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Role of Information and Communications Technology in Improving Equity and Quality of Education in India

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Role of Information and Communications Technology in Improving Equity and Quality of Education in India

ICT India Working Paper #66

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Center for Sustainable Development
EARTH INSTITUTE | COLUMBIA UNIVERSITY

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Abstract

Education is a fundamental right and is indispensable for the achievement of sustainable development. The role of ICT has enhanced and supplemented classroom learning and is an important tool to provide quality education for all. A good-quality education throughout the lifecycle, from early childhood through adulthood, can be a liberating process for individuals and it can act as a leveler and equalizer within the society. India has also made noteworthy progress towards the goal of *Education for All* in the past years. Starting from Sarva Shiksha Abhiyan to the Right to Education Bill, the focus has been to ensure equal access to quality education for the children. ICT has been a significant enabler in enabling this movement. The New Education Policy 2020 (NEP), recognizes the importance of technology in aiding teachers, bridging the language barrier between teachers and students, creating digital libraries, popularizing language learning as well as ensuring greater access to education.

Technology has made the learning space expand beyond the traditional classrooms. This has helped individuals to avail opportunities to continue learning throughout their lifetime. With the help of affordable smartphones, digital platforms, the geographical and economical barriers have been reduced to some extent. Advancements like QR embedded textbooks have made it possible to access high-quality educational content for the learners and teachers. ICT has the potential to alleviate or remove some of the barriers or constraints that prevent women and girls from accessing educational opportunities, such as illiteracy, poverty, time scarcity, sociocultural factors, mobility, and relevancy, leading to women empowerment and gender equality. It has brought education into homes and non-traditional learning spaces, where it can be accessed by girls and women. The digital tools and platforms have made education more inclusive as well, where children with special needs can study in a normal classroom environment. The country has acknowledged that EdTech isn't just about digitizing the content, but rather about providing unlimited access to learning which can be personalized and customized. This paper focuses on how technology has played a crucial role in bringing education to all and in improving equity and gender equality in India.

List of Abbreviations

ICT	Information and Communication Technologies
WHO	World Health Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
SDG	Sustainable Development Goals
SSA	Sarva Shiksha Abhiyan
NEP	New Education Policy
UNDESA	United Development of Economic and Social Affairs
SWAYAM	Study Webs of Active- Learning for Young Aspiring Minds
MOOC	Massive Open Online Courses
DIKSHA	Digital Infrastructure for Knowledge Sharing
NISHTHA	National Initiative for School Heads' and Teachers' Holistic Advancement
QR	Quick Response
NTP	National Teacher Platform
MIE	Microsoft Innovator Educator
CBSE	Central Board of Secondary Education
SMS	Short Message Service
CIET	Central Institute of Education Technology
DAISY	Digitally Accessible Information System

Introduction

The highest-performing education systems are those that combine equity with quality¹. Accommodating and meeting the specific needs to ensure everyone's learning needs are met, is the basic principle of a successful education system. The World Health Organization (WHO) definition of social equity is "the absence of avoidable or remediable differences among groups of people".² Educational communities across the world are working to provide better learning opportunities for all learners. The way education is delivered is key to ensuring its positive impact on reducing inequality, can be maximized. A good-quality education throughout the lifecycle, from early childhood through adulthood, can be a liberating process for individuals and it can act as a leveler and equalizer within the society. UNESCO has underlined the importance of the education sector for achieving sustainable development outcomes in all other areas. Learning opportunities for all, is the most crucial aim of SDG 4, an inclusive education that takes into account the specialized learning needs of vulnerable people, including women and girls, children of migrant workers, refugees, children with disabilities, and minorities.

India has also made noteworthy progress towards the goal of *Education for All* in the past years. The government has made significant progress to achieve the goals of the universalization of elementary education. Since 2001, the government's flagship education scheme Sarva Shiksha Abhiyan (SSA), which was implemented in partnership with the state governments, has been successful in significantly increasing enrollments and reducing the gender gap in primary education. With the relative success of SSA, the government had taken up universalization of secondary education in a mission mode through the implementation of the Rashtriya Madhyamik Shiksha Abhiyan. The passage of the "Right to Education" bill is another significant milestone in the task to ensure equal access to quality basic education for all. The bill was passed in 2009, making education a fundamental right for every child in the country. In recent years, the country has launched and encouraged various programs and schemes to strengthen the collective movement of universalizing education. Several policies, measures, and investments in the form of new initiatives, to enhance educational outcomes across access, equity, and quality in education are being witnessed.

