

Digital Education Challenges and Opportunities

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Abstract : Online education is existing since 2014 but it becomes the only mode of instruction in 2020 due to the Covid pandemic. The whole world faces a lot of challenges, especially in developing countries. It is because in developing countries technology is confined to metropolitan cities only. A major portion of these countries are still rural and cannot provide the necessary infrastructure for digital education. Even after these challenges, it brings manifold opportunities too. This paper will study the opportunities and challenges faced while providing education in Online Mode from the perspective of students, teachers, and education Institutes/Universities.

Keywords : Digital Education, Online education, Covid-19, Challenges, Opportunities, Recommendations

1. Introduction

Online Education is internet-based education that relies on the internet and other electronic instruments (Computer, Mobile, Tab, Radio, TV, etc.) for interaction and communication between the teacher and students. It can also be termed e-learning, computer-based education, web-based learning, distance education, etc. Online education was initially conceptualized in asynchronous mode from Boston in 1728 through weekly letters. In 1922 the courses are broadcasted on radio as World War one opened opportunities for broadcasting. In 1953, television was used as the medium of education at the University of Houston. The origination of the internet and the World Wide Web opens up new prospects for universities and educational institutes for online education. In 1996 duke University started its first executive MBA program globally. In 2008 first MOOC (Massive Online Open Course) [1] was created and in 2012 Coursera, Udacity, and edX were also launched.

The government of India has also taken many initiatives under the digital-India campaign to promote digital education. These are SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), DIKSHA, e-PG Pathshaala, Swayam Prabha, National Digital Library of India (NDLI), E-Shod Sindhu, National Programme on Technology Enhanced Learning (NPTEL), Virtual Labs, etc.

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Technology is growing exponentially in the 21st century which influenced almost every sector. As per the Economic Times report, the number of internet users will increase by 40% and Smartphone users will be doubled by 2023. Universities are offering one of the courses through the digital domain only. They provide interactive learning models to attract learners. Institutes are gradually introducing digital practices. They have updated their curriculum to introduce new

technologies so that they can deal with modern businesses [2]. Universities and Educational Institutes are shifting from traditional teaching to new age methodologies which are using the current technologies like IOT, Clouds, robotics, nanotechnology, etc. Moreover, many start-ups are coming forward to this sector which further changed the emplacement dynamics too.

Table : Literature Review

Authors	Year		Literature Study		
		Study	Perspective of teachers	Perspective of Students	The perspective of Educational Institutes/Universities
Challenges					
[2]	2020	This study is conducted o investigate the online strategies in Iran to improve the Quality of digital education	<ul style="list-style-type: none">• Become difficult to satisfy the students due to lack of human touch.	<ul style="list-style-type: none">• Dissatisfaction and confusion due to lack of human touch	<ul style="list-style-type: none">• Prmatue shift to online mode of education due to Covid-19 outbreak• Overloading of servers due to large scales users shifts from online to offline mode.
[3]	2020	This study has been conducted in Slovakia on Chemistry Secondary school teachers and students. The teachers used in this study are fully trained and equipped with ICT tools. Their experiences are recorded for digital education	<ul style="list-style-type: none">• Even after training, teachers need regular assistance.• They face problems to meet Student Expectations	<ul style="list-style-type: none">• Students face trouble due to slow internet connection So not able to attend high-Quality videos and meetings.• 33% of students reported problems regarding the speed of lectures and understanding online materials.	<ul style="list-style-type: none">• Provide regular training, support, and assistance.
[4]	2009	In this study, it has been found that Online nursing exhibits unique challenges, such as providing nursing students with online authentic learning experiences that relate to real-world nursing situations,	<ul style="list-style-type: none">• Need Sufficient time to develop Courses• Don't have sufficient Infrastructure	<ul style="list-style-type: none">• Difficult to have real-life experiences as required in nursing education	<ul style="list-style-type: none">• All organizations are cannot afford to provide/maintain the necessary infrastructure that is required for Nursing education
[5]	2014	As per the author, Online teaching cannot be used as an alternative to traditional learning. This is because Soft skill training requires interacting with real people to improve performance. The trainer can collect genuine feedback which helps him for progression	<ul style="list-style-type: none">• Slow internet connection• The faculty/instructor is that they have to restructure the classes which consume an adequate amount of time.• Frustrated and confused learners exhibit resistance in the classroom.	<ul style="list-style-type: none">• No Standard e-learning content is available• Slow internet connection• No Social Interaction• Learners have a low level of engagement	<ul style="list-style-type: none">• E-learning requires certain technical infrastructure that cannot be afforded by every participant/organization• An effective evaluation strategy is required especially in e-learning

