THE CHANGING CONTOURS OF ONLINE LEARNING IN INDIA: A CRITICAL STUDY

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ABSTRACT

Online learning is the latest addition in the realm of education in the world including India. Though this initiative was continuing for a long time in the past, the COVID-19 pandemic starting from the year 2020 gave an unprecedented fillip to this phenomenon. The increased availability of the computers, android mobile phones, and the expanding Internet network in the far-flung areas of the country made it possible for the students to study at home in e-learning mode. This method proved to be a boon to the teaching and student community both as the schools were closed due to the pandemic. There appeared several means and methods to spread education and learning in virtual mode. However, in the Indian context it has not been an easy task. There is a clear digital divide between the rural and urban populace. Moreover, the expansion of the Internet is not complete yet. There are many more things to consider. This paper deals with the process and growth of e-learning in India and suggests solutions to enhance the scope of virtual education in the Indian context.

Keywords: E-Learning, Internet, Computers, Online Mode, Digital Content

INTRODUCTION

The concept of traditional education has undergone a radical change during the last two decades in India. Online education has long been viewed as an alternative means to achieve the goals of universal literacy and higher learning. This could become possible with the inception of a new technological era which may be conveniently termed as the "Age of Internet and Computers". This has largely helped in augmenting the reach of education to those who are not capable of affording traditional education systems due to multiple reasons. Thus, online education has not replaced the old classroom style of teaching, yet it has supplemented the old system. Though the process of online learning was primarily meant to be used in the field of higher education, the COVID-19 pandemic has enlarged its scope to school-going children also. The sudden upsurge of this menace has dealt a lethal blow to existing educational systems all over the world. UNESCO has estimated that the education of more than 1.6 billion students in more than 190 countries were disrupted in 2020 and not even half of them have returned to the classrooms even after a whole year.[1]   In India also, the situation was disconcerting. Around 300 million children across all age groups are reported to be out of school in India now. This number is of the period when all schools were closed.[2] Since the countries are still reeling under the pressure of second, third or fourth wave of COVID-19, the situation is not clear about the full resumption of the old classroom system of education in the near future.

Barbara B. Lockee, in her paper, avers that the use of "varied delivery modes" have a long history in education. Both mechanical, and later electronic teaching machines have provided individualized learning programmes since the 1950s. B.F. Skinner, in his works, proposed using technology to walk individual learners 'through carefully designed sequences of instruction with immediate feedback indicating the accuracy of their response'. His notions laid the foundations of the first formalized representations of 'programmed learning' or 'designed learning' experiences. In the 1960s afterwards, Fred Keller developed a personalized system of instructions, in which students first went through assigned course materials on their own. That was followed by one-on-one assessment sessions with a tutor, gaining permission to move ahead only after demonstrating mastery of the instructional material. In the process, occasional class meetings were held to discuss concepts, answer questions and provide opportunities for social interaction.[3] However, in regard to the first Massive Online Course in history, there is no unanimity among the experts. A massive open online course consists of four critical features, namely, (i) it must be massive; (ii) it must be open; (iii) it must be online, and (iv) it

must be academic. Both the terms massive and open have no specific definitions, and are subject to different interpretations. One of the first and most accepted Massive Open Online Course (MOOC) which is in accordance with these parameters was the course "Artificial Intelligence" by Sebastian Thrun and Peter Norvig from Stanford University in 2011. More than 160,000 people from around the world signed up to learn this course jointly. It was the first time that an online course was so well-received by the students in a large number. Sebastian Thrun, encouraged by this success, teamed up with other partners to start an online learning platform UDACITY in 2011. In 2012, the online platform Coursera was founded. Media later termed 2012 as the Year of MOOC. Against the high expectations that online courses will soon make university redundant, education globally will be accessible and even free, the financial model of MOOC never got going, and most platforms were in the struggle phase before the advent of COVID-19.[4]