Information and Communication Technologies (ICT) have been a significant enabler in the movement, by transforming the content and modes of delivery and acquisition of learning. The availability of high-speed Internet access in the country has reduced many of the geographic constraints and other barriers. ICT makes it possible to inspire and encourage students by providing them with the opportunities to gather knowledge, explore ideas and express themselves using channels and tools that suit their preferred learning modalities.³ The New Education Policy 2020 (NEP), recognizes the importance of technology in aiding teachers, bridging the language barrier between teachers and students, creating digital libraries, popularizing language learning as well as ensuring greater access to education. The recently launched digital platforms are being optimized to make digital content available in the regional languages to make it reach the corners of the country. The new policy aims to digitally equip the schools, teachers, and schools. The policy calls for the establishment of a dedicated unit to plan the growth of digital technology, digital content, and capacity building for both schools and higher education's needs. Inclusive education takes into account the specialized learning need of vulnerable people, including women and girls, children of migrant workers, refugees, children with disabilities, and ethnic minorities.

¹ <https://www.oecd.org/education/school/50293148.pdf>

² <https://www.waterford.org/education/equity-vs-equality-in-education/>

³ https://www.academia.edu/40511312/The_role_of_ICT_in_realising_education_for_all_by_2030_Achieving_Sustainable_Development_Goal_4_ICT4SDG4

ICT for Sustainable Education

Sustainable Development Goals (SDGs) refer to a set of globally sustainable targets to develop the economy, society, and environment. SDG 4 is the education goal, it aims to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.”⁴ Education is seen as a key in the process of achieving sustainable development, as it plays an indispensable role for today’s children to carry on in the next generation. A report by the United Nations Development of Economic and Social Affairs (UNDESA) in 2015 identifies links between education and nearly all the SDGs. The most emphasized connections are those between education and growth (SDG8) and education and gender (SDG5)⁵. ICT-based innovation is occurring throughout the education value chain⁶. ICT plays a role as a powerful accelerator in every mechanism, teacher training, local curriculum, local-language instruction, monitoring and assessment of student performance, education-systems management, coaching and mentoring, and preparing students for a world in which ICT is a necessity for successfully navigating their future careers and lives and contributing to their national economies. It gathers valuable data to assist with planning. Thus helping, educational institutions make more informed decisions that have led to the adoption of measures responsible for upholding the economy and environment’s integrity.

ICT in education helps all types of learners as it breaks down some of the barriers to access, they encounter. Through ICT, the learning space is no longer limited to a traditional classroom, shifting educational delivery to the reach of every individual. SDG4 encourages the use of ICT to support the principles to improve access to inclusive and equitable education, provide a good quality of education that matches both the needs of students and the labor market. This ensures that individuals have opportunities to continue learning throughout their lifetime. However, technology itself is not an end in itself, but rather a means to an end. Education not only needs to think about how which it addresses pedagogical processes but also must consider a set of values supported on respect for the fundamental rights of individuals. Achieving the aims of SDG4 requires a clear understanding that ICT solutions must serve, rather than shape, the definition of and requirements for providing context-specific inclusive and quality education⁷. Online resources can facilitate education, participation, and access to employment opportunities for vulnerable people. Technological advancements help lower the barriers to education by providing tools that overcome challenges created by differences in cultural norms and language.

According to a [report](#) on the connection between ICT & SDGs by Earth Institute, Columbia University, innovative solutions that employ ICT will be fundamental for empowering education leaders and communities to achieve the goal of SDG 4, Education for all. Achieving SDG 4 will require collaboration between local, national, and international stakeholders – both internal and external to the schooling system – with shared accountability and commitment to the common goal of universal, quality education. The success of these goals will depend on innovative, multi-stakeholder strategies to empower grassroots community leaders to address the compelling shortages of trained teachers and quality school curricula, to help curb dropout rates in secondary education by making it more affordable, practical, and accessible. ICT innovations need to be combined with innovative policies, services, and solutions to deliver transformation at unprecedented speed and scale.⁸ Thus, the use of ICT in education can help in streamlining education system processes and thereby improve the quality of education.

