Digital Technology Adoption and Its Impact on the Education System During the Covid-19 Pandemic

Nityananda Barman
Dept. of Statistics, B.N. College, Dhubri, Assam, India
nynbarman@gmail.com

[Abstract] The Covid-19 pandemic has caused significant impact in education, resulting in shifts of the traditional education into online education. This study discusses the application of various e-learning tools, their pros/cons that affect the adoption of the right tools to facilitate educational processes. When we compared different video conferencing tools, Zoom was in the first position, followed by Google Meet and Microsoft Team. Google Meet can be used by all people without any hesitation. Google classroom is mostly preferred by students. There is limited research on this subject, which is a great challenge. To choose the right technology for education, research should be conducted on all available online tools.

[Keywords] Covid-19, technology adoption, Zoom, google meet, google classroom

Introduction

Covid -19 is a zoonotic virus with single stranded RNA. This virus includes in family Coronaviridae and subfamily Coronavirinae. The severity of the disease ranges from subclinical infection to respiratory infection leading to death of an infected person. In some cases, neurological symptoms also observed (Huang et al., 2020; Zhu et al., 2020). The common cold is, also, caused by Covid-19. This virus was first detected in the 1960s. Since then, every few years, highly virulent strains appear and cause a pandemic. The 2002-2003 severe acute respiratory syndrome (SARS) and the 2015 Middle East respiratory syndrome (MERS) (Liu et al., 2020) are two examples of such pandemics. Recently, it caused global pandemic with high morbidity and mortality in 2019.

Covid-19 enters the human body by direct transmission or through the spread of droplets (Chan et al., 2020; Li et al., 2020). The virus contaminates the surrounding objects and surfaces from which one person may be infected by touching their eyes, nose or mouth with his/her infected hands. The virus then enters in to the lung epithelial cells and increases the severity of the disease. The virus produces symptoms in 5-6 days after entry into the human body (Wang et al., 2020). Death may occur in 6 to 14 days after   the first appearance of symptoms (Ren et al., 2020). Before the appearance of symptoms, an infected person is able to transmit the virus to other people. Children below 10 years, aged people of more than 60 years, people with pre-existing medical conditions, and pregnant woman are mostly susceptible (Mahesh, 2020). In the first stage, there is a transient phase of viremia producing fever, cough, and fatigue; later, the person may produce sputum and have headaches, dyspnea and diarrhea. Pneumonia, acute cardiac injury, and respiratory distress symptoms were observed in chest CT scans. The pathological changes are a high erythrocyte sedimentation rate, leucopenia, high blood level of some cytokines, etc. In low and freezing temperatures, this virus appears to be stable for a certain period.

In Wuhan, a city of China, a case of pneumonia was detected 31st December, 2019 (Toit et al., 2020). Later, WHO declared that this case was due to a new form of the Corona virus i.e., Covid -19. Gradually, most of the countries were affected by this virus. In India, Covid-19 activity was first detected in Kerela January 30,2020. Gradually the disease spread to almost all the states of India.

To prevent the spread of this dangerous virus, WHO suggested all educational institutions shut down. So, there was need of alternative teaching methods during this lockdown period, which resulted in digital learning or learning through internet. In these difficult times, we all should try our best to make e-learning effective. Online learning methods are being used by teachers of various subjects to teach students, provide course materials, conduct tests, and upload lectures during this lockdown period in India. So, all teachers and students should use the online technology more efficiently to make the education process more

effective. The pros and cons of each online tool should be studied deeply before adopting the specific tool by educational institutes. Different institutes should conduct plenty of research of different online tools to bring the right technology for different educational initiatives. The selection of a particular technology depends on several factors, such as internet access and speed, security features, cost, user friendliness, choice of teachers and students, and so on. Among different online tools, ZOOM, Microsoft TEAMS, and Google Classroom are the most popular tools among teachers and students. However, most of the educational institutes are confused about selecting the best tool for online-learning. Therefore, a study related to comparison of different online tools is necessary to determine the best tools. Keeping these factors in mind, we try to analyze the pros and cons of online tools used during the lockdown period to help select the specific tools for specific purposes.

