Education through ICT Initiatives during the Pandemic in India

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List of Abbreviations

AAC	Alternative Academic Calendar
AIR	All India Radio
CBSE	Central Board of Secondary Education
DIKSHA	Digital Infrastructure for Knowledge Sharing
DTH	'Direct to Home'
HRD	Human Resource Development
ICT	Information and Communication Technologies
IT	Information Technology
KITE	Kerala Infrastructure and Technology for Education
MHRD	Ministry of Human Resource Development
MP	Madhya Pradesh
MSCERT	Maharashtra State Council of Educational Research and Training
NCC	National Cadet Corps
NCERT	National Council of Educational Research and Training
NIOS	National Institute of Open Schooling
NISHTHA	National Initiative for School Heads and Teachers Holistic Advancement
NPO	Non-Profit Organization
NROER	National Repository of Open Educational Resources
QR	Quick Response
SCERT	State Council of Educational Research and Training
SMS	Short Message Service
TV	Television
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
VICTERS	Versatile ICT Enabled Resource for Students
WHO	World Health Organization

Abstract

The global crisis of the COVID-19 virus has impacted the Education Sector tremendously. It has presented the education community around the globe with numerous challenges in continuing the learning process. The Indian Education system has also experienced an irreversible learning crisis amid the pandemic. School closure across the country has impacted everyone's learning experience. The pandemic has forced the sector to shift to a virtual and blended mode of learning. Information and Communication Technology (ICT) has helped the sector to survive and adapt to the new ways of online learning. The crisis has allowed various educational innovations to bloom. Stakeholders across the country have been trying their best to come together and innovate with various ways to support the students and teachers. Considering the various challenges of digital education in the country, efforts have been made by the country to optimize the potential of the existing and new educational platforms to be made available for everyone. During the pandemic, the country has witnessed a number of ICT driven initiatives on national, state, and individual levels. There has been a proactive approach in the education sector to utilize the maximum potential of technology to reach every learner. This paper examines a few such initiatives which have contributed significantly to making it possible for education to reach the remotest corners of the country with the help of technology-related tools.

Introduction

The COVID-19 pandemic is widely considered to be the most challenging health crisis the world has ever faced, attacking societies at their core, as described by the World Health Organisation (WHO)[1]. The novel coronavirus has caused a tremendous loss of lives, jobs, and opportunities around the world. It has affected all segments of the population and continues to do so. Almost every country has imposed complete or partial lockdowns to combat the spread of the virus. The education sector is no exception has been affected tremendously by such lockdowns. Students from all backgrounds had to face considerable challenges to continue their learning process. According to World Bank data, 190 countries have faced complete or partial school closure, affecting more than 1.7 billion students[2]. India also began closing down schools and colleges temporarily during the second week of March. As per the present situation, there is still uncertainty about when schools and colleges will reopen.

The pandemic has forced the Education Sectors to shift dramatically to virtual and blended modes of teaching and learning using various Information and Communication Technology (ICT) tools and has radically accelerated the pace and urgency of various ongoing technology-driven educational initiatives. Students and teachers are now relying on various online platforms to adopt new pedagogical methods to learn and teach. Educational communities across the world are coming together and figuring out various ways to support students and teachers with innovative platforms and strategies. The crisis has helped in the stimulation of innovation in the education field. India has also seen various ICT led initiatives to reach out to everyone in such difficult times, including the most marginalized populations who may lack access to adequate healthcare, and about education, lack access to devices and connectivity, families who may feel less equipped to children's learning from home. There has been a monumental rise in adopting widespread use of online tools like Zoom, Google Classroom, Blackboard, mobile applications to facilitate communication with parents, telephone, television, and radio to try to reach every learner. This global crisis has reiterated the potential of ICT in enabling the goal of education access and quality for all children.

India has been responsive in utilizing existing various national and state-level platforms like DIKSHA, National Repository of Open Educational Resources (NROER), WhatsApp, Television, Radio, etc as a response to continue the learning process during the pandemic. There has been a surge in various innovative approaches and solutions as well on an individual level in support of education. States like Kerala have paved the path in effectively using technology to ensure continuous learning by enabling universal access to ICT infrastructure for remote learning. Stakeholders in the educational community are moving forward towards blended learning using both online and offline modes of learning to ensure no student is left behind. This paper will cover such a few key initiatives at the national, state, and individual level and they are contributing to continue the learning process during the pandemic crisis and also lead a road to the future of education for all.

[1] https://www.un.org/development/desa/dspd/everyone-included-covid-19.html
[2] https://www.worldbank.org/en/topic/edutech/brief/lessons-for-education-during-covid-19-crisis

Impact of Pandemic on Education Sector

The COVID-19 pandemic has created the largest disruption of education systems in history, affecting nearly 1.6 billion learners in more than 190 countries and all continents. In response to the unprecedented educational challenges created by school closures due to the COVID-19 pandemic, more than 90% of countries have implemented some form of remote learning policy[3]. Closure of schools and other learning spaces has impacted 94% of the world's student population, up to 99% in low and lower-middle-income countries[4]. The disruptions caused by COVID-19 to everyday life meant that as many as 40 million children worldwide have missed out on early childhood education in their critical pre-school year. COVID-19 related school closures are forcing countries further off track to achieve their learning goals[5]. The ability to respond to school closure is proportional to the level of development of the respective country. In the most fragile education systems, this interruption of the school year will have a disproportionately negative impact on the most vulnerable pupils, those for whom the conditions for ensuring continuity of learning at home are limited[6].

In India, according to a UNICEF report[7], "School closures have impacted 247 million children enrolled in elementary and secondary education and 28 million children enrolled in pre-schools and Anganwadi centers. This is in addition to the more than 6 million girls and boys who were already out of school before the Covid-19 crisis", the report mentioned. This has not only hampered the learning journey but also the provision of essential services to children and communities, access to nutritious food, the ability of many parents to work and increase risks of violence against women and girls. Online learning apps and platforms for learning from home have been making it possible to continue the learning process in the safest possible manner. Simultaneously, the inevitable dependency on internet facilities and remote learning tools to continue the learning process has also made the situation more challenging especially for the most marginalized groups who are not equipped with digital learning resources or lack the motivation to continue learning on their own. Learning losses also threaten to extend beyond this generation and erase decades of progress, not least in support of girls and young women's educational access and retention[8]. Thus, the crisis has somewhere intensified the pre-existing education disparities by reducing the opportunities for many most vulnerable learners.

