Effective transformation during Pandemic; Offline to Online via ICT tools

Phirke Ajay Nilkanth, **Prabhudesai Swapnil Anil**
swapnil.prabhudesai@nmims.edu
Basic Sciences & Humanities Department, Mukesh Patel School of Technology Management and Engineering, NMIMS University, India

Abstract
The World Health Organization proclaimed a pandemic condition, which forced humanity to learn and adapt to new situations. The education system is one of the systems that has been compelled to adopt and adapt to changes on an almost instantaneous basis. For both instructors and students, the transition from traditional classrooms to online courses was difficult. This article offers a quantitative method for online lectures using Videos, Instructional Strategy, and Presentation in times of crisis, as well as ideas for dealing with the difficulties associated with online learning. To further determine the impact of digital learning, students were canvassed.

The COVID-19 epidemic has given us the opportunity to lay the groundwork for digital learning. The purpose of this article is to present a complete assessment on the influence of the COVID-19 epidemic on online teaching and learning, as well as to suggest a course of action.

Keywords: Education; online learning; pandemic; educator, learners.

I. **Introduction**

People all around the world are living through a significant historical period that has imposed a sudden quarantine on them, leaving them with no time to understand what that meant or what the implications would be. What was familiar was swiftly abandoned in favor of the necessity to adjust to a new way of life characterized by social isolation and physical separation. The COVID-19 epidemic has not only been a significant health catastrophe, but it has also been a major educational crisis. The specific crisis has presented policymakers with the choice of either closing educational institutions (public and private schools, as well as universities) or keeping them open, thereby either saving lives by reducing social contacts or maintaining the economy of each state. The majority of countries around the world have decided to continue with the lockdown of all educational establishments. As a result, physical doors of schools around the world were shut, forcing teachers and students to move into remote teaching and learning mode

Online learning has grown in popularity in recent years all around the world. The challenges presented by the pandemic scenario exposed us all to a new world of online education utilizing various platforms such as Google Meet, Zoom, MS Teams, and many others. The convenience of digital learning modalities has rescued and continues to rescue us from these trying times. We may tailor our procedures and processes to the demands of the learners using online learning modalities (Deborah Loewenberg Ball 2000, 241-247). Because

student satisfaction is a key element of learning, instructors employed a range of online resources to reach out to their students, such as videos, audios, animations, presentations, or any combination thereof (Kintu, M.J., Zhu, C. & Kagambe E 2017, 1-20).

There is evidence that interactive online educational films, especially those in the engineering field, can be helpful in encouraging university student learning. Flipped classrooms are also a useful online tool for both students and teachers (S. Anand, S. Chatterjee and K. Bijlani (2014), 193-194 and Maureen J. Lage, Glenn J. Platt, Michael Treglia (2000), 30-43 and D. Kavitha , D. Anitha (2018), 2349-2473). The effectiveness of the flipped classroom has been evaluated among students, and it has been proven that it is more effective to trainees. The alignment of online lectures, face-to-face student/teacher, and peer/peer interactions, along with the active learning component of the flipped classroom, is thought to have resulted in these gains (Hao, Y., (2016), 82-92). Online technologies, in particular, provide practitioners and learners with innovative and practical ideas for creating a learner-friendly atmosphere, increasing motivation, active learning, and improving access to information (H. Pham, H.B. Nguyen (2018), 104-119 and N Jabeen, Abdul Ghani (2015), 1811-1817 and Bridget Somekh, (2007)).