To continue the learning system, a long-term solution is needed in government and private educational institutes. In addition, to manage the crisis, the government should develop some strategies for the educational system. We should take out the technology that can effectively manage the education system with low procurement and maintenance costs. Before selecting, we should study the pros and cons of the specific tools. Therefore, this is the time to gravely rethink and redesign our education system in terms of the demanding need of the unprecedented current situation.

Literature Review

There is significant impact of Covid-19 on the different directions of the society of the globe, such as in travel, healthcare, economy, agriculture, education, commerce, business, etc. Among the different systems, the educational system is mostly affected by this pandemic. The government suggested closing all the schools and universities in 165 countries with the aim to prevent the spread of disease among the students. This will help flatten the curve of Covid-19. So, the teaching-learning methods, including the assessment methodologies of the education system, faced an unexpected situation. In India more than 32 core students have been affected by the nationwide lockdown. Students are depressed and in social stress, as they have missed the opportunity in learning and various jobs in different sector.

The higher education system is mostly affected by this pandemic. The students from India missed the scope of going for higher studies in developed countries like the US and the UK. It also increased the unemployment rate in the society. The Centre for Monitoring Indian Economy has reported that the unemployment rate increased to 23% in early April from 8.4% in mid-March (Sharma, Y, 2020). Therefore, it is necessary to take immediate and necessary steps to main the job tradition in the corporate and government sectors.

Singh and Awasthi (2020) conducted a comparative study on different video conferencing platforms and concluded that there are both advantages and disadvantages in every application. We should mostly be concerned with security before using these applications. Thakker et al. (2020) conducted research among engineering students of India to solve the problem of using e-learning platforms faced by them during Covid-19 pandemic and found that they mostly preferred the Google Meet platform when comparison was done by using a five-point Likert scale. When the net promoter scored (NPS) of 30.36, they observed that Microsoft Teams is the most satisfying e-learning platform. Parra and Granda (2021) evaluated the two online tools (Webex and Zoom) for students of the university. They used Questionnaire and Microsoft Reaction Cards to evaluate these two tools. They concluded that Zoom was significantly more attractive than Webex. However, in user experience and the classic aspects of usability, there was no significant difference between them.

There is a necessity of developing some strategies that can manage the crisis in the higher education system during Covid-19. There is a need of a long-term solution, which will help in the continuation of the learning system in schools, colleges, and universities. Online teaching-learning is mostly adopted by almost all countries to maintain the education system at all levels.

Methodology

This study is completely based on secondary data. The data are obtained from (a) books, (b) reports, (c) research publications, and (d) other published academic documents. The three main primary sources are Wikipedia, India Covid-19 data, and the data available in Ministry of Health and Family Welfare, India.

Results and Discussion

The lockdown due to Covid-19 pandemic affected almost all educational institutes to suddenly change their traditional educational processes and implement new online technologies in the existing traditional set up. Both teachers and students who are not familiar with the digital technologies and who have limited access to these technologies are facing problem in dealing with this changing situation. As the universities, schools, and educational institutions were closed, the traditional educational process is hampered, and therefore, all the institutions depend on e-learning methods to provide study materials and lectures and to conduct examinations.

In recent years, several online educational tools were available. Some countries have become very successful in the transfer of knowledge from teachers to students. In India, several institutions feel that digital education should be the part of future academic activities. Digital technology may be included in the admission process, teaching the students, in the examination process, enhancing faculty enrolment programs, etc. But for adopting the same, teachers, students, and parents should equally change their mindset and accept the new technology.

The government of India developed some platforms like Diksha, e-yantra, e-pathshala, FOSSEE, NIOS, and NROER to educate the students online. Zoom, Google classroom, Microsoft Teams and Google Meet are used by the teachers for online education.

Although different online tools are used in education system, unlike the other tools in Microsoft Teams, there no abilities for management of attendance of the participants. When security is concerned, Google Meet has a weak point, as it does not have an activity dashboard or access control mechanism. The Windows phone app is not supported by the Zoom and Microsoft Teams, whereas all the platforms available to people are supported by Google Meets. Among all the online tools, the low-cost tool is Microsoft Teams in comparison to Zoom and Google Meet. From the above, we observed that although the Microsoft Teams' quality is much higher than both Google Meets and Zoom, awareness of Microsoft Teams is very low among the people because the Microsoft Teams is somewhat weaker than Google Meets and Zoom. When we concentrated on security and privacy of the platform, Microsoft Team was not as favorable as Google Meet. In the case of Google Meets and Zoom, the percentage of awareness is of 81.6 and 86, respectively.