⁴ <https://sdg4education2030.org/the-goal>

⁵ https://www.academia.edu/40511312/The_role_of_ICT_in_realising_education_for_all_by_2030_Achieving_Sustainable_Development_Goal_4_ICT4SDG4

⁶ <https://www.ericsson.com/assets/local/news/2016/05/ict-sdg.pdf>

⁷ https://www.academia.edu/40511312/The_role_of_ICT_in_realising_education_for_all_by_2030_Achieving_Sustainable_Development_Goal_4_ICT4SDG4

⁸ <https://www.ericsson.com/assets/local/news/2016/05/ict-sdg.pdf>

ICT for Better Access to Learning Opportunities

ICT holds the potential to improve the quality of education by enabling easier access to resources. It removes barriers to learning materials, supports students where they are across varied learning contexts and needs, and gives educators more insight into the learning environments they are creating. Ensuring better access to ICT tools and platforms for everyone, especially in remote and low-income communities has been a persistent challenge for the educational policymakers and the decision-makers. Any technology is successful if it can be accessed and leveraged by a majority of the beneficiaries in any nation. In India, this technology has been mobile phones. Mobile phones have reached most Indian households now, including the remote corners of the country. The availability of low-cost smartphones along with the internet widespread has been a major enabler behind the penetration. According to the recently available data, India has 1.18 billion mobile connections, 700 million Internet users, and 600 million smartphones, which are increasing by 25 million per quarter.⁹ Indian government tapping into the potential of the ICT tools has launched various digital initiatives in the past few years. Even in situations where internet speeds and reliability make it almost impossible to use, digital platforms like Zoom, Google Classroom, or Microsoft Teams have been optimized for remote learning. The way Indian Education Sector has been utilizing technology for better access to educational resources are discussed below: -

Increased Access through Distance Learning

Distance learning has become a common mode of learning in any part of the world. It provides services to the learners at any stage of a student's learning life cycle and upgrades the skill set. With the help of the internet and a digital device in hands can avail unlimited knowledge and resources about anything and everything possible. Learners can learn subjects or courses available anytime. It has reduced the geographical barriers to a great extent and is economical as well. The Indian government has launched various digital initiatives under the nationwide movement of “Digital India” to make education reach everyone. A digital platform like SWAYAM¹⁰ hosts Massive Open Online Courses (MOOCs) to offer quality education on various subjects for students, from 9th-12th grade to postgraduate level. The platform also has SWAYAM PRABHA¹¹, a group of 34 DTH (Direct-to-Home) channels dedicated to broadcasting educational programs 24x7. The channels broadcast new content, repeated five times in the same day for students to select a convenient slot. ePathshala¹² portal was launched in 2015, to build a resource store for educational videos, audios, flipbooks, etc. Resources on the portal are available in Indian languages such as Hindi, English, and Urdu and can be accessed via smartphones, laptops, desktops, and tablets. Platforms like DIKSHA¹³ and NISHTHA¹⁴ are dedicated platforms to provide resources to teachers and students. Both of these platforms are leveraged for the professional development of the teachers, the platforms provide a wide range of training modules catering to the different needs of the students.

The educational communities are understanding that the digital divide is not just limited in terms of technology or infrastructure but also the skills and abilities of the people to benefit from access to technology¹⁵. Various studies and data have shown low-tech Ed Tech solutions like messaging apps or phone calls are likely to be most accessible in rural India. ASER 2020 report finds WhatsApp to be the most common medium through which learning resources are being shared. To strengthen the

⁹ <https://economictimes.indiatimes.com/news/india/indias-growing-data-usage-smartphone-adoption-to-boost-digital-india-initiatives-top-bureaucrat/articleshow/87275402.cms>

¹⁰ <https://swayam.gov.in/about>

¹¹ <https://www.swayamprabha.gov.in/>

¹² <https://epgp.inflibnet.ac.in/>

¹³ <https://diksha.gov.in/>

¹⁴ <https://www.india.gov.in/spotlight/nishtha>

¹⁵ <https://blogs.worldbank.org/edutech/education-technology-poor-rural>

digital movement ahead there is a deep focus on bringing in innovations building the capacity of digital infrastructure as well digital knowledge among a common person. In the days to come, private players to offer e-learning courses, along with the government's effort to strengthen the digital landscape of the country.