[6]	2018	The authors have conducted a study in India and discuss various driving factors, opportunities, and challenges faced by online education	<ul style="list-style-type: none"> • Limited Social interaction • Lack of motivation 	<ul style="list-style-type: none"> • Limited Social interaction • Language Barrier 	<ul style="list-style-type: none"> • Insufficient digital infrastructure • Questionable credibility of degrees
[7]	2020	This study has been conducted in Zambia to investigate the mathematics teachers perspective in online teaching during	<ul style="list-style-type: none"> • Unstable Electricity and internet connection • High internet cost • Unfamiliar technology • Skill and attitude to use online platforms and technology 	<ul style="list-style-type: none"> • Unstable Electricity and internet connection • High internet cost • Unfamiliar technology 	<ul style="list-style-type: none"> • Ensure every student and teacher has the facility to join online education. • It should be part of the curriculum even before and after the pandemic.
[8]	2020	This study has been conducted by the Education faculties of the Open University of Sri Lanka. The purpose of this project is to promote (C-DELTA) program in Secondary schools in Sri Lanka.	<ul style="list-style-type: none"> • Slow Internet connectivity • Language Barrier 	<ul style="list-style-type: none"> • Poor Internet connectivity • Poor motivation 	<ul style="list-style-type: none"> • Lack of Infrastructure
Opportunities					
[9]	2018	In this paper, the study is conducted in developing nations and found that it has positively impacted on health education against the infectious diseases	<ul style="list-style-type: none"> • Positive impact on health due to presence of infectious diseases 	<ul style="list-style-type: none"> • Reduced Cost • Increased access to content • Positive impact on health due to presence of infectious diseases 	<ul style="list-style-type: none"> • Reduced Cost
[5]	2014	As per the study, even traditional classroom teachings have no alternate. Even then companies are motivated for online training because of cost-effectiveness and ease of deployment.	<ul style="list-style-type: none"> • In traditional teaching, the teacher has to spend most of the time controlling the class. Now he can focus on teaching only 	<ul style="list-style-type: none"> • Flexibility of learning • Cost-effective • Immediate transfer of knowledge when required • Standardized training irrespective of location 	<ul style="list-style-type: none"> • Cost-effective • ease of deployment of e-learning to implement technology-based training • Quick start and wind up of e-learning courses. So companies save 20% to 60% of time
[6]	2018	The authors have conducted a study in India and discuss various driving factors, opportunities, and challenges faced by online education	<ul style="list-style-type: none"> • Motivates to use Blended model in future 	<ul style="list-style-type: none"> • Access to E-Learning through mobile phones are increasing 	<ul style="list-style-type: none"> • New courses are coming into the picture as per the demand i.e. Cloud computing, Big data, IoT, etc. • No of the industries coming into the E-Education market
[10]	2020	The study presents that how digital learning spaces help in enhanced learning of practical based subjects like art and craft and design	<ul style="list-style-type: none"> • Teachers are able to better engage the students • They are able to explain it in better way. 	<ul style="list-style-type: none"> • In the subject like art, students can experience the real world using virtual reality • In a subject like craft and design, students can 	<ul style="list-style-type: none"> • After successfully implementation on two subject these new methodology can be applied to more subjects like Music, Economics and Physical Education subjects etc.

