Asian Journal of Distance Education

Higher Education in India: Challenges and Opportunities of the COVID-19 Pandemic

Prakash Chandra Gope, DeepayanGope, Aditya Gope

Abstract: The higher educational institutions and universities were forced to be shut down due to the COVID-19 pandemic and came up with an alternative to resume the teaching-learning process via a digital mode of education. Due to many shortcomings in the digital mode of education, it is now necessary to reopen educational institutions. As students are important stakeholders, the views and suggestions are necessary before actually taking a decision on reopening the educational institutions. With objectives on reopening of educational institutions, modification in the course curriculum due to many problems faced by students during online teaching-learning process, health and safety protocols to be followed,etc, 21 questions are designed. Likert scale is used in data collections and analysed using various statistical tools.The students have different views on the reopening of the institutions during the COVID-19 pandemic. The practical or project-based course curriculum irrespective of offline or online mode of teaching is suggested by most of the students. On the health and safety protocols, the percentage of students giving priorities for creation of disinfection room, hand sanitization station entry and common places and regular health checkup are 74.82%, 80.69% and 74.48%, respectively. On the issue of the health and safety rule implementation, 92.4 % of students committed to pledge to adhere to the health and safety protocols, but 72.9% of students expressed that it would be difficult to enforce health and safety measures to the students inside the institution.

Keywords: COVID-19 pandemic, emergency remoteeducation, higher education, social and health issues, course curriculum.

Highlights

What is already known about this topic:

- Higher education institutions have students from all over India, studying in various institutions or universities.
- The novel coronavirus outbreak that originated at Wuhan in China in late January 2020 forced the educational institutions to close down.

What this paper contributes:

- A substantial majority of the students want to continue their study through online teaching mode till the cases of COVID comes under control.
- Students suggested practical or project-based course curriculum irrespective of offline or online mode of teaching.
- The health and safety protocols are more important aspects if institutions are reopened during COVID-19.

Implications for theory, practice and/or policy:

- Present online teaching and learning mode adopted by many institutions are not adequate and major changes are required.
- The alternate measures suggested by the students to follow the safety guidelines may be taken on reopening of the institutions for the implementation of the health and safety protocols.

Published byEdTechReview (ETR), New Delhi, India
ISSN 1347-9008 http://www.asianjde.org

Introduction

The novel coronavirus outbreak originated at Wuhan in China in late January 2020 and China declared a lockdown for its11 million residents. Furthermore, it got spread across other countries rapidly. The COVID-19 pandemic in India is a part of the worldwide pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first case of COVID-19 in India was reported on 30 January 2020. A 14-hour voluntary public curfew was called by the Indian Prime Minister on March 22, 2020. The first nationwide lockdown was declared by the Government of India on 24 March 2020 affecting a population of 1.3 billion. On 14 April, the Prime Minister extended the ongoing nationwide lockdown further till 3 May 2020. On 1 May 2020 lockdown across the country was further extended by two more weeks till 17 May. On 17 May, NDMA further extended the nationwide lockdown till 31 May. On 16 March, the Union government declared a countrywide lock-down of schools and colleges (https://en.wikipedia.org/wiki/COVID-19_pandemic_lockdown_in_India). Thus, the coronavirus lockdown measures have fully closed all the educational institution in India and more than 32 crore students have been affected by the various restrictions till writing this article due to the rapid increase of COVID cases. Keeping view of the challenges in front of educational institutions to reopen, a survey has been conducted among the students of various higher educational institutions and considering their views a detailed analysis was done.The results are used to highlight some of the critical issues, the institutions should consider before reopening the institutions or universities.

Literature

The education crisis on a global scale due to the COVID-19 pandemic was discussed by Bozkurt and Sharma (2020a). It was pointed out that education is unprepared and vulnerable to external threats and hence special measure should be taken to overcome the issues due to pandemic. To overcome the educational problem many countries came with alternate solutions. The shifting from offline mode to online mode during this tough time the only concern of many educators is not the quality of education (Carey, 2020). The majority of institutions across different countries adopted online teaching.Ali (2020) has presented the needs forflexible and resilient education systems during the COVID-19. Using meta-analysis methodology his findings reveal that universities worldwide are moving more and more towards online learning. Findings also revealed that apart from resources, staff readiness, confidence, student accessibility and motivation play an important function in ICT integrated learning.The Chinese government made a policy as “Suspending Classes Without Stopping Learning” to continue teaching activities. Due to many shortcomings and criticism of the policy adopted by the Chinese Government, Zhang et al. (2020) have suggested that the government needs to equip teachers and students with standardized home-based teaching/learning equipment, to conduct online teacher training, and to support academic research into online education. Many authors (Bozkurt et al., 2020; Chen et al., 2020; Dhawan, 2020, Song et al., 2004;Jena, 2020, Kundu,2020) have commented on the process of online teaching imparted in different institutions and mentioned some suitable measures to be adopted for better teaching-learning and satisfaction. Daniel (2020) presented some viewpoints as guidance to teachers, institutional heads, and officials on addressing the crisis during the COVID-19 pandemic. The preparedness of the institutions in ashort time to address the various issues of the students is discussed by Daniel in his viewpoint. It is also suggested flexible ways to repair the damage to students’ learning trajectories once the pandemic is over and gives a list of resources. The importance of online learning and Strengths, Weaknesses, Opportunities, & Challenges (SWOC) analysis of e-learning modes in atime of crisis was discussed by Dhawan (2020). Dhawan (2020) also discussed the growth of EdTech startups during the time of pandemic and natural disasters and included suggestions for academic institutions onhow to deal with challenges associated with online learning.How the Covid-19 pandemic has created a sellers’ market in Ed-tech is discussed by Teräs et al. (2020). The commercial digital learning solutions is for profit-making as these are not always be driven by the best pedagogical practices. “Most of the terms (online learning, open learning, web-based learning, computer-mediated learning, blended learning,

m-learning) have in common the ability to use a computer connected to a network, that offers the possibility to learn from anywhere, anytime, in any rhythm, with any means" (Cojocariu et al., 2014). However, Littlefield (2018) pointed out that instant feedback and immediate response are not possible under such an environment. Practiceis more important than reading. The online contents delivered by many institutions may not be high quality and sometimes students could not learn effectively. The poor communication of the content, many technical issues, and difficulties in understanding instructional goals are the major barriers for students in online learning (Song et al., 2004). The institutions have adopted the online teaching process due to the COVID-19 pandemic without looking into the outcome based on quality education. In this context, Deshmukh (2020) discussed the education policy and how to enhance knowledge with skills and develop appropriate attitudes for promoting the development of the nation. Deshmukh also highlighted the human relations model required for quality education. The importance and differences between online distance education and emergency remote teachingarediscussed and concluded that emergency remote teaching is not an option, but an obligation (Bozkurt and Sharma, 2020a). They have concluded that emergency remote teaching or re-engineered distance education should collaborate with different shareholders (e.g., psychologists, sociologists, therapists, etc.) to offer better and timely solutions. Producing solutions on broader grounds is vital, because during times of crisis, delivering content is not the only issue of concern, caring and supporting learners at such times is also important.

