure serves as a fundamental pillar. It is considered as a primary catalyst for the process of change with minimal opposition. The effectiveness of technology in bridging inequality is questioned due to affordability, purpose of use, and reliability of broad band connections. Access to computers and internet varies significantly across advantaged and underprivileged people. India has seen a significant growth in communication and technology from previous decade. Both government and non-governmental entities have made efforts to address the challenge in bridging the digital divide through the implementation of Digital Inclusion. The government of India has implemented various platforms that aimed at improving the telecommunication infrastructure. The objective is to facilitate the integration of contemporary telecommunication technology into all sectors of India (Singh, 2009). According to Oxfam India's policy brief on educational technology in school education in India, over 50% children with disabilities struggle to attend classes, only 4% of SC/ST regularly study online, and 57% adolescent girls believe boys have easier access to digital facilities in schools and colleges. The parts below will explore the digital divide between privileged and marginalized individuals in India.

- 1) *Computer*: In January-April 2018, 93.5% of respondents did not have a computer or a laptop. By the end of 2021, the figure had claimed to 96.6%.
- 2) *Caste*: The bulk of people do not have access to computes. However, computer access is more common for the general and OBC category than SC and ST populations. Between 2018- 2021, the gap between the general category and ST can be upto 7-8%.
- 3) *Education*: Higher education levels increase the likelihood of having access to a computer. Individuals

with a PG or Ph.D. degree are 40% more likely having a computer than a person with no education.

- 4) *Region*: According to estimates, urban residents are 7-8% more likely to own a computer than rural residents. Compared to pre and post-pandemic data, 99% of rural population did not have a computer, following the epidemic, there is an increase of 2% in rural population, while as urban population increased by 7-91%.
- 5) *Religion*: Among all religions Sikhs and Christians are more likely to own a computer than Hindus and Muslims.
- 6) *Income*: People with lesser incomes are less likely to own a computer. A computer is more likely to be owned by those with higher income levels.
- 7) *Gender*: By the end of 2021, 61% of men will own a mobile phone, compared to 31% for women, female face a 30% disadvantage.

4. Initiatives in Addressing the Digital Divide

The government of India aims to provide equitable learning opportunities for all students at all levels of education and in all locations, including remote areas. This will ensure the assessing services through a single click is no longer limited to the wealthy. Every state/UT takes a variety of inclusive measures to bridge the digital gap and provide media, internet, and digital literacy to all students, not just those who are most easily accessible. Tablets/smart phones were distributed as part of the state government's proactive efforts to cater to and engage students in teaching learning process. Education departments in states and UTs have made significant efforts to enhance digital learning and digital classrooms, enhance improving the status of ICTs. Following are some initiatives undertaken by the government of India.

- 1) *PM eVidya*: The Atma Nirbhar Bharat Programme has developed PM eVidya, a comprehensive project that unites efforts in digital, online and on-air education to provide multimode access.
- 2) *DIKSHA*: Diksha is India's one Nation One Digital platform for school education. The digital infrastructure for knowledge sharing (DIKSHA) portal and mobile app, developed by Ministry of Education, hosts a vast collection of ebooks and e-contents published by state/UT and national organization. E-content is available in 32 Indian language.
- 3) *Vidyanidhi*: The Vidyanidhi project has been a notable initiative supported by NISSAT, DSIR, Government of India. Vidyanidhi has the capacity to offer around one lakh meta data records for Indian thesis, as well as five thousand full text doctoral records. This projects specializes in offering thesis in several languages.
- 4) *VidyaDaan*: A national wide content contribution programe established in April 2020, uses the DIKSHA platform to facilitate the donation of e-learning resources for school education by educational bodies, private bodies, and individual specialists.
- 5) *Vidya Vahini*: The initiative Vidya Vahini was

- initiated by Department of information technology, Government of India in the year 2000. The objective of the initiative is to deliver computer education to a total of 60000 schools national wide.
- 6) *MOOCs on DIKSHA*: The national institute of open schooling (NIOS) has released online MOOC courses and chapter-wise e-content to DIKSHA. The NIOS has made around 50000 content available on DIKSHA starting May 2021. The repository will include explanation videos and reading materials.
 - 7) *DigiLocker*: The DigiLocker facility introduced by the Ministry of electronics and IT aims to enhance the digital empowerment of citizens by providing them with the ability to store and access electronic documents through a digital document wallet.
 - 8) *Swayam Prabha*:- Swayam Prabha DTH channels are designed to help and reach folks who do not have access to the Internet. The PM eVidya Initiative includes 12 swayam prabha channels dedicated to school education. Under the PM eVidya programme, NCERT has initiated a pilot run of leveraging DTH channels to disseminate class-specific curriculum-linked content which begin on September 1,2020.
 - 9) *A-View*: Amrita Virtual interactive e-learning world is a e-learning platform that offers multifaceted multimedia tool that provides users with the simulated learning experience. This initiative is a part of MHRD programme talk to a teacher.
 - 10) *e-Pathshala*: it is a collaborative programme of Ministry of Human Resource Development and NCERT. This platform is created to exhibit and distribute a wide range of educational electronic resources such as textbooks, audio recording, videos, magazines with the purpose of enhancing school instruction.
 - 11) *National Digital Education Architecture (NDEAR)*: This programme aims to strengthen the education ecosystem by providing a unified digital infrastructure. NDEAR aims to achieve the goal of NEP 2020 by creating a digital infrastructure for innovation in the educational ecosystem. This ensures autonomy and engagement of all stakeholders.
 - 12) *Shodhganga*: Shodhganga is a platform established by the INFLIBNET to serve as a digital repository for Indian electronic thesis and dissertation. 293 Universities in India have signed MoUs with the INFLIBNET centre to participate in the shodhganga project. All the thesis uploaded to shodhganga are accessible for reading and downloading in an open access manner to the global academic community.
 - 13) *For the Differently-abled*: DIKSHA provides universal design of learning (UDL) based curricular content in Indian Sign Language and Audio books for children's with special needs. Study material for visually impaired students have been designed using a digitally accessible information system (DAISY). Furthermore, one DTH channel is offered particularly

