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An Overview of Education in India during COVID-19 Pandemic – Opportunities and Challenges

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Abstract *Purpose – The Government of India has declared COVID-19 a pandemic and imposed lockdown throughout the country as a preventive measure from the infection. Almost every sector has witnessed a tough time during the crisis, including the education sector. The digital model of imparting education came into practice with online teaching and learning. This paper provides an overview of the education system during pandemic times. It discusses the opportunities and challenges faced by the stakeholders during online education in India in times of pandemic.*

Design/ Methodology/ Approach – The research undertakes the in-depth review of previous papers, articles, secondary sources – published and unpublished in the field.

Findings – The findings revealed that the Indian government has put in a lot of effort to provide education online by providing numerous free digital platforms to cater to the educational needs of learners of different age groups. But, inaccessibility of the internet to all and unpreparedness of educational institutions in developing sound infrastructure, resources and untrained teachers for online mode of education emerged to be the major challenges.

Practical Implications – The study's findings can be insightful for the Higher Education Institutions and the teachers to remodel their educational pedagogies overcoming all challenges and well equip for successful implementation of future online or blended education and to deal efficiently with any such crisis in future.

Originality/ Value – There have been numerous research studies on education during crisis times, but a few studies have been conducted in India focusing upon challenges and opportunities of imparting online education during COVID-19 times in India. The study will add to the existing exploratory data and fill in the gap by contributing to the literature related to online teaching and learning during the pandemic crisis.

Keywords: *COVID-19, Pandemic, Online Education, Opportunities, Challenges*

Paper Type: *Research Paper*

INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. " Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age." - WHO

COVID-19 has badly affected the entire world. The World Health Organisation has declared it a pandemic (WHO, 2020). The severity of toll is not perceived by the impact on the health of the citizens only but also world economies

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have shattered hugely because of the lockdown imposed by most of the nations as a matter of prevention from the lethal infection. The Indian economy may reach nearly 8.8tn Indian rupees due to the adverse impact of COVID-19 (Keelery, 2020). Like other sectors, the education sector globally has suffered a lot during the pandemic times. UNESCO has reported the gross impact of the pandemic on 63 million teachers in 165 countries. Not only this, around 1.3 billion learners were deprived of attending school or university across the globe, with India alone marking 32 million approximately (UNESCO, 2020). The critical concerns are raised regarding the negative impact upon teaching, learning, evaluations and credentials owing to prolonged closure of schools that further has resulted into unfavourable socio-economic impacts.

INDIAN EDUCATION IN COVID-19 PANDEMIC

The severity of the pandemic has led World Health Organization to issue guidelines regarding social distancing as the foremost important preventive step. Lockdown becomes ubiquitous. Recent research studies have documented the chronology of events occurring in many countries (Hua & Shaw, 2020; Shaw et al., 2020). COVID-19 has been identified as the worst pandemic owing to its quick spread, increased vulnerability of the elderly people and variation in recovery rates across the nations (Shaw et al., 2020). Nations across the globe declared to shut down closing markets, institutions, offices, organisations – anything to everything. The education sector too is affected badly. Schools, colleges, institutions and universities witnessed the complete closure. There was the suspension of the classes, internships and postponement of examinations, including the entrance tests too. The locked-down has locked all types of academic activities initially. But, it is also true that there lies an opportunity in times of adversity. The ghastly pandemic has also given birth to new ecosystems of teaching and learning and has transformed the pedagogy into a new digital model. The policymakers, governments, investors, and various educational technology companies started re-investing their time, resources, and energy into reforming educational technology for maximising support during the emergency crisis of COVID-19 (Hodges et al., 2020).

Initially, the academicians, educators and stakeholders were baffled on coping up with such crisis that has bolted all sorts of educational activities. With due course of time as the covid-19 is stretching for longer, the educational institutions around the world started working upon strengthening their resources and infrastructure (Pravat, 2020a) by providing technical training to their teachers for taking online classes efficiently, Asynchronous teaching; Remote Classrooms become the new buzz words. A plethora of online applications like Zoom, Google Meet, Youtube, Skype and WebEx etc. become the new face of teaching classrooms where teachers meet their students online and teach virtually. In order to make the communication more effective, the numerous groups of students, teachers, parents and guardians were formed that help removes their difficulties, if any, through this electronic medium.