COVID-19 crisis being an exceptional situation has also helped in accelerating the adoption of digital technologies to deliver education. Most of the educational institutions have moved forward in the direction of a blended mode of learning. New ways of delivery and assessments of learning paved a path for immense opportunities for a major transformation in

[3] https://data.unicef.org/resources/remote-learning-reachability-factsheet/
[4] https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf

[5] https://blogs.worldbank.org/education/how-could-covid-19-hinder-progress-learning-poverty-some-initial-simulations
[6] https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf
[7] https://www.unicef.org/rosa/sites/unicef.org.rosa/files/2020-06/UNICEF%20Upended%20Lives%20Report%20-%20June%202020.pdf
[8] https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf

the field of curriculum development and pedagogy. The pandemic resulted in a digital revolution in the higher education system through online lectures, teleconferencing, digital open books, online examination, and interaction in virtual environments[9]. In the Indian educational community, various stakeholders identified the challenges and the following opportunities of shifting from learning at school to learning through online platforms using various ICT tools. Immediate measures were taken to ensure keep up the motivation levels and, in their route, to learning in government schools and universities. In April 2020, the Ministry of Human Resources Development (MHRD) launched the Alternative Academic Calendar (AAC) developed by National Council for Teacher Education (NCERT) for primary, upper primary, secondary, and higher secondary schooling. The document presented measures to support educators to ensure continuity in curriculum learning being safe from their homes. The already existing national and state-level online platforms like DIKSHA, NISHTHA, and ePathshala proved crucial to provide training opportunities to a larger set of educators. Massive Open Online Courses (MOOCs) were encouraged for higher studies.

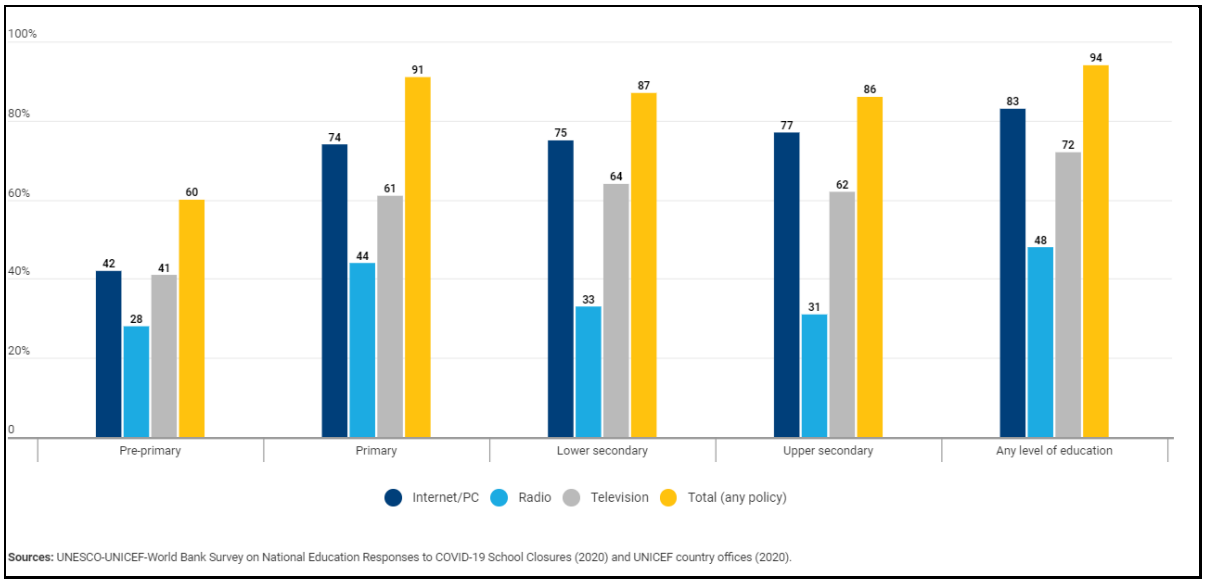
For teachers and parents, the transition from classroom teaching to online teaching has been overwhelming as well, where they are expected to create a safe learning environment virtually and at home. Many teachers and institutions were not trained and equipped adequately to shift to online teaching. Thus, putting them under extreme pressure to give their best and learn new skills in such difficult times. Even for parents, it has been a struggle to juggle their work from home and helping their kids with navigating the virtual learning process. Stakeholders in the educational community identifying such challenges have also understood the importance of keeping a check on the mental and emotional wellbeing of the family. There have been initiatives to support the students, teachers, and students with resources for mental wellbeing. Technology has helped immensely to be able to execute such initiatives in the time of virtual interaction. Such unprecedented challenges by the pandemic have helped our educational communities to realize the potential and scope of ICT enabled learning for the future. Ensuring equal and adequate access to platforms using a blended mode of learning is seen as the most important component to accelerate the process of transitioning to online learning soon. This will require our Indian Education system to focus on policies strengthening the ICT infrastructure and training and bridge the digital divide in the country and move the country closer to achieving Sustainable Development Goals.