Availability of Quality Educational Resources

Both the availability and quality of material can be a barrier to quality education¹⁶. Access to high-quality educational material is critical to the learning process. This can yield improvements in students learning outcomes equal to or greater than many interventions that are often more costly¹⁷. Easily accessible quality resources save time and effort to search for the appropriate learning resources for both the students and teachers. Many states in India have updated their textbooks with one with embedded QR (Quick Response) codes. The code, when scanned takes the user to the landing page of the learning modules¹⁸. These codes are mapped with the resources both for the students and the teachers associated with the particular topic. This has contributed to avail the resources created by the experts (teachers, subject experts). In the places where internet connectivity is sporadic, unreliable, or intermittent, innovative approaches to caching and accessing the content offline have allowed access to a vast number of online resources.

The COVID-19 pandemic has had a tremendous impact on the education sector in India. While it made millions of school-going children sit at home, it also created opportunities for innovations. The good old technology of "Television" and "Radio", proved to be most impactful and accessible to reach students remotely. The education community promptly optimized the low-bandwidth technologies to engage with the maximum number of students. This defined the sentiment to realize the potential of technology in the expansion of educational opportunity when used effectively, can greatly contribute to creating equality. Worldwide, 45% of families still have no internet access, and even where the internet is available, families often only have one device or limited access to use it regularly. To ensure that a worldwide push to leverage technology in education doesn't massively grow educational gaps, and instead realizes its potential to expand educational opportunity for all, we will need to make a huge investment to ensure universal access. Prioritizing access to low bandwidth technologies will make a huge difference. Knowledge can transform a society, but only if it is of high quality and is universal: people of all classes, genders, castes, religions, and regions must have free access to it.¹⁹

Empowering Teachers for Quality Education

Education technology is a transformative tool for the professional development of the teachers and helps them continue to deepen their knowledge and access learning wherever they are teaching. In India, educators are utilizing technology to help their students learn, connect and thrive in new ways. There has been a surge in using various applications, virtual tutoring, video conferencing tools, or online learning software. Teachers are using virtual classrooms to make engagement between teachers and students as close as possible to a real, in-class experience. The NEP 2020 has given enough emphasis on the role technology has to play in creating well-equipped teachers. It promotes the creation and availability of digital resources in regional languages. The focus of teacher education institutes has also shifted now to provide teachers with a solid understanding of the various media, their affordance, and constraints. Such understandings emerge when teachers are actively involved in

¹⁶ <https://educateachild.org/explore/barriers-to-education/resources>

¹⁷ <https://usprogram.gatesfoundation.org/News-and-Insights/Articles/How-High-Quality-Instructional-Materials-Can-Drive-Teacher-Growth>

¹⁸ <https://www.businessinsider.in/education/news/500-million-school-textbooks-now-provide-digital-content-by-scanning-qr-codes/articleshow/74277189.cms>

¹⁹ <https://thewire.in/education/ed-tech-companies-wont-create-a-more-egalitarian-educated-india>

teaching and learning with technology across the various disciplines. The educational communities realize, without empowering the teachers, a holistic change cannot be brought into the education system. Motivated teachers will only be able to take the positive impact of technology back into their classrooms and support student learning better.

Continuous Professional Development

National digital platforms like e-pathshala, DIKSHA, NISHTHA, and the National Teacher Platform (NTP) have become rapidly popular among teachers. Extensive teacher training modules enable and equip the teachers to overcome their technological challenges. Understanding the basics of an ed-tech interface to understand its significance, power, and benefits has been an important part of the e-education ecosystem. Continuous Professional Development enables the teachers to stay updated on new methods of teaching, skill development, techniques to map students learning and academic progress. With the help of digital tools and devices, teachers can now track and update their teaching and assessment methods enabling them to explore more advanced and updated techniques. The process of the whole ICT training helps teachers to understand both its benefits and limitations as well, giving them space to explore more ways of innovative teaching and exploring new educational avenues. This helps them create a positive learning environment that enables the teachers to encourage the students further towards productive tech-led learning. Ed-tech teacher training solutions supporters training this is inclusive towards social issues, especially for rural areas. With the help of online teacher training programs, awareness towards current issues like educating girl child, women empowerment, the importance of health and nutrition, and many such have been able to reach the remote areas of the country. The focus should be on empowering the human teaching talent with the help of technology rather than replacing them. The world throwing new complex challenges now and then, like the recent COVID pandemic, teachers need to be better equipped to adapt to the new environments and tackle new challenges.

