General Article

Expanding the scope of digital initiatives for transforming 21st century school education

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Abstract

The National Education Policy 2020 (NEP 2020) envisages a wider and more intensive role for use of technology for the purposes of improving teaching-learning and evaluation processes, teachers' preparedness and professional development, enhancing educational access, streamlining educational planning, management and administration including processes related to admissions, attendance, assessments, etc. Technology and innovation are central themes for the implementation of the 2030 agenda of the Sustainable Development Goals (SDGs). Technology can be used effectively to identify barriers and provide accessible solutions to all children particularly, children belonging to marginalized and socio-economically disadvantaged groups. COVID-19 has resulted in the shutting down of schools all across the world and as a result, the landscape of education changed dramatically. With this changing scenario, there is a distinct rise in eContent and e-learning, whereby teaching has been undertaken remotely and on digital platforms. However, the most crucial challenge with regard to the accessibility of these facilities cannot be ignored as the digital divide is seen across countries. In India too, there is a significant gap between those belonging to privileged and disadvantaged backgrounds. Many concentrated efforts for bridging the gap in education during covid 19 pandemic have been undertaken by the Government to ensure accessibility and availability of high-quality eContent for all children and teachers.

Therefore, this paper attempts to capture the International and national scenario regarding challenges of availability and accessibility of digital infrastructure, i.e. ICT/ digital facilities in India's schooling system. Further, the paper also highlights the recent initiatives which have been undertaken for expansion of Digital Education by the Government of India paving the way for a better future.

Keywords: Digital education, NEP 2020, eContent, 21st century skills, COVID 19, accessibility, teaching-learning

Introduction

As per UNDP Digital Strategy for 2022-2025 (https://digitalstrategy.undp.org/documents/Digital-Strategy-2022-2025-ABRIDGED-VERSION.pdf), digital is defined as "an ever-evolving range of technologies (like mobile technologies, artificial intelligence, machine learning, blockchain, Internet of Things, and robotics etc.) that impact nearly all aspects of our life in the world. Similarly, a mindset, which translates into a new way of working that enables people and institutions to innovate with technology" (https://www.un.org/ecosoc/sites/www.un.org.ecosoc/files/files/en/2017doc/Role-of-technology-in-implementing-the-SDGs.pdf). Technology and innovation are crucial factors towards the implementation of the 2030 Agenda and the Sustainable Development

Goals (SDGs) (https://www.un.org/ecosoc/sites/www.un.org.ecosoc/files/files/en/2017doc/Role-of-technology-in-implementing-the-SDGs.pdf). Technology can be used effectively to identify barriers and provide accessible solutions at all levels.

We all know that technological revolution or disruption has become the most prominent feature in the 21st century across the globe impacting day-to-day life of all the sections of society. The reliance on technology and its integration into the lives of human beings have opened infinite opportunities and has also thrown unique challenges on society. India's rise as a leader in information and communication technology and in other cutting-edge domains, such as space has been phenomenal (NEP, 2020). The Government of India's flagship programme 'Digital India Campaign' has enabled the transformation of the entire nation into a digitally empowered society and knowledge economy. While education will continue to play a vital role in this revolution, technology itself will play an imperative role in the improvement of the teaching-learning processes and educational outcomes of the students.

With the changing times and emerging challenges, technology will create numerous opportunities for education. As envisaged in National Education Policy 2020 (NEP 2020), new technologies involving artificial intelligence, machine learning, blockchains, smart boards, handheld computing devices and adaptive computer testing for student development will emerge as the agents of change. Whereas the other forms of educational software and hardware will not just change what students learn in the classroom but in the way, they have been learning, and thus these areas will require extensive research from technological as well as educational front's perspectives.

Objectives of the paper

The present paper focused on the following objectives:

- To understand and assess the impact of the COVID-19 epidemic on the school education system.
- To identify the challenges being faced by the schools with regard to accessibility of digital infrastructure facilities in the Government school system.
- To analyze and understand various measures taken by the Ministry of Education of India for continuing the learning process by providing various facilities during these challenging circumstances.

Methodology

Data and information presented in this paper are collected from various reports prepared by national and international agencies on the COVID-19 pandemic and based on available literature or secondary sources. The scope of this paper is to evaluate the efforts of India in bridging the digital divide. Information and data have been collected from various authentic websites including the dynamic database of the Ministry of Education i.e. UDISE+ (Unified District Information System for Education Plus). The paper has referred to various initiatives of the Government of India which are compiled from various reference materials and documents of the Ministry of Education. The referred journals and eContents relating to this paper are mentioned in the reference.

International Scenario during Pandemic

A number of recent studies and reports, both globally and in the Indian context have underlined the lack of access to adequate digital infrastructure and the constraints of digital online learning. The COVID-19 pandemic underlined the urgent need to bridge the divide of digital connectivity wherein 2.9 billion people were still found offline (ITU, 2021). During this unprecedented challenge thrown by the pandemic, the lack of affordable and accessible internet and appropriate digital skills, barred many

students, especially those from the socio-economic disadvantageous group (SEDG) who were studying from home. The COVID-19 pandemic disrupted school education in over 190 countries and affected 1.6 billion students (UNESCO, UNICEF, World Bank, and OECD 2021). Simultaneously, schools worldwide were completely closed for an average of four months in 2020 whereas partial school closures are factored in, the equivalent of almost two-thirds of a typical school year was lost (UNESCO, 2021). Around 369 million students worldwide went without school meals at the peak of the pandemic in April 2020 (World Food Programme 2021). This led disadvantaged children to dropout or be at higher risk of doing so (UNESCO, UNICEF, World Bank, and OECD, 2021). For instance, till September 2020, over 300,000 students in Peru (about 15 per cent of the student population) had dropped out of school due to its closures. This high drop-out rate has been attributed to economic instability, in addition to various hardships faced in accessing remote learning programs (Perez, 2020).