Today many educational institutions have started teaching and examinations in online mode. Due to the online system of education, many students are not able to learn due to the unavailability of the internet, facilities of computers, mobile phones, etc. Therefore, the digital mode of teaching and learning divides the students and createsa huge gap between the haves and have-nots or able to understand the subject or not. This creates mental tension in many of the students. The stress level of an undergraduate student depends upon the academic workload, institutional demands, and some external stress such as making decisions on intimate relationships (KoawoEdjah et al,2020). KoawoEdjah et al. (2020) recommended that the university through its Students' Affairs and Counseling Sections continue to empower students on how to manage and deal with stress to enhance their academic life. This suggested that duringthe COVID-19 pandemic,the course load due to the online teaching-learning process and examination stressed more to the students and affect their academic performances. Cao et al. (2020) conducted a survey among the students from Changzhi medical college by using cluster sampling on unbearable psychological pressure due to COVID-19. The results of Cao et al. indicated that 0.9% of the respondents experienced severe anxiety, 2.7% moderate anxiety, and 21.3% mild anxiety The correlation analysis of the results indicated that economic effects, and effects on daily life, as well as delays in academic activities, were positively associated with anxiety symptoms whereas social support was negatively correlated with the level of anxiety. It was suggested for the monitoring of the mental health of college students during epidemics.

All educational institutions including higher education institutions are facing various challenges due to the COVID-19 pandemic on the issue of reopening in India in the next few days or as directed by the Government of India. Now the challenges in front of the institutions are the healthcare system, to provide education along with implementing the various rules and guidelines of social distancing and sanitization. The re-opening of institution carries the public health risk of viral resurgence (Russell etal., 2020). As the coronavirus SARS-CoV-2 causes a deadly diseasewith a fatality rate between 2-3%, student safety and health care should be the top priority of educational institutions. India is a vast country with many complexities. Due to the geographical conditions of the educational institutes or students, availability of the facility to cope up with the online mode of education, the overall response of the country to the COVID-19 pandemic has thus been very mixed in the education sector. Also due to the lack of infrastructure in many institutions, online classes are not capable of substituting classroom lectures and demonstrations. This is more serious in higher education where the applied part of science, maths and chemistry is quite more. The practical classes in the lab-based subjects are also not being held online and mathematical papers are difficult to be instructed online. Hence, it can be said that the impact has not been very positive. Gupta and Goplani (2020) andJadhav et al. (2020)

have discussed the effect of COVID-19 on educational institutions in India with special reference to Schools and Colleges and analyzed the action and decision taken by the government for the safety of Educational Institutions and related stakeholders. The study was descriptive and analytical where the data has been collected from the various official websites, newspapers, E-news articles, and discussion with teachers. Through their discussion, Gupta and Goplani have justified the taken decisions to close down the institutions for the welfare of the stakeholders and society as right and appropriate.

After spending almost a fifth of the year (68 days) under COVID-19 lockdown, India declared the phase-wise unlock on 30 May 2020. No decision on the reopening of the educational institutions in India hasbeen taken in the first two phases of unlock. As per the month back survey data, 92% of Indian parents are unwilling to send their ward immediately upon reopening of Institutions. Watch and see for a month after reopening policy to be adopted by 56% and barely 8% have shown willingness to send their wards back to the institution on reopening (Dimitri, 2020; Jake Bryant, 2020). Now it is a problem for all educational institution and a time to convert the challenges due to COVID-19 into opportunity. Some of the important factors to prepare guidelines to reopen the educational institutions should be based on benefits and risks to education, public health and socio-economic factor, as mentioned in the guidelines of UNESCO, UNICEF, World Bank and the World Food Programme to reopen the educational institutions. According to a report of the Ministry of Human Resource Development (MHRD), the Government of India conducted a survey on higher education and observed that there are 993 universities, 39931 colleges and 10725 stand-alone institutions listed on their portal, which contribute to education. These institutions further reflect the student density of India as the total enrolments in higher education every year are nearly 37.4 million, reflecting the expanding horizons of the education sector. A lot has been discussed in and around higher education institutions in the past few weeks on how to proceed with the academic calendar. In India, the Ministry of Human Resource Development (MHRD) is formulating safety guidelines to be followed whenever classroom learning is resumed. A new seating matrix, staggered classes, different mess and library rules, revamped hostels and canteens, could be a part of students' socially distant lives in schools and colleges when they return. Due to the urgency and need of the time, the views of the students and parents should be considered while making guidelines to reopen educational institutions.

Hans d'Orville (2020) argued in his report that the current crisis due to the COVID-19 pandemic on educational institutions is an opportunity for stronger international teaching, research collaboration. It will provide a better focus and deliver solutions, including digital tools. Many authors suggested imparting proper training on modern teaching aids to educators. Linda & Maria (2020) have explored the strategies required to support educators in meeting the social-emotional and academic needs of students during such pandemic. Their study reveals that investing in high-quality educator preparation, transforming educator professional learning opportunities is required to match current needs. Understanding the impact of COVID-19 on education and how to face the challenges undertaken by educators and researchers werestudied and discussed by Bond (2020). Highlighting some of the missing elements in past research, Bond has presented a bioecological model of student engagement. It was concluded by Bond that most of the research was conducted in Europe and Asia, predominantly focused on teachers, with more studies undertaken in high schools and provided practical tips for teachers.

Education is one of the determinants of economic development and plays a crucial role to shape human capital in the world (Al-Baadani and Abbas, 2020). Hence, it is important to rethink the reopening of educational institutions and many countries have started opening educational institutions in a staggered manner and according to the disinfection protocols of the institutional buildings. Now it is a challenge for the Indian government to preparea standard operating protocol to reopen institutions of higher studies. This crisis can be looked upon as an opportunity to reconstruct our long-standing educational systems and establish better and updated practices in academia, suitable for the present

generation of learners (Strielkowski, 2020). We must prepare ourselves for the changing world when the COVID-19 pandemic is blown off. Effective guidelines and proper plans for reopening of higher educational institutions and adequate support system by the government is equally crucial to ensure that when students do return to the institutions and join in teaching-learning physically. It is also important to provide the necessary safe environments for students. After 8-9 months of COVID-19, it is being put in motion in a phased manner to reopen the educational institutions. Under such circumstances, the opinion of the students on the reopening of the institutions is of utmost importance.

Despite several studies in the past, the opinion or views of the students on the issue of reopening educational institutions in India is not addressed. Under such pandemic condition, what modifications in the teaching-learning process, the course curriculum is required based on the facilities available at students level and problem faced by the students during past online teaching is not fully studied or reported in the Indian context. This is an attempt to address these issues. The present research is to collect the views of students regarding various aspects as mentioned here and to establish a framework through the identification of problems, challenges and opportunities due to pandemic.