Reduced Workload

Along with the teaching responsibilities teachers also have added responsibilities for admirative work for the government or data collection. The availability of diverse school management apps makes it possible to have transparency among various stakeholders. With the help of various digital platforms, teachers and parents can interact consistently compared to in-person interaction. Technology enhances teachers' current practices to increase their instructional time and make their work smooth. ICT tools and platforms expand teachers' capacity to implement that would otherwise be challenging to adopt and maintain with the traditional classroom. Adaptive software platforms give teachers daily snapshots of students' individual learning needs, thereby making data-driven instruction much more manageable, in an intuitive manner. Teachers can avail themselves to various lessons plans, catering to differentiated learning levels in the classroom, give data-driven instruction, higher-order feedback to students. All these skills and techniques might not require technology, but technology can expand teachers' capacity to adopt these practices efficiently.

Network for Knowledge Sharing

Online platforms have provided teachers not only to learn new skills but also to grow as a community by sharing the best practices. Various digital platforms like DIKSHA hosts groups for teachers across the nation to share and learn. The Indian government has collaborated with various tech giants like Microsoft, Google, and Dell, to give exposure to Indian teachers to share and learn at the international platforms. Programs like Microsoft Innovative Educator (MIE) give platforms to educators who use technology to inspire their peers and enhance learning outcomes. Google in partnership with the central board of Secondary Education (CBSE), an Indian national-level education board for private and public schools, has helped teachers to run online classes. These kinds of programs and platforms

create a strong community among the educators and help in their transition process of utilizing technology in their classroom instructions and practices. Especially teachers switching to using technologies for the first time in their teaching experiences.

Role of ICT in Gender Equality

The gender gap in India has widened to 62.5%, largely due to women's inadequate representation in politics, technical and leadership roles, decrease in women's labor force participation rate, poor healthcare, lagging female to male literacy ratio, income inequality.²⁰ There are still several gaps remaining to be addressed, especially concerning female out-of-school children and literacy rates. Girls are likely out of school or illiterate, because of several obstacles in and outside of schools. Considering women are often primary caregivers in family situations, they have a central role in the intergenerational transmission of knowledge.²¹ Developing gender-aware best practice ICT and education policies is a crucial element in bridging the gender gap more generally in the region²². ICT has the potential to alleviate or remove some of the barriers or constraints that prevent women and girls from accessing educational opportunities, such as illiteracy, poverty, time scarcity, sociocultural factors, mobility, and relevancy, leading to women empowerment and gender equality. Education has a particularly important role to play in fighting the economic divide that both drives the gap between women and men and is driven by it.²³ Unless explicit measures are taken to address the constraints girls and women face, any attempt to formulate ICT as a tool for knowledge and information dissemination for the underprivileged may increase gender disparities and lessen the potential impact of ICT in education. ICT can also help lower barriers to education by providing tools that overcome challenges created by differences in cultural norms and language. It can also help lower barriers to education by providing tools that overcome challenges created by differences in cultural norms and languages. How ICT has helped in promoting Gender Equality in India, is discussed below.

