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Rising importance of remote learning in India in the wake of COVID-19: issues, challenges and way forward

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Abstract

Purpose – The present paper highlights the increasing importance of remote learning amidst the closure of educational institutions in India in the wake of COVID-19. This paper not only discusses critical issues and challenges that remote learning system in the higher education sector in India has been encountering amidst this pandemic but also sheds light on ways to deal with them.

Design/methodology/approach – The paper makes use of secondary sources of data along with descriptive and comparative approaches to examine the issues, challenges and way forward for a transition from face-to-face teaching to remote learning in the case of India.

Findings – The paper suggests that greater use of this alternative mode of learning can be made for checking "human capital deficit," preventing loss of future earnings (because of loss of education) and also for preparing a future-ready digital workforce to surf the Industry 4.0 wave. Besides, this can help to achieve the goal of "Education for all" and Sustainable Development Goal 4 (SDG 4). Among others, concerted policies for bridging skill gaps, forging partnerships and following equity-oriented policies for ensuring learning outcomes seem to be the way forward for a resilient education system.

Originality/value – As per our knowledge, no such study on the use of remote learning covering the higher education sector in India amidst COVID-19 has been done so far.

Keywords Remote learning, Higher education sector, Open and distance learning, Online learning, Skill development, Skill mismatches, and Future-ready labor force

Paper type Research paper

Introduction

Coronavirus pandemic has wreaked havoc and brought the world to a halt. Early detection of this deadly virus (COVID-19), but delayed response of the authoritarian state of China, has wreaked havoc across countries causing hundreds and thousands of deaths. It has hit the rich and poor alike and has disrupted several facets of life including education, entertainment and work. If the Wall Street Crash of 1929 (Great Crash) contributed to the Great Depression of the 1930s and if the US lender Lehman Brothers in 2008 fueled the global financial crisis of 2008, COVID-19 has been pointing toward the inevitability of next global recession of 2020. For social scientists, it has exposed the fragility of "global society, governance and world order" (Tharoor and Saran, 2020); for economists, it has been signaling onset of recession; for e-businesses, surging online orders are hinting at adaptation of new norms; and for educators, it has been giving an implicit indication of transit to remote learning through online platforms.

According to an estimate of UNESCO [1] (2020), 1.6 billion learners constituting 72.4% of total enrolled learners across 177 countries have got impacted so far (as on May 4,2020) because of temporary closure of educational institutions in an attempt to contain the spread of COVID-19. Closure of educational institutes in India to slow the spread of novel

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coronavirus, COVID-19, has placed unprecedented challenge on all stakeholders in education sector, including administrators, teachers, students, parents and caregivers, to ensure learning continuity and also to bring some semblance of normal life.

It is important to note that before the health crisis posed by the outbreak of COVID-19, India had been dealing with learning crisis too which was evidenced by high levels of learning poverty (The Times of India, 2020). There is enough literature which suggests that health and education are two important components of human capital and impact economic growth (Romer, 1990; Mankiw *et al.*, 1992; The World Bank, 2017a, b). Unfortunately, both these components of human capital have been hit hard by this contagious disease. Therefore, closure of these educational institutes has the potential to cause "human capital deficit" in the medium term as a result of loss of learning in the short term. This can get reflected in the decline in economic opportunities for young work force on the one hand, and loss of future earnings because of loss of education [2] on the other hand. This can have major cost for future recovery (in post-COVID period) and prosperity of India. Therefore, it is very important to close human capital gaps by ensuring learning continuity during COVID through online teaching-learning and by investment in human capital (both education and health infrastructure and quality) during and in the aftermath of COVID (World Bank, 2020). Amidst crisis, many countries including India have made education technology interventions for distance/remote learning which carries huge potential for making education more inclusive at lower costs and also via raising gross enrollment ratios [3] (GERs) in India. In addition, this can help us in achieving our long cherished goal of "Education for All" and Sustainable Development Goal 4 (SDG4) which aims at ensuring inclusive and equitable quality education and promoting lifelong learning opportunities for all.

It is interesting to note that sometimes the devastations caused by COVID-19, which is a humanitarian crisis, are compared with that of World War II (WW II), which was a military conflict. While pointing out the impact of a war on education, Ichino and Winter–Ebmer (2004) write that "An important component of the long-run cost of a war is the loss of human capital suffered by school-age children who receive less education." They further point out that "physical access to schools may be less easy because of bombings, fighting, army requisitions, and transportation difficulties. In addition, casualties among older family members may increase constraints and prevent an otherwise feasible transition into higher education even when the war is over." When we compare the devastations caused by the novel coronavirus (COVID-19) pandemic with that of WW II, we find that the negative effect of coronavirus is not less than that of war. If the WW II involved and caused devastations in 35 countries, COVID-19 has impacted and shattered 213 out of approximately 240 countries in the world. As the education process got disrupted during the WW II, sudden and abrupt disruption in the functioning of the regular education systems across the globe became noticeable even during this global health pandemic. Some countries opted for no lockdowns (Sweden); others a complete lockdown (India) to contain the impact of this contagious disease/slow the spread of COVID-19. Singapore, Hong Kong and Taiwan have adopted non-pharmaceutical initiatives, including social distancing and travel restrictions. Some have declared an emergency (Japan), and China, which is now apparently emerging out of the crisis, is relaxing restrictions and claiming normalcy (Joshi, 2020a). Aziz-Huck and Shmis (2020) point out that the past experience of previous health emergencies (like Ebola, SARS) reveals that the impact on education is likely to be more devastating for countries having low learning outcomes, high dropout rates and low resilience to shocks. Therefore, they suggest that these nationwide lockdowns could be the best time to test education technology intervention for distance learning as only few systems are ready to face this crisis at present. The opportunity offered by COVID-19 can be used by the educational administrators and policy-makers in India to introduce new learning modes like remote learning so as to make

their education systems more resilient. This can enable them to cope with current disruptions, recover from them and also to prepare for future emergencies.