ICT initiatives for continuing the Learning Process

During the time of sheer uncertainty and constant fear amid the Pandemic, technology has been a source of hope and lifeline in many ways. Considering the Education Sector, ed-technology made it possible to mitigate the extreme damage that could have been done to the sector and involved stakeholders. Educational communities have been using various platforms like Google Classrooms, Microsoft Team, Zoom, and many more to continue the process of learning for students amid pandemics. This has helped in believing more in the potential ICT tools hold to reshape the education sector for the better. Across the countries, the most common approach was digital instruction, which was used by 42 percent of countries for pre-primary education, 74 percent of countries for primary education, and 77

[9] https://www.downtoearth.org.in/blog/health/transitioning-classes-into-electronic-gadgets-life-of-students-in-lockdown-72962

percent of countries for upper secondary education. Many countries have also developed broadcast curricula (television- and radio-based), especially for primary and lower secondary students[10].



source:https://data.unicef.org/resources/remote-learning-reachability-factsheet/

India has been consistently endorsing the digital revolution in the education sector for the last few years and the ongoing pandemic became a major catalyst in accelerating the use of technology tools and digital platforms to facilitate the learning process. The recently launched National Education Policy 2020[11], also envisages the creation of a dedicated unit to devise the development of digital infrastructure, digital content, and capacity building to supervise the e-education needs[12]. It also talks about eliminating the digital divide and expanding ICT- based educational initiatives. Though, with the regional and household disparities in access to technology across the country, this transition has not been the smoothest for everyone. According to the National Sample Survey (2017-2018), only 23.8%p of Indian households had internet access, in rural households (66% of the total population) only 14.9% had access and in urban households only 42% had access[13]. Considering these numbers wouldn't have changed much in the last few years, the data does make the road ahead for the digital revolution in the country challenging. There is a need to develop a more blended way of education model mixed with textbooks and technology. While the stay-at-home requirements of the pandemic necessitated this shift, the lessons learned can be applied over the long term.

[10] https://data.unicef.org/resources/remote-learning-reachability-factsheet/

[11] https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

[12] https://www.bloombergquint.com/opinion/nep-2020-an-interplay-of-education-and-technology

[13]https://www.brookings.edu/blog/education-plus-development/2020/05/14/covid-19-in-india-education-disrupted-and-lessons-learned/

To address the challenges of remote learning, MHRD has undertaken several initiatives to support students, educators, and lifelong learners in their pursuit of education. These initiatives cover wide educational requirements, ranging from learners in schools to postgraduates. The already existing online platforms like DIKSHA, E-Pathshala, and Shagun (e-content), and many more are being optimized to their full potential to increase the connectivity and accessibility to content. Considering the challenges presented by the pandemic, various new initiatives like Manodarpan - a platform to provide psychological support to students, iGOT portal for training module for management of COVID-19 were launched. ICT tools like Radio and Television (TV) have been also used exponentially by almost all the states due to their vast potential to reach the highest number of students. According to the UNESCO-UNICEF-World bank survey[14] on National Education Responses to Covid -19 School closures, globally TV-based remote learning policies have the potential to reach the highest proportion of students (62%), which accounts for almost 930 million students worldwide. Indian educational communities have also been tapping into the opportunity to leverage TV as a platform to reach a wider range of students equipped with or without internet facilities. Some states are already running education programs on the government-owned Doordarshan television channel. The federal government, too, is running educational channels for senior classes[15]. State governments and individual educational organizations are understanding the existing gaps in accessibility to e-learning resources and are contributing to bringing the reach of digital platforms closer to everyone. Here are such noteworthy national, state, and individual level initiatives that helped the Indian education sector to continue learning amid the pandemic.

National Level ICT Initiatives

To address the challenge of remote learning, the Ministry of Human Resource Development (MHRD) has undertaken several initiatives to assist students and educators. Some of the initiatives used the already existing digital platforms effectively to tackle the learning gaps created due to pandemic. Platforms like Digital Infrastructure for Knowledge Sharing (DIKSHA), e-Pathshala, National Repository of Open Educational Resources (NROER) were used extensively for supporting the students and teachers across the country with educational resources and relevant training. ICT tools like TV, Radio helped the government to reach a larger number of target audiences. Some of such widely used initiatives on a larger scale in the country are discussed in detail below.

1) DIKSHA (Digital Infrastructure for Knowledge Sharing)

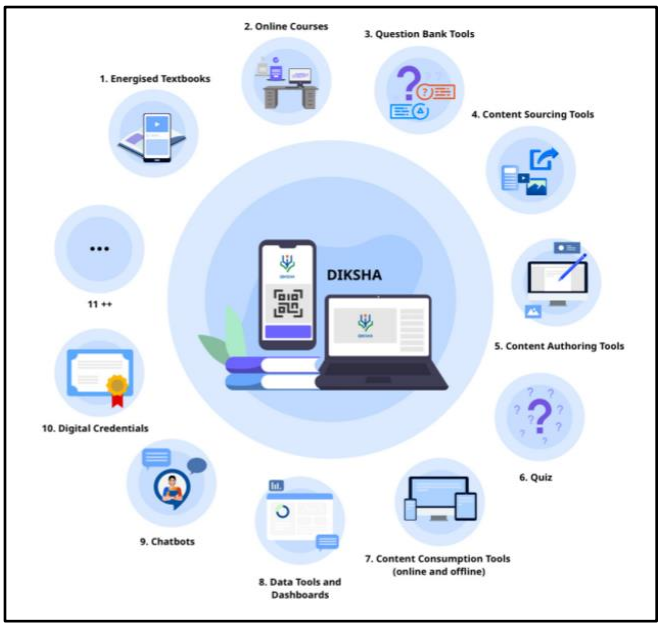
   DIKSHA[16] is an initiative of the National Council for Education Research and Training (NCERT) and MHRD launched in 2017. It is a national platform for school education available for all states and the central government for grades 1-12. The

[14] http://uis.unesco.org/en/news/unesco-unicef-world-bank-survey-national-education-responses-covid-19-school-closures-key

[15] https://www.straitstimes.com/asia/south-asia/india-using-tv-and-radio-to-teach-poorer-students

[16] https://diksha.gov.in/

platform can be accessed through a web - portal and mobile application. It provides access to a pool of e-content linked to the curriculum through several use cases and solutions such as QR coded energized textbooks (ETBs). There are training courses for teachers, quizzes, explanatory videos, and other helpful resources to create an engaging learning experience. Currently, the platform supports 18 languages and various curriculums of NCERT, CBSE, and SCERTs across India.