Further, a longitudinal study in the United States before and during the pandemic, showed that students using remote learning had lower levels of emotional, social, and academic well-being compared to classmates that attended in-person schooling (Duckworth et al., 2021). School closures have affected girls in becoming more vulnerable to the challenging circumstances of child marriage, gender-based violence and early pregnancy, leaving 5.2 million girls worldwide in primary and secondary school at risk of dropping out of school permanently (UNESCO, 2020). In such tough situations, the vast majority of countries have been offering multiple modes of remote learning. According to the Joint Survey conducted by UNESCO, UNICEF, the World Bank, and OECD, most countries delivered remote learning through online media (91 per cent) and TV (85 per cent), followed by paper-based take-home materials (82 per cent), and mobile phones (70 per cent) (A survey of education ministries conducted by UNESCO, UNICEF, the World Bank, and OECD, henceforth referred to as the Joint Survey. See UNESCO, UNICEF, the World Bank and OECD (2021)). Similarly, the survey also highlights that eighty per cent of governments in the Middle East and North Africa, 93 per cent in Europe and Central Asia, and 97 per cent in Latin America and the Caribbean decided to implement multimodal remote learning programs (UNESCO, UNICEF, the World Bank and OECD (2021)).

National Scenario

The pandemic in India was no different than in other parts of the world. The educational institutions were closed for a longer duration and this has led to learning gaps among children of all age-groups. The major shift to e-learning, during COVID-19 pandemic, has exposed long-standing issues of inequality and the digital divide in India. India has a multi-layered formal education system with 264 million students enrolled in more than 1.5 million schools (UDISE+ 2020-21). The school education sector, particularly the Government schools were in any way struggling with the issue of equitable, inclusive and quality education.

A study conducted by Azim Premji Foundation states that nearly 60 per cent of Indian school children do not have access to online learning opportunities which is further intensified for children with disabilities. Among teachers of children with disabilities in their regular classes, more than 90 per cent found them unable to participate in online classes (Field Research Group at the Azim Premji Foundation undertook a study covering 1,522 teachers (in 1,522 schools) and 398 parents in the public

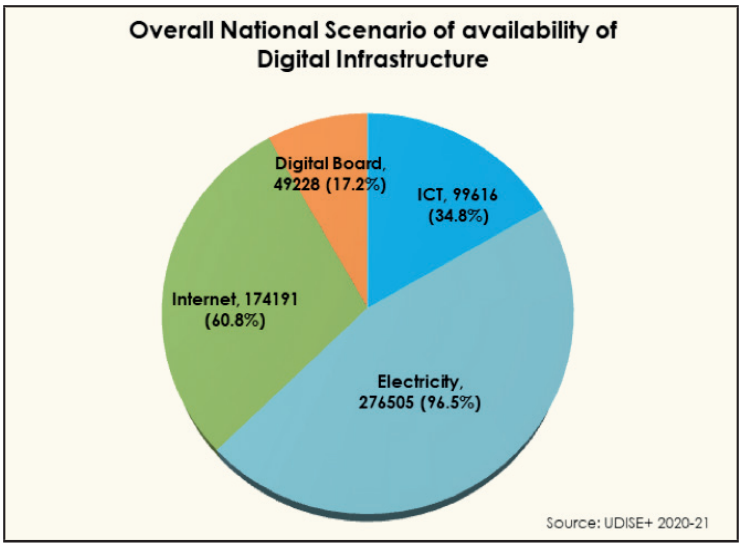
school system across 26 districts (80,000 children from the most disadvantaged geographies across India) in five states in five states Chhattisgarh, Madhya Pradesh, Karnataka, Uttarakhand and Rajasthan. URL: http://publications.azimpremjifoundation.org/2429/1/Myths_of_online_education.pdf). The UNICEF report on 'Remote Learning Reachability report' (2020) stated that only 24 per cent of households have access to the internet across the country. The report also stated that the learning gap is likely to widen across families, as children from economically disadvantaged families cannot access remote learning (https://economictimes.indiatimes.com/industry/services/education/just-24-per-cent-of-indian-households-have-internetfacility-to-access-e-education-unicef/articleshow/77784092.cms?from=mdr). According to a similar study conducted by Oxfam India, even among students attending urban private schools where half of their parents reported having problems with the internet signal, speed and the cost of mobile data.

Further, many other surveys and reports also highlight the challenging situation of the availability of eContent. Although a lot of digital content has been generated and transmitted to help children to continue learning from home, there is limited evidence on the extent to which this content is actually reaching children, whether they are engaging with it and the impact it is having on their participation and learning. (UNICEF and UNESCO, 2021)

Status of Digital Infrastructure in Schools in India

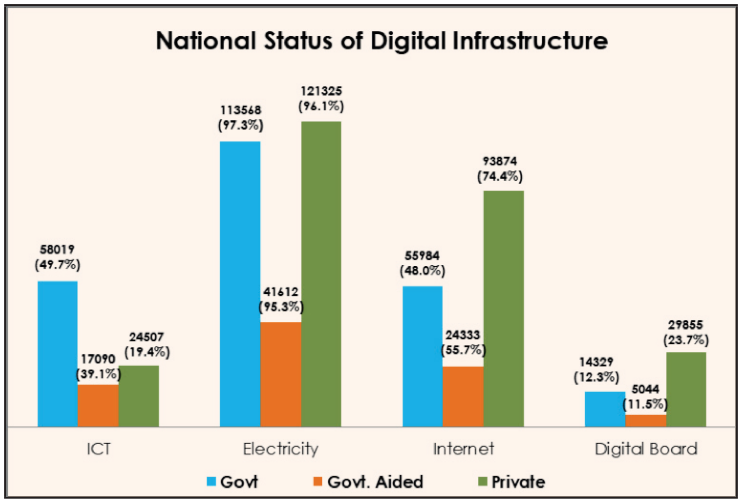
The present status of digital infrastructure available in secondary and senior secondary schools of India needs to be addressed on a priority basis for building a more resilient system for the future and to meet the pace of the digitalization process. Unless these core shortcomings are addressed, inequalities will continue to widen. Moreover, the Covid pandemic raised the issue of accessibility of education which can be seen in the below analysis of Graph 1 and Graph 2.

Graph-1: National Scenario of Digital Infrastructure in Secondary and Senior Secondary Schools



At the national level, the overall status of the availability of digital infrastructure can be observed from the given analysis. As per the database of UDISE+ 2020-21, out of total of 2,86,597 secondary and senior secondary schools, around 99,616 (34.8 per cent) schools have Information and Communication Technology (ICT) facilities, 2,76,505 (96.5 per cent) schools have electricity facility, 1,74,191 (60.8 per cent) schools have Internet facility and around 49,228 (17.2 per cent) schools have digital board facility. It can be observed here that ICT facilities, Internet facilities and digital board facilities need to be facilitated to improvise the functioning of the schools.