Besides, if we take the warning of various biologist, scientists and epidemiologists more seriously, then the critical role of remote learning becomes even more vivid. An American cellular biologist and a leading ecologist, late Barry Commoner, said in 1971 that "everything is connected to everything else" [4] which seems to have been proved by coronavirus which spread from Wuhan to more than 200 countries, making us understand how closely we are connected. A two-time Pulitzer Prize winner, professor emeritus Wilson said, "The ongoing mass extinction of species, and with it the extinction of genes and ecosystems, ranks with pandemics, world war, and climate change as among the deadliest threats that humanity has imposed on itself" [5]. And more recently, an American epidemiologist Larry Brilliant [6] (2009) warned in 2009 that "The threat of deadly new viruses is on the rise due to population growth, climate change and increased contact between humans and animals." He believes that this is an "age of pandemics." Giving serious thought to the words of these scientists ,the policy-makers with due participation of all stakeholders must start formulating digital strategies and should also start thinking of contingency plans for higher education. The time is to prepare response strategies for disasters like COVID.

It is interesting to note that the importance of distant mode of learning in democratization of education had been realized in India long back in late 1950s. But by bringing life, economies and education system to complete standstill, this pandemic has made us realize the limited capacity of face-to-face teaching and the hidden potential of digital interventions in education space for reaching large student populations. This shift to remote learning becomes more important in case of India, as it is a young country which is likely to reach its peak by 2025. It is expected that a quarter of the world's total workforce will be in India by 2025. The average Indian will be 29 years old, compared to 37 in China and the USA, 45 in Western Europe and 48 in Japan by the year 2020; therefore, this will make India one of the youngest nations in the world (The World Bank study). But skill gap and skill mismatches are very prominent in India, as more than 95% of people aged 15 years and above have no technical knowledge; there is a need to focus on skill development through different agencies and aim to train 500 million people by 2022. India at present is having a demographic advantage which is expected to last until 2040; therefore, in view of a very narrow time frame available to harness its demographic dividend and to overcome its skill shortages, COVID-19 has offered a lucrative opportunity for enhancing acceptance of alternative modes of learning in India. Besides, when economic opportunities are getting dried up due to the onset of the worst recession after independence, this will prove to be advantageous for Indian youth for generating self-employment opportunities in post-COVID period.

Undeniably, the virus aftermath is going to benefit many online program management platforms and educational startups involved in delivering online education like EduGorilla, EduKart, Embibe, Meritnation andVedantu. In post-coronavirus world, the virtual conference and virtual exhibition startups might emerge to provide a complete new experience to the participants, while staying at home. Further, this cannot be possible without information communication technology (ICT); therefore, this will help in the further growth of IT sector too. In other words, going digital seems to be the way forward in a post-pandemic world. In this hour of need, corporates can assist in co-creation of industry certified with partial or full digital content and can help in growth of digital education and digitization of skill development courses in India. Remote learning will help evolve the concept of lifelong learning too. Besides, if this mode of learning is implemented properly and earnestly by understanding the requirements of industry for future digital skills and also by forging partnerships, it can help India prepare a brigade of future-ready digital workforce to surf Industry 4.0 wave and put her on continued economic ascendancy in medium and long term in post-COVID world. Therefore, it is imperative that the educational institutions must

migrate to remote learning amidst Covid-19 to mitigate the loss of learning on the one hand, and to make students future-ready on the other. Indeed, this crisis has brought to the fore the instrumental role of remote learning at all levels of education in general, and higher education in particular. The study also highlights the issues and challenges associated with this digital transformation.

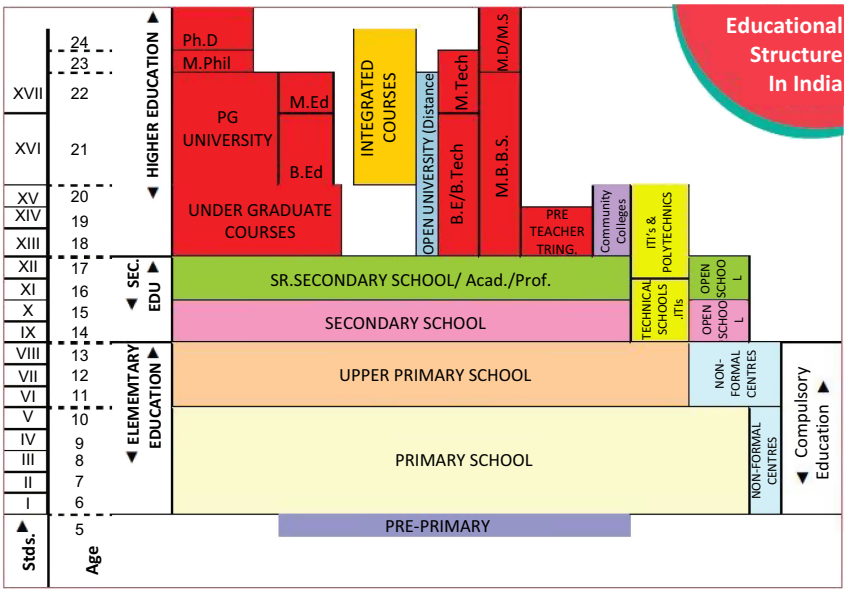
Having discussed the importance of remote learning in the Indian context, it will be highly appropriate if we discuss the higher education landscape of India in brief first, followed by the transition to remote learning amid COVID-19 and various issues and challenges associated with this digital transformation of higher education. After providing a glimpse of the options explored by various countries (in addition to closures of educational institutions) during this pandemic like remote learning and provision of educational resources to mitigate loss of learning, the paper will conclude and show the way forward.