ONLINE LEARNING AND THE COVID-19 PANDEMIC

Prior to the onset of COVID-19 pandemic in 2020, various innovations in the field of education had occurred to make the universal adoption of remote learning a near possibility. The pandemic brought into its wake many challenges which needed out of the box solutions in the field of education. Online learning was a fair alternative but the difficulties on the way were enormous. First, there was a major challenge of access. In rural areas, in particular, there was the lack of Internet connectivity in some locations. Also, the competing needs among family members for the use of home technology was also present. However, creative solutions emerged to tide over the problems. 'For example, school buses have been used to provide mobile hotspots, and class packets have been sent by mail. Instructional presentations were aired on local public broadcasting stations'.[5] The same year, 2020, witnessed the enhanced availability and adoption of electronic resources and activities that can now be integrated into online learning experiences. Synchronous online conferencing systems, such as Zoom and Google Meet, have enabled the experts globally to join online classrooms and have allowed presentations to be recorded for individual learners to watch at their most convenient time. As a consequence, the capacity to serve learners of all ages has now been established in an effective manner. Further, innovations such as virtual field trips and virtual labs have seen the light of the day, keeping in view the importance of hands-on, experiential learning. Online

education can, thus, move from serving adult learners and higher education to young learners, in primary and secondary education and from ages 15-18.[6] In fact, the growth of online education in the COVID-19 pandemic period has so far blurred the lines between traditional and distance education. "Less single mode, more multi-mode (and thus educator choices) is becoming the norm due to enhanced infrastructure and developed skill sets that allow people to move across different delivery systems"[7]

THE INDIAN EXPERIENCE

Pre-COVID-19 period

In order to extend the scope of literacy and knowledge in the country, the Government of India has launched several initiatives which can be enumerated as under:

(i) Digital Literacy

Two schemes were introduced in 2014 by the central government to extend the reach of digital literacy to the masses. The first one, "Scheme for IT Mass Literacy", National Digital Literacy Mission, was aimed to train 10 lakh persons. Digital empowerment of citizens by providing universal digital literacy forms an integral part of the Digital India initiative of the Government of India. Keeping this in view, a scheme entitled "Digital Saksharta Abhiyan" (DISHA) was approved to make 42.5 lakh persons digitally literate in selected households throughout the country. Similarly, another scheme, "Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) was approved by the central government to usher in digital literacy in rural India by covering 6 crore rural households (one person per household) by 2019.[8]

(ii) Technology Enabled Learning

The Department of Higher Education, Ministry of Human Resource Development is administering the National Mission on Education through Information and Communication Technology (NMEICT) Scheme to leverage the potential of ICT, in teaching and learning process for the benefit of the learners in higher education institutions in anytime, anywhere mode. The three cardinal principles of Education Policy are access, equity and quality could be well taken care of by providing connectivity to all colleges and universities, providing low

cost and affordable access-cum computing devices to students and teachers and providing high quality e-content free of cost to all learners in the country. NMEICT Scheme covers all three elements. Content generation and providing connectivity along with provision for access devices for institutions and learners are the two major components of NMEICT Scheme. It seeks to bridge the digital divide. On one hand, there exists a gap in the skills to use computing devices for the purposes of teaching and learning among urban and rural teachers as well as learners in the domain of higher education. At the same time, there is a need to empower those who have remained untouched by the digital revolution and are unable to join the mainstream of the knowledge economy. NMEICT Scheme aims at bridging this gap and it plans to focus on appropriate pedagogy for e-learning and providing facilities for performing experiments through virtual laboratories. Besides that, it also focuses on online testing and certification, online availability of teachers to guide and mentor learners, utilization of available Education Satellite (EDUSAT) and Direct to Home (DTH) platforms, training and empowerment of teachers to effectively use the new method of teaching learning etc. Furthermore, a one stop education portal, Sakshat (www.sakshat.ac.in) is envisaged to facilitate lifelong learning of the students, teachers and employed personnel or those who are in the pursuit of knowledge free of cost. This portal is expected to be the main delivery platform for the contents developed under the NMEICT Scheme. INFLIBNET has undertaken this task of creating a one stop e-content portal for easy access to all the contents developed under the mission.[9]

(iii) National e-Library

The National Digital Library is envisaged as a National knowledge asset. It is to provide a ubiquitous digital knowledge source which will support and enhance education, research and innovation catering to the needs of all the learners in the country. Its aim is to develop and provide efficient access to various learners irrespective of their backgrounds, expectations and languages.[10]

(iv) e-Pathshala

NCERT books are available free in digital version on e-pathshala app. Lakhs of students have downloaded this app and many more have visited this app.[11]