Graph-2: Digital Infrastructure status in Government, Government Aided and Private Schools of Secondary and Senior Secondary Schools



Source: UDISE+ 2020-21

Graph 2 also highlights the management-wise infrastructure in terms of the ICT and digital facilities available at Secondary and Senior Secondary schools which were found to be inadequate.

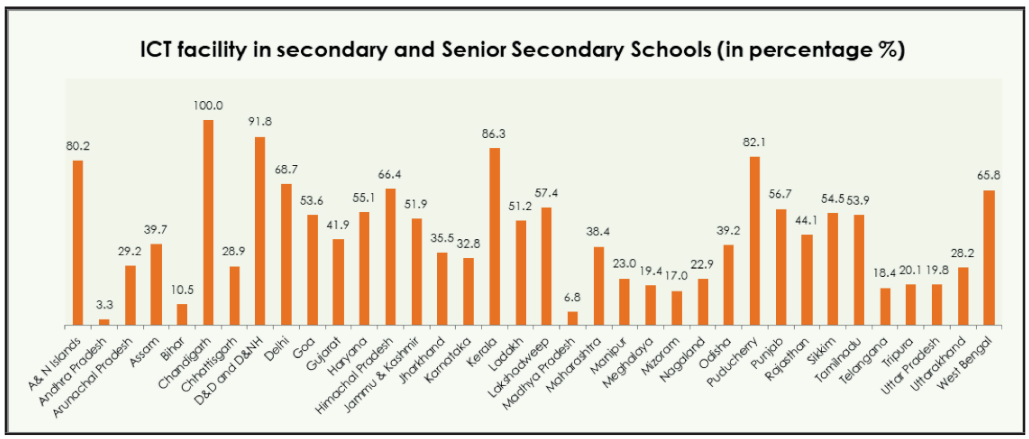
A detailed State and UT-wise status is given below will provide an insight into the present situation, which will help in preparing a constructive plan of action and will enable equitable access to digital infrastructure (ICT, Internet, Electricity and Digital Board) across the country. The analysis given below will help the implementing stakeholders to prepare for the future by providing basic facilities in the schools.

ICT Facility in Schools: ICT in schools provides lots of opportunities by providing the learners with improved educational content and more effective teaching-learning processes. The availability of ICT in schools improves the learning process through various provisions of more interactive educational materials that increase the learner's motivation and potential for improving the quality and standards of students. Graph 3 highlights the availability of ICT facilities in all States and UTs at the Secondary and Higher Secondary Schools. Many States and UTs need to avail the facilities for better functioning of the schools.

Graph 3 shows the present status in which a large number of States and UTs are having challenging situations in the availability of ICT facilities in schools. Few States and UTs such as Chandigarh

(100 per cent), D&D and D&NH (91.8 per cent), Kerala (86.3 per cent) and Puducherry (82.1 per cent) have better coverage facilities whereas States like Andhra Pradesh (3.3 per cent), Bihar (10.5 per cent), Madhya Pradesh (6.8 per cent) are showing the challenging scenario. This gap analysis has pointed out that all States and UTs must provide 100 per cent ICT facilities in the schools so that the online classroom teaching process can be improved.

Graph-3: State and UT-wise status of ICT facility in Secondary and Higher Secondary Schools



Source: UDISE+ 2020-21

As per UDISE+ 2020-21, around 99,616 (34.8 per cent) Secondary/Sr. Secondary schools have ICT facilities which includes 58,019 (49.7 per cent) Govt. Schools, 17090 (39.1 per cent) Govt. Aided Schools and 24,507 (19.4 per cent) Private Schools. Table 1 given below provides States and UT-wise status of the availability of ICT facility in different management of schools i.e. Govt., Govt. Aided and Private Schools. Table 1 shows the comparative analysis of the availability of ICT facilities in Govt, Govt. Aided and Private Schools highlight the gap anatomy of the availability. This gap analysis is referring to the efforts that need to be undertaken by the States and UTs in order to avail the digital infrastructure facilities. Based on this state-wise analysis, States and UTs may prepare a plan of action to improve the ICT facilities.

Table-1: State and UT-wise status of ICT available in Secondary and Higher Secondary Schools

State/UTs Name	ICT Facility					
	Government		Govt. Aided		Private	
	Schools	in %	Schools	in %	Schools	in %
India	**58019**	**49.7**	**17090**	**39.1**	**24507**	**19.4**
A & N Islands	84	84.0	1	50.0	12	63.2
Andhra Pradesh	493	6.81	0	0.0	0	0.0
Arunachal Pradesh	101	30.9	10	29.4	28	24.3
Assam	2955	62.5	90	7.9	569	17.5
Bihar	635	6.8	17	5.4	580	27.7