Different studies have   revealed that in the teaching/learning process, Zoom is considered as the best tool. Zoom can be easily installed on the computer and to join in the online classes all should simply click on the join link at a given time. As it is free, teachers do not have to pay. The teacher can also talk in a group, and it is does not matter how many teachers are present in that group. It is also very important that Zoom can be use easily by both teachers and students, and, also, it is compatible on all computer systems. Overall, among all the video conferencing solutions, most of the users considered Zoom as the best option.

Table 1

The Pros and Cons of Different Online Tools

Online Tool	Pros	Cons
Zoom	i) Collaboration tools ii) Account is free iii) Connects to conferencing equipment iv) Works with every single working device including Linux v) Host up to 500 participants	i) Call-in users cost an extra fee ii) Must cancel popup blockers to use.

Google meet	i) Share screen ii) Send records through visit iii) Free for everybody to use iv) No extra fees for call-in members v) Additional features with G Suite membership	i) Can have less members ii) Clunky and untrustworthy for Mac clients
Google classroom	i) User-friendly. Both the teachers and students can use it easily. ii) Can be used through various devices. iii) By using Google Drive sharing is possible iv) Through Google Drive Teachers can share documents to their students by uploading the particular content. v) Students can also share their doubts for discussion and assignments for grading vi) Teachers can share their grading and feedback on the student's performance. vii) The correction on the notes and assignment can be done digitally. ix) Grading of the students can be done quickly by the teacher and the that can be export to the Google sheet. x) There is a provision of multiple classrooms. xi) When anyone of the teacher upload new documents, notifications are sent by the Google Classroom to the students	i) Sometimes G-Suite is needed to set up a meeting on Google meet and for that we need to pay. ii) Internet access should be required continuously. iii) Students that are not acquainted with the computer they will face problems during handing. iv) Not very user friendly for low class students. They need to take help of their parents.

Conclusions

Although digital learning systems are employed in most schools, colleges, and universities, all the teachers and students are not involved in this system. Especially in countries like India, the curriculum is not designed for online learning. Most of the older teachers are not aware about how to operate the internet in their mobile phones. Moreover, internet connection is not available in some remote areas, also. In India, some areas are so backward that the electricity and internet facility are not available. So, a big question remains about how online education can be successful in such remote areas of India. A large part of the population in village areas are in BPL category and away from the digital world, and they are not capable of buying mobile devices with internet connections for their studies. The deprivation of the students in the rural areas can easily be felt, and this is in the educational field and, thus, the future of the student, society and state is at stake. So, the sudden shift of traditional classroom learning to digital learning may not be successful in developing countries like India. Thus, online learning stands as a new challenge for the near future.

For the first time, around the world, online education has been implemented during the COVID-19 pandemic. It helps in design strategies by the educational institutions to compensate due to Covid-19 lockdown. This lockdown significantly impacts the face-to-face traditional education system. All the developing countries like India need to enhance their broadcast and online teaching infrastructures for virtual classes. For the time being, most of the online tools are sufficient for learning, but improvement is required to adapt it with the fast-changing education system resulting from the Covid-19 lockdown. Various

studies revealed that most of the platforms are not updated per the current requirements, especially the video and audio quality of the respective online platforms. Various studies have revealed that Google Meet is considered the best tool by the students, followed by Zoom and Microsoft Teams, respectively. If the features related to social presence is improved in Microsoft Teams, it can stand as a strong competitor to both Google Meet and Zoom.

In the present situation, digital learning is not considered as the best alternative to traditional learning when both theory and practical are combined. Improvements of the different online tools are necessary to make them more user and technically friendly and more adaptable with high effectiveness. Motivation of teachers and students is also necessary to make this digital learning successful in different areas of developing countries. The basic purpose of education is being served by the available online tools, but more enriching experience can be achieved by integration of the platform with other platforms. Considering the above points, it can be concluded that online learning is best to maintain the education process among the students and teachers in this unprecedented situation in India, but enhancement of infrastructure for digital platforms is ultimately necessary to consider this method of learning completely fruitful.

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