It is not exaggerated to say that the major success of online teaching lies on the shoulders of teachers. There have been few studies that addressed the barriers of online teaching but concentrated upon developed countries like Japan, Germany, US etc. but there is a scarcity of such studies in the context of developing nations (Stoffregen et al., 2016; Sutherland, 2014). The pandemic situation has aroused an urgent need for teachers to get accustomed to this new concept of online teaching.

There is no denying the fact that providing digital education to every student was biggest challenge owing to lack of digital facilities and internet facilities in Indian subcontinent.

The present paper focuses on the following objectives-

- To know about various initiatives undertaken by the Government of India in the education sector during the pandemic.
- To seek opportunities during COVID-19 in the education sector.
- To find out challenges faced during COVID-19 in the education sector and to offer some remedial measures/ constructive suggestions.

The information for the present study is collected from various reports curated by agencies of national and international repute. Also, numerous research papers, articles on the topic were reviewed.

REVIEW OF LITERATURE

The global education system has been completely jeopardised because of the COVID-19 pandemic. The digital formats of asynchronous learning became a boon to combat the challenge faced by educational institutions. Conventional learning has taken to the new face of online education and teachers have changed their traditional pedagogical methods to novel online methodologies. It was a challenge for the teachers in the Indian sub-continent to adapt to the digital mode of online/remote teaching and evaluations in no time. Initially, it became a terrible teaching experience for the teachers to take classes from home on online mode amid crisis (Punit & Qz.com, 2020). The challenges were too many, like lack of skills, technical knowledge and training among teachers, lack of preparation time for the development of e-content and non-suitability of certain courses for online teaching (Gratz & Looney, 2020).

Furthermore, internet bandwidth issues; want in knowledge, interest & skills; attendance issues of students; lack of students' engagement and participation (Shelley & Ashish, 2020). Also aggravated the intensity of challenges the teachers face while teaching online (Arora & Srinivasan, 2020; Kaup et al., 2020). Also, incidents of online classroom indiscipline were reported that stressed the teachers more for delivering online (Punit & Qz.com,, 2020). Overall the experience to teach online from home environment setting was demotivating for the teachers (Joshi, Vinay & Bhaskar, 2020).

Moreover, India lacked the quality infrastructure needed to deliver online education efficiently (QS-ERA, 2020). The digital divide is clearly discernible due to improper infrastructural dimensions in the Indian society while providing online education around the country (Mishra, 2020). Most educational institutions faced a challenge to comply with this transition because of the scarcity of well trained and technical sound faculty members who can impart online education remotely (Vermaet al., 2020; Sharma, 2020). The deficiency of training, educational institution size and complex nature of the programme (Haber & Mills, 2008) and want of infrastructure, technological assistance, equipment, institutional support and resources, doubt on efficacy of Information and Communication technologies and lack of confidence (Al-Senaidi et al., 2009) were barriers perceived at institution level, system level and interpersonal level intimidate the adoption of technology by the teachers to impart online education (Buabeng-Andoh, 2012; L loyd et al., 2012). Nine categories were identified as barriers to effective online teaching and learning as academic, fiscal, geographic, governance, labour management, legal, student support, technical and cultural (Berge and Mrozowski, 1999) because of technological incompetencies among the faculty members, unfavourable attitude, dearth of resources, institutional support and infrastructure, lack of self-confidence and course complexities (Prottas et al., 2016; Keengwe et al., 2008; Yuen and Ma, 2008; Chen, 2010; Peralta and Costata, 2007; Taylor, 2002). Parents also experience problems doing their work at home and facilitating their children's schooling from home (Duffy & Kent, 2020).