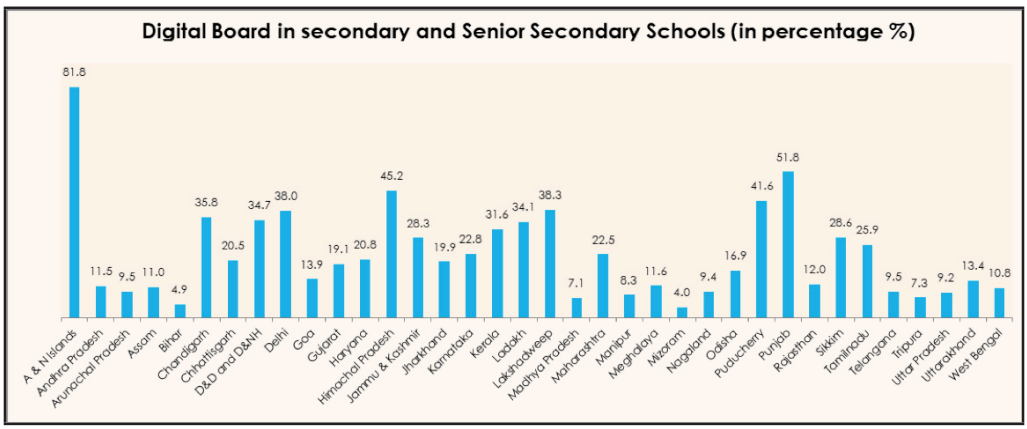
Chandigarh	100	100.0	7	100.0	58	100.0
Chhattisgarh	1838	38.1	4	3.6	260	11.1
D&D and D&NH	57	98.3	7	87.5	26	81.3
Delhi	1023	93.4	156	86.2	302	34.3
Goa	45	46.9	222	55.5	15	50.0
Gujarat	902	46.2	3456	67.7	971	17.2
Haryana	3029	88.5	4	25.0	1643	32.5
Himachal Pradesh	2179	76.3	-	-	647	46.1
Jammu & Kashmir	1755	67.9	0	0.0	524	29.0
Jharkhand	1103	38.1	30	16.5	436	32.4
Karnataka	3533	54.0	1636	37.4	1737	17.1
Kerala	1241	95.4	1408	98.0	1512	72.6
Ladakh	66	51.6	0	0.0		
Lakshadweep	14	93.3	-	-	13	40.6
Madhya Pradesh	284	3.0	7	2.6	929	11.3
Maharashtra	859	43.8	7407	44.9	2630	26.6
Manipur	107	23.4	11	12.2	161	24.2
Meghalaya	38	29.0	203	27.7	75	9.8
Mizoram	107	31.8	34	21.7	5	1.4
Nagaland	37	11.7	-	-	141	30.5
Odisha	4019	67.9	194	4.9	426	21.7
Puducherry	139	99.3	20	66.7	157	73.0
Punjab	3737	98.7	321	87.9	1415	25.7
Rajasthan	10643	68.7	-	-	3212	20.2
Sikkim	125	57.3	6	54.5	14	37.8
Tamilnadu	5968	95.5	220	12.2	1288	22.1
Telangana	2679	38.5	1	0.3	0	0.0
Tripura	197	19.6	7	21.2	27	23.7
Uttar Pradesh	582	21.9	1544	30.3	4020	17.3
Uttarakhand	511	21.3	65	16.3	519	47.9
West Bengal	6834	71.1	2	5.1	155	15.9

Source: UDISE+ 2020-21 *(-) No Aided Schools*

Digital Board Facility: Digital board is an interactive screen which displays text, images, videos, etc., and helps students to visualize content better in the teaching process. This also provides students a healthy classroom atmosphere and allows teachers to show the educational content and interact with the students in a more collaborative manner. Graph 4 given below highlights the availability of Digital Board facilities in all States and UTs at Secondary and Higher Secondary Schools.

Graph 4 highlights the availability of Digital Board facilities in all States and UTs at Secondary and Higher Secondary Schools. The below analysis highlights that very few States and UTs such as Andaman and Nicobar Islands (81.8 per cent), Punjab (51.8 per cent) and Himachal Pradesh (45.2 per cent) are showing better coverage facilities whereas other States and UTs are showing a severe challenging scenario. A lot of effort is required to be put in place for providing digital boards in the schools by the States and UTs so that students can avail the benefit of online learning.

Graph-4: State and UT-wise status of Digital Board facility in Secondary and Higher Secondary Schools



Source: UDISE+ 2020-21

As per UDISE+ 2020-21, around 49,228 (17.2 per cent) Secondary/Sr. Secondary schools have Digital Board facility which includes 14,329 (12.3 per cent) Govt. Schools, 5,044 (11.5 per cent) Govt. Aided Schools and 29,855 (23.7 per cent) Private Schools. Table 2 given below provides States and UT-wise status of the availability of Digital Board facility in different management of schools i.e. Govt., Govt. Aided and Private Schools. States and UTs need to provide such facilities in the classrooms so that online learning cannot be hampered. This will help children with good quality e contents for better classroom learning processes.

Table-2: State and UT wise status of Digital Board facility available in Secondary and Higher Secondary Schools

State/UTs Name	Digital Board Facility					
	Government		Aided		Private	
	Schools	in %	Schools	in %	Schools	in %
India	14329	12.3	5044	11.5	29855	23.7

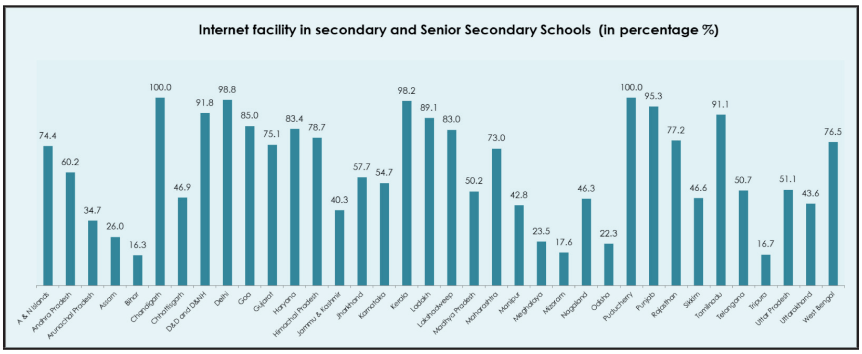
A & N Islands	92	92.0	0	0.0	7	36.8
Andhra Pradesh	561	7.8	16	2.8	1161	15.8
Arunachal Pradesh	15	4.6	4	11.8	26	22.6
Assam	647	13.7	24	2.1	333	10.2
Bihar	92	1.0	6	1.9	475	22.7
Chandigarh	18	18.0	3	42.9	38	65.5
Chhattisgarh	709	14.7	15	13.6	768	32.8
D&D and D&NH	19	32.8	0	0.0	15	46.9
Delhi	300	27.4	17	9.4	503	57.1
Goa	4	4.2	60	15.0	9	30.0
Gujarat	283	14.5	710	13.9	1438	25.5
Haryana	582	17.0	1	6.3	1180	23.4
Himachal Pradesh	1519	53.2	-	-	406	29.0
Jammu & Kashmir	938	36.3	0	0.0	307	17.0
Jharkhand	539	18.6	13	7.1	329	24.4
Karnataka	733	11.2	480	11.0	3586	35.4
Kerala	370	28.4	193	13.4	960	46.1
Ladakh	44	34.4	0	0.0	-	-
Lakshadweep	10	66.7	-	-	8	25.0
Madhya Pradesh	204	2.2	6	2.2	1068	13.0
Maharashtra	467	23.8	2861	17.3	3063	30.9
Manipur	17	3.7	1	1.1	83	12.5
Meghalaya	18	13.7	124	16.9	47	6.2
Mizoram	13	3.9	7	4.5	14	3.8
Nagaland	9	2.8	-	-	64	13.9
Odisha	1618	27.3	75	1.9	306	15.6
Puducherry	63	45.0	9	30.0	88	40.9
Punjab	117	3.1	6	1.6	4878	88.7
Rajasthan	1705	11.0	-	-	2079	13.0
Sikkim	51	23.4	2	18.2	23	62.2
Tamilnadu	1010	16.2	248	13.8	2340	40.2
Telangana	401	5.8	14	4.9	966	13.2
Tripura	53	5.3	1	3.0	30	26.3
Uttar Pradesh	180	6.8	134	2.6	2530	10.9
Uttarakhand	128	5.3	6	1.5	386	35.6
West Bengal	800	8.3	8	20.5	341	34.9