Methodology

A student survey was conducted using a questionnaire comprising 21items.The questionnaire was designed to collect the views of the students from the various higher educational institutions, one most important stakeholder of the Educational Institutions of Higher studies on the teaching-learning process and standard operating protocols (SOPs) for reopening the educational institutions. A Google Form survey questionnaire was designed based on five main aspects ofthe reopening of higher educational institutions. All challenges are divided into five groups. This is quantitative cross-sectional research designed to explore when and under what condition to reopen the educational institutions, how the teaching-learning system should be, what modification is needed in the course syllabi structure, how the health sanitization system and disciplinary measures are to be taken on reopening the institutions (Creswell, 2004). Questions are open-ended as well as closed-ended and based on the Likert scale and the need of the hour. Such kind of survey based on the Likert scale can also be seen in the work of Allen and Seaman (2007);Browne (1998);Creswell (1994);Sprague (2007);Vidyut et al. (2020);Lall and Singh (2020);Joshua-Luther (2020). The detailsof the questionnaire are presented in the subsequent sections. Data for the survey was collected from the students of technical studies, management studies situated in hilly areas, coastal areas and plain areas. Views of medical institutions are not taken as the problems associated with the medical institutions are quite different than those mentioned here. Voluntary participation, confidentiality and anonymity ethical philosophy was used in this survey. Some of the working experiences during COVID-19 in the modern system of higher education presented by Michael et al. (2020) was taken into account while formulating the questionnaire.

Research Model/Design

During this pandemic, all educational institutions are shut down,as a result of which the academic activities suffered a lot. Due to the online teaching and learning process adopted during the pandemic, most of the students haveundergone mental and financial stresses. To address students' issues on health and safety protocols, course curriculum, teaching andlearning process and facilities, etc. the present study is designed with 21 questions for an online survey. Sample Questionnaires are presented here.

Q1. In the present condition of COVID-19, what would you prefer?

1. to join your Institution in the next session (the cases of Corona is not normal)
2. to continue with online teaching mode/remote learning of education till normalization of the situation

Q2. When to reopen the institutions of higher education in India?

1. at any time
2. when the coronavirus curve flattens
3. when the coronavirus curve start decreasing

Q3. Provide your views on the Teaching-Learning system (in 5 point Likert scale)

1. Institution to continue with online teaching activities with students staying at home
2. Institution to continue with mixed-mode of teaching with students staying at hostels (online and offline). Only doubt clearing session should be offline mode.
3. Completely offline mode of teaching by creating two or more sub-sections and following an odd-even basis.

Q8. If you have no option other than to resume your Institution, how do you rank your priorities that the institutions should create before reopening (in 5 point Likert scale) on the following issues?

1. A disinfection room should be created at the entry of the institution/University building and all students should enter through the disinfection area/room before entering the building
2. Clear demarcation of entry and exit line on the floor using footprints and divider line
3. Up-gradation to no-touch washrooms of the existing washrooms
4. Hand sanitizing station at the entrance and common places
5. Regular health check-up

Other questions are presented in the discussion. The data isanalyzed using various statistical tools.

Data Collecting Tools

It was felt that the most essential question for students on this issue of “Reopening educational institutions-Post COVID-19 pandemic” are health safety, safety facilities, teaching model and challenges for higher education institutions or universities. Today, because of extremely worse conditions due to the COVID-19 pandemic such questions and responses from the stakeholders such as students would certainly be quite demanding, both from an educational organization and also from the Government of India and the higher education department. Furthermore, it was considered important not only to collect as many responses from as many students as possible but also to create a heterogeneous group of students from the technical and management institutions and universities so that it would simulate as wide a range of students as possible to contribute their views. Moreover, students from different geographical conditions such as plain, hilly and coastal areas are included. Random sampling and selection of institutions are made in this investigation.

Sampling

The participants in this survey are both male and female from the higher educational institutions situated in the hilly areas, coastalareas and plain areas of India. A total of 293 students participated in the survey from different institutions.

Table 1

Distribution of respondents by Age, Gender and zone or area

Age (years)	Male (%)	Female (%)
18-20	7	7
20-22	22	10
22-24	24	11
>24	11	8
Total	65	35
		100

Zone	Male (%)	Female (%)
Hilly area	25	15
Coastal area	18	13
Plain area	21	7
Total	65	35
		100

To address the issues described here, the survey was conducted for both the first and second semester in May 2020 to June 2020 and August 2020 to October 2020.The distribution of respondents by Age,Gender and region (hilly areas, coastal areas and plain areas) are presented in Table 1.

Data Analysis

The mean, standard deviation (SD) and median are the statistical parameters used for comparison and to draw a valid conclusion. However, several criticisms on the use of mean and SD for Likert scale data are found in the literature. Similarly, many reports in support are also available in the literature. Harry and Deborah (2012) recommended descriptive statistics to be used in Likert type data and discussed on the Likert scale and Likert type data. In their study, it is suggested that mode, median and proportions are appropriate statistical tools to be used for Likert scale data. It is also suggested that mean and SD can be used for the analysis of Likert scale data.In this study, mean and modal values are used for analysing the students' views on different aspects of the study. Dependency test was conducted using Chi-square (χ^2) test. Analysis and conclusions were made using *t* and *p* statistics.

Validity and Reliability

Dependency test was conducted using Chi-square (χ^2) test.Other statistical tools such as *t* and *p* statistics are used for determining the validity and reliability of the results and recommendation. Test of hypotheses used in the analysis ispresented in the subsequent sections.

Research Procedures

Views received from the students from various institutions are analyzed using various statistical tools. χ^2test was used to validate the conclusions.Furthermore, the research procedure is explained in the subsequent sectionsalongwith questions used in the study.

Findings and Discussions

Data presented in Table 1 reveals that there were more males (65%) than females (35%) in the study. The majority of the respondents were between the ages of 20 and 24 years (67%). It shows that respondents are mostly from the second year to the final year of graduation. 40% of students are from hilly areas followed by 31% of coastal and 28% from plain areas. In the present investigation, the geographical effect is not included due to length limitation. Question wise findings and discussion are presented below.

Question "When to reopen higher educational institutions in India?"

Since Graduate, Post Graduate and Ph. D students are regarded as the most important stakeholders taking decisions about when and how to reopen the higher educational institutions, the first two questions are designed on "When and how to reopen the higher educational institutions in India?". It was felt that the most essential question for the students was to focus on the suitable time of reopening institutions in this COVID-19 pandemic. Hence, a question is framed as a close-ended question with three options. Views of the total respondents or students on these three different issues are shown in Fig. 1. 60.3% of the students are with the opinion of institutions to reopen only when the coronavirus curve starts decreasing, whereas 32.8 % are having a view that the educational institutions should reopen when the coronavirus curve flattens. Only 6.9% of students are ready to join institutions, universities at any time irrespective of the spread of the COVID-19. As per the median value (M=146th) of the data, most of the respondents are in favour of reopening the institutions only when the coronavirus curve starts decreasing.As per the students'views,it is not advisable to reopen the higher education institutions without normalization of COVID cases.