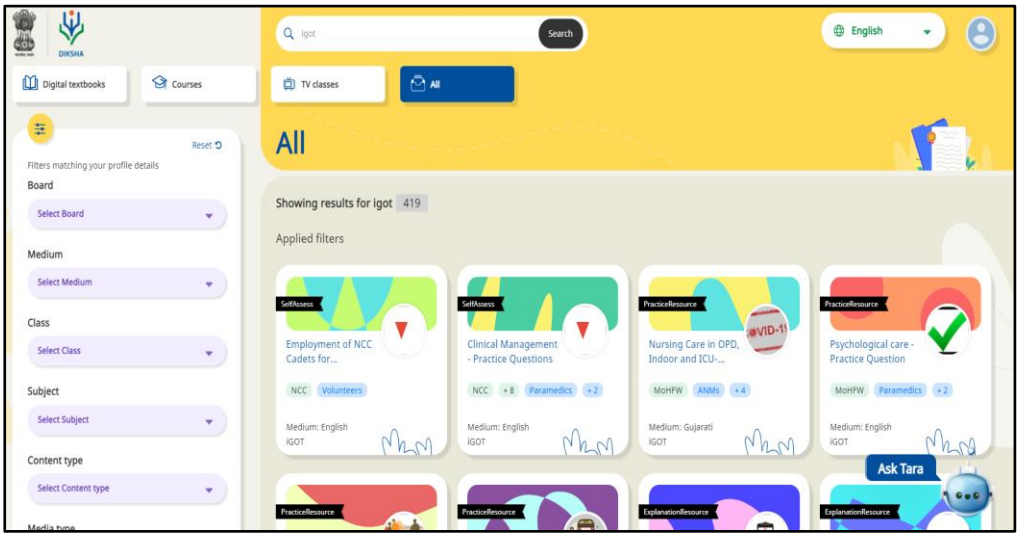
Source: https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

DIKSHA platform is designed to inherently support states/UTs to exercise autonomy, independence, and choice to craft and run learning programs to suit their needs and achieve their goals, by using solutions, tools, and data on the platform[17]. It is estimated that it is already being used by more than one crore teachers and students across the country in more than 30 states & UTs for curriculum-based education and training. The platform has been put to use extensively during the school lockdown in the pandemic. There have been remarkable innovative ideas and programs being explored because of few key aspects of the platform that are relevant and suitable for adoption in the current times[18]. It has been designed as a shared space using open standards available for use by teachers, learners, educationists, academics, administrators, government, NGOs, and educational functionaries. As of July 2020, it is estimated that over 60 crore ETBs are being printed this year in India by 35 states and Union territories, with more than 30 crore content plays and 200 crore page hits already on DIKSHA.

[17] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

[18] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

The government of India also utilized the platform to launch a training module for the management of COVID-19 named the 'Integrated Government Online Training" (iGOT) portal[19]. The portal aims to enhance the capacity building of frontline workers to handle the pandemic efficiently. There are courses for Doctors, Nurses, Paramedics, Hygiene Workers, Technicians, Auxiliary Nursing Midwives (ANMs), State Government Officers, Civil Defence Officers, and many more such frontline working organizations. The portal provides agencies like the Health Department and National Cadet Corps (NCC) with the ability to upload their content suited for its various users through mobile app and online webpage. DIKSHA platform has been proved as a revolutionary step ahead in the direction of digital India vision and has helped a large number of learners and the frontline workers of the country with capabilities to fight the COVID-19 virus by getting just in time knowledge and skills sets to help overcome the ongoing crisis. A massive number of students and teachers from all over the country have been using the platform to continue their learning since the time schools were closed. It has been the most popular application in school education during a pandemic due to its design to rapidly evolve with inputs,



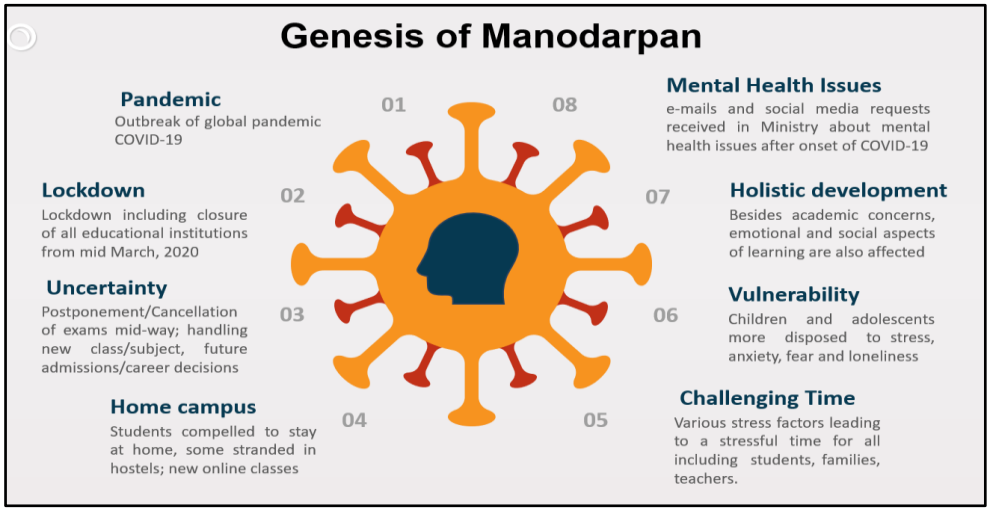
contributions, innovations from states/UTs across the country.

[19] https://diksha.gov.in/igot/

Source: https://diksha.gov.in/explor

2) Manodarpan

The Ministry of HRD launched the initiative MANODARPAN[20] to provide psychosocial support to students for their Mental Health and Well-being during the challenging times in the Pandemic. The platform is available on the web portal. The COVID crisis has been not just a serious medical concern but also brought psycho-social stress for everyone. Children and adolescents being more vulnerable to heightened levels of stress, anxiety, and fearfulness along with other behavioral issues. Understanding these challenges Indian government felt the equal need to focus on the mental wellbeing of the students. The platform covers a wide range of activities to provide psychological support to the students, counseling services, online resources, and a helpline. The webpage page advisory, practical tips, posters, podcasts, videos for psychological support, FAQs, and online query system. Primarily designed to help students, the platform has many advisories for teachers to follow during the lockdown period on how to make use of the interactive online classes, peer learning, identifying professional support, etc.