Educators have a critical role in ensuring that learners effectively participate in conversations, which enhance learning by giving clear standards for channeling knowledge. (Shivangi Dhawan (2020), 5-22 and Alicia D. Beth,Michelle E. Jordan,Diane L. Schallert,JoyLynn H. Reed & Minseong Kim (2015), 471-484). However, there were several roadblocks in the way of online teaching and learning. Many challenges have been noted by the researchers, including a lack of basic amenities and technological issues. (Martin Daumiller, Raven Rinas, Julia Hein, Stefan Janke, Oliver Dickhäuser, Markus Dresel (2021), 106677 and S Ghavifekr, T Kunjappan, L Ramasamy, Annreetha Anthony (2016), 38-57) These challenges include download errors, installation issues, login issues, audio and visual problems, and so on. To solve the problem of time, many traditional instructors are experimenting with new pedagogies such as sharing self-made animations, instructional videos, flipped classrooms, and so on. (Petrea Redmond (2011), 1050 – 1060 and N. W. Coppola, S. R. Hiltz, N. Rotter (2002), 169-190 and T. Volery, D. Lord (2000), 216-223).

Greater academic satisfaction may be obtained by integrating technology and education in the appropriate direction. Among the options, delivering a live lecture followed by a brief video recap is extremely successful. In recent years, e-learning has gained popularity in India. Many platforms provide low-cost courses to students through Massive Open Online Courses. Nevertheless, many Indian institutions were unwilling to use online teaching and learning. The problems created by the Corona Virus epidemic, on the other hand, led everyone to a new world of online learning and remote instruction. However, for all instructors,

developing any online course content for efficient delivery in the form of videos, animations, audios, and so on takes time.

Teachers used a variety of web - based teaching and learning methods during the COVID-19 epidemic.

II **India's Supporters of Online Education**

As per the government of India, despite the huge number of internet users, the country's internet penetration rate was estimated to be around 50% in 2020. Diksha, Swayam Prabha Channel, Shiksha Van, E-Pathshala, and the National Repository of Open Educational Resources are among the projects spearheaded by the Ministry of Human Resources Development's Department of School Education and Literacy (NROER). It's worth mentioning that, in addition to the efforts of the Indian central government, each state has its own online education projects suited to their own requirements (Madanjit Singh, Sulaimon Oyeniyi Adebayo, Munish Saini, Jaswinder Singh (2021), 7569–7607).

III. Adaption of Massive Open Online Courses (Mooc) in India

In India, there is a pressing need to enhance elementary and secondary school classroom practices, and the magnitude of the task is said to necessitate novel methods to teach professional learning. Massive Open Online Courses (MOOCs) are one such strategy, and one that is seen to give a way to transcend standard training procedures and disrupt established pedagogic practices in the context of this study. TESS-India (Teacher Education via School-Based Supportiii) is a UK–India teacher education collaboration run by the Open University and supported by UKAid. TESS-India intends to promote teacher education in India by using open methods and technology in seven states: Assam, Bihar, Karnataka, Madhya Pradesh, Odisha, Uttar Pradesh, and West Bengal.

Each week's study focused on learning activities centered in a local context, reflecting actual issues experienced by teacher educators, and aiming to be personally engaging and satisfying for participants (Fischer, 2014). Posting comments in forums in response to specific questions, consulting colleagues, and giving and receiving feedback all took up a similar amount of study time. Participants were encouraged to draw on and make sense of their experience each week, which was a vital component. For each activity, the expected learning time was given, and the distribution of different types of activities is displayed in Figure 1 (Freda Wolfenden, Simon Cross, Fiona Henry, 127-142).

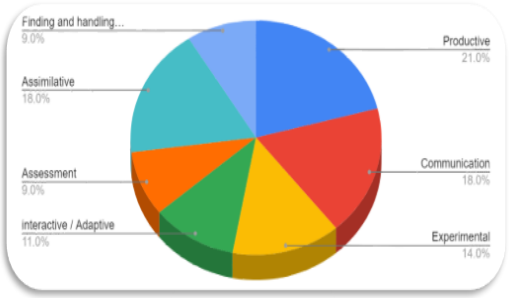


Figure 1: TESS-India MOOC distribution of activity type

IV. Online education's newest and most dominant technology

Technology has played a larger part in education in recent years, and its impact will be felt much more broadly in the future. Tech-enabled learning can not only transform the online learning experience, but it can also augment and supplement traditional

classroom pedagogy. It may provide greater flexibility and support for learning than traditional forms. Teachers can usetechnology to become more collaborative andextend learning outside the classroom.