				think and speak using online webinars.	
[8]	2020	This study has been conducted by the Education facilities of the Open University of Shri Lanka. The purpose of this project is to promote (C-DELTA) program in Secondary schools in Shri Lanka.	<ul style="list-style-type: none"> • Awareness of digital concepts like Digital Identity and Digital Footprint • Improving digital learning concept mapping • Improved digital educational leadership skills 	<ul style="list-style-type: none"> • Improved digital learning Skills, concept mapping Skills • Gain more confidence experiencing by online learning and online testing 	<ul style="list-style-type: none"> • After successful implementation of the C-Delta program Educational Institutes are able to add into school curriculum. • Receiving computer and Internet facilities to ICT labs
Recommendations					
[11]	2020	The study is conducted during the covid-19 outbreak and 5 points are recommended to increase the confidence in e-learning	<ul style="list-style-type: none"> • The instructor needs to be well organized and prepared in advance • A good relation/trust must be established between student and teacher 	<ul style="list-style-type: none"> • Students need to be Self-regulated. • Mental health of Students must be good • A good relation/trust must be established between student and teacher 	<ul style="list-style-type: none"> • Course must be taught in chunks • Proper feedback system need to be there to maintain to ensure student satisfaction level.
[12]	2021	The author evaluated student persistence in online courses based on various factors. These are anxiety, satisfaction, effort expectancy, engagement, behavioral intention, employer encouragement, facilitating conditions, and performance expectancy. Among which satisfaction, expectancy, engagement, behavioral intention, facilitating conditions, and performance expectancy effects positively on the other hand factors like anxiety and employer encouragement affects adversely on student persistence in online courses. The author considers student anxiety and satisfaction are the most important factors	<ul style="list-style-type: none"> • Instructors need to improve the pedagogy to increase student participation and interaction. 	<ul style="list-style-type: none"> • Students need to be self regulated and they also need to improve their skills by themselves by watching the videos ,reading the tutorials etc. • They need to be fully participative 	<ul style="list-style-type: none"> • Academic institutions can arrange orientation sessions for those students who require skills to attend online courses • LMS should be easy, user friendly. • LMS should contain attractive content to motivate the students
[13]	2006	The author specifies that Nursing education requires a different approach for teaching practical skills, preparing E-learning materials, and for proper communication with patients and team members.	Different pedugogical approach is required so that individual and personalized attention can be provided to each student.	<ul style="list-style-type: none"> • Students need to be self regulated 	<ul style="list-style-type: none"> • Before shifting to a digital approach these points need to be taken care of. Moreover, teachers/tutors must be provided tools with an e-learning environment to manage the lecture material easily and efficiently
		This study has been conducted in most of the countries in the world and it has been found	<ul style="list-style-type: none"> • Teachers should take care of speed and modulation of voice during online lectures to improve 	<ul style="list-style-type: none"> • Students need to be self-regulated • They need to combine offline self-learninf with 	<ul style="list-style-type: none"> • Preplanning is required • Whole Curriculam must be devided into modules to

[2]	2020	despite challenges they supported online education and recommendations have been given to overcome these challenges.	the grasping power. • Other teaching assistants must be used like WhatsApp and other social media tools to improve the communications	online teaching.	increase student focus • Opting new method of teaching • Preparing teachers time to time
[14]	2020	This article analyzes how the instructor strategies for designing online discussions affect student participation and grades.	• The instructor should design discussion and grading so that students can involve themselves in a meaningful way so that it can be used for knowledge construction.	• Student need to be participative in class discussions to understand the concepts in a better way	• Online participation should be graded .it should be part of evaluation specially in online education.

3. Challenges In Digital Education

Diverse researches have been reviewed and it has been found most students and teachers faced the same kind of challenges.