(v)   SWAYAM-Study Webs of Active-Learning for Young Aspiring Minds

SWAYAM is a Massive Open Online Course (MOOC) initiative on a national platform with a comprehensive academic structure. This integrated platform is designed to offer courses in engineering, humanities and social science etc. to be used by learners at large. It also envisages the formation of a Consortium of premier educational institutions and universities to offer flipped online courses, once the necessary conditions like due authentication and award of certification are fulfilled, instantaneously. All the courses are interactive, prepared by the best teachers in the country that can be accessed without any fee by the learners anywhere. More than 1000 especially chosen faculty and teachers across the country have participated in formulation of these courses. The courses hosted on SWAYAM are in four quadrants, namely, (i) video lectures; (ii) specially prepared reading material that can be downloaded/printed; (iii) self-assessment tests through tests and quizzes; and (iv) online discussion forum for clearing the doubts. Further, steps have been taken to enrich the learning experience by using audio-video and multi-media and state-of-the-art technology. However, learners have to register themselves for the final proctored programme that comes at a fee and attend in-person at designated centres on specified dates, to get a SWAYAM certificate. Eligibility for the certificate is announced on the course page and learners get certificates, in case the desired criteria match. Universities and colleges approving credit transfer for these courses can use the marks/certificate obtained in these courses for the same.[12] SWAYAM hosts 1,900 complete courses including teaching videos, computer weekly assignments, examinations and credit centres, aimed both at school (Classes 1 to 12) and higher education. SWAYAM Prabha is a group of 32 direct to home channels devoted to the telecasting of educational programmes.[13]

Post-COVID-19 Endeavours

(vi) In March 2020, the Ministry of Human Resource Development started sharing free e-learning platforms. They included the Diksha portal which has e-learning content aligned to the curriculum, and e-Pathshala, an app by the National Council of Educational Research and Training (NCERT) for Classes 1 to 12 in multiple languages.[14]

(vii) The unprecedented Corona pandemic has given birth to innovations also. According to Mr. Dharmendra Pradhan, Union Minister of Education and Skill Development stated that "A number of innovative models came up during the pandemic. Based on the principle that

technology is an equaliser and enabler, the Union Budget made provisions for 200 new TV channels for education dissemination, allocating about Rs. 930 crore in five years. The current budget has also made provisions for digital teachers with an allocation of Rs.6 crore."[15]

(viii) In September 2021, in line with National Education Policy (NEP), NITI Aayog partnered with edutech giant Byju's, to provide free access to its tech-driven learning programmes to students of Classes 6-12 in government schools across 112 "Aspirational Districts". Under the initiative, BYJU's will also provide "free" coaching classes to over 3,000 "meritorious" students of Classes 11 and 12, offered by Aakash Institute, for engineering and medical entrance examinations.[16]

(ix) National Education Policy, 2020

The National Education Policy, 2020 and the "Concept Note on Blended Learning" which UGC brought out in May 2020, both leave enough room for online learning. It would be worth mentioning here the relevant provisions of this policy regarding online and digital education:

23. Technology Use and Integration

23.1. India is a global leader in information and communication technology and in other cutting-edge domains, such as space. The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bidirectional.

23.2. Given the explosive pace of technological development allied with the sheer creativity of tech savvy teachers and entrepreneurs including student entrepreneurs, it is certain that technology will impact education in multiple ways, only some of which can be foreseen at the present time. New technologies involving artificial intelligence, machine learning, block chains, smart boards, handheld computing devices, adaptive computer testing for student development, and other forms of educational software and hardware will not just change what students learn in the classroom but how they learn, and thus these areas and beyond will require extensive research both on the technological as well as educational fronts.

23.3. Use and integration of technology to improve multiple aspects of education will be supported and adopted, provided these interventions are rigorously and transparently evaluated in relevant contexts before they are scaled up. An autonomous body, the National Educational Technology Forum (NETF), will be created to provide a platform for the free exchange of ideas on the use of technology to enhance learning, assessment, planning, administration, and so on, both for school and higher education. The aim of the NETF will be to facilitate decision making on the induction, deployment, and use of technology, by providing to the leadership of education institutions, State and Central governments, and other stakeholders, the latest knowledge and research as well as the opportunity to consult and share best practices. The NETF will have the following functions: National Education Policy 2020 57 a) provide independent evidence-based advice to Central and State Government agencies on technology-based interventions; b) build intellectual and institutional capacities in educational technology; c) envision strategic thrust areas in this domain; and d) articulate new directions for research and innovation.