Initiatives Undertaken By Government of India In Education Sector During The Pandemic

It was March 16, 2020 when the Union Government announced nationwide shut down of all the educational institutions in India as a preventive measure from spreading the pandemic. Also, the postponement of the secondary and higher secondary schools' examination was declared by the Central Board of Secondary Education (CBSE) and most of the state governments and other educational boards on March 18, 2020. Revised guidelines regarding the conduct of examination were also issued by CBSE that regulated the size of the exam centre to be such that students seating with one-meter distance from each other with a maximum of 24 students in one classroom. The Government of India implemented countrywide Janta Curfew on March 22, 2020 and then from March 25, 2020 complete shutdown was implemented in different phases. There were numerous phases of Lockdown and Unlockdown under the government's strategy to stop the spread of the pandemic, but the educational institutions remained completely closed during this pandemic phase. Though the physical setups of the educational institutions are closed throughout the length and breadth of the entire country, there is no stone left unturned by the states' governments to continue education at every level during the lockdown period. There is a complete transformation of teaching-learning ecosystems that rely entirely upon the usage of digital technology, and classes at schools, colleges, universities and other educational institutions started on virtual mode. It paves the plethora of opportunities to develop new professional skills and knowledge. Whereas the teachers got occupied equipping themselves with learning new technology and applications to provide remote and online teaching efficiently, online learning becomes the best possible solution to get an education during the pandemic period (Pravat, 2020b). The Indian government's vision of "Digital India" seems to be a panacea for the COVID-19 crisis. The Indian government undertook timely initiatives, state government and private organisations to provide online education at the time of closure.

The Ministry of Human Resource Development released a press note on March 21, 2020, for sharing several e-learning platforms like Study Web for Active Young Expiring Minds (SWAYAM), National Programme on Technology Enhanced Learning (NPTEL) etc. to support the government's decision of closure of educational institutions. Numerous efforts were put in by the Ministry of Human Resource Development (MHRD) for the students to continue learning like online educational portals and educational channels through Direct to Home TV and Radio etc. WhatsApp, Zoom, Google Meet, Facebook Live, Youtube live and Telegram etc. became essential tools for delivering online teaching-learning. A unique digital platform is created by MHRD that brings together all the digital resources for online education to ease learning for students during the lockdown. Not only this, PM eVidya – an extensive initiative was also announced to offer balanced, uniform access to education through multiple modes concentrating upon integration of all digital/online and on-air education efforts with the aim of benefitting around 25 crore school children in the country. A synopsis of the initiatives that embarked upon digitisation of Indian education to combat crisis situations is as under (MHRD, 2020a).

- Digital Infrastructure for Knowledge Sharing (DIKSHA)

  National online school education platform that can be accessed through a web portal and mobile application is a boon for the students, teachers and parents having e-content developed under the guidance of Central Board of Secondary Education (CBSE) & National Council Of Educational Research and Training (NCERT) and enriched with curriculum-based audio lessons, video lessons, worksheets, e-textbooks and e-assessments.

- e-Pathshala

  NCERT has developed this multilingual learning app for classes 1-12 which stores numerous e-books, flip books, learning material, audio and video lessons for the students, teachers, and parents.

- National Repository of Open Educational Resources (NROER)

  The portal houses e-content in the form of books, interactive material, audio and video modules for classes 1-12. It also includes a variety of interactive activities and STEM-based games to foster students' engagement and active participation.

- Swayam

  A plethora of Massive Open Online Courses (MOOCs) is available at the online educational platform for senior secondary students, undergraduate and postgraduate programs. Almost all subjects like engineering, humanities, social sciences, commerce, etc. are offered vis Swayam. Also, it offers various online Faculty Development Programs, Annual Refresher programs and other teacher training programs for the development of the teaching fraternity.

- Swayam Prabha

  It is the set of 32 DTH TV channels transmitting the educational content on all subjects for classes 9 to 12 and Higher Education round the clock with a wider reach of being at every corner of the country. It is easily accessible with DD free Dish Set Top Box and Antenna.

- e PG Pathshala

  The platform is for Post Graduate students offering several e-books, online course content and study material on all the subjects.

