Chapter 13
COVID-19 Impact on Educational System Globally

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Abstract  Education plays a very important role in the development of the society. A good educational system produces good citizens. The nations which compromise their education live far behind in the race of development. The advancement of ICT has brought drastic positive changes in the educational system and made the knowledge available and accessible from everywhere. The E-Learning system is also prevailing in most modern societies, and a lot of people who are not able to attend regular classes are getting benefit from it. However, it cannot be the supplement of traditional face-to-face learning mechanisms. The blend of the traditional educational system with E-Learning is very fruitful, and a lot of developed societies are getting its benefit. Recently, the rapid growth of COVID-19 all over the world has put the traditional education system to halt. The policy of lockdown and isolation has put billions of children away from school. Most governments have officially declared school closure to prevent the widespread of COVID-19. In such a situation, online learning is the only solution to run the vehicle of the educational system. However, the current E-Learning infrastructure was not expecting this rapid paradigm shift from the traditional educational system toward E-Learning. Therefore, a lot of issues are reported daily such as Internet connectivity, security breaches, conducting the assessment, etc. In this paper, we will provide the impact of COVID-19 on the educational system worldwide and the strategies that might be useful to fill the gap created by school closure during COVID-19.

Keywords  COVID-19 · E-Learning · Online learning · ICT · Digital learning

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13.1 Introduction

Education is a collective mechanism in which essential intellectual awareness, life skills, and cultural expectations are taught to children throughout the society. Every nation in the world has some kind of academic system, but such systems differ widely. Before the situation in COVID-19, the traditional education system was running smoothly; learning in the classroom is very beneficial because of the direct interaction between students and teachers. Working at the school allows students and instructors to get to know each other more. This helps teachers to get to know students, assess their strengths and shortcomings, serve as mentors, and direct students into their future potential. In the conventional classroom, students will express their opinions directly with the instructor and explain their own concerns while receiving definitive responses to their queries (Fig. 13.1).

The daily leisure events revive the students, and they get some relaxation from the tension of the studies they love and are having fun because of these recreational activities. Throughout the classroom, the students know easily. This is mainstream education’s most popular aspect, and it’s the productive learning style. Before COVID-19 the research institutes were providing valuable knowledge of research subjects, enhancing logical thinking skills, increasing awareness of the scope and difficulty of analytical study, building realistic skills, increasing comprehension of the essence of research, promoting curiosity in science and learning literacy, and strengthening collaboration skills. The realistic knowledge was provided by educational institutes; research laboratory equipment teaches students how to create a compelling case and perform experiments for the new developments.

Before COVID-19 starts, the total students enrolled in different departments were around 1.5 billion. Currently students have less opportunities for learning at home because almost all the science students don’t have access to laboratories. They are unable to perform their practical exams. Every country is trying to
facilitate students by providing them remote options. Most of the universities have taken corporate account from different companies in order to schedule different remote sessions. It’s impossible for every country to provide learning environment to all the 1.5 billion students across the globe. Around 6.3 billion teachers have been affected due to this pandemic.

The COVID-19 has changed, in a matter of a night, how the future can educate the students. The reforms provide us with a quick look at how schooling has progressed over a night. One aspect that comes to mind in such an environment is remote education by webinars, virtual learning management systems, and online courses. For the first time, E-Learning serves an ability to create a useful stand. Theoretically we have several resources at hand, as remote learning is not a new subject. In comparison to the roots that go back many hundred years, the Internet has given us many useful alternatives. In this situation, it’s impossible to override teacher’s interaction with students. So, we begin testing webinar sites first. Overall, they allow for collaboration on training materials, real-time contact through audio and video, and other activities, such as quizzes and assignments that can be used as evaluation techniques. Institutions performed Web wonders. In very short span, the sector has done what others thought due to the efforts of IT specialists.

Before COVID-19 the educational system was not facing many challenges, and students were attending their classes conveniently and were directly interacting with their teachers and class fellows; besides study students were also engaging themselves in extra cocurricular activities, as they facilitate the development of various domains of mind and personalities such as intellectual, emotional, moral, social, and aesthetic development. Everyday new inventions were taking place in the field of science and technology. As COVID-19 has terribly affected the world, it was not feasible to open the educational institutes, but on the other hand, it was not possible to take the education of students for granted. Educational institutes have adopted the online education system as it is one of the best solutions in the prevailing situation and continuing the learning process.