Higher education landscape in India

India has one of the largest higher education systems in the world in terms of the number of institutions, and third largest (after China and the USA) in terms of enrollment in India (Joshi, 2012).

Figure 1 given below highlights the educational structure in the country.

India's higher education system is managed by the University Grants Commission (UGC) and the various councils. The UGC, established by a statute in 1956, is responsible for determination and maintenance of standards of higher education. At the time of independence, India had 20 universities and approximately 500 colleges with total enrollment of 0.2 million students (Joshi, 2012, 2020b). The number of higher education



Source(s): Reproduced fromUniversity Grants Commission(2018), Higher Education : All India & States Profile 2017-18. Secretary, University Grants Commission Bahadur Shah Zafar Marg, New Delhi

Figure 1.
Educational structure in India

institutions increased manifold over seven decades, and by 2018–19, there was a vast network with 993 universities, 39,931 colleges and 10,725 stand-alone institutions. The enrollment stood at 27.2 million in important programs at undergraduate and postgraduate levels in regular mode (Government of India, 2019a).

Besides regular mode of learning, another mode of learning – open and distance learning (ODL) system – has played a crucial role in India's higher education system since the 1960s by reaching out to the unreached. Through ODL, these two terms are used interchangeably but are actually different, as "open learning" is a philosophy and distance education (DE) is a mode of learning for translating it into reality" [7]. Thus, ODL is a term which accepts the philosophy of "openness" and uses the "distance mode" of learning." The major objective of ODE is to democratize education by making it accessible in a flexible manner to various sections of society so as to address various dimensions of disparities – regional, rural–urban, social and gender. The need for the correspondence education (through evening colleges, correspondence courses) was felt by the UGC in its report of 1956–60. However, the planning commission took serious note of it in the Third Five-year Plan (1961–66). The Expert Committee under the chairmanship of Dr. D S Kothari was set up on the recommendation of the Central Advisory Board of Education which recommended the institution of correspondence courses in view of the greater flexibility, economic viability and innovative methods of imparting education on pilot basis. This led to the establishment of the University of Delhi's School of Correspondence Courses and Continuing Education in 1962. The distance education (DE) system became popular because of three factors like ease in access, affordability and convenience. However, this system was not free from the rigidities of the conventional education system. Therefore, the need was felt for the removal of the structural rigidities of the existing DE system and integrating it with developments in communication technology so as to cater to the demands of the modern society. Higher education was democratized further by introducing the Open University system in the 1980s. The National Policy on Education (NPE) 1986 gave prominence to an open university system. Dr. BR Ambedkar Open University, Hyderabad, was established in 1982, followed by the establishment of Indira Gandhi National Open University (IGNOU) at the national level by the Parliament of India in 1985.

Currently, India has one of the largest DE systems in the world, second only to China. The following institutions offer DE today:

Box 1.

(1) National Open University
(2) State Open Universities
(3) Distance Education Institutions (DEIs) at
- Institutions of National Importance
- Central Universities
- State Universities
- Deemed to be Universities
- State Private Universities

(1) DEIs at Stand-alone Institutions
- Professional Associations
- Government Institutions
- Private institutions

Source: Based on https://www.ugc.ac.in/deb/pdf/ODLwhatwhyandhow.pdf

Besides regular mode of learning, (ODL mode too has played a crucial role in enhancing the gross enrollment ratio in India (which stood at 36% in 2018–19, comprising ODL enrollments) and making education more inclusive. The education through this mode has been made available and accessible to the disadvantaged groups, such as those living in remote and rural areas, working people and women. ODL accounts for 10% of students' enrollment.

In addition to the above, informal education which includes pre-primary, coaching classes, vocational education and multi-media/technology-based educational courses and so forth supplements or acts as a substitute to formal education (KPMG and Google, 2017). Education through online mode has been steadily picking up in India which implies the provision of learning modules, lectures and so forth through Internet-enabled devices to customers.

Transition to remote learning amidst COVID-19 [8]

From the above, it is obvious that the expansion of online education had been happening in India even before the outbreak of COVID-19. Therefore, remote learning is not something new to India. But this sudden shock given by this contagious virus has awakened all the stakeholders in the education system. The disruption caused by the virus, fear of its spread and consequent closures of educational institutes and loss of leaning forced them to move on to remote learning. While teachers and students have been trying to communicate through apps as well as teaching management systems, colleges and universities, in addition to using these modes of communication, are holding webinars and video conferences to ensure that learning goes on. Educational institutions and the Ministry of Human Resources and Development (MHRD) have been guiding and encouraging the teachers to start using online teaching platforms. The traditional face-to-face teaching system has taken a back seat during this time of social distancing in quarantine period.

Wider use of technology such as Google Classroom, Google Hangouts and video-based collaboration services like Webex, Zoom, Loom, Skype, Teams and learning management systems have been playing an important role in the transformation of the traditional face-to-face teaching–learning system. This crisis has brought to the fore the hidden potential of online learning system. Recent study of KPMG and Google (2017) revealed that online education system in India is set to grow to USD 1.96 billion by 2021, from USD 0.25 billion in 2016, and is expected to register a compound annual growth rate of 52%. The study cited convenience, flexibility (with commencement dates, variety of study material) and low cost as the key motivating factors to adopt online channel of learning; however, nobody knew that COVID-19 will become the fourth key factor. The unique contribution of COVID-19 is that the teachers, students, administrators and government engaged in the offline, regular, face-to-face mode of learning have realized the need of online education tools and the infrastructure to communicate with students amid closure of schools, colleges and universities during the times of pandemics. If the corporates of India have chipped in to help government in tackling virus outbreak by making masks and sanitizers, the Ministry of Human Resource Development (MHRD) has come forward with its e-learning resources, varying from digital courses like Massive Open Online Course (MOOC) to digital library to check "learning poverty" and the consequent "human capital deficit" in the short and medium term and also to ensure that "demographic dividend" is tapped by India. It is important to point out that "SWAYAM" portal [9] of government of India, MHRD hosts 1900 courses from Class 9 till post-graduation, prepared by 1,000 specially chosen teachers across the country to be accessed by anyone, anywhere at any time. The subjects have been aligned to the curriculum and include engineering, humanities, social sciences and law and management courses including robotics. This portal houses video, specially prepared reading material that can be downloaded/printed, self-assessment tests through tests and quizzes and an online

discussion forum for clearing the doubts. An attempt has been made to enrich the learning experience by using audio-video and multi-media and state-of-the-art pedagogy / technology.