CHALLENGES AND OPPORTUNITIES FACED DURING LOCKDOWN

A lot of challenges were posed during pandemic times because of the shutting down of educational institutions across the nation. Suspension of the classes and postponement of the examination at school, college and university level resulted in pausing the entire education system for a while. It took time for the government and private players to strategise educational activities online. The challenge was huge since providing online education to each student across the country was nearly impossible. Learners living in metropolitan cities and where internet connectivity is not an issue can receive education online with the help of phones, laptops and systems, etc. The challenge was critical to reaching that stratum where internet connectivity is minimal and who could not afford smartphones or other gadgets needed to get online education. As a result, this online teaching-learning system has created a digital divide amongst students in India, hitting hard the students belonging to low-income families where getting two meals per day became a challenge due to lockdown. The gap between rich and poor, urban and rural, has deepened in the pandemic landscape. As the fall of crisis was sudden, even the teachers and students were not prepared for sudden transformation in teaching-learning pedagogies and it is evident that it takes time to adapt to the new systems and procedures. Initially, there were many issues for the teachers expected to fit themselves overnight to remote teaching without any technical knowledge and skill.

Also, it becomes challenging to teach students practical knowledge that can only be possible through actual practice in the physical setup of laboratories only. The other drawback identified during online teaching is the lack of co-curricular activities and meeting with friends and peers that make an essential ingredient of the education system (Lall and Singh,. 2020) that focuses on all-round development of children. Profane learning material, lack of self-discipline and liveliness of learning environments, absence of a competitive classroom environment were serious challenges of work or study from home (Bao, 2020). There were numerous impacts of COVID-19 on students' mental and emotional health (De Oliveira Arauioal, 2020), making them more stressed, panicked and tensed due to the increasing burden of online courses, evaluations, submissions, and assignments, seminar presentations and thesis defences (The Guardian, 2020). Not only this, but the admission processes also got delayed. The global education opportunities have also been stranded as students studying in foreign countries are returning to India due to the shut down of international universities for an undefined period. The decline in global higher education is one of the grave problems caused by COVID-19.

The recruitments are postponed, and placements of the final year students got badly affected as companies are delaying the on board of the students. The picture gets more imperfect due to increasing statistics of unemployed people as many lost their jobs due to closure of industries or are sent to paid leaves for infinite times. The unemployment rate has raised to 8.4% as reported by The Centre for Monitoring

Economy (Educationasia.in). The admission rate to various educational institutions has drastically lowered down since people are struggling for basic needs. The global employment opportunities are paused due to lockdown restrictions overseas. Also, many Indian have returned to India after losing jobs due to COVID-19. Parents who have lost their jobs are finding it difficult to pay huge fees for continuing the education of their wards. The Government of India has launched a mid-day meal scheme in schools to provide nourishment to the children coming to school and boost up school enrolment in tribal areas and low-income groups. But the school closure has led to loss of nutrition for such children leading to problems of malnutrition.

It is also said that in every crisis, is hidden an opportunity. COVID-19 also has created so many opportunities for the education sector too. The onset of the pandemic was quick and gave no time for preparation to anyone. Still, with time, the educational institutions in India well equipped themselves to provide seamless support services to the learners. It was also a transition from a conventional educational system to a new educational system hallmarked with online teaching, remote teaching and blended classrooms, etc. The educational institutions provide proper training to the teachers to efficiently equip them for online teaching, and pandemic times have triggered the adoption of digital technologies in education. The opportunities took the face of digitised pedagogies ornamented with buzz words like e-classroom, virtual classroom, e-content, e-assessment, e-discussion forums, e-tutorials etc.

The new learning environments are created by online education, concentrating on the accessibility of education for all and enriching learners with numerous skills, attitudes, professional aptitudes and competencies (Vlachopoulos et al., 2012). The opportunities are not only for the educational institutions and stakeholders but also for the private companies that are into developing Learning Management Systems, tools and techniques for online delivery for the educational institutions (Mishra, 2020). There is an increase in online meetings, virtual conferences and webinars opportunities. Collaborative teaching and learning opportunities are new forms of teaching opportunities where educational and research collaborations are witnessed worldwide amongst faculty members of different nations (Mishra, 2020).

There is a rise in digital literacy among people as a pandemic crisis has encouraged them to learn and use digital technology. Sharing of information, knowledge, course content, queries and learning material is done through various electronic channels like e-mails, e-discussion forums, SMS, WhatsApp, online platforms like Zoom, Google Classroom etc. There are opportunities for learners to study online from other countries' institutions and thus receive worldwide exposure. The demand for the Open and Distance Learning has increased providing learning from multiple resources at self-pace.