23.4. To remain relevant in the fast-changing field of educational technology, the NETF will maintain a regular inflow of authentic data from multiple sources including educational technology innovators and practitioners and will engage with a diverse set of researchers to analyze the data. To support the development of a vibrant body of knowledge and practice, the NETF will organize multiple regional and national conferences, workshops, etc. to solicit inputs from national and international educational technology researchers, entrepreneurs, and practitioners.

23.6. A rich variety of educational software, for all the above purposes, will be developed and made available for students and teachers at all levels. All such software will be available in all major Indian languages and will be accessible to a wide range of users including students in remote areas and Divyang students. Teaching-learning e-content will continue to be developed by all States in all regional languages, as well as by the NCERT, CIET, CBSE, NIOS, and other bodies/institutions, and will be uploaded onto the DIKSHA platform. This platform may also be utilized for Teacher 's Professional Development through e-content. CIET will be strengthened to promote and expand DIKSHA as well as other education technology initiatives. Suitable equipment will be made available to teachers at schools so that teachers can suitably

integrate e-contents into teaching-learning practices. Technology-based education platforms, such as DIKSHA/SWAYAM, will be better integrated across school and higher education, and will include ratings/reviews by users, so as to enable content developers to create user friendly and qualitative content.

23.8. This policy has been formulated at a time when an unquestionably disruptive technology - Artificial Intelligence (AI) 3D/7D Virtual Reality - has emerged. As the cost of AI-based prediction falls, AI will be able to match or outperform and, therefore, be a valuable aid to even skilled professionals such as doctors in certain predictive tasks. AI's disruptive potential in the workplace is clear, and the education system must be poised to respond quickly. One of the permanent tasks of the NETF will be to categorize emergent technologies based on their potential and estimated timeframe for disruption, and to periodically present this analysis to MHRD. Based on these inputs, MHRD will formally identify those technologies whose emergence demands responses from the education system.

23.9. In response to MHRD's formal recognition of a new disruptive technology, the National Research Foundation will initiate or expand research efforts in the technology. In the context of AI, NRF may consider a three-pronged approach: (a) advancing core AI research, (b) developing and deploying application-based research, and (c) advancing international research efforts to address global challenges in areas such as healthcare, agriculture, and climate change using AI.

23.11. Universities will aim to offer Ph.D. and Masters programmes in core areas such as Machine Learning as well as multidisciplinary fields "AI + X" and professional areas like health care, agriculture, and law. They may also develop and disseminate courses in these areas via platforms, such as SWAYAM.

23.13. Data is a key fuel for AI-based technologies, and it is critical to raise awareness on issues of privacy, laws, and standards associated with data handling and data protection, etc. It is also necessary to highlight ethical issues surrounding the development and deployment of AI-based technologies. Education will play a key role in these awareness raising efforts. Other disruptive technologies that are expected to change the way we live, and, therefore, change the way we

educate students, include those relating to clean and renewable energy, water conservation, sustainable farming, environmental preservation, and other green initiatives; these will also receive prioritized attention in education.

24. Online and Digital Education: Ensuring Equitable Use of Technology

24.1. New circumstances and realities require new initiatives. The recent rise in epidemics and pandemics necessitates that we are ready with alternative modes of quality education whenever and wherever traditional and in-person modes of education are not possible. In this regard, the National Education Policy 2020 recognizes the importance of leveraging the advantages of technology while acknowledging its potential risks and dangers. It calls for carefully designed and appropriately scaled pilot studies to determine how the benefits of online/digital education can be reaped while addressing or mitigating the downsides. In the meantime, the existing digital platforms and ongoing ICT-based educational initiatives must be optimized and expanded to meet the current and future challenges in providing quality education for all.

24.2. However, the benefits of online/digital education cannot be leveraged unless the digital divide is eliminated through concerted efforts, such as the Digital India campaign and the availability of affordable computing devices. It is important that the use of technology for online and digital education adequately addresses concerns of equity.