The abrupt shift to digital learning platforms: issues and challenges

Unfortunately, only a few countries are fully prepared for this abrupt shift to digital learning platforms after the outbreak of pandemic. Though the educators seem to have accepted the abrupt shift to digital learning platforms in the absence of any other choice available for learning continuity, the expectations from the education system remain the same during the pandemic. These expectations to ensure the continuity of learning in an uninterrupted fashion stand as follows: the availability of e-content, remote teaching plan, the pedagogy of teaching, preparedness of all stake holders, connectivity infrastructure, cybersecurity and psycho-social support system during the pandemic.

Closures of educational institutes like colleges and universities and switching from face-to-face teaching learning to online mode of learning have highlighted several issues and challenges associated with e-learning environment. The issues namely, inadequate provision of e-learning content, lack of clarity about teaching methods (pedagogical issues), lack of preparedness of stakeholders (like teachers, students, caregivers and parents) to manage new technologies (training issues) and the resultant confusion and stress, poor quality of connectivity infrastructure (lack of Internet facility, low bandwidth, higher cost, etc.) or network-readiness issues, digital divide, data security and cybersecurity issues, attitudinal issues (because of diminished motivation of stakeholders) along with psychological issues (due to social isolation and distancing) are getting exacerbated in various countries including India during the pandemic. Besides, chalking out remote plan, devising appropriate assessment and examination techniques are some other challenging issues. To add to it, some outstanding issues of accreditation, quality control and regulation need to be addressed effectively to ensure better learning outcomes.

Prior to the outbreak of COVID-19 [10] pandemic, there had been several challenges in higher education sector in countries like India too such as the curriculum/course content deficiencies and quality issues. Though online content has been developed to meet the challenges like social distancing, yet the quality of content suffers from similar shortcomings which existed earlier. Secondly, the willingness of academic staff to switch to online mode of curriculum delivery too matters. Their unwillingness can be attributed to the absence of the required skills, lack of training and lack of available infrastructure. The Internet is probably the most important form of critical infrastructure required for transformation from face-to-face teaching to remote learning. The scope of remote learning is not limited to just sending e-mails, but it requires video conferencing capacities, reliable VPN (Virtual Private Network) connection and the ability to share large data sets too for research purposes within a short period of time. Herein comes the importance of network-readiness index (NRI) [11] of countries which ranks 121 economies.

It is quite obvious from Table1 that among the BRICS countries, China was the top performer (with 41st rank) followed by the Russian Federation (48th rank), Brazil (59th rank) and South Africa (72nd rank). India occupied the lowest rank vis-a vis other countries of this block, with 79th rank out of 121 countries. It is really shocking that India, which was once termed as the "IT services hub" of the world, was not leading even lower-middle-income group countries in terms of network-readiness in 2019. The top three performers of the lower-middle-income group were Vietnam (with 63rd rank), Moldova (66th rank) and Ukraine (67th rank). Even in the Asia Pacific region, the Philippines and Indonesia were faring well in terms of technology-readiness, with 71st and 76th ranks, respectively, in the world in 2019.

Besides, this technology-readiness issue in the pre-COVID-19 period, reducing socioeconomic disparities and equity (academic, social, financial, physical for low-income/

at-risk students) [12] in higher education was a big challenge as only 34.45% people were using Internet in India in 2017. During COVID-19, emphasis on greater uses of remote learning and lack of affordability of devices (like computers, laptops, smart phones, etc.) and inaccessibility of Internet connectivity (due to higher costs) in case of overwhelming population (64% in 2017) appears to be "elitist" and distortional in terms of expanding inequity [13] and likely to widen existing disparities and have serious adverse implications for the Indian economy and society. The first and second digital divide, which lies at the core of the educational challenge, can further marginalize already excluded groups like women, backward classe people, and people living in hilly and tribal regions in the context of existing educational practices and environments. Therefore, governments need to support and complement their efforts through equity-oriented policies, frameworks and targeted funding. It has been rightly pointed out by OECD that, "The digital divide in education goes beyond the issue of access to technology. A second digital divide separates those with the competencies and skills to benefit from computer use from those without" [14].

Besides, there is another problem of adequate space [15] (for both teachers and students), which is so essential for focusing on academic work. In addition, long periods of self-isolation/social distancing norms laid down by the government can have an adverse impact on the psychological well-being of students and staff, especially for those who live alone away from their home state/state of origin. Besides, there is a growing fear among teaching community that there might be hiring freeze for cost-cutting during the pandemic, and therefore existing contracts may not be renewed.

During this COVID-19 period, different countries adopted various short-term mitigation policies concerning teaching and learning. Let us see how countries have been trying to use edutech during this COVID-19 pandemic to give support access to remote learning to ensure that learning goes on.

Emerging education approaches across countries during COVID-19 pandemic

After the outbreak of COVID-19, many countries have resorted to closure of educational institutions and at the same time have been utilizing different educational technologies to provide remote learning opportunities for students to mitigate loss of learning. The above-referred problems have been managed following different approaches in different countries.