DISCUSSION

Numerous challenges and problems were faced by the teachers while tutoring from home on various digital platforms. The home environment does not suit delivering online lectures effectively due to multiple reasons like unwanted noises, household chores, visiting relatives, children at home, and family interference that ruins the classroom discipline and sense of commitment, which is the foremost ingredient in quality teaching. The continuity of online teaching and learning at the home environment is adversely affected due to persistent external distractions caused by noisy surroundings (Press Trust of India, 2020). It is imperative to develop a well-equipped proper setup devoid of any external or family disturbance to impart remote teaching efficiently.

The significant role of educational institutions to provide proper infrastructure and resources for supporting teaching and learning can not be denied. Online teaching becomes smooth and easy in the institutions where the faculty has been well trained, resourceful, and equipped with technical knowledge & assistance and sound institutional infrastructure. The challenges are gross for the teachers where the institutions don't have a suitable teaching environment without the provision of any teacher training facilities and technological assistance. And the COVID-19 crisis has witnessed that the Higher Educational Institutions in India are unable to handle online teaching adequately (Mahesh, 2020; Azevedo et al., 2020) and are facing financial challenges due to unexpected costs and decrease revenue generation because of increasing cancellation of admissions of national and international students and refund of fees & other charges (The NCSL Podcast, 2020; Rosowsky, 2020). There is need of strong leadership that brings out creative solutions to current concerns to survive in crisis times (Deloitte, 2020).

The selection of a suitable online platform for the effective delivery of online teaching is a severe problem the teachers feel because of the data issues, security issues and virus & phishing attacks. In addition to this, the internet connectivity issues, power cuts, and improper hardware & software aggravate the problem (Shenoy et al., 2020), leading to the development of negative attitudes amongst teachers towards remote teaching. Thus, it is evident that these problems and issues need to be addressed to bring in quality in remote teaching. Also, there must be some recognition and rewards for the teachers to encourage them and boost up their morale.

It is obvious that remote teaching is not a replacement for conventional face to face teaching, but its significant role can not be underestimated. Digital technology helps improve quality of teaching and learning, but it can only act as a

complementary role to imparting education like in blended mode, not be taken as a fully online education system (Tan, 2020). This paper clearly projects the strengthening of the education system by integrating technology backed up by the constant and full support from the government, educational institutions and stakeholders. The institution must have a well-equipped technological infrastructure dedicated to imparting digitally–supported education in real and virtual setup. Teachers must be fully trained in developing the e-content, operations of the institutional Learning Management Systems, effective e-delivery of the course content, blended instructional strategies and digitally confident. The National Education Policy (2020) has been drafted by the Ministry of Human Resources and Development, Government of India, focussing upon online delivery for the enrichment of teaching and learning. It is also proposed to dedicate the funds for the development of EdTechs like LMS, Moodle, Microsoft Teams etc. by the Higher Educational Institutions. Big data, 3D printing, Artificial Intelligence, Robotics and Virtual Reality etc. are the tools proposed to be adopted in advanced future education (MHRD, 2020c).

CONCLUSION

There is no denying the fact that Indian Education System has been hugely affected by the COVID-19 pandemic. The effect is bilateral – there are challenges and opportunities as well due to the crisis. There is an upsurge in the usage of digital technologies that are integrated to the delivery of Open and Distance Learning due to numerous initiatives taken by the Indian government and certain private sectors. It is undoubtedly a boon for the students who can avail such facilities of receiving remote education at their homes during pandemic times but not every child is privileged to afford this type of education. The educational institutions, the government bodies and private organisations are trying effortlessly to resolve this issue and to take education to every home. It is high time when educational institutions should strengthen their digital infrastructure to combat such issues in future, too, if a similar situation arises. There must be innovative and creative strategies for the uniform accessibility of online education across the nation.

The concept of "work from home" is getting more relevant in the present crisis and has laid an urgent need to strive harder towards maximum utilisation of digital platforms by the students for academic purposes and equipping themselves to fit in technical ecosystems in the future. There must be studies on the best practices from the world in the education sector during pandemic times, and the adoption of the most suitable pedagogical strategies must be done. This new online teaching-learning system must be properly evaluated and monitored so as to undertake its outcome assessment in terms of students' learning and provide an insight on the gap areas that are needed to improve upon. The remote teaching, synchronous and asynchronous modes of teaching must be blended in the future education system for the benefit of students.