We have tried to cover the impact of COVID-19 along with its suspected origin. Education system situation before COVID-19. How colleges and universities are dealing with this pandemic along with their strengths. How remote and online learning opportunities are helping students and the issue associated with the connectivity of different collaboration tools. In this document, we have also tried to cover the learner and students impacted due to this virus and how education system changed over the nights. This document also has details on the challenges and problem that education system was facing before COVID-19. How existing tools are helping students to connect and attend the class session along with pros and cons of the software. We have learned the following lessons from COVID-19:

- It’s time to reform the current school framework.
- Online classes must be conducted using collaboration tools.
- The role of the teacher needs to be refined.
- Partnership between the public-private sectors is mandatory for the development of education software.
• Strategies to educate students in the interconnected world should be defined.
• Technology should be unlocked to minimize social interaction.

This chapter attempts to identify the COVID-19 impacts on the education system globally that caters the challenges to sustain the education. Education needs to be addressed with the challenge of a short time around the world. Includes the existing distance learning tools and techniques with their pros and cons. Detailed discussion on the role of technology for helping to continue education and the future planning to address any emergency situation. Lastly summarizing the main findings and suggest some future directions.

### 13.2 Literature Review

At the end of December 2019, a new coronavirus (called SARS-CoV-2) triggered an infectious disease outbreak (COVID-19) that emerged in Wuhan, China, and spread rapidly in China and abroad. In this market, animal species are being sold. The coronavirus disease (COVID-19) is likely to originate from animal species and then is transferred to humans. Transmission is verified from humans to humans. The time of incubation varies from 5 days, which can go up to 14 days. On March 12, 2020 [2], the WHO has called the disease COVID-19 a pandemic. According to a recent Chinese survey, nearly 80% of patients has moderate disease, and the overall occurrence of case fatality rate is about 2.3% but reaches 8.0% in patients aged 70–79 years and 14.8% in those aged 80. Effective care is required urgently to stabilize symptomatic individuals but also to reduce the transmission time of the virus to minimize public dissemination [3]. The repositioning of old medicines for use as antiviral therapy is an essential strategy among candidate drugs to treat COVID-19, and knowledge regarding safety profile, side effects, and medication interactions are well established [4].

Coronaviruses are a class of viruses that cause mammal and bird diseases, including human respiratory tract infections. These infections are usually moderate, but rarer types like Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS) can be lethal. The COVID-19 disease spread quite rapidly and took just 30 days to travel from Hubei to the rest of Mainland China. With many people coming back from long vacations, the virus spread to other countries as well [5]. The Chinese National Health Commission released more details on the epidemic on January 12, 2020 reporting viral pneumonia [6]. In a sequencing study of patients’ isolates, the virus was described as a novel coronavirus. In addition, a genetic code for the diagnosis of viral infection has been developed [7]. Further tests have showed that some people had acquired illness and had no record of visiting the seafood shop. These studies have also shown the ability of the human being to transmit this infection and have consequently been reported in more than 100 countries around the world. Owing to near communication with an infectious
individual, prone to coughing, sneezing, nasal droplets or aerosols, the human to the infection spreads [8].

Countries also collectively closed colleges and training facilities, impacting more than 80% of the world’s student population. Several countries have adopted municipal school cuts, and such reductions are likely to be frequent. There is a large body of literature on the closing of educational facilities to reduce the dissemination of infectious diseases in the community by cutting off substantial transmission chains. Given the warning over the latest COVID-19 pandemic, the majority of universities worldwide have either postponed or cancelled all campus events, such as lectures, conferences, sports [9].

The Nation, through the Ministry of Health, declared in a press conference that all classrooms, colleges, and universities will be suspended because of fears about the spread of coronavirus (COVID-19), which allegedly ravaged several regions of China [10], the United States, Italy, Spain, and other sections of Europe and Africa. This suggested that high school students completed term 1 of the academic year 2020 in both public and private schools without sitting for their end-of-term exams so at the conclusion of any of the three academic year periods, both public and private schools must hold appraisal assessments. The early closing of educational facilities was a successful move by the government to secure students by future COVID-19 threats because educational atmospheres are areas where hundreds of students gather, rendering those unsafe sites where disease would propagate rapidly (Fig. 13.2) [11].