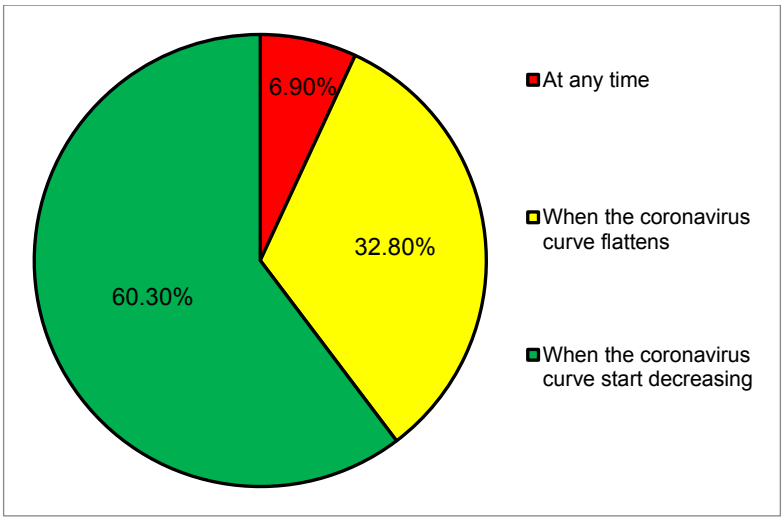

Figure 1. Students view on "when to reopen the higher educational institutions or universities"

Fig. 2 depicts the views of the students to join the institutions irrespective of the condition of the COVID-19 at any time or to continue with online education. The close-ended question is included in Fig. 2. In respect to the preference of the students whether to join or to continue with online teaching, it is found that 70.4 % of the students are having a view with the continuation of the online teaching without reopening the institutions or universities till the COVID cases in India normalizes whereas 29.6% students are willing to return to their institutions or universities atany time. This shows that a substantial majority of the respondents seem to continue their study in online teaching mode till the cases of COVID comes under control. It reflects that the pre-existing norms of social distancing, wearing a mask, and hand sanitization are not adequate measures to reopen and a guarantee to the prevention of the virus transmission.

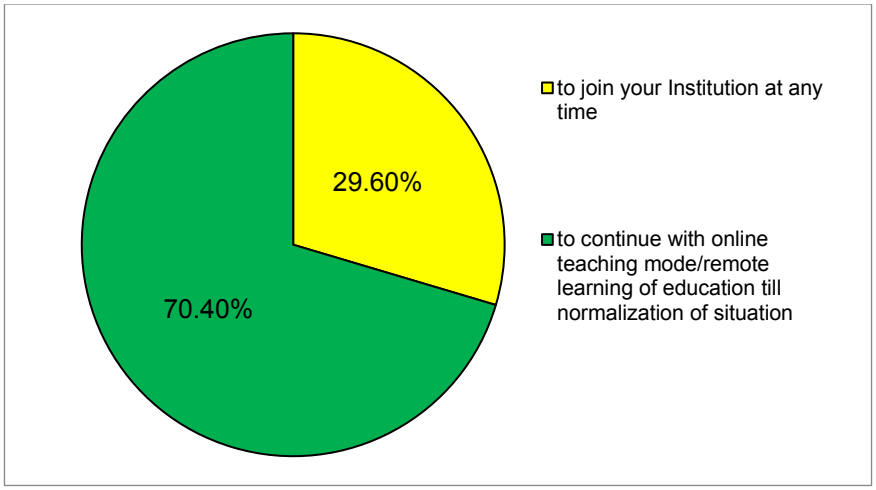

Figure 2. Students views on the preference of the students during the COVID-19 pandemic

Question on "Teaching-Learning System"

Under the teaching-learning system, the students were asked to indicate their views on a 5 point scale (Likert scale) on three different issues viz online teaching, mixed-mode teaching and offline teaching. The related questions and views of the students are shown in Table 2.Table 3 shows the mean, median and standard deviation (SD) of the Likert scale data on the opinion on the teaching-learning process during the COVID-19 Pandemic.

Table 2
Opinion on teaching-learning process during COVID-19 Pandemic

	1	2	3	4	5	
3. Your opinion on Teaching-Learning system	strongly disagree	disagree	neutral	agree	strongly agree	Total
Q3.1 Institution to continue with online teaching activities with students staying at home	33	38	66	85	71	293
Q.3.2 Institution to continue with mixed mode of teaching with students staying at hostels (online and off line). Only doubt clearing session should be offline mode.	67	67	70	52	37	293
Q.3.3 Completely offline mode of teaching by creating two or more sub-sections and following an odd even basis.	125	67	42	41	18	293
Total	225	172	178	178	126	879

Table 3
Statistical properties of Likert scale data on the opinion on the teaching-learning process during COVID-19 Pandemic

Question	Median	Mean	SD
Q3.1	4.00	3.42	3.15
Q3.2	3.00	2.74	2.56
Q3.3	2.00	2.18	2.06

Issues on the teaching-learning process and the corresponding views of the student communities are shown in Fig. 3. 24.4% of students chose the highest scale values of 5 which means they strongly agree with the statement “Institution to continue with online teaching mode with student staying at home”. 29.2% decided on a 4 indicating that they agree on a remote teaching mode of learning. 11.34% of students have disagreed on the online teaching-learning process to be adopted in universities or higher educational institutions. A good number of students (about 22%) could not decide what to do. The mean value for the whole group was slightly above 3.5 (M=4), which indicate that most of the students are with the opinion to continue with the online teaching staying at home. For the teaching-learning process in“completely offline mode by creating two or more number of subsections and following an odd-even basis”, 42.3% of students have shown strong disagreement and only 6.2% students have strongly agreed on the offline teaching with different subsections. The results of the students' opinion on “Institution to continue with mixed-mode of teaching with students staying at hostels (online and offline) and only doubt clearing session should be offline mode” is found to be interesting. An average indication of disagreed students is 45.4% as compared to the agreed students of 30.6%. 24.1% rated with a scale of 3 as neutral. Table 2 shows that the median is more appropriate with the conclusions made from the frequency. Table 3 reveals that online teaching is the most appropriate during COVID-19 than the other two options given in the questionnaire. Hence, it is suggested to continue with online teaching during the pandemic.