Practical Implications

The present study is beneficial for the Higher Educational Institutions planning to adopt online teaching and learning as a regular mode in future education. The known challenges and issues can be resolved in advance and a blueprint of the hurdle-free online teaching-learning system can be prepared. The assessment and examination system must be reformed and teachers must be fully supported and trained to deal with such challenges in the future.

SUGGESTIONS

To erase the digital gap between rich and poor, the government should work on creating a conducive digital environment for all where there is sustainable access to online education by all during the pandemic period. The policies must be formed, and strategies be developed for deployment of the funds to universalise digital education to everyone across the nation. The government should provide the internet facilities at the remotest areas and free learning gadgets. There must be instant planning and execution on the matters related to increasing unemployment due to COVID-19. Action must be taken to reduce the impact of pandemic on recruitment and hiring processes. Collaborative efforts are needed from the government, private companies and HEIs to solve the problem of technical infrastructure.

The significant importance of technology in the co-creation of educational systems and technologies is all discernible. Thus, the Higher Educational Institutions must revise and upgrade their existing strategies, procedures and infrastructure for the implementation of technology-driven teaching-learning sessions and assessments. Blended teaching and flipped classrooms must be encouraged. Teachers must be trained to embrace EdTech for sustainable future education. They must register themselves into courses that guide them on the successful execution of online teaching and assessment. Not only this, they must continuously upgrade their knowledge and skill related to technology-driven education systems. There must be the provision of funds from the institutions for faculty enrolling into such courses.

With the proliferation of numerous online programmes on the same subject offering variance in the teaching methodology, course delivery, and assessment, there is a need to have quality checks. It is suggested to establish Quality Assurance Mechanisms that benchmark online teaching. There must be proper adherence of the guidelines given by the government during the opening of the educational

institution.

LIMITATIONS AND FUTURE SCOPE

The present study has highlighted the challenges and the opportunities posed by the pandemic in the education sector in India. As the topic is too novel, related literature is scarce in the Indian context. Further research can be undertaken by studying the students' perspective and on techniques and tools to enhance student participation and engagement in the online virtual learning environment. This study is based upon the critical analysis of previous studies done in other nations that may show variation in results in the Indian education ecosystem, and so, it is suggested to study the management, educational organisations and stakeholders perception, expectation and experiences related to online teaching and learning in India.

REFERENCES

Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers and Education, 53*(3), 575-590.

Arora, A. K., & Srinivasan, R. (2020). Impact of pandemic COVID-19 on the teaching-learning process: A study of higher education teachers. *Prabandhan: Indian Journal of Management, 13*(4), 43-56.

Retrieved August 23, 2020, from https://static.pib.gov.in/WriteReadData/userfiles/NEP_Final_English_0.pdf

Azevedo, J. P., Hasan, A., Goldemberg, D., Iqbal, S. A., & Geven, K. (2020). Simulating the potential impacts of COVID-19 school closures on schooling and learning outcomes: A set of global estimates.

Bao, W. (2020). COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies, 2*(2). doi: 10.1002/hbe2.191

Berge, Z. L., & Mrozowski, S. E. (1999). *Barriers to online teaching in elementary, secondary, and teacher education.* UMBC Faculty Collection.

Buabeng-Andoh, C. (2012). Factors influencing teachers adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using ICT, 8*(1).

Chen, R. J. (2010). Investigating models for preservice teachers' use of technology to support student-centered learning. *Computers and Education, 55*(1), 32-42.