Countries across the globe have been using "high tech, low tech and no tech approaches [16]" to ensure learning continuity. Interventions in the form of text messages (through mobiles in Vietnam and Mongolia) to utilizing social media platforms (like Facebook, WhatsApp, YouTube channels [17]) to broadcasting media (like radio and audio instructions [18] and television [19]) and digital platforms [20] seem to be replacing the established ways of communication with technology-enabled interfaces (The World Bank, 2016, 2020a, b). Virtual classes, virtual conferences and virtual exhibitions seem to have become the order of the day as we move in to a corona-impacted world (Joshi, 2020b).

Country	NRI ranking 2019 (out of 121 countries)
Brazil	59
The Russian Federation	48
India	79
China	41
South Africa	72

Note(s): BRICS is an acronym used for five countries Brazil, Russia, India, China and South Africa
Source(s): Portulans Institute (2019), Network Readiness Index 2019, Washington D.C., USA.

Table 1. Network readiness index rankings 2019 of BRICS countries

It is important to include the case of China as the Ministry of Education (ROC) tried to ensure continuity of learning when classes got disrupted by launching an initiative, titled "Ensuring learning undisrupted when classes are disrupted." Certainly, India can draw valuable lessons from the approaches followed in China.

The following steps were undertaken over time to achieve the objective of learning continuity

Case study: China's response to COVID-19

China has tried to resolve the above-referred issues in a proper and systematic manner through the following interventions.

(1) *Use of technology*: The problem of e-content has been handled by mobilizing 22 validated online course platforms, using artificial intelligence to provide primary and secondary schools with free online courses.

(2) *Flexible methodologies*: Schools and teachers have been advised to remain flexible and use appropriate methodologies to facilitate learning. They can choose appropriate modes of delivery based on local e-readiness, including online platforms, digitalized TVs or mobile apps.

(3) *Guidance to teachers and online training*: The guidance has been provided to the teachers on teaching methodologies through livestreaming of online tutorials and MOOCs. The recommended number of online learning hours varies by grade. It has mobilized society-wide resources for the provision of online courses and resources. It has made 24,000 online courses accessible for university students. The Ministry of Education launched an initiative, titled "Ensuring learning undisrupted when classes are disrupted."

(4) *Plugged communication gaps*: To check any communication gap and to ensure smooth transition to online system (when all face-to-face meetings are banned), the Ministry of Education organized teleconferences with all the enabling organizations, agencies and service providers like school management agencies, online platform and course providers, telecom providers and other stakeholders. An attempt has been made by the Ministry of Education to manage the two expected barriers in the implementation of its vision, namely, slow Internet connectivity and low bandwidth of major online education service platforms, especially the capacity of the National Cloud-Platform for Educational Resources and Public Service in serving millions of visitors simultaneously by entering into partnership with the Ministry of Industry and Information Technology. By collaborating with the telecom sector and online platform service providers, the online security has been strengthened. In addition, it has also made provision for psycho-social support and courses to impart knowledge about the virus and protection against it (The World Bank, 2020a).

Policy initiatives of GOI to mitigate loss of learning

In addition to closings educational institutions (as has been the case with many other countries), India decided to shift to remote learning and use of electronic educational resources created and generated in 2017 for undergraduate and postgraduate courses to mitigate the loss of learning. The government has been trying to capitalize on work already done in this direction and addressing ever-present challenges like degrees of accessibility within communities and regions to ensure equity in access.

There are enough e-learning resources available in India. This can be judged from the statement of All India Council of Technical Education (AICTE), "SWAYAM (Study Webs of

Active-Learning for Young Aspiring Minds) MOOCs platform is World's Largest Online Free E-Learning Platform Portal designed to achieve the three cardinal principles of Education Policy viz., Access, Equity and Quality by covering School/Vocational, Under-Graduate, Post Graduate, Engineering and Other Professional Courses" [21]. SWAYAM hosts 1900 courses, both technical and non-technical. The initiatives of Government of India (GOI), which started in 2015, that is, in pre-COVID period, which was totally unaware of the future crisis when establishing SWAYAM portal, were dedicated to the nation in July 2017. This advanced preparedness of e-learning resources has stood us in good stead during the pandemic.

Table 2 shows the e-learning resources of the GOI to ensure learning continuity during these extraordinary circumstances created by a contagious disease.

After the outbreak of the crisis, the government of India responded with agility. This can be observed from the timeline of notices issued by the UGC, which is a regulatory body and responsible for coordinating, determining and maintaining standards of higher education

Name of the portal	Details about e-learning resources
The DIKSHA-National Teachers Platform for India	(1) E-learning content for students, teachers and parents aligned to the curriculum including video lessons, worksheets, textbooks and assessments (2) Under the guidance of its national board of education (CBSE) and NCERT, the content has been created by more than 250 teachers who teach in multiple languages (3) QR codes in textbooks encourage students to go beyond the book (4) The app is available to use offline
E-Pathshala	(1) E-learning app by NCERT for classes 1 to 12 in multiple languages (2) The app houses books, videos, audio, etc. aimed at students, educators and parents in multiple languages including Hindi, Urdu and English
The National Repository of Open Educational Resources (NROER) portal	(1) A host of resources for students and teachers in multiple languages including books, interactive modules and videos including a host of STEM-based games (2) Content is mapped to the curriculum for classes 1–12, including aligned resources for teachers
SWAYAM	(1) Hosts 1900 complete courses, including teaching videos, weekly assignments, exams and credit transfers, aimed both at school (class 9 to 12) and higher education (undergraduate and postgraduate) levels (2) Subjects are aligned to the curriculum and include engineering, humanities, social sciences, law and management courses including robotics
SWAYAM PRABHA	(1) A group of 32 Direct-To-Home (DTH) channels devoted to telecasting of educational programs round the clock and accessible all across the country (2) The channels air courses for school education (class 9–12), higher education (undergraduate, postgraduate) as well as for out-of-school children, vocational education and teacher training (3) Subjects include arts, science, commerce, performing arts, social sciences, humanities, engineering, technology, law, medicine and agriculture (4) Schedules for the television broadcast as well as archived programs are available on the website

Source(s): Based on various websites of the GOI and the above-referred programs

Table 2.
E-learning resources in India to mitigate loss of learning

and also disbursement of funds to recognized universities. WHO took time to declare the disease as pandemic on March 11, 2020 (though the first it was noticed in China in December 2019). The delayed declaration has been criticized widely.