1. Internet connection: Major challenge faced by both students and teachers is slow and exorbitant internet connection [3,5,7] which is the backbone of online education. It has been especially faced in non-urban areas of developing countries which results in longer waiting times and ultimately increases student's frustration and confusion.
2. Lack of Infrastructure: There is overloading of servers [2] and deficiency of other necessary infrastructure [3-8] due to premature shift to online education due to covid-19. Moreover, most of the students cannot afford to purchase a desktop/laptop which is a requirement especially for practical/programming subjects for effective online education.
3. Unfamiliar Technology [7] and resistance to change: All the students and teachers are not aware of latest technology. Moreover, technology is changing day by day. Furthermore, there is resistance to change from traditional teaching to online teaching/learning
4. Less Social Interaction [3-6]: Learners have a low level of engagement and interest due to the passive nature of the online lecture. In traditional classrooms, the participants have the opportunity to collaborate, communicate with each other. They can share experiences, problems, support, and friendship [5] which helps them not only in real-life learning but also improves their mental and physical health. This is required for better personal and professional development. This opportunity is not there in online classes. In nursing/medical education [4] where it is required to have good communication between the staff and patients, Social interaction becomes a mandatory requirement.
5. Self-management of Students: In online education there is no direct control of teachers on students so they need to be self-motivated and self-disciplined [6,8]. Parents also play an essential role to make them self disciplined. Moreover proper environment need to be provided during online education so that they can focus on studies.
6. Time: As teachers need to restructure their lectures [4-5] and there is no standard e-content available for online lectures. They need more time to prepare the lecture and materials. So proper preplanning is required.
7. Evaluation and credibility of degrees: In online education, it becomes a challenge to evaluate [5] the students as teachers or Educational Institutes have no direct control over them especially in the scenario of Covid -19. Moreover, there are more chances of fake degrees online so it becomes a question on the credibility of degrees [6].
8. Language Barrier [6, 8]: Online courses can be taught worldwide as well they can reach up to rural areas. But in that case, language becomes an issue if the course is published in a single language

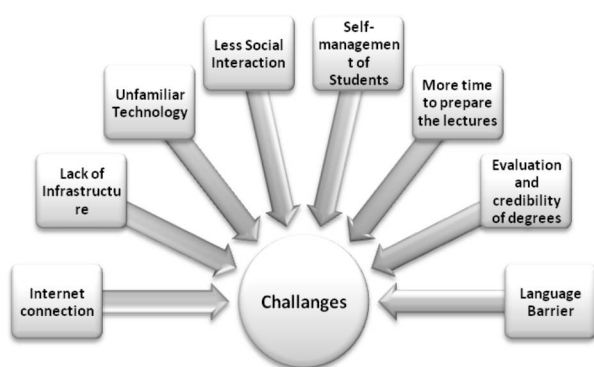


Fig. 1 : Challenges in Digital Education

4. Opportunities In Digital Education

Despite of above mentioned challenges the whole world is adopting digital education. This is because of its opportunities i.e. flexibility in learning, cost effectiveness, global exposure, better skills and employability.

1. The flexibility of learning [5,6]: As online education is accessed from the Web, so it is accessible anytime and everywhere where the internet is available. Students need not to travel from long distance to study a course. Moreover, the students who r working or having other liabilities have the opportunity to continue their studies.
2. Cost-effective: Online education is cost-effective [5, 9] because students do not have to pay hostel as well as transport charges. Moreover, there is a lot of free E-content available on the Web. The government is also facilitating for the same so that education can be reached, everyone.
3. Improved skill and confidence [8,10]: There are numerous standardized courses available online and taught by knowledgeable and well-known educators. Now everyone has access to them which was not there in the case of traditional education.
4. Better Employability [5]: Online education act as a medium to bridge the gap between candidates and respective employers. There is an abundance of courses available on advanced technologies in almost every domain i.e. cloud, IoT, Big Data, Software testing, Hospitality, Nursing, Coding, and many more. Students can maintain their skills as per industry expectations.

5. Global Exposure [5]: Many reputed and prestigious institutions all over the world were earlier out of reach. It is because of their admission procedure and unaffordable nature. Now they are offering online courses which are reachable as well as accepted by employers

6. Blended Model [6]: Now a day's blended Model is becoming popular in which students can take benefit from Online learning as well as traditional teaching. Both student and teacher need to be present and online teaching methodologies are blended into traditional methods.

7. Better impact on Health: As teachers and students need not to interact physically so there is no harm from infectious disease. In this way online teaching protects the society from these kinds of diseases.

8. More Productive classes: In traditional classrooms teachers spend most of the classroom time in controlling students. Now in digital learning they can concentrate more on teaching.

5. Recommendations And Conclusion



Fig. 2 : Opportunities in Digital Education

As seen from the literature, online teaching cannot replace traditional teaching because cannot ignore the its importance of traditional teaching for development of physical and mental health. Even after the challenges, online education is becoming popular day by day due to the opportunities it is providing to society and it's a need of the hour too. In the case of the pandemic situation, this is the only solution when we cannot compromise the health of students and teachers. But to improve its effectiveness we have overcome most of the challenges discussed in section III. For this we all students, teachers, educational

Institutes, Universities, Industries, and Govt. policymakers have to join our hands and work together to overcome these challenges.