The Government of India is supporting several e-learning projects across the country as part of the National Mission on Education, including Swayam, Swayam-Prabha, National Digital Library, e-Yantra, and Virtual Lab, which are assisting students and teachers in upskilling and providing quality resources. Furthermore, these initiatives are resulting in the development of knowledge tools that promote creativity and innovation, particularly among young pupils.

Language limitations exacerbate complications in a multilingual country like ours. Deep-learning systems that can translate English lectures into a student's local tongue are being developed using cutting-edge text translation and machine learning research. Voice recognition and text summarization technologies are similar in that they can transcribe a whole lecture and condense paragraphs of text into pertinent bullet points. Teachers' capacity building will be critical to the success of educational technology utilization.

V. Ecosystem of online learning

In India, the COVID-19 pandemic has provided an unexpected boost to online education. Despite facilities in government schools for online lectures, existing fault lines—"between rural and urban, male and female, affluent and poor"—were neglected (Protiva Kundu, “Indian education can’t go online – only 8% of homes with young members have computer with net link”, Scroll, 5 May 2020). The penetration of the internet in urban and rural areas is being researched, according to the Indian government. In comparison to persons living in rural locations, it has been shown that 54% of the population in metropolitan areas had better access to the internet. This number drops to 34% in rural areas. It is also discovered how people of different ages use the internet. According to this information, there are 433 million users that are 12 years of age and over, which is a pretty sizable demographic.

The Government of India also surveyed the weekly use of internet in rural and urban areas and the percentage population of users is obtained (Nielsen, Internet and Mobile Association of India, Digital in India: 2019 – Round 2 Report.). Results are depicted in Figure 2 below. Regardless of demography, the number of active internet users using the internet every day much exceeds the number of people using the internet weekly, as shown in the graph below. The government's initiatives are beginning to bear fruit, but there are still numerous areas to be addressed.

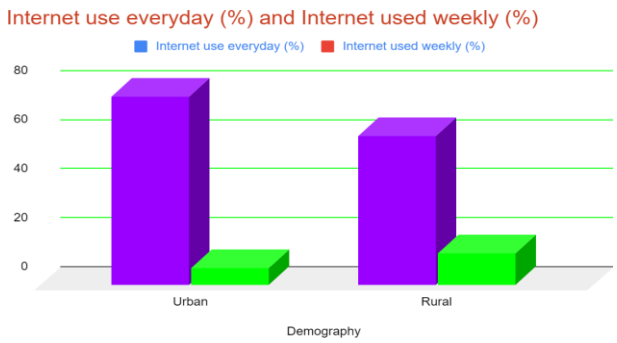


Figure 2: % of users using the internet weekly and daily with demography.

VI. Data Collection and Analysis

Various methodologies of online session

delivery used during the Covid-19 outbreak. Teachers at the institute swiftly acclimated to the change and began collecting student data, offering tests, and performing continuing evaluations in virtual format. Remedial lectures and doubt-solving sessions were also offered via online portal systems for students who were slow learners. This procedure was attended by almost all of the faculty. All our students were able to acclimate to the new system.

We have also carried out the survey about the positive impact of the online education system on the students of different age groups. The data is then compared with the face-to-face lecture delivery systems. We surveyed a very large number of students at different levels of education like junior KG, senior KG, school, high school and college. Some interesting facts were come forward. This data is tabulated in Table 1

Education Level	Positive impact of online education system	Positive impact of offline education system
Junior KG	40 %	60 %
Senior KG	46 %	54 %
School	52 %	48 %
High School	60 %	40 %
College	75 %	25 %
University	85 %	15 %

.

Table 1: impact of online education on the students at various education level.

Data is gathered from Mukesh Patel School of Technology Management & Engineering, and feedback on many aspects of online course delivery is gained. Issues related to online education were discussed which are given in the following Table 2.