COVID-19 and Subsequent Lockdown. Retrieved June 16, 2020, from https://pib.gov.in/PressReleasePage.aspx?PRID=1619368

De Oliveira Araujo, F., De Lima, L., Cidade, P., Nobre, C., & Neto, M. (2020). Impact of Sars-Cov-2 and its reverberation in global higher education and mental health. *Psychiatry Research, 288*. doi: 10.1016/j.psychres.2020.112977

Deloitte. (2020). COVID-19's impact on higher education: Strategies for tackling the financial challenges facing colleges and universities. Retrieved June, 14, from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/public-sector/us-gps-covid-19-impact-on-higher-education.pdf

Duffy, C., & Kent, L. (2020). Parents reflect on homeschooling as teachers voice fears about schools during coronavirus pandemic. Retrieved May 2, 2020, from www.abc.net.au/news/2020-04-26/coronavirushomeschooling- remote-learning-public-private-schools/12177112

Gratz, E., & Looney, L. (2020). Faculty resistance to change: an examination of motivators and barriers to teaching online in higher education. *International Journal of Online Pedagogy and Course Design (Design,), 10*(1), 1-14.

Guardian. (2020). Universities. Retrieved May 10, 2020, from //www.theguardian.com/education/universities

Haber, J., & Mills, M. (2008). Perceptions of barriers concerning effective online teaching and policies: Florida community college faculty. *Community College Journal of Research and Practice, 3*2(4-6), 266-283.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *EDUCAUSE Review.* Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Hua, J., & Shaw, R. (2020). Corona virus (COVID-19) 'infodemic' and emerging issues through a data lens: The case of China. *International Journal of Environmental Research and Public Health, 17*(7), p. 2309, doi:10.3390/ijerph17072309

Joshi, A., Vinay, M., & Bhaskar, P. (2020). Impact of coronavirus pandemic on the Indian education sector: perspectives of teachers on online teaching and assessments. *Interactive Technology and Smart Education*.

Kaup, S., Jain, R., Shivalli, S., Pandey, S., & Kaup, S. (2020). Sustaining academics during COVID-19 pandemic: the role of remote teaching-learning. *Indian Journal of Ophthalmology, 68*(6), p. 1220.

Keelery, S. (2020). India – estimated economic impact of COVID-19 by sector 2020 j Statista. Retrieved June 16, 2020, from www.statista.com/statistics/1107798/india-estimated-economic-impact-of-coronavirusby- sector/

Keengwe, J., Onchwari, G., & Wachira, P. (2008). The use of computer tools to support meaningful learning. *AACE Journal, 16*(1), 77-92.

Lall, S., & Singh, N. (2020). COVID-19: Unmasking the new face of education. *International Journal of Research in Pharmaceutical Sciences (SPL),* No. 1, 48-53.

Learning platforms – Shri Ramesh Pokhriyal 'Nishank' pib.gov.in., Retrieved June 16, 2020, from https://pib.gov.in/PressReleasePage.aspx?PRID=1607521

Lloyd, S. A., Byrne, M. M., & McCoy, T. S. (2012). Faculty-perceived barriers of online education. *Journal of Online Learning and Teaching, 8*(1).

Mahesh, S. (2020). A need now but no replacement: Teachers share concerns about online classes during COVID-19 [Web log post]. Retrieved from www.newindianexpress.com/education/2020/may/06/a-neednow-but-no-replacement-teachers-share-concerns-about-online-classes-during-covid-19-2139605.html

MHRD. (2020a). Students to continue their learning by making full use of the available digital e-Learning platforms.

MHRD. (2020b). *UGC guidelines on examinations and academic calendar for the universities in view of the COVID-19 pandemic*. University Grants Commission.

MHRD. (2020c). National education policy 2020. In Press Information Bureau, (pp. 33-49).

Mishra, S. V. (2020, June 3). COVID-19, online teaching, and deepening digital divide in India. *SocArXiv.*.

Peralta, H., & Costata, F. A. (2007). Teachers's competence and confidence regarding the use of ICT. *Sísifo-Educational Sciences Journal,* 75-84.

Jena, P. K. (2020a). Challenges and opportunities created by COVID-19 for ODL: A case study of IGNOU. *International Journal for Innovative Research inMultidisciplinary Filed*, *6*(5), 217-222.

Jena, P. K. (2020b). Online learning during lockdown period for COVID-19 in India. *International Journal of Educational Research*, *9*(5(8)), 82-92.

Prottas, D. J., Cleaver, C. M., & Cooperstein, D. (2016). Assessing faculty attitudes towards online instruction: A motivational approach. *Online Journal of Distance Learning Administration, 19*(4).