Source: http://manodarpan.mhrd.gov.in/

[20] http://manodarpan.mhrd.gov.in/

A national toll-free helpline (8448440632) has also been set up, which is managed by a pool of experienced counselors/psychologists and other mental health professionals, and plans to continue beyond the COVID-19 situation. The idea behind the initiative is to acknowledge the importance of the well-being and functioning of an individual in such a stressful time. Telephonic services being an easily available resource in the country as compared to internet-based services, helped the platform to reach those who needed support. Resources mobilized through the initiative are envisaged to facilitate a sustainable psychological support system for students, families, and teachers, and will be a great utility even in the post corona times with proactive and preventive mental health and wellbeing services integrated into the mainstream of learning processes.

3) Swayam Prabha TV Channels

Swayam Prabha[21] is an initiative by MHRD to provide DTH channels that are meant to support and reach those who do not have consistent access to the internet. 'SWAYAM' stands for Study Webs of Active Learning for Young-Aspiring Minds. 32 channels are devoted on a 24x7 basis to telecast high-quality educational programs by the MHRD. Channels are embarked on for school education and higher education separately. Provision is made for telecasts of live interactive sessions on these channels with experts from home through Skype. The Department of School Education and Literacy also tied up with private DTH operators like Tata Sky & Airtel to air educational video content to enhance the reach of these channels.
The states were coordinated to share air time (4 hrs daily) of the 5 existing Swayam Prabha channels to telecast their education-related contents. The number of TV channels for school education has now been increased from 5 to 12 to transform into 'one class, one channel', that is, one channel each for all grades from 1 to 12. To ensure coherent access through multimodal delivery, the same content is organized by chapter & topics on the DIKSHA platform as well to ensure asynchronous usage by anyone, anytime, anywhere. The channel covers both school education (class 9th to 12th) and Higher Education in a wide range of subjects like engineering, vocational courses, teacher training, performing arts, social sciences and humanities subjects, law, agriculture, and many more. Reaching out to students through television has helped with the challenge of remote learning in India amid the COVID-19 crisis. Television holds a larger share of its presence in Indian households. According to recent data from 2018, 66% of households in India own TV sets[22]. Also being easier to share a resource within a community among neighborhoods, makes TV an option for better reach.

[21] https://www.swayamprabha.gov.in/

[22] https://www.moneycontrol.com/news/india/tv-penetration-rises-to-66-in-india-highest-in-5-southern-states-survey-2748321.html

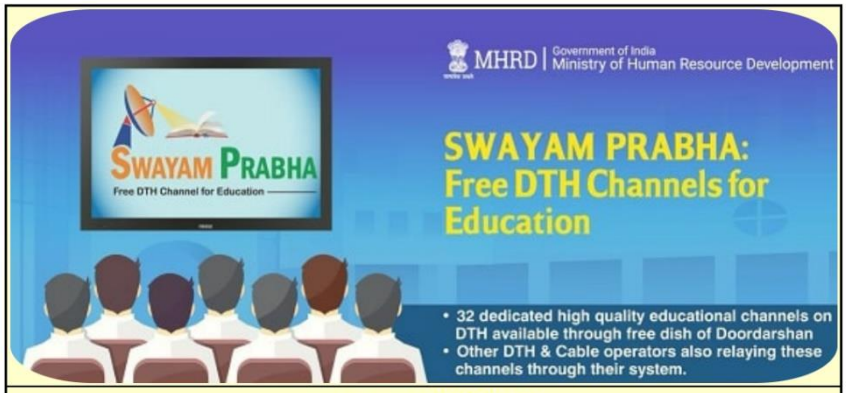


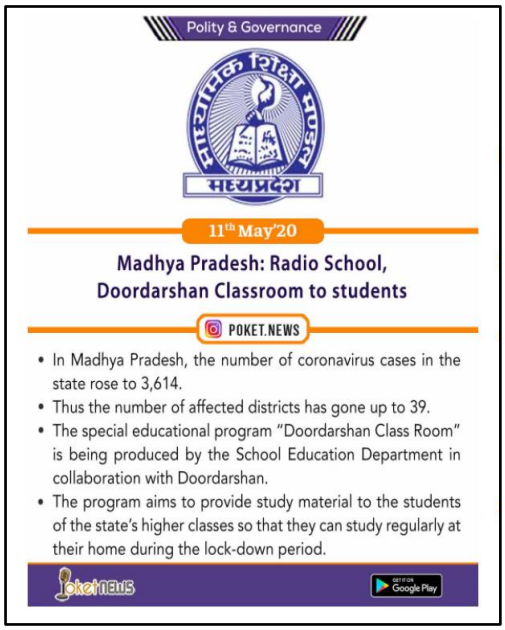
Image Source - MHRD Twitter

4) All India Radio

For the vast reach and depth of dispersion of various educational resources to the remotest region of the country, central and various state governments have been utilizing radio channels. All India Radio (AIR) is being used to broadcast virtual classes and other educational content through regional channels across the country. The platform is being specially used for children from primary grades (1- 5) in remote areas who do not have access to online resources. The broadcasts focus on activity-based learning. 289 Community Radio Stations have also been used to broadcast content for the National Institute of Open Schooling (NIOS) for grades 9 to 12. A Podcast called Shiksha Vani of the Central Board for Secondary Education (CBSE) is being effused by learners of grades 9 to12. Shiksha Vani contains over 430 pieces of audio content for all subjects of grades 1 to 12[23].

[23] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

In Madhya Pradesh, the State Education Center and AIR have started an initiative of 'Radio School'. Under this initiative, all the channels of All India Radio in MP have broadcasted programs from Monday to Saturday from 11 am to 12 pm. The purpose of this special educational radio program is to provide regular study to students of the state at home during the lockdown period. The program includes class wise and subject wise educational resources. Many more states have been utilizing this national platform to reach every student of their states.