- First and foremost, necessary infrastructure [2,3,8] must be provided because a good Internet speed, necessary equipment is the spine of online education.
- These online courses must be planned [2,13] well in advance and the curriculum and schedule must be changed accordingly so that teachers can provide quality education.
- All the necessary support and assistance [12,13] need to be provided to students, teachers, and staff members to overcome the fear of technology. Regular workshops and webinars need to be arranged to provide the necessary knowledge and support.
- Teachers should be prepared and motivated has to opt for effective online teaching methodologies [2, 12, 13] i.e., they need to take care of voice modulation as voice is the only media in online lectures. They need to engage every student.
- An effective evaluation system [12,13] needs to be opted to access the effort of every student efficiently. Online participation should be graded so that every student can be engaged
- An effective feedback system [11] must be opted to measure student satisfaction.
- Synchronous online teaching must be opted so that students can participate and express themselves.
- New methodologies [2] i.e virtual reality, augmented reality, simulations, gaming should be used to create the interest of students.
- Courses need to be published in different languages [6] to broaden their reach.

References

- [1] Kaplan, A.M. and Haenlein, M., 2016. Higher education and the digital revolution: About MOOCs, SPOCs, social media, and the Cookie Monster. *Business Horizons*, 59(4), pp.441-450.
- [2] Nikdel Teymori, A. and Fardin, M.A., 2020. COVID-19 and Educational Challenges: A Review of the Benefits of Online Education. *Annals of Military and Health Sciences Research*, 18(3). J. Clerk Maxwell, *A Treatise on Electricity and Magnetism*, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
- [3] Babinčáková, M. and Bernard, P., 2020. Online experimentation during COVID-19 secondary school closures: Teaching methods and student perceptions. *Journal of chemical education*, 97(9), pp.3295-3300.
- [4] Smith, G.G., Passmore, D., and Faught, T., 2009. The challenges of online nursing education. *The Internet and Higher Education*, 12(2), pp.98-103K. Elissa, "Title of paper if known," unpublished.
- [5] Tadimeti, V., 2014. E-soft skills training: Challenges and opportunities. *IUP Journal of Soft Skills*, 8(1), p.34.M. Young, *The Technical Writer's Handbook*. Mill Valley, CA: University Science, 1989.
- [6] Jindal, Aman & Chahal, Bhupinder. (2020). Challenges and Opportunities for Online Education in India. *Pramana*.
- [7] Mulenga, E.M. and Marbán, J.M., 2020. Prospective teachers' online learning Mathematics activities in the age of COVID-19: A cluster analysis approach. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(9), p.em1872.
- [8] Karunanayaka, S.P. and Weerakoon, W.M.S., 2020. Fostering Digital Education among Teachers and Learners in Sri Lankan Schools. *Journal of Learning for Development*, 7(1), pp.61-77.
- [9] Liyanagunawardena and Aboshady (15) Liyanagunawardena TR, Aboshady OA. Massive open online courses: A resource for health education in developing countries.
- [10] Nortvig, A.M., Petersen, A.K., Helsinghof, H. and Brænder, B., 2020. Digital expansions of physical learning spaces in practice-based

- subjects-blended learning in Art and Craft & Design in teacher education. *Computers & Education*, 159, p.104020.
- [12] Martin. How to optimize online learning in the age of coronavirus (COVID-19): A 5-point guide for educators. 2020.
- [13] (Lakhal, S., Khechine, H. & Mukamurera, J. Explaining persistence in online courses in higher education: a difference-in-differences analysis. *Int J Educ Technol High Educ* 18, 19 (2021).
- [14] (Kokol, P., Blazun, H., Micetic-Turk, D. and Abbott, P.A., 2006. E-Learning in nursing education challenges and opportunities. *Studies in health technology and informatics*, 122, p.387.)
- [15] Lee, J.E. and Recker, M., 2021. The effects of instructors' use of online discussions strategies on student participation and performance in university online introductory mathematics courses. *Computers & Education*, 162, p.104084.