Punit, I. S., & qz.com (2020). For many of India's teachers, online classes amid lockdown have been an awful experience. Scroll.in, Retrieved August 23, 2020, from, https://scroll.in/article/961738/for-many-of-indias-teachers-online-classes-amid-lockdown-have-been-an-awful-experience

QS-ERA (2020). COVID-19: A wake-up call for Indian internet service providers. Retrieved August 23, 2020, from www.igauge. in or www.igauge.in/news/2020/4/covid-19-a-wake-up-call-for-indian-internet-service-providers

Rosowsky, D. (2020). Four ways COVID-19 is hurting higher education and why that matters. Retrieved June 14, 2020, from, www.forbes.com/sites/davidrosowsky/2020/05/04/four-ways-covid-19-is-hurtinghigher- education-and-why-that-matters/#63c2c9b459f1

Sharma, A. K. (2020). COVID-19: Creating a paradigm shift in India's education system. *Economic Times Blog.* Retrieved July 31, 2020, from https://economictimes.indiatimes.com/blogs/et-commentary/covid-19- creating-a-paradigm-shift-in-indias-education-system/

Shaw, R., Kim, Y. K., & Hua, J. (2020). Governance, technology and citizen behavior in pandemic: Lessons from COVID-19 in east Asia, in progress in disaster science. *Progress in Disaster Science, 6.* doi: 10.1016/j.pdisas.2020.100090

Shelley, D., & Ashish, D. (2020). An investigation into research trends of massive open online courses (MOOCS). *International Journal of Hospitality & Tourism Systems*, *13*(2), 17-28.

Shenoy, V., Mahendra, S., & Vijay, N. (2020). COVID-19 lockdown technology adaption, teaching, learning, students engagement and faculty experience. *Mukt Shabd Journal, 9*(4), 698-702.

Stoffregen, J. D., Pawlowski, J. M., Ras, E., Tobias, E., Ščepanovic, S., Fitzpatrick, D., Mehigan, T., Steffens, P., Przygoda, C., Schilling, P., & Friedrich, H. (2016). Barriers to open e-learning in public administrations: A comparative case study of the European countries Luxembourg, Germany, Montenegro. *Technological Forecasting and Social Change, 111,* 198-208.

Sutherland, S. (2014). Team teaching: four barriers to native English speaking assistant teachers' ability to model native English in Japanese classrooms. *Asian EFL Journal: Quarterly Journal, 16*(2), 156-180.

Tan, A. (2020). Zoom is your new classroom: Will online education become the norm after COVID-19? Retrieved June 14, 2020, from www.msn.com/en-my/news/other/zoom-is-your-new-classroom-will-onlineeducation-become-the-norm-after-covid-19/ar-BB15myku

Taylor, C. R. (2002). E-learning: The second wave. *T and D, 56*(10), 24-31.

The Guardian. (2020). UK universities face cash black hole amid coronavirus crisis. Retrieved June 14, 2020, from www.theguardian.com/education/2020/mar/06/uk-universities-face-cash-black-hole-coronavirus-crisis

The NCSL Podcast. (2020). Higher education responses to coronavirus (COVID-19). Retrieved June 14, 2020, from www.ncsl.org/research/education/higher-education-responses-to-coronavirus-covid-19.aspx

UNESCO. (2020). COVID-19 educational disruption and response, UNESCO. Retrieved June 16, 2020, from https://en.unesco.org/covid19/educationresponse

Verma, G. Campbell, T.Melville,W., & Park, B. Y. (2020). Science teacher education in the times of the COVID-19 pandemic.

Vlachopoulos, D., Sangrà, A., & Cabrera, N. (2012). The conceptual framework of e-learning: A view from inside. *The International Journal of Learning: Annual Review, 18*(4), 93–104. doi:https://doi.org/10.18848/1447-9494/CGP/v18i04/47573

WHO (2020), COVID 19 Public health emergency of international concern: global research. https://www.who.int/health-topics/coronavirus#tab=tab_1

Yuen, A. H., & Ma, W. W. (2008). Exploring teacher acceptance of e-learning technology. *Asia-Pacific Journal of Teacher Education,* 36(3), 229-243.