24.3. Teachers require suitable training and development to be effective online educators. It cannot be assumed that a good teacher in a traditional classroom will automatically be a good teacher in an online classroom. Aside from changes required in pedagogy, online assessments also require a different approach. There are numerous challenges to conducting online examinations at scale, including limitations on the types of questions that can be asked in an online environment, handling network and power disruptions, and preventing unethical practices. Certain types of courses/subjects, such as performing arts and science practical have limitations in the online/digital education space, which can be overcome to a partial extent with innovative measures. Further, unless online education is blended with experiential and activity-based learning. It will tend to become a screen-based education with limited focus on the social, effective and psychomotor dimensions of learning.

24.4. Given the emergence of digital technologies and the emerging importance of leveraging technology for teaching-learning at all levels from school to higher education, this Policy recommends the following key initiatives:

Pilot Studies for Online Education

Appropriate agencies, such as the NEFT, CIET, NIOS, IGNOU, IITs, NITs, etc. will be identified to conduct a series of pilot studies, in parallel, to evaluate the benefits of integrating education with online education while mitigating the downsides and also to study related areas, such as, student device addiction, most preferred formats of e-content, etc. The results of these pilot studies will be publicly communicated and used for continuous improvement.

- Digital infrastructure: There is a need to invest in creation of open, interoperable, evolvable, public digital infrastructure in the education sector that can be used by multiple platforms and point solutions, to solve for India's scale, diversity, complexity and device penetration. This will ensure that the technology-based solutions do not become outdated with the rapid advances in technology.

- Online teaching platform and tools: Appropriate existing e-learning platforms such as SWAYAM, DIKSHA, will be extended to provide teachers with a structured, user-friendly, rich set of assistive tools for monitoring progress of learners. Tools, such as, two-way video and two way-audio interfaces for holding online classes are a real necessity as the present pandemic has shown.

- Addressing the digital divide: Given the fact that there still persists a substantial section of the population whose digital access is highly limited, the existing mass media, such as television, radio, and community radio will be extensively used for telecast and broadcasts. Such educational programmes will be made available 24/7 in different languages to cater to the varying needs of the student population. A special focus on content in all Indian languages will be emphasized and required; digital content will need to reach the teachers and students in their medium of instruction as far as possible.

- Virtual Labs: Existing e-learning platforms such as DIKSHA, SWAYAM and SWAYAMPRABHA will also be leveraged for creating virtual labs so that all students have equal access to quality practical and hands-on experiment-based learning experiences. The possibility of providing adequate access to SEDG students and teachers through suitable digital devices, such as tablets with pre-loaded content, will be considered and developed.

- Training and incentives for teachers: Teachers will undergo rigorous training in learner-centric pedagogy and on how to become high-quality online content creators themselves using online teaching platforms and tools. There will be emphasis on the teacher's role in facilitating active student engagement with the content and with each other. National Education Policy 2020 60

- Online assessment and examinations: Appropriate bodies, such as the proposed National Assessment Centre or PARAKH, School Boards, NTA, and other identified bodies will design and implement assessment frameworks encompassing design of competencies, portfolio, rubrics, standardized assessments, and assessment analytics. Studies will be undertaken to pilot new ways of assessment using education technologies focusing on 21st century skills.

- Blended models of learning: While promoting digital learning and education, the importance of face-to-face in-person learning is fully recognized. Accordingly, different effective models of blended learning will be identified for appropriate replication for different subjects.

- Laying down standards: As research on online/digital education emerges, NETF and other appropriate bodies shall set up standards of content, technology, and pedagogy for online/digital teaching-learning. These standards will help to formulate guidelines for e-learning by States, Boards, schools and school complexes, HEIs, etc.

24.5 Creating a Dedicated Unit for Building of World Class, Digital Infrastructure, Educational Digital Content and Capacity Technology in education is a journey and not a destination and

capacity will be needed to orchestrate the various ecosystem players to implement policy objectives. A dedicated unit for the purpose of orchestrating the building of digital infrastructure, digital content and capacity building will be created in the Ministry to look after the e-education needs of both school and higher education. Since technology is rapidly evolving and needs specialists to deliver high quality e-learning, a vibrant ecosystem has to be encouraged to create solutions that not only solve India's challenges of scale, diversity, equity, but also evolve in keeping with the rapid changes in technology, whose half-life reduces with each passing year. This centre will, therefore, consist of experts drawn from the field of administration, education, educational technology, digital pedagogy and assessment, e-governance, etc."[17]