Feedback	Grades (%)			
	Excellent	Very Good	Good	Bad
How was the overall experience with the online classes so far?	51	31	10	8
How was the level of interaction during online sessions?	60	20	15	5
Were these sessions able to Cover the topics well, especially while handling technical concepts?	57	27	9	7
Were the pre-reads (PPTs, notes, case studies, articles) provided by the faculty help you understand the topic better?	67	17	6	10

Table 2: feedback obtained from the students on many factors of online education systems.

Thefeedback gave us the clear indication of the advantages the online education system has and also it throws the light on the areas wherethere is a need for improvement.

Feedback from students from various social and economic backgrounds was collected and assessed on a scale of 1 to 5 to gain a clear image of the influence of online education on them. If your online education experience has been less than stellar, you will be assigned point 1. If the students think the online education experience is satisfactory, they will assign 2 points. Students will provide three points in feedback if they are satisfied with the new educational system. When online education has more positive consequences than negative effects, points 4 are assigned. If students have had a positiveexperience with online education, they will give the highest number of points 5.

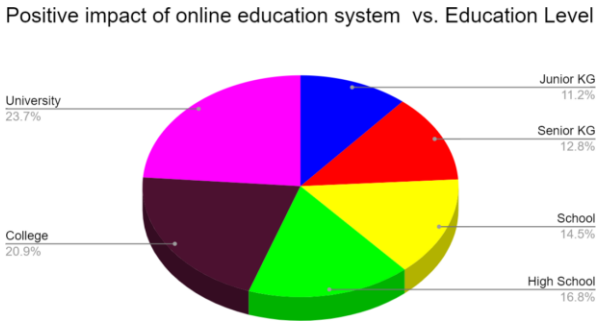
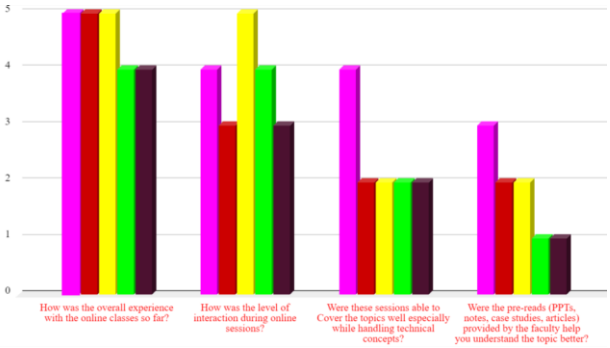


Fig.3 Impact of online education method on students across various education levels

As a result, we have collected data that clearly demonstrates the benefits and drawbacks of the new methods to teaching and learning. Students from diverse streams were chosen and asked for their thoughts. Five different branches were taken into account. Circuit branches (IT, EXTC, Mechatronics, Data Science, Computer etc.), non-circuit branches (Mechanical engg., Civil Engg., Chemical eng. Etc.), basic sciences, life science and pharmacy were the most common branches. Various components



of the online education system

were taken into account during this procedure. The samedata is plotted in Figure 4 to understand it easily.

Fig.4 Merits and demerits of online education across different branches of science andtechnology

VII. Outcomes

The implications of online teaching and learning for the education industry are manifold. We must look at the consequences, whether they are positive, negative, or ugly. The pace of technological growth is uneven, particularly in India. Most of the country still lacks basic internet access, particularly in rural areas. As a result, the advantages and disadvantages of online teaching and learning must be thoroughly evaluated. There are multiple barriers to online education. It is past time for our culture to comprehend the intricacies of online education – in India, for India. The following sections address the positive, bad, and ugly effects of online

education on Indian societies.