The timeline of notices [22] bring to attention the fact that preparedness for facing the pandemic and its impact assessment was done by UGC swiftly as its first advisory was issued on March 5, 2020. In all, one panel discussion and press release, two advisories, three appeals and remaining 11 letters issued by UGC from March 5 to April 29, 2020, address all the issues raised in Section 4, from availability of e-content to accessibility issues, from examination to assessment issues, from precautionary to preventive methods to counter COVID-19, from physical to mental well-being issues and ways to handle them and also reminding all the stakeholders about their responsibility toward self, society and nation.

Though India too has made e-content available to the public, the implementation approach of China and India is different. This has to do something with their political systems. The authoritarian system of China as compared to democracy in India gives an edge to China in taking tough decisions and ensuring effective implementation of policies. Besides, China has uniform curriculum in the country, which makes implementation of policies easier than in a diverse country like India. Thirdly, China resolved problems of connectivity, communication and training swiftly because of better governance [23]. Though "ICITIZATION" took place in India in early 1990s, yet IT penetration is slow in terms of devices required for Internet usage, bandwidth, speed and so forth. Therefore, first and second digital divides are quite noticeable. Higher public spending on IT and strengthening of existing digital infrastructure can play an important role in this transition phase in India. The presence of 627 million Internet users in the country also gives a positive future outlook for online learning in India. Though many institutes in India have been trying to accommodate and enrich the educational experiences of differently abled persons by making special equipment and devices such as computers with screen reading software, low-vision aids, scanners and mobility devices available to them, this is the time for laggard institutions to start planning for ramping up their services before the virus clears up (Joshi, 2020b).

Conclusions and the way forward

From the foregoing, it is clear that the governments world over are in dilemma after the outbreak of this contagious "Novel Coronavirus," because relaxation of restrictions can lead to resurgence of cases and closures of educational institutions are disastrous from economic point of view. Undeniably, COVID-19 has put higher education in India at cross-roads. It is important to understand that the education system in India has been designed for face-to-face teaching and learning. The strategies cited above can be used for short periods, but if the situation created by lockdown and school closures continues for long period, then the alternative mode of content delivery needs to be adopted. It becomes all the more important in the light of projections given by Psacharopolous *et al.* (2020). They opine that "the scale of economic damage likely already stored up due to lost learning indicates the care with which governments should plan their next policy moves. Like so many aspects of this pandemic, the impact on children and young people seems more likely to take the form of a long crisis rather than a short, sharp shock." Therefore, the time has come when we have to make a choice. The choice will be between clinging to traditional style of teaching in classroom settings or to move on to remote learning during times of crisis and remote learning will be a substitute or complement to the face-to-face teaching. This transition to new form of learning system can help in redefining the learning system and especially the tertiary education system in India. Online education can help in achieving the goal of "Education for all" [23] and SDG 4 by making education accessible even in remote areas at less cost and more with flexibility and convenience. Investment in technology infrastructure, high-quality digital educational content, basic IT skills and local capacity building by involving local bodies, private sector

and civil society is critical. Besides, monitoring and evaluation [25] of "what works" and what does not will be required on a continuous basis. In case of the latter, iterative solutions must be rolled out without delay to ensure learning outcomes. In addition, the issue of accreditation and quality control should be addressed.

This is the time to analyze and ask ourselves the following: Do we believe that education is the only way to achieve prosperity and inclusive growth, and the trend of digitization should not be reversed? If yes, then it is high time that policy-makers with due participation of all stake holders start thinking of online education as complementary [26] to or, in some cases, alternative/substitute to traditional education. The formulation of digital strategies and contingency plans for higher education is a must now so that in case of emergencies /disasters, one should migrate to online classes with ease. The time is to prepare response strategies for disasters like COVID, as the epidemiologists have been warning since long that this is an "age of pandemics" [27]. So we have to learn to adjust whenever disruptions appear because of manmade or natural disasters or climate change, and find ways to augment the live classroom experiences with virtual experiences. Indeed, the movement to digital learning /remote learning will be more convenient in case we introduce blended model first and we too try to introduce centralized curriculum in the country as is the case with China. The crisis has brought in the need for centralized curriculum in the country. It has been very rightly pointed out by Degnarain (2020) that "A radical rethinking of education is needed, and the COVID-19 crisis is accelerating the debate around non-classroom teaching methods, novel methods of examinations, and the overall education." COVID-19 has given an opportunity to reorient the education sector by reforming education keeping in with the requirement of 21st century [28]. With committed leadership in India at present, looking ahead in this direction seems to be easy now.

The MHRDof the GOI must organize teleconferences with school, colleges, universities management agencies, online platforms and course providers, telecom providers and other stakeholders to plan the implementation of the initiative. Remote learning, work-from-home and tele-visits have already put huge strain on the existing national Internet infrastructures and has increased the congestion on the information highways [29]. Therefore, there is an urgent need for interventions to strengthen Internet infrastructure and "augmenting interconnection capacity" so as to enable it to keep up with the sudden surge in bandwidth demand. This is the time to forge partnerships with private sector, with chambers of commerce and industry to expand national-, state- and district-level capacities to ensure the remote provision of education and also for raising GERs essential for building human capital and ensuring prosperity of our country. The new technical cooperation agreements for crisis-sensitive planning need to be done at regional and international levels to anticipate risks and act in advance to check the loss of lives and recovery costs too. It is imperative to mobilize all major telecom service providers to boost Internet connectivity service for online education, especially for the underprivileged and backward regions. There is a need to strengthen online security through collaboration between Department of Telecommunication and online platform service providers to ensure cybersecurity and to check theft of intellectual wealth. Finally, the legacy of COVID-19 depends on the response of the educators to a big question: Do they want to be part of faster adoption of new technologies, new processes in India's education system? If yes, then for sure, this adversity is having the potential to put India on economic ascendancy in the medium and long term. There is a need to guide, encourage and motivate faculty members as well as students in universities to make a transition to online teaching by engaging motivational speakers, industry experts and so forth through webinars. Teachers have to be given guidance and training on teaching methodologies through livestreaming of online tutorials during these difficult times.