Digital Literacy

In a situation where attending conventional institutions of learning is difficult or impossible for women and girls, ICT can be used to bring education into homes and non-traditional learning spaces.²⁴ Informal learning opportunities via ICT platforms arguably represent the most transformational education opportunity for women and girls. Digital literacy is defined as the ability to digital technologies for meaningful actions within a life situation. India has been launching various programs promoting digital literacy for girls and women. These programs also address the issue around privacy, safety, and misinformation on digital platforms and with the usage of the internet. As part of one of the research projects by the Center of Sustainable Development, Columbia University, a learning center was established in Mahbubnagar district in Telangana. The center aims to address the disadvantages, faced particularly by women and those with limited exposure to education and skill training, keeping them in low literacy and digital literacy levels. The curriculum is carefully designed in the areas of computer, English, life skills, and environment. Facilitating women's access to appropriate content is critical to ensure women can fully exploit the opportunities. Partnership with the local government makes it a sustainable process, where women are being trained in digital competency areas as well as trade-related knowledge areas, and communicate with other women to become more aware of gender biases and injustices that often hinder their growth. Such initiatives

²⁰ <https://www.livemint.com/news/india/how-india-fared-in-global-gender-gap-report-2021-11617726598143.html>
<https://www.un.org/womenwatch/daw/public/w2000-09.05-ict-e.pdf>

²¹ https://www.academia.edu/40511312/The_role_of_ICT_in_realising_education_for_all_by_2030_Achieving_Sustainable_Development_Goal_4_ICT4SDG4

²² https://www.infodev.org/infodev-files/resource/InfodevDocuments_887.pdf

²³ <https://www.oxfam.org/en/research/power-education-fight-inequality>

²⁴ https://www.infodev.org/infodev-files/resource/InfodevDocuments_887.pdf

especially in rural areas help women to gain more respect at both the family and community levels. Younger women feel more confident to approach the job market. There is a sense of and unity solidarity developed as well, as they learn these new skills and bring forth leadership qualities.

Empowerment through Employment and Awareness

The Internet can offer great assistance to employment opportunities especially catering to women. It offers a database, put together by women's groups, from which women can find relevant links, connections, resources, and information and develop opportunities. Significantly several non-profit organizations have diversified their services to provide support to this class of entrepreneurial women. The Self-Help Group is a community-based group of women catering to socio-economic challenges in rural India. It comprises women members and is dedicated to women's empowerment in rural areas. These groups have also seen a transition in the era of digitization has been a potential channel to accelerate and promote digital knowledge among women in rural India. With the help of mobile phones, these women are imparting knowledge about health, finance, employment. Tools such as short message services (SMS) and mobile applications can provide personal health management information and reminders. Many women and girls receive inadequate or incorrect information about topics such as reproductive health and HIV/AIDS. ICT tools can offer a private way for women and girls to access resources and information on these important health issues.

ICTs for People with Special Needs

ICT offers a great potential to support lifelong learning for all groups of students, including those who have special educational needs. The application of ICT must enhance independence, integration, and equal opportunities for such people and in this way will facilitate their inclusion in society as valued, respected, and contributing members. It can offer a range of opportunities for children with disabilities or special needs. It can support the development of reading and writing skills, but also as a tool to develop social relation skills.²⁵ Unequal access to educational resources is the major challenge in the journey of learning for children with special needs. With the help of assistive technology, ICT tools ensure providing educational opportunities. Programs like distance learning allow students with disabilities to continue living at their homes. Students with intellectual, hearing, or reading disabilities, impaired vision, dyslexia, or any other disabilities, can make effective use of audio libraries to complete educational courses. It helps promote the attendance of students with special needs in mainstream schools. This helps to create an environment of inclusive classroom environment and awareness in the other children in the classroom. Often children with special needs feel lonely and increased social connections through contact with peers, friends, and teachers give them more chances to form relationships with community members.²⁶

Indian government with the help of technology has worked on improving the issues of access and outreach of resources for children with disabilities. The Central Institute of Education Technology (CIET) under NCERT is involved in promoting the utilization of educational technologies through radio, TV, satellite communications cyber media, etc. CIET holds the credit for organizing forums such as the international forum on adopting an ICT perspective to Education and Learning which also include the component of designing an e-learning environment and assistive technology for students with disabilities. The NEP 2020 with the focus on educational opportunities for children with special needs, has felt the urgent need for introducing additional special educators for certain areas of school education. The national digital platform DIKSHA has resources dedicated to visually impaired and hearing-impaired students. The National Institute of Open Schooling is committed to making its

²⁵ <http://www.aquilonis.hr/SNEP/#:~:text=Specifically%20with%20special%20needs%20learners,mental%20or%20just%20concentration%20problems.>

²⁶ <https://iite.unesco.org/pics/publications/en/files/3214644.pdf>

website accessible to people with disabilities, by incorporating different features which will make it easier for users to browse the website. Features like study material have been developed in Digitally Accessible Information System (DAISY) a technical standard for digital audiobooks, periodicals, and computerized texts. Another Flagship Program by Ministry of Minority Affairs.