Source: UDISE+ 2020-21 *(-) No Aided*

Schools Internet Facility: Using the Internet in the classroom actually gets students more excited about learning which helps students get the chance to directly engage with information rather than passively listen to lectures.

Graph 5 given below highlights the availability of Internet facilities in all States and UTs at the Secondary and Higher Secondary Schools. This situation affects the overall digital learning in the classrooms which need basic facilities like the internet. Few States and UTs such as Chandigarh (100 per cent), Puducherry (100 per cent), Delhi (98.8 per cent), Kerala (98.2 per cent) and Punjab (95.3 per cent) have shown far better facilities in comparison to States and UTs like Assam (26 per cent), Bihar (16.3 per cent), Tripura (16.7 per cent), Odisha (22.3 per cent), Mizoram (17.6 per cent) and Meghalaya (23.5 per cent), where the challenges of availing minimum facilities still exist. Besides having ICT and other facilities, the internet is one of the essential requirements for providing opportunities to continue the classroom learning process.

Graph-5: State and UT-wise status of Internet facility in Secondary and Higher Secondary Schools



Source: UDISE+ 2020-21

As per UDISE+ 2020-21, around 1,74,191 Secondary/Sr. Secondary (60.8 per cent) schools have internet facilities which includes 55,984 (48.0 per cent) Govt. Schools, 24,333 (55.7 per cent) Govt. Aided Schools and 93,874 (74.4 per cent) Private Schools. Table 3 given below provides States and UT-wise status of the availability of Internet facilities in different management of schools i.e. Govt., Govt. Aided and Private Schools. This issue of the availability of internet facilities in Govt. Aided and Private schools hamper the online learning facility for students which required attention due to Covid 19 pandemic. States and UTs need to put more resources in order to cover all schools.

Table-3: State and UT-wise status of Internet facility available in Secondary and Higher Secondary Schools

State/UTs Name	Internet Facility					
	Government		Aided		Private	
	Schools	in %	Schools	in %	Schools	in %
India	**55984**	**48.0**	**24333**	**55.7**	**93874**	**74.4**
A & N Islands	71	71.0	2	100.0	17	89.5

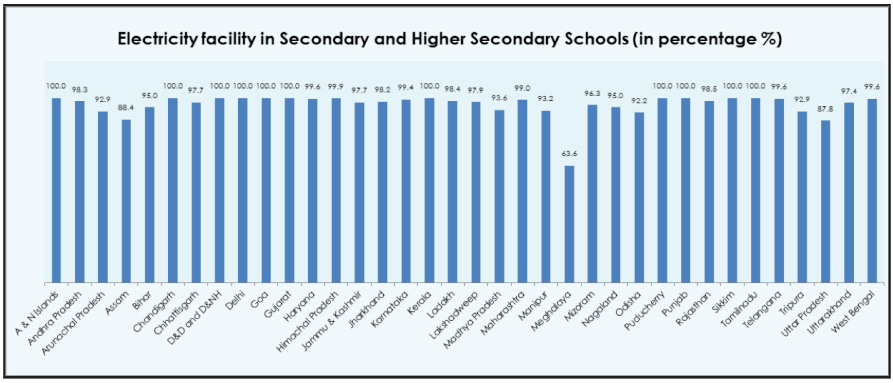
Andhra Pradesh	3128	43.2	253	43.6	5752	78.3
Arunachal Pradesh	65	19.9	21	61.8	79	68.7
Assam	1011	21.4	82	7.2	1278	39.3
Bihar	805	8.6	30	9.5	1089	52.0
Chandigarh	100	100.0	7	100.0	58	100.0
Chhattisgarh	1652	34.2	59	53.6	1697	72.5
D&D and D&NH	51	87.9	7	87.5	32	100.0
Delhi	1083	98.9	172	95.0	876	99.4
Goa	67	69.8	351	87.8	29	96.7
Gujarat	698	35.8	3642	71.3	5197	92.0
Haryana	2480	72.4	13	81.3	4584	90.8
Himachal Pradesh	2081	72.8	-	-	1269	90.5
Jammu & Kashmir	562	21.7	0	0.0	1206	66.8
Jharkhand	1481	51.2	99	54.4	970	72.1
Karnataka	1754	26.8	1838	42.0	7920	78.1
Kerala	1276	98.1	1424	99.1	2036	97.7
Ladakh	114	89.1	1	100.0		
Lakshadweep	15	100.0	-	-	24	75.0
Madhya Pradesh	2393	25.4	154	56.2	6445	78.6
Maharashtra	908	46.3	11137	67.5	8672	87.6
Manipur	46	10.0	9	10.0	464	69.8
Meghalaya	27	20.6	216	29.5	139	18.2
Mizoram	48	14.3	28	17.8	75	20.6
Nagaland	45	14.2	-	-	315	68.2
Odisha	1335	22.6	374	9.4	932	47.5
Puducherry	140	100.0	30	100.0	215	100.0
Punjab	3774	99.7	365	100.0	5062	92.0
Rajasthan	11897	76.8	-	-	12351	77.5
Sikkim	86	39.4	6	54.5	32	86.5
Tamilnadu	5733	91.7	1511	84.0	5382	92.5
Telangana	2324	33.4	102	35.7	4951	67.7
Tripura	104	10.4	13	39.4	75	65.8
Uttar Pradesh	592	22.3	2193	43.1	13068	56.2
Uttarakhand	624	26.0	168	42.0	903	83.4
West Bengal	7414	77.2	26	66.7	680	69.7

Source: UDISE+ 2020-21 *(-) No Aided Schools*

Electricity facility in Schools: There is no doubt about the fact that electricity is the most basic requirement for digital education, like laptops, desktops, or even smartphones and Digital Boards need the power to work. So if the schools are not completely electrified, that is one of the biggest challenges of digital education.