Gradually, the issues related to accessibility, equity (digital divide) and lack of communication among the stakeholders, namely, administrators, teachers, students and

parents, need to be resolved to ensure better learning outcomes. This will also necessitate proper and quality training to faculty to enable them to navigate online platforms including accommodating the interests of persons with disability and building a healthy and resilient cyber ecosystem. Various initiatives of GOI must be accompanied by equity-oriented policies, frameworks and targeted funding to assist at-risk students [30]. The almost sudden transition to remote learning may have come as a surprise to many amidst COVID-19, but it is a huge step in the right direction. If implemented properly, it can help in checking "digital divide" and reaping "digital dividends." Going digital is the way forward for the education sector.

To conclude, a cyclical approach to education in emergencies (like COVID-19) comprising of three components, preparing, coping and recovery, is crucial. As pointed out by Azzi-Huck and Shmis (2020), "While different scenarios exist, several of them assume that the COVID-19 spread will happen in waves, which means the process of addressing it should be cyclical. Countries not yet impacted should begin preparing" "starting with a response plan. This would facilitate "coping" once the crisis hits and minimizing the negative impacts. The plan can include introducing protocols for screenings in schools, rolling out hygiene practice campaigns, imposing school closures, offering distance learning, using closed schools for emergency purposes and so forth. As the emergency phase dissipates, communities could move into a "recovery" mode, with governments implementing policies and measures to regain lost time. The approaches may include adjustments to the academic calendar, prioritizing students in grades preparing for high-stake examinations, and continuing with distance learning in parallel to schools. Countries that have shown greater resilience in repeated crises, such as those in East Asia, are the ones that were able to benefit from lessons learned and to respond quickly to new crises, such as this one. They have been able to use the momentum to re-prepare, investing and reinforcing systems going forward."

Notes

1. UNESCO.https://en.unesco.org/covid19/educationresponse/. Accessed on May 4, 2020.
2. As per a model developed by Psacharopolous *et al.* (2020) based on certain assumptions, "the cost to the United States in future earnings of four months of lost education is $2.5 trillion—12.7 percent of annual GDP. And with well over half the country's states deciding to keep schools and universities closed until the fall at the earliest, much of this loss may well materialize. Extrapolating to the global level, on the basis that the U.S. economy represents about one-quarter of global output, these data suggest the world could lose as much as $10 trillion over the coming generation as a result of school closures today." India indeed will not be an exception to this.
3. GER implies total enrollment in higher education, regardless of age, expressed as a percentage to the eligible official population (18–23 years) in a given school year. GER in higher education in India is low and stands at 26.3% in 2018–19. GER for male population is 26.3%, and for females, it is 26.4%.
4. http://c250.columbia.edu/c250_celebrates/remarkable_columbians/barry_commoner.html
5. https://eowilsonfoundation.org/e-o-wilson-writes-article-for-sierra-club-magazine-on-why-we-need-the-half-earth-solution/
6. Who helped to eradicate small pox as a doctor working for WHO in the 1970s.
7. For ODL/ODE system, see https://www.ugc.ac.in/deb/pdf/ODLwhatwhyandhow.pdf
8. This section is based on Joshi (2020b)
9. See https://swayam.gov.in/about
10. Joshi (2012)
11. The NRI is one of the leading global indices on the application and utilization of information and communication technology (ICT). This index ranks 121 economies based on four pillars viz. technology, people, governance and impact. Each pillar is further composed of three sub-pillars. For example, in the case of the 'technology pillar', accessibility, content and future technologies are three

sub pillars. Similarly, individuals, businesses and governments are the three sub-pillars of the second pillar named 'people'. In the case of the third pillar 'governance', trust, regulation and inclusion, and in the case of the fourth pillar, 'impact', economy, quality of life and SDG contribution are the three sub-pillars each, respectively (see: Portulans Institute, 2019).