VII.1. The positive outcomes

Learning anything unusual is achievable through the online teaching learning process, which is difficult to attain in a regular school system. A learner has access to an infinite number of topics in a variety of fields. Based on online education, people of all ages now learn at their own speed, without inhibitions, and without jeopardizing other responsibilities. As a result of the start and spreading of COVID-19, one of the most affected sectors in India is education. A student from a Mumbai college stated, when questioned about their experiences with online education on campus, "In this epidemic situation, having an online option is essential. It has supplied us with knowledge while avoiding the need for us to travel and is more flexible." In this regard, the positive impact of online education is also suggested by Ruchika et. Al (R. Sharma (2020), 177 – 181). It was reported that online Learning offers the student the flexible time of place and time of delivering or receiving learning information. It also offers wide avenues for students to continue learning to acquire new and upgrade knowledge, skills, and values by understanding and interpreting at a time and at a place of their choice.

It's possible that students will find it a welcome break from their rigid schedules and long commutes to class. For some college students who find it difficult to focus in large classes with many students, this may be a less distracting option. Many instructors take advantage of this by experimenting with new coaching and assessment methods. If, on the other hand, online education becomes the sole mode of instruction for a lengthy periodof time, the good, bad, and ugly eventually emerge.

VII.2. The Negative Effects

Although the use of the internet for recreational purposes is common around the world, online education remains a serious challenge. Teachers may be uncomfortable with creating digital content and communicating it successfully online. It's unfair to expect them to suddenly improve and students to adjust.

Professors in offline classes use body language, facial expression, and eye contact as important clues. However, in the case of online course delivery, it is difficult to tell. Negative impact of online education was also reported (MORTAZA MOKHTARI NAZARLOU, (2013), 11 – 16). It was found that the long- time usage of computers can do harm to people's health. It mainly includes electromagnetic radiation, harm to eyesight and damage of organs and so on.

"We don't receive regular feedback in the form of students' remarks during online sessions," a college instructor in Mumbai said, "which lowers the efficacy of teaching." In a typical classroom setting, many questions emerge. For example, in what way or manner many pupils' fashionable classes exist obey? How many kids exist capable of performing to grasp the concept? Is the lecture pace appropriate? Is it real that few people actively learning happen essential nature surpasses? These questions, in another way, exist troublesome to address fashionable online classes. For students in the lower age groups, the drawbacks of online education are amplified. Many parents have expressed dissatisfaction with the way children aged 8 to 14 are affected by internet schooling. A parent of a 9-year-old who

attends a private school in Mumbai believes that online education should not be given to such young children. Because they have such a limited attention span and lose interest quickly." This was a significant concern for parents of small children. According to statistics, even college students prefer an in-class physical learning experience over a virtual one. Similar queries were also reported by Slamet Utomo (Slamet Utomo (2021), 160 – 169). It was found that students feel bored for too long being at home and learning from home. Students want to return to school immediately, meet with teachers and other students. Another impact experienced by students is the lack of interaction between students and teachers and students and other students (Slamet Utomo (2021), 160 – 169).

Many people understand that using cell phones for educational reasons might be distracting. In addition, science, engineering, and technology courses usually include hands-on laboratory experiments, minor projects, and field trips to supplement theoretical learning. This aspect of learning is severely limited in online schooling.

To summarize, education comprises not only the acquisition of subject-specific knowledge, but also the development of a variety of abilities among students over time, such as social skills and sportsmanship. If children rely only on online instruction, their holistic development may be impeded, andmany may underperform later in theirprofessional and personal lives.

VII.2.1. The Negative Consequences

India is one of the most diverse countries on the planet. In terms of geography andculture, India is diverse, but it also has enormous socioeconomic disparities. In the sphere of education, this is also true. DespiteIndia's massive population, only a small percentage of the population currently has access to online education. There are numerous challenges that make it difficult for online education to reach all parts of thecountry. Frequent power outages, poor or non-existent internet connectivity, and the inability to afford vital electronics are allmajor worries.