Thus, the new National Education Policy 2020 holds the key for the advancement of online learning in India through various programmes, schemes and innovative measures. There is no denying the fact that in the future blended or hybrid style of education will remain in the education sector. However, there are some grey areas also in the effective implementation of online learning programmes in India. In this regard, the 16th Annual Status of Education Report (ASER) 2021(Rural) is illustrative of the field realities. According to this report, in the primary education field, there is a stark digital divide.[18] As per the report, the availability of smartphones in rural India was 36.5% in 2018, which increased to 61.8% in 2020 and 67.6% in 2021. Moreover, at least 27.9% households in rural India bought a new smartphone for their children's education this year, as against 9.1% last year. But the report pointed out that smartphone availability didn't translate into access to education. "Although over two-thirds of all enrolled children have a smartphone at home (67.6%), over a quarter of them have no access to it (26.26.1%). There is also a clear pattern by grade, with more children in higher classes having access to a smartphone as compared to children in lower grades."[19]

CONCLUSION

Online education system is gathering momentum worldwide, and also in India. The old classroom style of imparting education is now being supplemented with online learning tools, giving birth to a hybrid system of learning. The COVID-19 pandemic in 2020 heavily contributed to its growth, but the technological advancements, especially the Internet and the computers, proved to be a catalyst in giving shape to this "new normal" of post-COVID era

where online learning phenomenon came as a substitute for the old system. However, challenges are manifold, considering the fact that this hybrid system of education is going to stay in the world, including India. There is an urgent need to improve the hybrid model and develop online educational content. Further, the digital divide between the rural and urban children needs to be tackled in the shortest possible time. In this regard, it is noteworthy that the task of laying optical fiber networks in rural areas has gained momentum, yet a lot more work has to be done in this regard. Though the availability of smartphones has increased to a great extent, over a quarter of them having smartphones are unable to use it for various reasons. This is an alarming situation. In this context, the availability of laptops, tablets and other electronic devices need to be ensured, especially in the rural areas. A wholehearted support to government schools, in particular, for carrying out the online learning schemes on the part of the government is most desirable. Challenges are many and the response has to be swift and significant so that every child gets education by the effective use of the hybrid system, including online education. Till now, the digital initiative was taken in a haphazard manner. Lack of adequate digital infrastructure and ill-equipped teaching faculty proved to be a deterrent in achieving the required progress. Now, the pandemic is almost over, and this is high time to think fast and work diligently to run the system of imparting education in India by using technology to the fullest extent.

REFERENCE

1. Muralee Thummarukudy & Neeraja Janaki, Online Opportunities and Challenges, 593, Manorama Yearbook, 2022.

2. Sunny Sebastian, The blank pages in India's online learning experience, The Hindu, Feb 22, 2021.

3. Barbara B.Lockee, Online education in the post-COVID era, available at https:rdcu.be/cQmU9, accessed on 13.7.7.2022.

4. Muralee Thammarukudi & Neeraja Janaki 594, Manorama Yearbook, 2022.

5. Barbara B.Lockee, Online education in the post-COVID era, available at https:rdcu.be/cQmU9, accessed on 13.7.7.2022.

6. Ibid.

7. Ibid.

8. India 2018, Ministry of Information and Broadcasting,Publications Division, Government of India, p.120.

9. India 2016, 297-298, Publications Division, Ministry of Information and Broadcasting, Government of India.

10. India 2017, 251, Publications Division, Ministry of Information and Broadcasting, Government of India.

11. India 2020,172, Publications Division, Ministry of Information and Broadcasting, Government of India.

12. India 2022, Publications Division,382, Ministry of Information and Broadcasting, Government of India.

13. Sunny Sebastian, The blank pages in India's online learning experience, The Hindu, Feb 22, 2021.

14. Ibid.

15. Dharmendra Pradhan, NEP will restructure the education sector, Hindustan Times, Jun 29, 2022.

16. Express News Service, The Indian Express, Sep 17, 2021, available at https://indianexpress.com/article/india/niti-aayog-ties-up-with-byjus-to-provide-study-material-to-schools-7514119/, accessed on 13.7.22.

17. Available at https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf. Accessed on 14.7.2022.

18. Editorial, Hindustan Times, Nov 19,2021.

19. Fareeha Iftikhar, More phones, but digital divide remains, Hindustan Times, Nov 18, 2021.