12. https://blogs.worldbank.org/education/covid-19s-immense-impact-equity-tertiary-education.Last accessed June 5, 2020.
13. For a related discussion, see: Trucano, M. "The Second Digital Divide." World Bank EduTech blog, April 16, 2010.
14. OECD (2010). Educational Research and Innovation: Are the New Millennium Learners Making the Grade: Technology Use and Educational Performance in PISA 2006. Paris: OECD Publishing.
15. OECD (2019) clearly points out that 40 million households faced housing shortage in 2015. Provision of adequate and affordable housing is an ever-growing challenge. In urban areas, the problem is that of congestion, mainly too many people per dwelling and in rural areas the quality of housing. In all, 25% of total urban population still lives in slums. OECD (2019), https://read.oecd-ilibrary.org/economics/oecd-economic-surveys-india-2019_554c1c22-en#page115. Last accessed June 8, 2020.
16. By making available the text books to children at home. https://www.ndtv.com/education/classroom-learning-will-change-post-covid-19-lockdown-hrd-secretary. Last accessed June 7, 2020.
17. Especially in low- and middle-income countries likes in Bhutan, Brazil and Kenya.
18. As in Columbia, Dominican Republic, India, Kenya, Fiji, etc.
19. As in Argentina, Austria, Bulgaria, Costa Rica, Croatia, Czech Republic, India, Indonesia, Mongolia and Vietnam.
20. Like Google Classroom, Google Hangouts, *The Google Loon Balloons* (as in Kenya) and video-based collaboration services like Webex, Zoom, Loom, Skype, Microsoft Teams, etc., learning management systems (in India). Countries like China, Italy, India, France, Germany and Saudi Arabia have been leveraging the potential of ICT to ensure learning continuity.
21. http://aicte-india.org/bureaus/swayam
22. See Table A1.
23. (Joshi, 2011).
24. See : https://www.worldbank.org/en/topic/education/brief/education-for-al.l
25. Trucano ,M.(2016), "Technologies In Education Across The Americas: The Promise And The Peril – And Some Potential Ways Forward" World Bank Education, Technology & Innovation: SABER-ICT Technical Paper Series.
26. Blended education model.
27. See Brilliant (2009).
28. Besides, this pandemic has also highlighted the need for reforming the education sector, including the National Education Policy (NEP). The NEP was framed in 1986 and modified in 1992, and for three decades there was a clear-cut vacuum. This can enable India to be a "global knowledge superpower."
29. https://medium.com/@kasprdata/slow-internet-how-covid-19-is-stressing-internet-infrastructure-in-your-country-f94ee6e3b156. Last accessed June 8, 2020.
30. https://blogs.worldbank.org/education/covid-19s-immense-impact-equity-tertiary-education

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Annexure

Table A1.
Timeline of actions taken by the UGC

Notices issued by UGC	Subject	Addressed to	Aim
March 5, 2020	Advisories for Universities and colleges -Novel Coronavirus(COVID-19)	The vice chancellors of all universities	Recommendation with respect to the preventive measures to combat the threat of COVID-19 and highlighting the need for coordinated and collective effort in a mission mode
March 12, 2020	Awareness and information sharing about the initiatives under the National Mission on Education through information and communication technology	The vice chancellors of all universities, the principals of all colleges , firectors CFTIs	Awareness about digital initiatives of GOI
March 19, 2020	Precautions to be taken in the light of COVID-19	The vice chancellors	Rescheduling of examination, evaluation and notification of helplines and e-mails by institutions to check anxiety among the stakeholders
March 21, 2020	Advisory: preventive measures to achieve social distancing – permission to teaching and non-teaching staff to work from home	The vice chancellors	Recommendation to the teaching community to utilize their time productively by engaging in productive activities like development of e-content, research etc.
March 21, 2020	Appeal by UGC chairman	The vice chancellors of all universities, the principals of all colleges	Reminding teachers of their duties toward the nations and motivating them to spread awareness about and preventive measures to combat coronavirus
March 25, 2020	Let COVID-19 not stop you from learning-ICT initiative of MHRD and UGC	The vice chancellors of all universities, the principals of all colleges	Information sharing on e-learning resources and motivating the academic community to utilize the time productively by engaging in online learning
March 27, 2020	Safety and care of hostel residents	The vice chancellors of all universities, the principals of all colleges	tEnsure safety and health of all stakeholders
March 28, 2020	Appeal : for contribution to combat COVID-19	The vice chancellors of all universities, the principals of all colleges, directors CFTIs	to make university community aware of its societal responsibility and for strengthening the efforts of GOI to combat COVID-19 pandemic

(*continued*)

Table A1.

Notices issued by UGC	Subject	Addressed to	Aim
March 28, 2020	UGC quality mandate: suggestive academic activities	The vice chancellors of all universities, the principals of all colleges	to spread awareness among stakeholders about how the challenges in higher education relating to employability, upholding state of the art curriculum, enrichment and maintenance of quality teaching, research and services, adoption of ICT for teaching-learning and preparing the next generation as socially responsible citizens and leaders will be addressed through various detailing of measures
March 30, 2020	Measures to boost immunity during COVID-19	The vice chancellors of all universities, the principals of all colleges	Sharing information provided by Ministry of AYUSH on self-care guidelines for preventive health measures and boosting immunity
April 3, 2020	COVID-19: stay safe	The vice chancellors of all universities, the principals of all colleges	to spread awareness about all measures mentioned above and awareness about AROGYA SETU app developed by the Ministry of Electronics and IT (MEITY) and PMs appeal to switch off lights, light candles, diya or mobile torch on March 5, 2020
April 5, 2020	mental health and well-being of students during and after COVID-19	The vice chancellors of all universities, the principals of all colleges	To set up helplines for mental health, regular mentoring through telephone, e-mails, digital and social media platforms, behavioral health, etc.
April 10, 2020	Downloading the Aarogya Setu app	The vice chancellors of all universities, the principals of all colleges	to urge teaching, non-teaching and students and society to download the Aarogya Setu app to help the government in assessing risk of spread of COVID-19 and ensuring isolation wherever required
April 11, 2020	Appeal for inviting ideas/suggestions for Bharat Padhe Online campaign	The vice chancellors of all universities, the principals of all colleges	to boost e-learning and intensifying online education in India

(*continued*)

Table A1.

Notices issued by UGC	Subject	Addressed to	Aim
April 17, 2020	Issues related to examination and academic calendar	The vice chancellors of all universities, the principals of all colleges	constitution of expert committee considering genuine interests of stakeholders to deliberate on the issues related to examination and academic calendar and recommendation
April 22, 2020	Panel discussion	All stakeholders	Information dissemination on e-initiatives on DD news by the chairman, UGC
April 25, 2020	Press release on examination and academic calendar	The vice chancellors of all universities, the principals of all colleges	to share information about the constitution of two committees to look in to the issues faced by the universities and colleges regarding teaching-learning processes, examinations, admissions, academic calendar and other related issues in view of the pandemic

Source(s): Based on https://ugc.ac.in/

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