The condition rapidly escalated with the closing of schools from 29 countries based on the COVID-19 epidemic evidence and expectations that it decreases social contact among students and hence the transmission intersection. School closures may have a beneficial impact on casualties during an epidemic, either by reducing infection and the amount of incidents or by growing the health-care staff eligible for patient care [12]. According to UNESCO during COVID-19 pandemic, over 90% of the world’s students are not attending school. Some schools started the online class using webinars because this was the only way to continue education in this

Fig. 13.2 COVID-19 transmission cycle [1]
pandemic. Many schools announce the summer/winter vacations because they don’t have E-Learning environment. Colleges and universities also started online learning education in order to continue the learning process.

Current obstacles for delivering services and educating people in the context of insecurity, the allocation of wealth and the loss of traditional learning opportunities. Our evolutionary strategy is meant to be a universally applicable technique for enhancing our current landscape [13]. Effective contact between learners, clinical teachers, and administrative staff was recorded to strengthen mutual confidence and promote adequate cooperation [14]. The anticipated difficulties could be changing electronic classrooms face-to-face education that is essential for students with hearing problem; it may be more perplexing because most of the students may not have Internet access and wireless-enabled laptops.

Education is the most important step toward the progress of any country. All the education institutes needs to hire motivational speaker to conduct motivational speeches during this pandemic so that all the students remain motivated for attending the online classes and remain positive about their learning. Low-bandwidth consuming software tools should be used for online learning so that the students living in the village and small towns with limited access to Internet can get benefits of online learning opportunities. Education institutes need to publish their books on their official website, because students will not be having access to the library books. One the most important things is that all the lectures should be recorded and need to be available on the official institution website that will help the student to attend missing lectures.

Distance education has traditionally provided via phone, but thanks to expanded usage of the Web and technical advancements, it is now accessible on the device or smartphone screen through different resources such as telephone, multimedia networking apps, and social connectivity such as networks, student clubs, student bundles, and video conference platforms such as ezTalks Cloud Meetings [15]. Personal cloud storage resources are becoming increasingly common. With a flood of companies joining the sector and an increasing promise of inexpensive storage space, cloud storage is projected to produce a large volume of Internet traffic early. There is relatively little information regarding the design and efficiency of these structures and the workload they face [16]. One of the best cloud storage software tools is Dropbox, and some E-Learning software tools are Microsoft Teams, Zoom, and Webex.

• Pros
  – Usually, you can set your own study pace too.
  – It’s your decision, when and where you’re learning.
  – Wherever you reside, it doesn’t matter—you can get a degree from everywhere in the country.
• Cons
  – You need an Internet connection.
  – You should have knowledge about how to operate the tools.
  – If you lose a connection, you will be disconnected from the online session.
  – Student should have microphone and camera for interaction.

In 2001, an initial evaluation of the technical capacities of four Internet-based online video conferencing devices (CUseeMe, ICUII, Virtual VoxPhone Black, and NetMeeting) was performed with language teachers and device specialists, and NetMeeting was established as the most effective oral and visual connectivity support platform in DLE [17, 18].

Currently there are a lot of tools available for video conferencing. A detailed comparison is given below (Table 13.1):

Main challenges are arranging online classes in an effective manner. Fully functional LMS (learning management system) is required for uploading assignment and conducting online quizzes and exams. There are concerns to be worried as extended school closing and home detention during the spread of the disease may have adverse impacts on the physical and mental fitness of children. Data shows that children who are out of school (e.g., weekends and summer holidays) have less active activity, a slightly longer turnaround period, erratic sleeping habits, and fewer healthy diets. The psychological effect on children and adolescents is a more serious but easily overlooked problem. Stressors such as excessive duration of time; sickness issues; anger and loneliness; lack of paperwork; lack of regular contact with parents, friends, and instructors; lack of personal rooms at home; and loss of family income may have much more detrimental and irreversible consequences on adolescents [18].