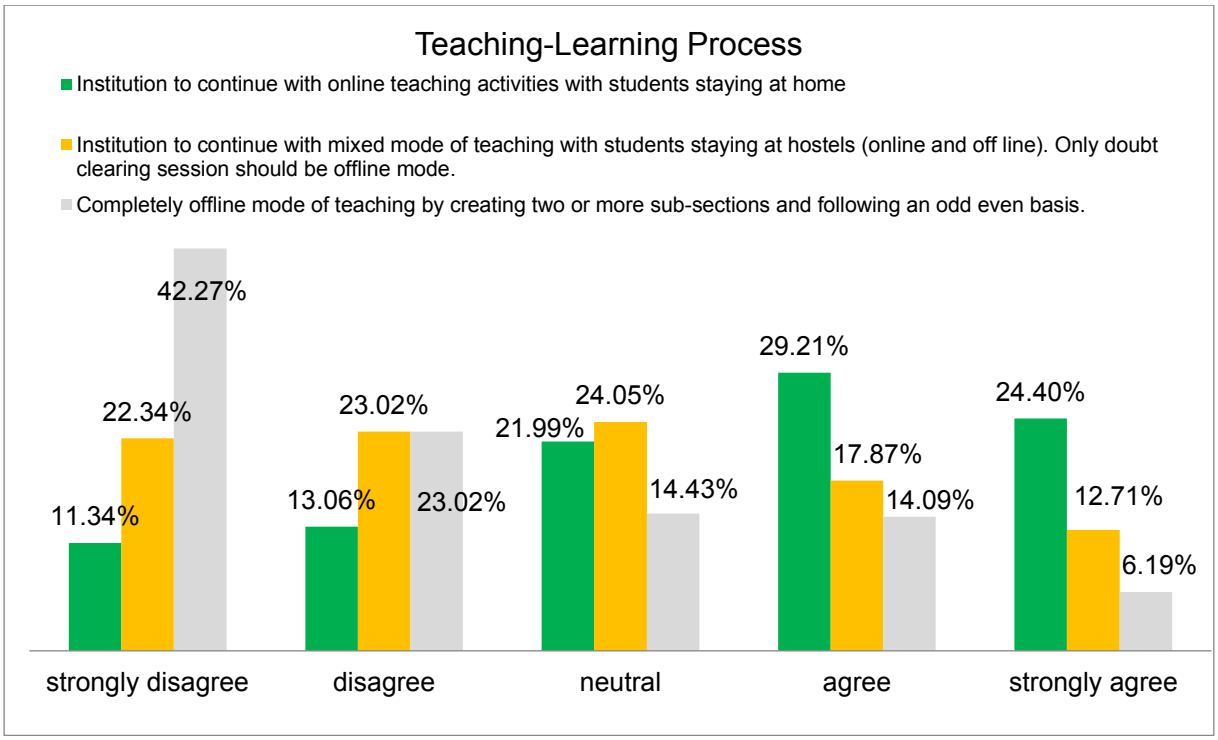

Figure 3. Student views on the present system of the teaching-learning system followed in higher educational institutions

Table 4
Results of χ^2 test on the teaching-learning process during COVID-19

	Chi-square test					
	1	2	3	4	5	
Objectives	strongly disagree	disagree	neutral	agree	strongly agree	
Q3.1	23.52	6.52	0.75	11.10	20.02	61.92
Q3.2	0.85	1.63	1.92	0.91	0.60	5.90
Q3.3	33.33	1.63	5.06	5.66	13.71	59.41
				Calculated	χ^2	127.2236
				Tabulated	χ^2	15.51
					dof	8
				Significance level		0.05
					p	1.06378E-23

Test of hypotheses

The questionnaire is prepared to study the effect of the pandemic on the teaching-learning process. The correlation between the questions framed and pandemic is evaluated by using Chi-square (χ^2) test. The results of the dependency test conducted using Chi-square (χ^2) test ispresented in Table 4. The following hypothesis is used. There is a relationship between coronavirus disease (COVID-19) and the teaching-learning process.

Decision rule: The researchers, therefore, reject the null hypothesis, “there is no relationship between coronavirus disease (COVID-19) and teaching-learning process” as the calculated value of χ^2 =127.22 is greater than the critical value of 15.51 at 0.05 significance level. Therefore, the alternate hypothesis is accepted that there is a relationship between coronavirus disease (COVID-19) and the teaching-learning process. The *p*value is less than 0.05 which confirmed the conclusion made from the statistical test. From the χ^2 test it can be concluded that Q3.1 and Q3.3 are equally important for the students. However, most of the students prefer the online mode of teaching during the COVID-19.

Question on "Course curriculum"

The course curriculum of a degree program and the mode of its delivery are very important. Views of the students on the Likert scale are obtained and presented in Table 5. Is the existing course curriculum sufficient and most suitable during the pandemic or not? To obtain the views of the students on this issue the questionnaire was designed with 4 questions and is presented in Table 5.

Table 5

Opinion on the course curriculum during COVID-19 Pandemic

4. Your opinion on the Course curriculum	strongly disagree	disagree	neutral	agree	strongly agree	Total
Q4.1 Redesign of course curriculum and fundamental courses should be taught in offline mode and other courses through online mode	42	46	74	85	45	292
Q.4.2 Online courses should be practical oriented and basics should be explained in the practical classes	35	29	66	104	58	292
Q.4.3 More emphasis to virtual practical classes	27	34	82	92	57	292
Q.4.4 Project based courses to be introduced	34	30	72	76	80	292
Total	138	139	294	357	240	1168

Fig. 4 shows theviews on the necessity for the redesign of the present course curriculum for the blended teaching-learning process under thepandemic situation or even in normal condition too. Four options are given to the students to choose with their rating from 1 to 5, 1 as highly disagree and 5 as strongly agree (Likert scale). These four options are (1) Redesign of course curriculum and fundamental courses should be taught in offline mode and other courses through online mode (2) Online courses should be practical oriented and basics should be explained in the practical classes (3) More emphasis to virtual practical classes and (4) Project-based courses to be introduced. The percentage of the students who strongly agreed is15.5%, 20%, 20% and 29.6% respectively. If the average values of agreed and strongly agreed students are taken together it was seen that 44.7%, 55.67%, 51.21% and 55.67% of the students have given their views for the above four options respectively. Table 6 presents the statistical parameters of the opinion on the course curriculum during COVID-19 Pandemic shown in Table 5.

On the frequency-based analysis, these results reveal that most of the students have given the highest weightage on practical or project-based course curriculum irrespective of offline or online mode of teaching and the mean value of the Likert scale data support the same. However, as per median value questions, Q4.2 to Q4.4 are equally important for the students. All three questions (Q4.2 to Q4.4) are related to the practical based course curriculum. This is a big concern for the institutions and other authorities to redesign a practical based course curriculum, which may improve the employability of the students. As in the survey,practical-based course curriculum is more preferred, it can be concluded that providing education is not sufficient but to make it more employable, is what the student desire. A more practical based course curriculum can only provide adequate practical-based skills that are required by industry.