Way Forward

The innovative solution that employs ICT will be fundamental to empower education leaders and communities to achieve the goal of SDG 4, Education for All.²⁷ EdTech isn't just about digitizing the content, but rather about providing unlimited access to learning which can be personalized and customized. Blended learning, empowered teachers, and standardized quality content alongside a robust monitoring and evaluation system are some elements that will be essential to achieve SDG 4. There needs to be a structured and focused approach by the govt and Ed-tech players in meaningful engagement with all the key stakeholders such as parents, teachers, students, educationists, nonprofit, and technology-based organizations within our education ecosystem. ICT tools and platforms for remote distance learning and teacher training, education data collection, will allow addressing the issues of access and inequalities in attaining human capital for female, lower-income, and special needs members of society. Properly evaluated ICT interventions can enhance the potential for quality education by removing socio-economic constraints, opportunity cost, the language of instruction, preventing health deficiencies. Massive investments in both technology and teachers simultaneously will strengthen the moment of Digital India.

Immediate interventions in the country will look like strengthening the connectivity of all schools, primary, secondary, and tertiary, to mobile broadband. More and more teachers are to be trained in ICT equipment and applications, as well as students in ICT application at all levels of schooling. Development of more online curriculum in local language and online courses, with accompanying print teaching materials. How policies could be made stronger to make education inclusive and make it more accessible to gender. Ensuring a gender perspective ICT-based projects, by designing technologies appropriate to women's needs. Encouragement of the ed-tech start-ups should be in low economic backgrounds. This has disrupted the fundamental premise of using technology for equity and accessibility. There is an urgent need for an EdTech Policy, this will help in setting up a road map for the stakeholders of the education system such as policymakers, educationists, teachers, and private players. It should address issues of infrastructure, ecosystem, development, assessment, learning, and teaching – alongside the systemic issues of access, affordability, and collaborative outcomes. There is a need for increased ICT awareness among teachers and parents, capacity building, need for institutional agility, and constant iteration. Thus ICTs can offer substantial possibilities to improve the lives of the students, promoting gender equality and resources for all.

²⁷ <https://www.ericsson.com/assets/local/news/2016/05/ict-sdg.pdf>

References

Mete, Jayanta & Patra Narayan Jyoti. "The Role of ICT in Improving the Quality of School Education in India". ResearchGate. July 2014.

https://www.researchgate.net/publication/292403689_THE_ROLE_OF_ICT_IN_IMPROVING_THE_QUALITY_OF_SCHOOL_EDUCATION_IN_INDIA

"The Role of ICT in Realizing Education for All by 2030". Academia.edu.

https://www.academia.edu/40511312/The_role_of_ICT_in_realising_education_for_all_by_2030_Achieving_Sustainable_Development_Goal_4_ICT4SDG4

Martinez Mabel, Barron Maria & Zacharia Sharon." How can countries implement low tech remote learning? Using the experiences from Edu Radio and Edu TV in Sierra Leone and Pakistan to develop knowledge Packs". World Bank Blogs. May 18, 2021.

<https://blogs.worldbank.org/education/how-can-countries-implement-low-tech-remote-learning-using-experiences-edu-radio-and-edu>

Singh Devyani & CAM corporate Team. "NEP 2020: An Interplay of Education and technology". India Corporate Law. August 21, 2020

<https://corporate.cyrilamarchandblogs.com/2020/08/nep-2020-an-interplay-of-education-and-technology/>

"National Education Policy advocates use of Technology in Education". Digital Learning Network. July 29, 2020. <https://digitallearning.eletsonline.com/2020/07/national-education-policy-advocates-use-of-technology-in-education/>

"ICT & SDGs". The Earth Institutes, Columbia University.

<https://www.ericsson.com/assets/local/news/2016/05/ict-sdg.pdf>

Kopp, Wendy. "Lessons from this Worldwide Experiment with Distance Learning". Teach For All. June 22, 2020.