It's also apparent that after a few months of online learning, around half of a class of 50 to 60 students attend class with whatever device and connection they have. The remaining kids are missing approximately 10-12 students. "It is a very frustrating experience to engage children of younger age groups in online format," a teacher in a government-aided school in the small village of Ratnagiri in Maharashtra notes a similar trend. There are a number of network issues that affect both teachers and students. As a result of these challenges, the session's continuity is jeopardized. Teachers are increasingly experimenting with new techniques of conducting online sessions to address this issue. Many places have "classes" in which instructors distribute films with students through WhatsApp or YouTube so that they can watch them whenever they want to address issues like internet

connectivity and device availability. However, this, too, comes with difficulties in understanding the teachings and encourages study without a thorough understanding of the themes. Pre-recorded sessions on television and radio are similar, but they cater to a bigger audience of students who are unable to attend live online classes.

The disadvantages of online learning don't stop there. It has also brought attention to the country's huge gender gap. Many families in rural areas of the country are struggling financially. As a result, it is common for girls to be the first to get struck. According to a recent poll of 800 students in government schools in Maharashtra, only 29% of girls have cellphones in their homes, compared to 37% of boys. In most homes, smartphones were almost exclusively owned by male adults, and girls had less access to them than boys, with half of these families unable to purchase internet data packages.

As a result, the vast majority of students who took part in this survey preferred online sessions aired on television and radio. Girls, on the other hand, were found to spend more time doing housework than boys, which happened to coincide with the time when these shows were shown. Such educational disparities may exacerbate India's already significant wage disparity between men and women. Another significant drawback of online education is the presence of students with disabilities. They are among the most reliant on in-person education, and hence are unlikely to benefit from online learning. Students with disabilities were concerned about the availability of study resources inaccessible formats, according to one survey. Their teachers were also concerned about how to educate students with learning impairments, autism, and limited vision without using touch. A lack of sufficient education may worsen the high dropout rates of these children from schools in developing countries.

VII. Opportunities for Teachers and Learners

Although there have been numerous problems for educators, schools, institutes, and the government in regards to online education, the COVID-19 epidemic has created multiple chances for those who are unprepared or have long-term intentions to deploy an e-learning system. It has strengthened the bond between instructors and parents like never before. Homeschooling necessitates parents' financial and academic support for their children's education. During this continuing disaster, children with disabilities require additional and specialized assistance.

For the first time ever, online platforms such as Google Classroom, Zoom, virtual learning environments, social media, and other group forums such as Telegram, Messenger, WhatsApp, and WeChat are studied and tried for teaching and learning. Even after face-to-face teaching resumes, this can be explored further, and these platforms can provide extra materials and coaching to learners.

Teachers are expected to come up with innovative ideas to help overcome the constraints of virtual teaching. On a local level, teachers are actively collaborating with one another to develop online teaching approaches. As instructors, parents, and children have similar experiences, there is unparalleled potential for collaboration, creative solutions, and openness to learn from

others and try new techniques. Many educational organizations are making their tools and solutions available for free in order to assist and support teaching and learning in a more interactive and engaging manner. Online learning has allowed teachers and students to teach and learn in new ways that are not possible in a traditional classroom setting.

The educators and educational institutions who have welcomed this transition as a chance for development and exploration have been in a position to best serve the needs of students both now and in the future. Although technological advancement in education was always going to occur, the pandemic really hurried up the process, forcing acceptance of this requirement and adaptation to digital hurdles on a timeframe that was far faster than it would have otherwise been. Online learning has demanded a new level of focus and effort from students who are compelled to complete their studies in a remote setting, as well as a new level of technological adoption from professors in ways they may have never encountered before. More students than ever before are now able to choose this method of instruction because to the options created by COVID-19, and in the years to come, the expansion of remote learning will be extremely beneficial for both teachers and students.

When students view them through computer screens, the internet, instant messaging, and social networking are now directly competing with faculty lecturing on platforms like Zoom. Because of the numerous possible distractions on their students' laptops, tablets, or phones, teachers now need to figure out how to keep their students' attention. In order to engage students, sustain their attention, and maintain involvement through a variety of activities in the online instruction of classes, they have had to alter their teaching tactics and practices. This calls for a greater range of abilities as well as the capacity for adaptation and experimentation while learning is taking place, challenging the existing cookie-cutter approach to curriculum.