Table 6

Statistical properties of Likert scale data on the opinion on course curriculum

Question	Median	Mean	SD
Q4.1	3	3.15	2.90
Q4.2	4	3.41	3.13
Q4.3	4	3.40	3.10
Q4.4	4	3.47	3.21

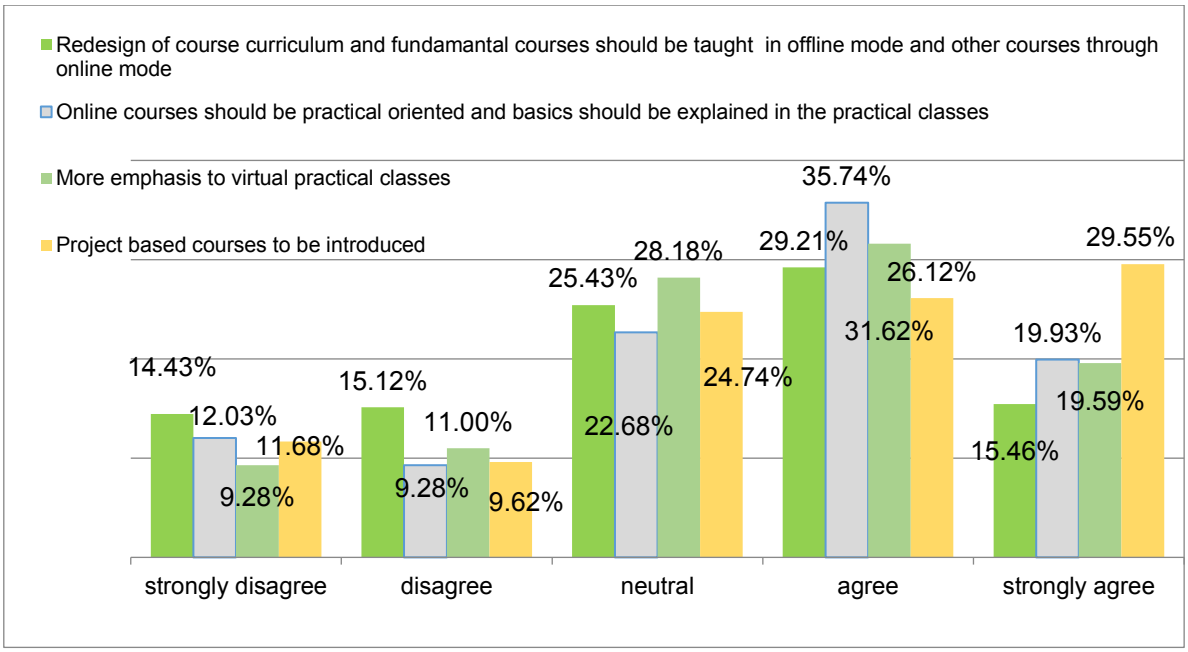

Figure 4. Student views on the redesign of the course curriculum for blended teaching-learning process

The conclusions are supported with the statistical analysis using the χ^2 test. The results of the χ^2 test are presented in Table 7. Based onχ^2 test, the hypothesis that there is no impact on the course curriculum due to COVID-19 is rejected and the alternate hypothesis of a strong relation between COVID-19 and course curriculum is accepted. The project-based course curriculum is found to be on the top priority of the students followed by the mixed mode of teaching curriculum for fundamental courses and application type of courses. The main constraint of the online teaching-learning process is the availability of the internet and computer or mobile facility to the students as well as to the faculties. It can be said that many students are having no such facilities or many students may not be able to understand the subjects due to the online mode of teaching.

Table 7

Impact of COVID19 on the course curriculum of the higher education system in India

4. Your opinion on the course curriculum	strongly disagree	disagree	neutral	agree	strongly agree	Total
Q4.1	1.630	3.642	0.003	0.202	3.750	9.228
Q4.2	0.007	0.951	0.765	2.438	0.067	4.228
Q4.3	1.630	0.016	0.983	0.085	0.150	2.864
Q4.4	0.007	0.649	0.031	1.967	6.667	9.321
			Calculated		χ^2	25.642
			Critical		χ^2	21.03
					dof	12
			Significance level			0.05
					p	0.012

Aristovnik et al. (2020) presented insights into students' satisfaction and perception of different aspects of their lives during the pandemic, including their opinions on the immediate and distant future. How the socio-demographic (and geographic) factor played an important role in the students' satisfaction level was also discussed. Seeingthe importance of this factor, a question was framed as "The Institution should identify students segments with a specific need (example: weaker students, having no internet facilities, difficult to understand in online teaching mode, etc.) and offline mode of teaching should be arranged for them" with agree and disagree option. Table 8 shows the responses of the students.

Table 8

Students' opinion on poor/weaker section of students

6. The Institution should identify students segments with a specific need (for example: weaker students, having no internet facilities, difficult to understand in online teaching mode, etc.) and offline mode of teaching should be arranged for them.	Male	Female	Total
Agree	148	91	239
Disagree	42	12	54
Total	190	103	293

81.4% views are in the support of "The Institution should identify students segments with a specific need (example: weaker students, having no internet facilities, difficult to understand in online teaching mode, etc.) and offline mode of teaching should be arranged for them". This shows the sound thinking and social responsibility of the students. This view indicates that the institution or universities should think for the economically poor and below-average students by providing extra effort on the teaching-learning process.

The results revealin-depth information on some of the important aspects of the online teaching-learning process adopted by educational institutions. It is clear from the views of the students that the present system of online education or teaching process adopted during the pandemic is unsuitable for most of the students when skill development is concerned. It also fails to provide in-depth knowledge that is required by many industries. Understanding and acquiring technical skills is affected mostly due to the inadequate teaching-learning facilities both at the institutions and student's level. Hence, it is important to strengthen the infrastructure or adopt a collaborative learning process with reputed higher educational institutions or research organizations if such online teaching process is to be continued. Providing lecture notes as PDF without imparting any practical knowledge may be a barrier for skill development and future career prospects. As suggested, redesign of the course curriculum considering the practical aspects, project-oriented course curriculum may be abetter alternative. Bozkurt& Sharma (2020b) presented on the crisis due to pandemic and how to convert this into an opportunity. They have suggested that reimagining, redesigning and recalibrating education can be more accessible by everyone insociety. The importance of digital learning using information and communication technique (ICT) during the pandemic is also discussed by many authors (König et al., 2020; Rapanta et al., 2020).

Instructional need and challenges

The students' priorities on health issues during the COVID-19 pandemic are of utmost importance. The institutional needs and challenges on this issue are categorized into five questions. The related questions and the views of the students are presented in Table 9. Opinions are obtained using the Likert scale (1 to 5).

Priorities and challenges due to the COVID-19 pandemic for higher educational institutions are depicted in Fig. 5 based on data presented in Table 9. Two questions are framed on the health and safety priorities with different subsections. Creation of disinfection room and hand sanitization station at the entry of the institution or university and regular health checkup is given the highest priority(strongly agreed) with 48.8%, 57.4% and 50.9% respectively. 47.8% of students have an opinion that the old washrooms should be upgraded to no-touch washrooms.Clear demarcation of entry and exit line on the floor using footprints and divider line is given the least importance with just 35.1%.