| Features              | zoom | Google Hangout | Class Webex | Microsoft Teams | slack |
|-----------------------|------|---------------|-------------|-----------------|-------|
| Video                 | Yes  | Yes           | Yes         | Yes             | Yes   |
| Screen Sharing        | Yes  | Yes           | Yes         | Yes             | Yes   |
| Meeting recording     | Yes  | Yes           | Yes         | Yes             | Yes   |
| Max users             | Up to 500 depends on plan | Up to 250 depends on plan | 50 Up to 1000 depends on plan | Up to 250 Unlimited |
| Mobile-friendly       | Yes  | Yes           | Yes         | Yes             | Yes   |
| Join via link         | Yes  | Yes           | No          | Yes             | Yes   |
| Drawing tools         | Yes  | Yes           | No          | Yes             | Yes   |
| No student sign-up    | Yes  | No            | No          | Yes             | No    |
The IT-based methodologies include webinars, virtual learning management systems, and video conferencing tools to help education systems to fight against COVID-19. Teachers worldwide appear to be capable of managing virtual classroom, communicating with students on social media platforms, and teaching students affected by the COVID-19 pandemic through distance learning. In numerous educational establishments, learning management systems (LMSs) were adopted to improve pedagogy through their features and applications. Educational institutes were encouraged to use LMSs to enhance the working atmosphere of students and their instructors working together.

The role of technology in education, in its Web creation relationship. Stating that, the value of conventional learning methods and educational strategies cannot be ignored, because one should still teach algebra, for example, in a discursive manner and it gives students and instructors the ability to feel the pleasure of participating, or active involvement [19]. Technologies obviously can touch a far larger student population, irrespective of spatial and/or social restrictions [20]. Technology shifts the position of teachers from instruction to help and encouragement, which shifts reliance on some times and locations we want students, particularly young students, to “do” school. Let’s assume that while COVID-19 is reflections in our rear view, the inventions and technologies that enabled our students and educational institutions get through it are normal and frequently used resources in the great challenge of educating children (Fig. 13.3).

Continued adoption of structured and informal education across classrooms, linked to community-based risk management, promises the creation of a “health culture” of communities less fragile and more responsive to future catastrophe impacts [21]. Institutions should be trained in a manner that provides them with adapted information and strengthens their capacity to handle and plan for disasters and maintain preparation for future emergencies. Future preparation would include the efficient distribution of capital. By enhancing their understanding of the partnership between preparedness and catastrophe risk management, schooling will enable individuals to take preparatory steps. In fact, trained citizens will have a stronger idea about what preparedness steps can be taken.
13.3 Discussion

The COVID-19 pandemic is a health problem in the first place. Most nations (rightly) have agreed to shut down schools, colleges, and universities. Online teaching evolves at an untested, unparalleled rate [22]. A number of experiments were essentially cancelled. Obviously, such challenges may only pose a short-term problem but may also have long-term consequences for the students who have been impacted. It is predicted that inequalities between students would increase. Closing schools, colleges, and universities is crippling student schooling across the globe. Significant assessments of professional qualifications for the whole class are cancelled. We’re likely to see these actions globally depending on the duration of the lockdown. But it is also likely that certain student occupations will profit from interruptions [23]. In higher education, several universities and colleges are replacing standardized tests with electronic evaluation instruments; this is a different environment for both teachers and students, so evaluations are expected to contain a larger measuring error than average. In higher education, many universities and colleges are replacing traditional exams with online assessment tools; this is a new area for both teachers and students, and assessments are likely to have greater measurement errors than usual. Public-private education collaborations may rise in value as a remedy [24]. In developed countries such as Pakistan, a positive development in future education can be rendered to account for student loses, and school changes may gain in the future. The benefit of that would be that the joint approach of government and private educational establishments will prove to be in the benefit of the students in the future. In fact, there is a need to reduce the expense of obtaining online schooling in places where online education is delivered utilizing digital platforms such as Microsoft Team, Zoom, Google Classroom, WhatsApp, etc. To receive information, the Education Commission will keep in good contact with the educational establishments. The responsible authority will also have a forum for students to lodge concerns regarding online schooling so that they can be further implemented [25]. Colleges and colleges have provided for the budget limitations by growing the proportion of their paid teaching personnel. Although it poses its obstacles, it is also a huge opportunity to break out of old habits and develop fresh, strong, meaningful learning models that take advantage of technology. In the longer run, this year’s college application process will be more complicated owing to standardized assessments, online education, and improvements to criteria. New applications in the home are likely to drop because many students and their parents will no longer be in a position to pay tuition fees when they are laid off. In a very short time, the faculty and staff have transitioned all learning to online and virtual, and this will undoubtedly have an impact on student success and retention.