<https://medium.com/teach-for-all-blog/lessons-from-this-worldwide-experiment-with-distance-learning-da9ed171ad>

"Survey of ICTs for Education in India and South Asia, Country Studies". InfoDev. 2020

https://www.infodiv.org/infodiv-files/resource/InfodivDocuments_879.pdf

"Digital Education Initiatives". IBEF, August 12, 2021

<https://www.ibef.org/blogs/digital-education-initiatives>

Walker Jo, Pearce Caroline, Boe Kira, Lawson Max. "The Power of Education to Fight Inequality". OXFAM International, September 17, 2019. <https://www.oxfam.org/en/research/power-education-fight-inequality>

Karpati Andrea. "Promoting Equity Through ICT in Education". OECD, June 2003.

<https://www.oecd.org/education/research/31558662.pdf>

Trucano, Michael. "Promising Uses of Technology in Education in Poor, Rural and Isolated Communities Around the World". World Bank Blogs. July 22, 2014

<https://blogs.worldbank.org/edutech/education-technology-poor-rural>

Kottayil, Vinod & Kalidasan & Goyal Tanya, "Ed-Tech Companies Won't Create a More Egalitarian, Educated India". The Wire. December 31, 2021.

<https://thewire.in/education/ed-tech-companies-wont-create-a-more-egalitarian-educated-india>

"Importance of Equity in Education | How to achieve Equity in Education?". EdMonger Consulting. August 30, 2021

<https://edmonger.com/2021/08/30/importance-of-equity-in-education/>

Kishore, Anita. "National Education Day: Digitally Empowered Teachers Can Unlock India's Potential". Mint. November 11, 2021.

<https://www.livemint.com/education/news/national-education-day-digitally-empowered-teachers-can-unlock-india-s-potential-11636599189778.html>

"How EdTech is Assisting to reduce Teacher's Workload". mPower Elearning Solution.

<https://www.mpowero.com/blogs/how-edtech-is-assisting-to-reduce-teachers-workload/>

Empowering Educators and Students, A promising future enabled by education.

<https://www.microsoft.com/en-in/about/empowering-educators.aspx>

Chatterjee, Shreya. "Digitizing Self-Help Groups in India". Center for Financial Inclusion. September 12, 2016.

<https://www.centerforfinancialinclusion.org/digitizing-self-help-groups-in-india>

Mishra, Garima & U.V.Kiran. "Role of ICT in Achieving Complete Gender Equality in India". IJTRA. May-

June 2015. <https://www.ijtra.com/view/role-of-ict-in-achieving-complete-gender-equality-in-india.pdf>

"The Impact of New Digital Technologies on Gender Equality in Developing Countries". Inclusive and Sustainable Industrial Development Working Paper Series WP 20. UNIDO. 2019.

<https://www.unido.org/api/opentext/documents/download/16760725/unido-file-16760725>

Karam, Azza. "Education as the Pathway towards Gender Equality". UN Chronicle.

<https://www.un.org/en/chronicle/article/education-pathway-towards-gender-equality>

ICT India Working Paper. "Blue Print for a Rural District Based ICT Center, Mahbubnagar, Telangana State, India. CSD, Columbia University. August 2019.

https://csd.columbia.edu/sites/default/files/content/docs/ICT%20India/Papers/ICT_India_Working_Paper_16.pdf

Pandey, Pooja and Srivastava Sumyesh. "Excluding the excluded: India's response to the education of children with disabilities during COVID-19". Times of India. April 26, 2020.

<https://timesofindia.indiatimes.com/blogs/voices/excluding-the-excluded-indias-response-to-the-education-of-children-with-disabilities-during-covid-19/?source=app&frmapp=yes>

"How ICTs can help overcome the barriers that stand between millions of children and an education".

ICT4SDG.ITUNews. January 3, 2019. <https://news.itu.int/icts-can-overcome-barriers-that-stand-between-millions-children-education/>

Sharma, Kritika. "Modi govt working on policy to regulate edtech platforms, says Education Minister Pradhan".

ThePrint. January 3, 2022. <https://theprint.in/india/education/modi-govt-working-on-policy-to-regulate-edtech-platforms-says-education-minister-pradhan/794038/>