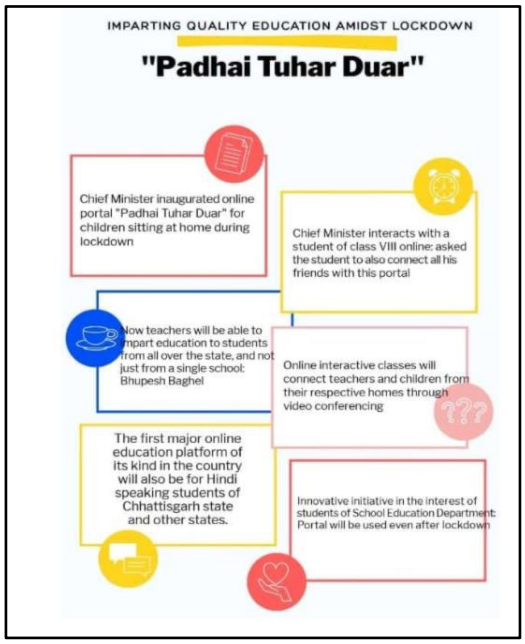
State Level Initiatives

All the states in the country have been adapting to various ICT led initiatives to provide the necessary resources required for the transition to online education. Considering students had to continue their education from their homes during the lockdown, state governments attempted innovative ways of providing syllabus-based e-content. States have been understanding the challenges with digital education and have been making various efforts to reach everyone using some form of technological tools. Here are some of the initiatives by these states.

1) Chhattisgarh - Education at your doorstep Initiative

The state government released its platform - '*Padhai Tuhar Duar*' - 'Education at your Doorstep' Portal to tackle the impact of the COVID crisis in the education sector. The objective of the platform is to connect teachers and students by providing access to good quality educational content from the comfort of their homes. The platform has a mix of resources like Live classes, offline video lectures, simulations, animations, worksheets, podcasts, etc. The state education department has worked on creating around 45000+ virtual schools, where the teachers engage with their students and provide the teaching and learning material daily. Teachers also guide students in solving the homework which is uploaded on the portal. The homework than is reviewed by the teachers using the annotation tools available on the portal and sends it back to the students.

(source:https://www.nvsrobhopal.com/chhattisgarh-padhai-tuhar-dwar-registration-online-login/)



Chhattisgarh being the region with mostly dense forests, internet connectivity is a serious challenge in reaching many students. To tackle the challenge, the government has taken proactive steps to ensure that the students are also able to connect using feature phones or landline phones. This way students do not need to have any smartphone or internet facilities. Even small classes at *para* (mohalla), at the neighborhood level, were started and Bluetooth technology was used to share the study material with students. These mohalla classes were named '*Padhai Tuhar Para*'. Under this initiative, around 23,643 teachers have been helping about 7,48,266 students to continue their education in 35,982 centers[24].

The department of School Education has also taken serious steps on crowdsourcing content from teachers, NGOs, and other content development firms at zero cost. The idea is to provide a mixed variety of joyful learning materials to our students. Once the content is uploaded, it is then carefully reviewed by the experts, and only after the approval; the content is visible to the students. As of date, the portal has garnered more than 18,500 crowdsourced audio-video content, in addition to this, it also has 1000+ image-based activity sheets, course material, audio (MP3) based content. In addition to this, more than 1500+ hours of live lectures have been delivered in 13,000+ sessions through the portal which has been attended by approximately 12,00,000+ participants from class 1-12. These features have helped the teachers and students to connect from their homes without the need for traveling outside for various subjects ranging from class 1-12[25].

2) Kerala - KITE initiative

Kerala has been the flag bearer for reaching the hardest to reach with the help of technology during COVID. During such difficult times, the state has been effectively using technology to ensure continuous learning and embodied their slogan "*Physical Distance and Social Utility into practice*". The state government launched virtual classes through Kerala Infrastructure and Technology for Education (KITE)[26], an educational television channel launched in 2005 with the vision of taking the benefits

[24] https://www.telegraphindia.com/education/education-in-covid-times-chhattisgarh-shows-the-way/cid/1799999

[25] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

[26] https://kite.kerala.gov.in/KITE/

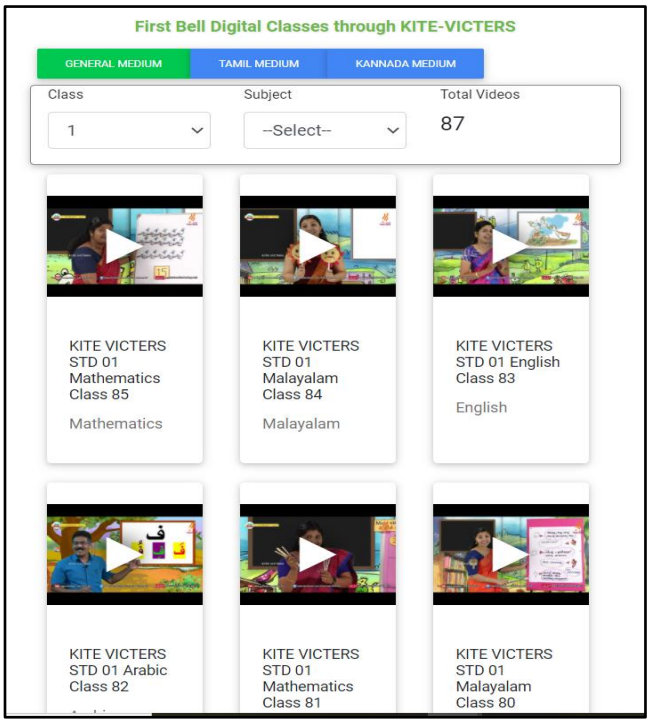
of technology-driven education to grass root levels. A program of Online or Digital classes named "First Bell" was devised to be broadcasted through VICTERS Educational Channel. The government also formulated the programs with the help of the community to ensure access to all children to attend the digital classes. Apart from the television, the sessions were made available on the web page of KITE and Facebook, and YouTube. The duration of the classes varies from thirty minutes to two hours and the classes are available simultaneously on Victers channel and website, mobile app, and social media pages for free[27]. In case the classes were missed by the students due to any reasons, the classes can be downloaded and used later or repeatedly viewed thereby ensuring that no student is denied the availability of the classes.