Graph 6 given below highlights the availability of Electricity facilities in all States and UTs at the Secondary and Higher Secondary Schools. This also gives us the scope to achieve 100 per cent electricity in all schools of India.

Graph-6: State and UT-wise status of Electricity facility in Secondary and Higher Secondary Schools



Source: UDISE+ 2020-21

As per UDISE+ 2020-21, around 2,76,505 (96.5 per cent) Secondary/Sr. Secondary schools have an Electricity facility which includes 1,13,568 (97.3 per cent) Govt. Schools, 41,612 (95.3 per cent) Govt. Aided Schools and 1,21,325 (96.1 per cent) Private Schools. Table 4 given below provides States and UT-wise status of the electricity facility in different management of schools i.e. Govt., Govt. Aided and Private Schools. It is visible from this table that by covering a few more schools the country would achieve 100 per cent electricity in all Govt, Aided and Private Schools.

Table-4: State and UT-wise status of electricity facility available in Secondary and Higher Secondary Schools

State/UTs Name	Electricity Facility					
	Government		Aided		Private	
	Schools	in %	Schools	in %	Schools	in %
India	**113568**	**97.3**	**41612**	**95.3**	**121325**	**96.1**
A & N Islands	100	100.0	2	100.0	19	100.0
Andhra Pradesh	7020	97.0	575	99.1	7304	99.5
Arunachal Pradesh	297	90.8	34	100.0	111	96.5
Assam	4675	98.9	579	51.0	2803	86.2
Bihar	8887	94.8	281	88.9	2035	97.2
Chandigarh	100	100.0	7	100.0	58	100.0

Chhattisgarh	4668	96.8	110	100.0	2331	99.6
D&D and D&NH	58	100.0	8	100.0	32	100.0
Delhi	1095	100.0	181	100.0	881	100.0
Goa	96	100.0	400	100.0	30	100.0
Gujarat	1952	100.0	5107	100.0	5646	100.0
Haryana	3416	99.8	16	100.0	5026	99.5
Himachal Pradesh	2854	99.9	-	-	1402	100.0
Jammu & Kashmir	2514	97.2	1	100.0	1778	98.5
Jharkhand	2872	99.2	172	94.5	1299	96.5
Karnataka	6500	99.4	4375	99.9	10050	99.1
Kerala	1301	100.0	1437	100.0	2083	100.0
Ladakh	126	98.4	1	100.0		
Lakshadweep	15	100.0	-	-	31	96.9
Madhya Pradesh	8601	91.2	253	92.3	7901	96.4
Maharashtra	1950	99.5	16327	98.9	9818	99.2
Manipur	418	91.3	63	70.0	649	97.6
Meghalaya	82	62.6	508	69.3	444	58.3
Mizoram	325	96.7	152	96.8	348	95.6
Nagaland	290	91.8	-	-	449	97.2
Odisha	5670	95.8	3473	87.6	1777	90.6
Puducherry	140	100.0	30	100.0	215	100.0
Punjab	3786	100.0	365	100.0	5501	100.0
Rajasthan	15457	99.8	-	-	15491	97.2
Sikkim	218	100.0	11	100.0	37	100.0
Tamilnadu	6251	100.0	1798	100.0	5817	100.0
Telangana	6923	99.5	272	95.1	7294	99.8
Tripura	926	92.3	32	97.0	110	96.5
Uttar Pradesh	2060	77.5	4616	90.7	20537	88.3
Uttarakhand	2326	96.8	387	96.8	1074	99.2
West Bengal	9599	99.9	39	100.0	944	96.7

Source: UDISE+ 2020-21 *(-) No Aided Schools*

Initiatives undertaken for the Expansion of Digital Education

In India, school closures have affected millions of children from pre-primary to secondary levels of schooling. The major shift from face-to-face to online learning has put the spotlight on the vast inequalities within the education system between and within states. In view of the above situation and to ensure that no child is left behind, it was clear that only online education will not be able to provide universal access and cannot be taken up as the single and possible option. COVID-19 has created an opportunity for governments to deal with such situations and also to revamp the system by taking necessary actions and providing needful resources. The

successful strategy to cope with the prevalent pandemic situation has to be multifaceted and multimodal.

India also saw huge migration in the first wave of the pandemic. People in huge numbers migrated to their hometown, so the states and UTs were given clear and comprehensive directions (Guidelines for children of Migrant labourers issued on 27th July 2020 by Ministry of Education) that children of migrant labourers may be admitted to the nearby schools and they may not be asked for any documents. In order to complement efforts undertaken for online education, a lot of supplementary teaching-learning material in the form of worksheets/workbooks/storybooks etc. was provided to children of all grades. Teachers also visited students in small groups and provided them with guidance. Some of the important initiatives are listed below:

I. Enhancing and Strengthening the Scope of ICT under Samagra Shiksha

Samagra Shiksha, the largest Centrally Sponsored Scheme for School Education in India not only provides support for ICT and smart classrooms to both Govt. and Govt. Aided schools in all states and UTs but also has provisions for making quality eContents for students and teachers. The scheme also provides financial support to States and UTs for developing quality eContents under DIKSHA. Technology will be able to create lifelong learners who can figure out what concepts children need to learn, unlearn and relearn at various stages of life to live sustainably in a green, regenerative future. Acknowledging this, the Government of India is committed to ensure learning for all, with equity, to cover all students at all levels of education and in all geographical locations, even in the remotest parts of the country so that digital learning is no longer the luxury of the few people.

Further, the NEP 2020 calls for investment in digital infrastructure, online teaching platforms and tools, virtual labs, digital repositories, online assessments, technology and pedagogy for online teaching-learning. Subsequently, the policy also stresses the promotion of multilingualism and the power of language in teaching and learning through innovative and experiential methods, including gamification and apps, by weaving in the cultural aspects of the languages - such as films, theatre, storytelling, poetry, and music - and by drawing connections with various relevant subjects and with real-life practices. In this context and beyond, technology will be the imminent part of education as it gives practical experience for the future, provides an audio-visual experience, makes studying less boring, a treasure trove of unlimited information, gives additional tools to teachers, and builds more interactive and instills collaborative spirits towards learning practices.