Classes cannot be facilitated in a videoconference or digital context in the same way that they have been in a physical, in-person format due to changes in the established techniques of interaction between teachers and students. It is highly likely that successful professors in this "new normal" are those who have embraced technology as a support system for student involvement. In general, educators have heeded this appeal, demonstrating a desire to learn about and experiment with cutting-edge technology that has an impact that lasts. It has been crucial for continued engagement throughout this uncertain period to connect with students via online activities, group discussions, interactive polling, and screencasts.

Teachers now have the chance to reconsider their duties and explore fresh ways to tasks they may have been performing in the same manner for years as a result of the disruption caused by the pandemic. Faculty have often found their passion for their work has been rekindled when compelled to perform their duties differently. From a pre- and post-pandemic perspective, this drive for creativity has sparked a huge shift in the educational landscape, and instructors need to be ready for a student population that is now more accustomed to remote learning. Teachers will need to develop their abilities as remote educators to give their institutions the opportunity to preserve a competitive advantage as the need for the flexibility that comes with remote learning is likely to rise.

VIII. Conclusion

This paper addresses the importance and effectiveness of online education for students aimed at self-learning and better understanding. We implemented three approaches: Video, Instructional strategy and Presentation along with our online lectures during this current pandemic. Overall, preliminary results show positive perceptions on the use of these online tools when merged with the traditional classrooms. Students emphasize the usefulness of videos as reference material to clear their doubts. This method also provides the flexibility to view the video according to their own convenience. Results show that the students preferred the methodology of conducting actual class followed by providing Video, Instructional approach and Presentation. These strategies were useful for strengthening the concepts, for clearing doubts, and to prepare for exams. This paper presents findings from an initial study, and more experiments with different courses and student groups are required to authenticate the suggestions in this paper. Feedback obtained from the students across different age levels and different demographics showed the positive and negative impact of online lecture delivery systems. Survey carried out in our own institute clearly indicated that the online education system can have a positive impact on the students if all the technical issues are resolved properly. Overall, in a country like India a lot has to be done in order to fully achieve the success of online education.

Bibliography

1. Alicia D. Beth,Michelle E. Jordan,Diane L. Schallert,JoyLynn H. Reed & Minseong Kim, "Responsibility and generativity in online learning communities, *Interactive Learning Environments*, 23, (2015): 471-484, https://doi.org/10.1080/10494820.2013.788035.
2. Bridget Somekh, "Pedagogy and learning with ICT: Researching the art of innovation,"*Routledge Taylor and Francis Group*, (2007).
3. D. Kavitha , D. Anitha, "Flipped ClassroomUsing ICT Tools to Improve Outcome for theCourse 'Soft Computing' - A Case Study,"*Journal of Engineering Education Transformations*, 32, (2018): 2349-2473, http://dx.doi.org/10.16920/jeet%2F2018%2 Fv32i2%2F139499.
4. Deborah Loewenberg Ball, "Bridging Practices: Intertwining Content and Pedagogy in Teaching and Learning to Teach," *Journal of Teacher Education*, 51,3, (2000): 241-247, https://doi.org/10.1177/002248710005100301 3.
5. Freda Wolfenden, Simon Cross, Fiona Henry, "MOOC Adaptation and Translation to Improve Equity in Participation," *Journal of Learning for development-JL4D*, Vol. 4, No. 2, 127-142, Microsoft Word - Wolfenden.docx (ed.gov).
6. H. Pham, H.B. Nguyen, "Teachers' perceptions about powerpoint use as an ict tool for teaching vocabulary in Vietnam," *European Journal of Foreign Language Teaching*, 3, (2018): 104-119, https://doi.org/10.5281/zenodo.1466108.
7. Hao, Y., "Exploring undergraduates' perspectives and flipped learning readiness in their flipped classrooms," *Computers in Human Behavior*, 59, (2016): 82-92,

https://doi.org/10.1016/j.chb.2016.01.032.