Table 9

The institutional need and challenges on student health issue during COVID-19

8. If you have no option other than to resume your Institution, how do you rank your priorities (1 to 5] on the following issues.	strongly disagree	disagree	neutral	agree	strongly agree	Total
Q8.1 A disinfection room should be created at the entry of the building and all students should enter through the disinfection area/room before entering the building	31	10	35	75	142	293
Q8.2 Clear demarcation of entry and exit line on the floor using footprints and divider line	28	9	58	96	102	293
Q8.3 Up-gradation to no-touch washrooms of the existing ones	23	4	48	79	139	293
Q8.4 Hand sanitizing station at the entrance and common places	23	5	30	68	167	293
Q8.5 Regular health check-up	29	6	42	68	148	293
Total responses	134	34	213	386	698	1465

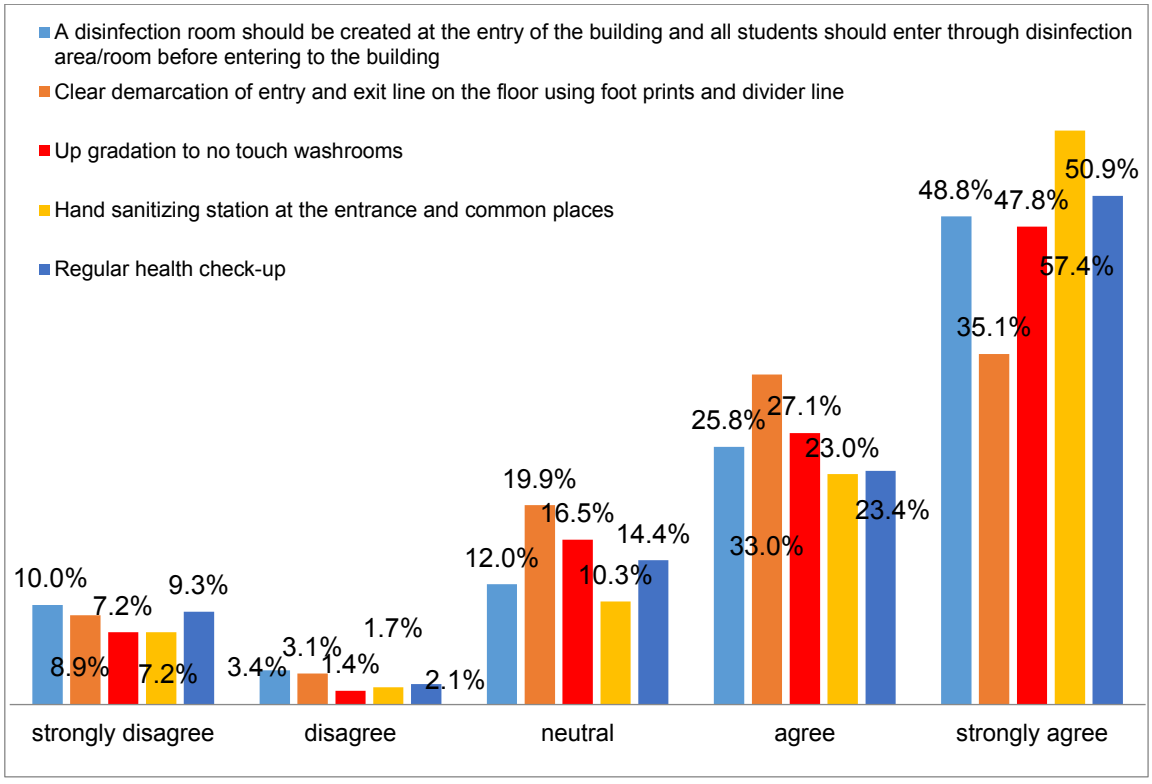

Figure 5. Priorities and challenges due to COVID-19 pandemic for higher educational institutions

The average percentage of the students who have given priorities for the creation of disinfection room, hand sanitization station in entry and common places and regular health checkup is74.6%, 80.4% and 74.3% respectively. 70.8% are having the opinion that there should be “no touch washrooms”. The conclusions made from the survey data are supported through the statistical analysis and the results are presented in Table 10. The observations from the frequency analysis are supported through the statistical parameters in Table 11.

The second part of the institutional challenge is to enforce the rules and regulations on health issues or the Standard Operating Protocols (SOPs). Would all the students after reopening of the institutions or university maintain rule and order or guidelines for the prevention of coronavirus infection? This is perhaps a big issue for the administration. Due to the importance of it, opinions of the students are obtained from thequestion “Do you think it is difficult to enforce health and safety measures to the students inside the institution/University? The responses of the students are presented in Table 12.

The results shown in Table 12 reveal that 72.9% of students agree with the above ambiguity. Out of it, about 50% of male students have expressed their views that it would be difficult to enforce SOPs. About14% of male students and 13% of female students have an opinion that it can be enforced easily. This reveals that it would be really difficult for the institutions to implement all precautionary measures to stop the spreading of the virus. In another question on “Do you pledge to adhere to the health and safety protocols if the institution reopens?” about 92.4 % of students committed to pledge to adhere to the health and safety protocols if the institution reopens. Hence, an undertaking from the students and parents in this issue may be a suitable tool for the implementation of the health and safety protocols.

Table 10

Chi-square results on the institutional need and challenges on student health issue during the COVID-19

8. If you have no option other than to resume your Institution, how do you rank your priorities (1 to 5] on the following issues.	strongly disagree	disagree	neutral	agree	strongly agree	Total
Q8.1	0.658	1.506	1.356	0.063	0.041	3.624
Q8.2	0.054	0.712	5.567	4.578	10.127	21.038
Q8.3	0.539	1.153	0.685	0.042	0.003	2.421
Q8.4	0.539	0.476	3.727	1.096	5.378	11.216
Q8.5	0.181	0.094	0.008	1.096	0.505	1.885
Total	1.970	3.941	11.343	6.876	16.054	40.184
			Calculated		χ^2	40.184
			Tabulated		χ^2	26.03
					p	<0.05

Table 11

Statistical parameters on the institutional need and challenges on student health issue during the COVID-19

Question	Median	Mean	SD
Q8.1	4	3.98	3.68
Q8.2	4	3.80	3.48
Q8.3	4	4.05	3.71
Q8.4	5	4.20	3.85
Q8.5	5	4.02	3.71

Different priorities have no relation with COVID-19 is defined as the Null hypothesis. The results of χ^2 rejected the Null hypothesis at 0.05 significant level and shows a strong relation. As per χ^2 test results the highestpriority is to follow the health and safety measures during the COVID-19 pandemic. Hence, it can be concluded that there should be difficult for the institutions to enforce the health and safety protocols (SOPs) to be followed by students, and hence, strict alternate rules should be implemented.

Table 12

Response on "Do you think it is difficult to enforce health and safety measures to the students inside the institution/University?"