The state has been already championing the technology-enabled educational environment even before the pandemic. ICT has been a part of the curriculum from the primary stage itself and hence the transition to online teaching was not an unknown shift for most of the stakeholders in the state. To help the teachers for the transition to virtual teaching, specific ICT training was provided to 81000 primary school teachers for 5 days. The teachers used the SAMAGRA[28] resource portal for self-learning with the help of numerous digital contents available in the portal. Having their TV channels: KITE VICTERS and KITE was a big advantage and a strong preparation for the state to shift to a digital way of education. KITE has also an online learning platform: Samagra Resource Portal, which is a repository of digital resources of all subjects from class 1 to 12 with the academic support of SCERT. The Education department of Kerala in association with MHRD launched the DIKSHA program for grades 9th and 10th for the academic year 2019-20. Under this initiative, 108 energized textbooks were introduced catering to all the four mediums of instruction-Malayalam, English, Tamil, and Kannada. Over the last academic year, it has clocked a total of over 90 lakh scans[29]. These initiatives of the state have been widely acknowledged and appreciated by the state's stakeholders and educational community of the country. Kerala's example demonstrates how prioritization and targeted investment can enable universal access to ICT infrastructure and content for learners to continue learning.

[27] https://thewire.in/education/kerala-covid-19-education

[28] https://www.samagra.kite.kerala.gov.in/#/home/page

[29] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf



3) Madhya Pradesh - DigiLEP Initiative

The state government of Madhya Pradesh has been swiftly responding to the current COVID crisis by introducing a series of interventions across all sectors, as the socio-economic profile of students studying in state-run government schools and their limited access to educational resources during the lockdown. The recent crisis has allowed extensive use of IT-based platforms in the education sector. During the lockdown in wake of COVID 19, the School Education Department of Madhya Pradesh has proactively taken upon the task of ensuring children not lose out on any opportunity to learn and to continue their academic progress by providing access to tech-enabled learning sources. The state has used this opportunity to envision integrating digital learning with classroom teaching in the post-Covid by introducing well-planned interventions addressing critical elements of the learning ecosystem: students, parents, and teachers.

Addressing the challenges of the students who do not have adequate availability of high-speed internet to access online resources, in April 2020 the state government launched the DigiLEP initiative. DigiLEP stands for Digital Learning Enhancement Program, which takes the advantage of the WhatsApp platform to provide learning opportunities. The program has three main elements: curation of very high-quality digital content, creation of a well-defined WhatsApp architecture of 50,000+ groups covering all clusters and secondary schools of the state, and a well-oiled delivery mechanism ensuring around 6.5 lakh+ views per day. The resources were curated by an interstate team of more than 50 members, SCERTs of MP, Jharkhand, and Orissa states as well. It also includes multiple non-profit organizations across the country and content experts from civil society organizations who came together to curate NCERT curriculum-based competency videos that could be used by anyone for home learning. Every cluster in the state has eight groups to cover parents of students in elementary grades, and at least one group for each class. Additionally, district-level WhatsApp groups called DigiLEP groups, have also been made where all cluster academic coordinators and all Principals are added. WhatsApp is one of the most widely used platforms across smartphone users has been proved a crucial platform to continue learning during the pandemic. According to the recent data, the daily viewership of the content has increased from 2.5 lakh per day to around 7 lakh per day. In addition to this, the state has been actively engaging with other possible ICT-enabled interventions. Initiatives like, collaborating with All India Radio (AIR) to conduct Radio School, utilizing DIKSHA platform for providing educational resources for the students and teachers.

4) Maharashtra - The Learning from Home Package

In the ongoing situation of school closure and limited physical movement, The Department of School Education, GoM, with technical support from UNICEF has developed a 3 phased Learning Continuity Plan to ensure continuity in learning for all children grades 1-12. As a part of the plan, The Learning from Home Package has been developed comprising educational interventions available on different technology platforms, such as TV, Mobile phone, and Internet which is shared daily with parents and children through an SMS or WhatsApp message. These different modalities are selected based on the varying access of families to these technologies depending on their location and financial status. The initiative envisioned to keep the inclusive approach to provide educational resources to all children, even the most vulnerable can get access to educational content. The package was coordinated through the technical support of UNICEF and partners - Pratham Books, GaliGaliSimSim, DIKSHA, etc. Some of the initial data on reach using the different interventions that are part of the Learning from Home package is in the below table.

Platform/ Programme	Modality	Target Audience (children)	Total Numbers reached as of reporting date	Date of reporting
Diksha	WhatsApp	Grades 1-12	May 20th data: 5,83,984	3-Jun
GaliGaliSimSim (start date 20thApril 2020)	TV	Children 3-8 years	1,117,000 or 1.12 Million kids, 2-14 yrs.	20th Apr'20 – 22nd May'20
Pratham Books – Missed Call Do KahaaniSuno (start date 22nd April 2020)	Give missed call on 080330 94243 from any mobile phone (basic or feature orsmart phone) and even a landline phone	Ages 0-14 years	Number of Calls from MH : 119k Number of listeners [Children] MH :45K Number of stories listened to in MH :112K Tot. num. of minutes consumed by MH state:250k	1-Jun
Pratham Radio (1stMay 2020)	Radio	children 3-10 years	3,99,430	11-Jun-20
Bookyboo Books (14th May launch)	Internet	children 3-10 years	97,648 downloads	4-Jun-20
Webinars with Education Functionaries covering a variety of topics	Webinar	education functionaries	3900 in each of 5 webinars	30-May-20
Career Portal	Online	grades 9-12	accessed by over 2000 students	6-Jun-20

source:https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

MSCERT in collaboration with Leadership for Equity also started the *Abhyasmala* campaign in April 2020. The campaign aims to provide students with academics as well as co-curricular content. For this, DIKSHA core teams were established at the state level to coordinate the work of Abhyasmala. Every day WhatsApp message containing links of digital content is shared by the SCERT director with the students through officers and teacher networks. Around 29,500 academic and co-curricular content pieces are available on DIKSHA-Maharashtra through the contribution of teachers and content partner organizations. Since *Abhyasmala* started, the content on DIKSHA has been played for 2.18 crore times in Maharashtra. Since the campaign has started a total of 22 lakh students and teachers have used the content circulated via DIKSHA. Out of these, 16.94 lakh were students from grades 1 to 10[30].