for hearing impaired students in Indian Sign Language.

- 14) *E-Adhyayan (e-Books)*: This platform grants users access to over 700 e-books and video content specifically designed for PG courses. The entirety of the e-books are derived from e-PG Pathshala courses.
- 15) *Spoken Tutorial*: The spoken tutorial initiative has been launched by Ministry of Human Resource Development (MHRD) of the Indian government. It offers educational content in various languages and formats across numerous platforms and in several languages.

5. The Significance of Digital Connectivity in Contemporary Society

Modern society relies heavily on digital connectivity, which affects many aspects of life of an individual. Its significances arise from its transformational effects on communication, information access, economic prospects, and social connections. Here are the top reasons why digital connectivity is essential in today's environment.

- 1) *Communication Purpose*: Digital connectivity offers rapid and worldwide communication. People can interact with others all over the world via email, messaging application, social networking platform and videoconferencing capabilities, which stimulate cooperation, share ideas and maintain relationships.
- 2) *Information Availability*: Digital connectivity provides access multitude of knowledge, educational resources, news, and research materials. It encourages lifeline learning, enables individuals to gain new skills, and stimulates research and innovation in a variety of sectors.
- 3) *Educational Opportunities*: Digital connectivity has changed the educational science, online learning platforms, educational software, digital resources provides students adaptable and personalized learning experiences. Educational is more accessible to focus in remote places and underserved groups by breaking down geographical boundaries.
- 4) *Economic Opportunities*: In the digital age, career possibilities and economic activity are mostly conducted online. It enables firms to reach a worldwide client base, resulting in increased economic growth and productivity.

Modern civilization places a high value on digital connectivity. It improves communication, information access, economic opportunity, education, social interactions, access to services and civic participation. Providing ubiquitous access to internet connectivity is vital for promoting equality, empowering individuals, and advancing social and economic growth in the digital era.

6. Recommendations to Bridge the Digital Divide

- 1) Conduct digital literacy camps in rural India to teach students how to use technology in schools and digitize

panchayats.

- 2) Create a timely and accountable redressal process for EdTech and Healthtech concerns from parents, children, and other customers.
- 3) Government should make efforts to bridge India's current income inequality by increasing the income of the poorer, and setting a decent minimal living wages.
- 4) Governments and educational institutions should prioritize developing internet infrastructure, especially in rural and disadvantaged areas.
- 5) Collaboration among governments, educational institutions, non-profit groups and technology corporations is essential for solving the digital divide.
- 6) Schools can set up technological resource centers with computers, internet connectivity, and educational applications. These centers can provide children with access to technology both during and after school.
- 7) Educational technology requires ongoing research and innovation. Collaboration among governments, educational institutions, and researchers can help bridge the digital gap by exploring emerging technologies, best practices, and effective initiatives.
- 8) Education policies should stress equity and ensure all students have access to quality digital resources and help to use them effectively.

7. Conclusion

The digital divide in India poses a multifaceted challenge that necessitates collaborative efforts from diverse stakeholders. The COVID-19 pandemic has highlighted the need to address this gap, since remote learning has become essential, revealing inequalities in student's access to technology and internet connectivity. Implementation of policies that focus on increasing the availability of broadband, offering subsidized devices and promoting digital literacy among students and teachers are crucial measures for reducing the gap in access to technology. Moreover, it is essential to cultivate digital competences and promote digital responsibility among members of society. Furthermore, it is crucial to tackle socio-economic problems such as discrepancies in income,

differences between rural and urban areas and gaps between gender. In India many social problems like unemployment, population explosion, poor communication and natural calamities always grab the attention of government, but digital divide has never got a top priority in any government agenda, so the problem should be addressed. Addressing the digital divide is crucial for fostering economic and social progress, as well as for supporting digital rights, empowering individuals and constructing resilient and inclusive societies in this digital era.

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