II. PM eVIDYA

A comprehensive initiative, PM e-VIDYA (https://pmevidya.education.gov.in) was launched to amalgamate and synchronize all efforts related to digital/online/on-air education to enable coherent multi-mode access to education.

- **DIKSHA (Digital Infrastructure for Knowledge Sharing)** (https://diksha.gov.in) is the One Nation One Digital Platform for Education and is the largest national initiative by any country that provides free access to quality e-content. The content is crowd sourced for learners and teachers, thereby leveraging the unique talent of several individuals, organizations, and institutions through technology. The content on

DIKSHA is hosted in 36 languages (32 Indian Languages and 4 Foreign Languages), including ISL. DIKSHA is equally promoting and encouraging learning through local/regional languages. DIKSHA is also being transformed into a platform for the coherence of access with TV and radio.

- **One Class One TV Channel:** The pandemic has shown the need for resilience and multidimensional models in education. The benefit of using TV is that it supports distance and remote learning, supports learning in the absence of teachers, aids as a support for teachers and complementary learning to schooling, and provides the education to the most disadvantaged during the crisis, also supports parental/caregiver support with learning especially in early childhood education. Under the One TV Channel Initiative, 12 Swayam Prabha Channels (https://pmevidya.education.gov.in/swayam-prabha-tv.html) are earmarked for school education under the one class, one TV channel initiative and more than 7,000 programs have been developed. To ensure coherent access through multimodal delivery, the broadcasted content is organised by chapter & topics on DIKSHA to ensure asynchronous usage by anyone, anytime, anywhere. Further, as per recent budget announcements, access to TV channels has been expanded substantially to 200 TV channels wherein the 'one class-one TV channel' program of PM eVIDYA will be expanded from 12 to 200 more TV channels. This will enable all states to provide supplementary education in regional languages for classes 1-12.
- **Radio broadcasting/Podcasts** (https://pmevidya.education.gov.in/radio.html) are used for children in remote areas with no means of internet access. More than 3,480 pieces of curriculum-based radio programs have been produced for dissemination on 397 radio stations and also through iRadio 1,229 programs have been disseminated. A Podcast called Shiksha Vani of the CBSE is also being effectively used by learners of grades 9 to 12.
- **For Children with Special Needs (CwSN)** (https://pmevidya.education.gov.in/cwsn.html), 2,970 Indian Sign language (ISL) based content, Mukta Vidya Vani, an audio streaming podcast and Radio Vahini, with 24x7 broadcast and talking books (in Daisy format) for learners with Blindness and Low Vision have been prepared and also a total of 3,424 Audio Books have been developed. In addition, around 10,000 ISL dictionary words have been uploaded on DIKSHA portal.
- **Manodarpan** (https://manodarpan.education.gov.in): To provide Psychosocial Support for the Mental Health & Well-Being of Students during the COVID Outbreak and beyond, the Manodarpan initiative has been launched. Manodarpan Cell was set up in the National Council of Educational Research and Training (NCERT) and orientation of counsellors associated with the Manodarpan Helpline was organized. Guidelines for the counsellors to provide psycho-social support to callers on the Manodarpan Helpline were shared. NCERT has taken various steps to reach out to school students and their primary stakeholders (parents and teachers) for helping

them to maintain their mental and emotional well-being during the present times of COVID-19 pandemic. To help school students across the country share their concerns and seek help to deal with stress, anxiety and related mental health concerns during and after COVID-19, 'Counselling Services for School Children' was started in May 2020 by NCERT on phone/email through its trained counsellors. This service was provided free of charge by trained counsellors across different regions of the country.

- **National Digital Education Architecture (NDEAR)** (https://www.ndear.gov.in): NDEAR blueprint for school education is prepared in a way that NDEAR shall act as a super-connector for all players and requirements of the school education ecosystem, from teaching-learning to assessment, tracking of individual progress, to areas related to administration, governance and monitoring process. NDEAR blueprint focuses on facilitating towards achieving the goals as laid down by NEP 2020, through a digital infrastructure for embracing innovations in the education ecosystem, ensuring greater autonomy and equal participation of all the relevant stakeholders. Making NDEAR functional will help in the wider reach of great innovations and solutions by States to be leveraged by others as solutions and ideas that have worked in a particular State would be reusable and reconfigurable by another State. Further, student and school registries undertaken by the States for tracking enrolment and learning levels of every individual child would provide real time dynamic data to design appropriate interventions.

- **Emphasis on blended teacher training programmes: NISHTHA**

The Department of School Education and Literacy (DoSE&L) launched the National Initiative for School Heads and Teachers for Holistic Advancement (NISHTHA), a National Mission in 2019 to improve learning outcomes at the Elementary level through an Integrated Teacher Training Programme. NISHTHA (https://itpd.ncert.gov.in) is a unique effort led by the NCERT under the aegis of Samagra Shiksha where an inclusive approach was adapted to augment the capacities of teachers to bring positive change in the education system. The reason which makes NISHTHA exclusive is that it is an evolving and dynamic training programme and provides abundant flexibility to the states and UTs to incorporate and contextualise local flavour and content.

Initially, NISHTHA was launched to build the capacities of around 40 lakh elementary teachers and Heads of Schools including faculty members of SCERTs, DIETs and Block Resource Coordinators and Cluster Resource Coordinators. Initially, NISHTHA training was conducted in a face-to-face mode by NCERT and around 23,137 Key Resource Persons (KRPs), State Resource Persons (SRPs) and 16,99,931 School Heads and Teachers of elementary schools were trained under NISHTHA in 2019-20 in the pre-lockdown period.

The Covid pandemic posed serious challenges to face-to-face mode training. Also, teachers were required to adapt to online teaching, therefore, all NISHTHA modules were made online and a specific module on Covid-related challenges was added. The modules were also translated into 10 regional languages (Assamese, Bengali,

Bodo, English, Gujarati, Hindi, Kannada, Odia, Telugu and Urdu) and around 24 lakhs elementary school teachers from 27 States and UTs and various autonomous bodies have completed online training in June 2021. The live interactive sessions by the experts from NCERT and a group of key resource persons providing mentoring to teachers have been able to minimise the limitations of online training and kept the element of vibrancy and synergies alive.