The adoption of project-based learning and collective preparation to full credit hours will facilitate that. In fact, simplifying criteria for degrees will often go a long way toward not just encouraging applicants but also training colleges for potential cohorts. Similarly, professionals require ways to participate successfully. Instead of conventional coursework, colleges should opt into mentored learning opportunities
and online professional growth services [26]. Decision-makers will therefore utilize and distribute capital wisely in a manner that enables smaller institutes to leverage information from larger universities. This may involve capturing video or audio presentations and shared usage of electronic conference sites.

In a case study of Peking University, the educational institutes have initiated initiatives to create an accessible education network focused on knowledge and network technology digitally since the beginning of the twenty-first century. The number, complexity, and length of the teaching material are suitable for the training of students and the properties of online learning activities. Due to the low concentration of students in online learning, it is necessary to change the pace of the teaching so that the teacher’s information is presented effectively. Teaching assistants and professors must give their students timely input, such as online video tutoring and e-mail guidance. Certain measures must be adopted to enhance the degree and depth of student attendance. Principle of contingency plan preparation. Due to the huge amount of online education [27].

For most colleges, particularly those campuses which emphasize an intimate college experience, the necessary transition to online learning has been challenging. Particularly if foreign students are eligible to enroll online in fall courses, there would be questions of electronic connectivity as well as freedom of expression and considerations of thinking for certain people with more austere regimes [28]. Additionally, owing to different time zone variations, many foreign students will not be willing to take part in real-time classes conducted remotely, and in the case that foreign students cannot be given a transitional solution, higher education organizations would suffer fewer diverse student demographics and greater financial pressure. In short now the future is online education and online learning. All the institutions are refining their process in order to conduct online classes and exams.

13.4 Conclusion

Educational institutes need to respond skillfully and creatively to stay ahead of the events. As well as key project management and marketing positions, exposure to epidemiological experience is crucial for senior leadership. Moreover, as no two universities work in nature or design similar, a one-size-fits-all solution would go out of the window. The higher education sector in the world has a tremendous potential to build on when a growing amount of employers seek educational programs that closely match the requirements of modern global industry. Universities will need to incorporate equity-based measures as many students may not have the tools or access needed to complete the online coursework. Steps to address future instability and risks to plan execution need to be assessed and enforced. Finally, in comparison to their own budgetary issues, higher education organizations ought to consider fair workplace choices from teachers to janitors and third-party suppliers. When Earth marches forward from the darkest day of the novel coronavirus pandemic, the higher education industry has a great chance to turn a fresh leaf and use
that ability to push further into a better future. It would take a desire to step outside of conventional frames and to introduce creative, flexible, and constructive initiatives around the board. I hope that a day will arrive where educators will express their experiences and help each other in a way that creates trust like we’ve never seen before. And I hope the planet is more respected for how challenging it is to educate a student but also for how valuable and vital educational initiatives are to our future.

13.5 Future Directions

Our work shows that online learning has been shown to improve knowledge processing and take less time, suggesting that the coronavirus improvements could have induced remaining here. We believe that schools that rely on electronic program management services to administer online programs have had a more challenging time in making this move. We need confidence in investing in such a competitive market, however, does not continue as it used to in the short to midterm. Private sector roles for development of innovative online learning solution now become very important. Collaboration tools need to be tested in the future. Reviews of tools need to be published of the official website so that institutions can share their feedback with each other. The COVID-19 crisis could well transform our environment, and our global perspective can also tell us how schooling must evolve to help educate our young learners for what the future can bring. Educating peoples in an interconnected world is the future, redesign of educator’s position, providing life skills for the future and technology enabling to provide knowledge.

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