Maharashtra also became the first Indian State to collaborate with Google India in the state-wide deployment of its Google for Education. As a part of the partnership, Google will roll out G-Suite for Education and Google Classroom technology without any cost for over 2.3 crore teachers and students in the state. The platform will also offer teacher training and free resources around distance learning resources for educators. The motive of the partnership is to make remote learning an easier process

[30] https://www.education.gov.in/sites/upload_files/mhrd/files/India_Report_Digital_Education_0.pdf

and help teachers to stay connected with their students. "Teach from Home"[31] An information hub by Google is also available in Marathi to help the educators find the most updated and relevant information on technology-enabled learning. Maharashtra has been one of the states that have always prioritized the integration of technology in teaching practice as a key area for helping to raise learning outcomes for students across the state. The state has been keen on identifying the most effective ICT tools and approaches for various types of learning environments within the state that can be scaled up. During the pandemic also, the state followed a similar approach and captivated on various platforms to try to reach every student.

Individual Initiatives

Independent initiatives by various profit, non-profit organizations, and individuals have also been an incredible force behind the nation's collective effort to utilize technology to make learning possible for so many students. Many EdTech organizations have capitalized on the opportunity to scale up their interventions which require high-end ICT tools and resources like high-speed internet, computers or laptops, etc. While some initiatives have also utilized the crisis opportunity to help resources reach everyone with the help of technology. Here are some of such initiatives in India.

1) SmarterED Platform

SmarterED[32] is an initiative by Lenovo, the global technology leader, in collaboration with Vidyalaya, a non-profit that connects volunteer teachers with students. It is a platform designed to bridge the teacher-student gap in India, especially in the time of online learning. The platform enables teacher volunteers to create unique learning experiences for students who need it the most. It also matches student-teacher profiles to enhance the chances of success in personalized one- to - one experience for the students. Interested teachers can further extend their collaboration by exploring further opportunities to work with the NPO eVidyaloka, to disseminate classroom sessions over the internet, subsequently, subject to their screening process. Currently, students from grade 5th to 12th can use the platform to choose their teacher and learn skills based on their time availability. The platform currently supports multiple languages including English, Hindi, Malayalam, Tamil, Kannada, and Telugu. In the present time of virtual learning, the SmarterEd platform has built up the capacity of up to almost 15,000 students and over 11,000 teachers.

[31] https://teachfromanywhere.google/intl/en/#for-teachers
[32] https://www.lenovosmartered.com/#/home

2) Digital Daan

The biggest challenge in the digitization of the education sector in the country is the unequal access to digital devices among the stakeholders. Pandemic has shut down the source of e-learning for a certain section of the student community that has been hit hard with the school closures. To address such digital divide and promote inclusion, Digital Empowerment Foundation[33] has started a movement to collect and encourage people to donate all kinds of old and used (but functional) Smartphones, Laptops, Tablets, Desktop/Computer (Monitor & CPU), Printers, Projectors, cameras and any such device which can help someone to learn virtually. The donation is done through their 700 centers across 25 states and 130 districts located in rural, tribal, marginalized, and unreached areas - enabling people in multiplier effect using real-life crowdsourcing. The organization envisions to have a three-year plan of collecting, refurbishing, and donating 1 million devices[34].

3) Individual Efforts of the Teachers

Despite the efforts of the national and state authorities, the challenges to reach every student to continue their learning have been challenging. In such situations, many teachers have gone out of their way to support their students in all possible ways. One such teacher Ritika Tomar from Sonbhadra, Uttar Pradesh state has come up with the solution to use a particular ICT tool effectively. She used the platform WhatsApp to divide her students into two groups into the ones having smartphones and one who had simple sell phones. She used WhatsApp group and message services to reach out to both groups respectively. She made her students aware of other initiatives like TV channels and Radio channels providing educational resources. She helped her students with other digital platforms, like DIKSHA, 'Let's Learn English' as well. Her efforts helped the available ICT initiatives reach her students in the best possible way. Many such teachers have been going for such innovative approaches to problem-solving using limited resources while taking online classes. In rural areas, few teachers are using the tool loudspeakers to teach their students following the protocols of social - distancing at the same time. This way lot of teachers have potentially explored various ICT tools to teach their students in the pandemic.

[33] https://digitaldaan.in/#digitaldaan
[34] https://timesofindia.indiatimes.com/home/sunday-times/digital-daan-is-becoming-the-new-way-to-give/articleshow/77312134.cms

Conclusion and Way Forward

The unprecedented global crisis of COVID-19 has made the education sector face many challenges. These challenges have made the world think of possible solutions to overcome the obstacles due to the crisis. India's education sector has been impacted tremendously when so many children had to sit at home. Technological innovations in the sector have made it possible to navigate through such difficult times. The sector has been using technology to come up with various possible solutions. These initiatives made sure to provide the platforms to have access to various educational resources and guiding tools to be able to continue their learning virtually. The importance of e-learning has been realized and it has been acknowledged by the various stakeholders in the education community. The availability of various digital platforms and e-resources has helped the country to follow a proactive approach to find solutions during the pandemic. The scenario also highlighted the gaps in the availability of these resources to reach every student. This calls for the policymakers to establish possible bridges to overcome these gaps. There is a dire need to provide strong internet connectivity and digital equipment to every corner of the country to be able to get benefit from these resources. In the post-COVID world, a blended mode of learning will help to systematically fill these gaps and make students and teachers more comfortable with the digital shift. The pandemic has helped in realizing the potential of blended learning to be able to reach the remotest part as well. It has also helped teachers and students in exploring various options available for their learning. This will make them feel more responsible for their learning as the onus of learning is on them as well. As envisioned under SDG 4, ICT will play a huge role in improving the inclusiveness, equity, and quality of education. The steps taken so far in this direction will help strengthen the country's digital learning infrastructure in the long run.

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