Now, the scale and scope of NISHTHA have been expanded and NISHTHA 2.0 has been launched to amplify the competence of Secondary teachers. It has 68 modules including: Curriculum and Inclusive Education; ICT in Teaching, Learning and Assessment; Personal-Social Qualities for Holistic Development of Learners; Art Integrated Learning; Understanding Secondary Stage Learners; Health and WellBeing; School Leadership Development; Vocational Education; Gender Issues in Education; Initiatives in School Education; Toy Based Pedagogy; and School Based Assessment. States can contextualise these modules in line with their state-specific needs. Since the launch on 29 July 2021, it has received responses from 33 States and UTs and various autonomous bodies have already on-boarded the course.

Further, a specialised NISHTHA 3.0 training to train teachers from ECCE to Grade V under the NIPUN Bharat mission with emphasis on foundational literacy and Numeracy has been launched on 7 September 2021. NISHTHA 3.0 aims to cover 25 lakh teachers and has 12 modules including Introduction to FLN Mission; Shifting towards Competency-Based Education; Understanding the Learner; Transacting 3 months Play Based School Preparation Module for Grade I Children and Balvatika; Foundational Language and Literacy; Foundational Numeracy; Learning Assessment; Involvement of Parents and Community; Integration of ICT in Teaching, Learning and Assessment; Multilingual Education; Toy Based Pedagogy; and School Leadership.

Vision of NEP 2020 for Expansion of Digital Education:

As mentioned in NEP 2020, the scope of technological interventions will be expanded for various purposes of improving the teaching-learning and evaluation processes. Simultaneously, emphasis will be given for supporting teacher preparation, focusing on teacher's professional development, enhancing educational access, and streamlining the process of planning, management, and administration related to admissions, attendance and assessments." (P-57, National Education Policy, 2020)

The role of education will also be to assist in raising awareness about the potentially disruptive effects of technology and will also address related issues. Further, the recent pandemic compelled us to be prepared with alternative modes of quality education and blended learning is the future of the 21st century. The benefits of the availability of online/digital education and existing digital platforms need to be optimised and expanded further to meet the current and future challenges towards improving quality education for all. In this regard, it has become all the more relevant to invest in public digital infrastructure in the education sector that can be used by multiple stakeholders keeping in view India's large scale diversity, complexity and device penetration. This will also ensure

that the technology-based solutions do not become outdated with the rapid advances in technology.

Although the pandemic has receded now and schools have reopened, it has opened the platform for the integration of technology in the day-to-day classroom transaction processes. The physical classes cannot go back to completely traditional methods; therefore, there is a need to expand the digital infrastructure and repository of eContent.

However, persisting disparities in access to ICT facilities for students, teachers and limited digital literacy knowledge especially at the community-level are the critical bottlenecks for ascending digital learning across the country. Another significant challenge is to monitor the implementation of digital learning facilities. Limited information is available on how learners are guided and performed during digital learning. For India to fully implement the policies and programmes and effectively reach the beneficiaries, the focus will also be given to addressing the challenges of operationalization.

Way Forward

In order to reverse the learning loss caused during school closure due to COVID-19 pandemic, and its detrimental effect on school-going children, various steps have been undertaken by the Government of India and States/UTs. The Budget 2022-23 has clearly emphasised that the thrust of education in 2022-23 would be on digital education. The focus for school education would be on starting 200 TV channels, setting-up of 750 virtual labs in science and mathematics, and 75 skilling e-labs for the simulated learning environment by 2022-23. Emphasis will be given on the availability of high-quality eContent in all spoken languages for delivery via the internet, mobile phones, TV, and radio through Digital Teachers (https://www.indiabudget.gov.in/). Further, a competitive mechanism for the development of quality eContent by the teachers will be set-up to empower and equip them with digital tools of teaching and facilitate better learning outcomes.

There is no doubt that the 21st century will be driven by the disruption created by technology, and the divide between 'have and have not' will increase more if a substantial section of the population does not get digital access. Therefore, it must be our priority to eliminate the digital divide through concerted efforts to ensure equity and inclusion.

We can leapfrog in education when we unleash the potential of a billion Indians - to learn and to help each other learn. Education is about learning, and learning should not just be restricted to schools. It should be learning by all, learning for all, learning with all. An approach toward integrating the use of technology with the education system will lead to development. The present initiatives and the collective efforts of the Ministry of Education, its autonomous bodies, all States/UTs, and tech support partners are aimed at fulfilling our vision of making India a Global Knowledge Superpower and restoring India's glory as a great centre of learning with effective implementation of the NEP 2020. A key role in this regard will be played by Artificial Intelligence (AI) systems, which will be designed to work with teachers more effectively, and which in turn will assist in continuous improvement in students' learning outcomes. Perfect use cases are immersive labs, flipped classrooms, gamification of NCERT content, and adaptive and personalised learning.

Coherent Access to eContent is the key to the expansion of the digital universe, a digital repository accessible to all and having a variety of learning

materials including the creation of coursework, learning games & simulations, gamification and content in multiple languages, with clear operating instructions will complement the learning in classrooms. Further, the existing mass media, such as television, radio, and community radio may also be extensively used for telecast and broadcasts. Educational programmes may be developed in multiple languages including sign language and in DAISY format to cater to the varying needs of the student population.

Teachers are also required to be trained to use ICT in the teaching-learning process and on learner-centered pedagogy and how teachers become high-quality online content creators themselves using online teaching platforms and tools. Teachers may also be trained for making online/digital education blended with experiential and activity-based learning.

Technology may also be used for designing assessment frameworks to assess 21st century skills, portfolio, rubrics, standardised assessments, and assessment analytics. In addition to above, it is also crucial to set standards for a blended mode of learning, eContent, appropriate use of technology, and pedagogy for online/ digital teaching-learning.

Digital transformation in education has to be inclusive, thoughtfully designed and implemented, to ensure that all processes put students at the centre. We must strive to build a more open, accessible, equitable, inclusive, robust, and transparent education system that is prepared to reap the advantages of technology and promotes a conducive learning environment for each learner.

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