8. Kintu, M.J., Zhu, C. & Kagambe E, "Blended learning effectiveness: the relationship between student characteristics, design features and outcomes," *Int J Educ Technol High Educ* **14,** 7 (2017), https://doi.org/10.1186/s41239-017-0043-4.
9. Martin Daumiller, Raven Rinas, Julia Hein, Stefan Janke, Oliver Dickhäuser, Markus Dresel, "Shifting from face-to-face to online teaching during COVID-19: The role of university faculty achievement goals for attitudes towards this sudden change, and their relevance for burnout/engagement and student evaluations of teaching quality," *Computers in Human Behavior*, 118, (2021): 106677, https://doi.org/10.1016/j.chb.2020.106677.
   Maureen J. Lage, Glenn J. Platt, Michael Treglia, "Inverting the classroom: A Gateway to Creating an Inclusive LearningEnvironment," *The Journal of Economic Education*, 31, (2000): 30-43, doi/abs/10.1080/00220480009596759.
10. MORTAZA MOKHTARI NAZARLOU, "Research on Negative Effect on E-Learning," *International Journal of Mobile Network Communications & Telematics (IJMNCT)*, 3(2), (2013): 11 – 16, 3213ijmnct02.pdf (wireilla.com)
11. Madanjit Singh, Sulaimon Oyeniyi Adebayo, Munish Saini, Jaswinder Singh, "Indian government E-learning initiatives in response to COVID-19 crisis: A case study on online learning in Indian higher education system ,"*Education and Information Technologies,"26*, (2021): 7569–7607, https://doi.org/10.1007/s10639-021-10585-1.
12. N Jabeen, Abdul Ghani, "Comparison of the traditional chalk and board lecture system versus power point presentation as a teaching technique for teaching gross anatomy to the first professional medical students," Journal *of Evolution of Medical and Dental Sciences*, 4, (2015): 1811-1817, DOI: 10.14260/jemds/2015/258.
13. N. W. Coppola, S. R. Hiltz, N. Rotter, "Becoming a virtual professor: Pedagogical roles and ALN," *Journal of Management Information Systems*, 18(4), (2002): 169-190, https://doi.org/10.1080/07421222.2002.11045703.
14. Petrea Redmond, "From face-to-face teaching to online teaching: Pedagogical transitions," Proceedings Ascilite, (2011): 1050 – 1060, Redmond-full.pdf (ascilite.org).
15. R. Sharma, "Online learning and it's positive and negative impact in higher education during covid-19," *EPRA International Journal of Multidisciplinary Research (IJMR)*, 6 (9) (2020): 177 – 181, 850pm_32.EPRA JOURNALS-5163.pdf
16. S. Anand, S. Chatterjee and K. Bijlani, "Pedagogy Experiments with RecordedVideo Lectures," *2014 IEEE Sixth International Conference on Technology for Education*, (2014): 193-194**,**DOI: **10.1109/T4E.2014.43.**
17. Shivangi Dhawan, "Online Learning: A Panacea in the Time of COVID-19 Crisis," Journal of Educational Technology Systems, 49, (2020): 5-22, https://doi.org/10.1177/0047239520934018.
18. S Ghavifekr, T Kunjappan, L Ramasamy, Annreetha Anthony, "Teaching and Learning

with ICT Tools: Issues and Challenges from Teachers' Perceptions," Malaysian *Online Journal of Educational Technology*, 4, (2016):38-57, EJ1096028.pdf (ed.gov)

19. Slamet Utomo, "The Impact of Online Learning Processes in primary School During the COVID-19 pandemic," (2021): 160 – 169, DOI 10.18502/kss.v5i7.933.
20. T. Volery, D. Lord, "Critical success factors in online education," *International Journal of Educational Management*, 14(5), (2000): 216-223. https://doi.org/10.1108/09513540010344731