Opinion	Male	Female	Total
Yes	147	66	213
No	42	37	79
Total	189	103	292
	Calculated	χ^2	121.00
	Critical	χ^2	3.84
	Significance level		0.05
	dof		1
	p		<0.05

Students' comments

On one of the two pages of the questionnaire, the students were asked to share their views and opinions related to the topic and kept as an open-ended question. 56.70% of students have given their thoughts and opinions about the reopening of higher educational institution and the challenges – what they considered good and bad, and why? Most of the students have an opinion that the institutions or universities should reopen when the risk is minimum or COVID-19 gets finished and till then online mode of teaching should continue with better facilities and more advanced teaching-learning techniques. Some students have pointed out that it would be very difficult to maintain such high standards of the protocol in every college or university. Some views of the student community are in the favor of semester drop except for the final semester. Their opinion is that the final year students should be allowed to complete their degree in time so that they don't face any problem with their future career. It is also pointed out that due tothe change in temperature and change in weather condition; there is a high chance of getting infected.Many institutions will not be able to maintain social distancing because of the unavailability of adequate space. The concern on health hygiene, cleanliness of hostel washrooms and messes of institutions or university was raised by most of the students. It was also mentioned by many students that the university or higher educational institutions should reopen when the mortality rate drops below 1%. Many students have pointed out the methods or the mode of online teaching that many institutions are following. Providing PDF notes or simple discussion on various platforms like Zoom or others is not effective. Special major alternation should be adopted by the institutions if the online mode of teaching is to be continued. It is also pointed out that the present mode of online teaching is not enough to provide or improve the technical skills that are required for industries.

The higher educational institutions and universities are heterogeneous not only in the degree programme but also if we consider the students admitted. Higher education institutions have students from all over India, studying in various institutions or universities. A lot of students might be from red zones and containment zones. Many students have an opinion that if in such condition even if one person is infected and takedown few others with him or her after returning to the institution then how the university or institution is going to cope-up with it? So the majority of the students viewed not to open the higher educational institutions till the coronavirus effect gets normalized to zero infection. It is also mentioned by the students that making it a zero session except for the final semester students would be a better choice than reopening the institutions in a hurry mood. Under such circumstances institutions should remain closed and virtual classes should be made more clear and understandable and there should be clarification sessions to clear doubts.

The present study reveals that health safety and health care of the students when they shall be called for offline classes should be given thetop most importance by the administration. All necessary health

care facilities should be developed before reopening the educational institutions in hostels and institution's premises. The study also suggested that skill-based education can help them for a better career and it will widen the job opportunity. Thus, the proper modifications in the course curriculum and teaching-learning process adopted as of now should be modified by introducing a project-based course curriculum to fill the gap between practical skill needed inindustry and the theoretical knowledge imparted in the institutions. Industrial collaborative teaching may be one of the solutions. The institutions should develop good infrastructure for online or offline quality teaching and there should be a linkage between the institutions having quality research facilities and teaching aids withother institutions to share their infrastructure and expertise.

Conclusion and Suggestions

In the present study on the issue of reopening of the institutions of higher education, the majority of the students considersthat the institutions should reopen only when the coronavirus curve starts decreasing or flatten. In the meantime, a substantial majority of the respondents want to continue their study through online teaching mode till the cases of COVID-19 comes under control. More than 60% of students agree with the statement "Institution to continue with online teaching mode and student staying at home". "Institution to continue with mixed-mode of teaching with students staying at hostels (online and offline) and only doubt clearing session should be offline mode" is the least favoured choice by the students. On the weaker or poor students having no internet facilities or computers or facing difficulty to understand the subjects in online teaching, a mixed (online and offline) teaching mode is the most preferred solution forthe students. 81.4% of students are in support of conducting offline mode of teaching for weaker students or if the internet or other facilities are not available. For the rest of the students online is the most preferable mode of teaching in this COVID-19 pandemic situation. Students suggested redesign of the course curriculum and suggested for practical or project-based course curriculum irrespective of offline or online mode of teaching. On the health and safety protocols, the average percentage of students giving priorities for creation of disinfection room, hand sanitization station in entry and common places and regular health checkup is74.82%, 80.69% and 74.48% respectively. 75.17% are having an opinion that there should be "no touch washrooms". On the issue of the health and safety rule implementation, 92.4 % of students committed to pledge to adhere to the health and safety protocols, but 72.9% of students expressed that it would be difficult to enforce health and safety measures to the students inside the institution/University. An alternate measure such as an undertaking from the students and parents to follow the safety guidelines may be taken on reopening of the institutions for the implementation of the health and safety protocols.

Limitations and future scope of the study

The present study is limited to three issues that have arisendue to the COVID-19 pandemic i.e about reopening of educational institutions, the merits and demerits of the online teaching-learning process and the health and safety protocol required on reopening the educational institutions. It is well known that online teaching basically in the technology area is not an effective method of imparting practical knowledge which is akey factor for a successful job career in industries. Hence, views on the shortcomings that required in career building should be the future aspect. As in this study, the view on online teaching is taken from the students only, however, teachers also have faced many difficulties while shifting from offline mode of teaching to online mode of teaching. Hence, the nature of difficulties faced by teachers during online teaching from low-income countries where quality teaching facilities are not available should also be a part of future study.

Acknowledgements

The authors wish to thank all the students who took part in the survey for their important contribution to an increased understanding of issues related to the reopening of "Higher Educational Institution in India-System Priorities in Post COVID-19: A Survey"

References

Ahmed, A. A., & Mohammed, A. (2020). The impact of coronavirus (COVID19) pandemic on higher education institutions (HEIs) in YEMEN: Challenges and recommendations for the future. *European Journal of Education Studies*, 7(7), 68-81. https://doi.org/10.46827/ejes.v7i7.3152

Ali, W. (2020). Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic. *Higher Education Studies*, 10(3), 16-25. https://doi.org/10.5539/hes.v10n3p16

Allen, E., & Seaman, C. A. (2007). Likert Scales and Data Analyses. *Quality Progress*, 40, 64-65.

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., &Umek, L. (2020). Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective. *Sustainability*, *12*, 8438. https://doi.org/10.3390/su12208438

Arti, M. K. (2020). Modeling and Predictions for COVID 19 Spread in India. https://doi.org/10.13140/RG.2.2.11427.81444

Bond, M. (2020). Schools and emergency remote education during the COVID-19 pandemic: A living rapid systematic review. *Asian Journal of Distance Education*, *15*(2), 191-247http://asianjde.org/ojs/index.php/AsianJDE/article/view/517

Bozkurt, A., & Sharma, R. C. (2020a). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education*, 15(1), i-vi.https://doi.org/10.5281/zenodo.3778083

Bozkurt, A., & Sharma, R. C. (2020b). Education in normal, new normal and next normal: Observations from the past, insights from the present and projections for the future. *Asian Journal of Distance Education*, 15(2), i-x.https://doi.org/10.5281/zenodo.4362664

Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S., Al-Freih, M., Pete, J., Olcott, Jr., D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. J., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., Shahadu, S., Brown, M., Asino, T. I., Tumwesige, J., Ramírez Reyes, T., Barrios Ipenza, E., Ossiannilsson, E., Bond, M., Belhamel, K., Irvine, V., Sharma, R. C., Adam, T., Janssen, B., Sklyarova, T., Olcott, N., Ambrosino, A., Lazou, C., Mocquet, B., Mano, M., &Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education, 15*(1), 1-126. https://doi.org/10.5281/zenodo.3878572

Browne, M. N., & Keeley, S. M. (1998). *Asking the right questions: A guide to critical thinking*. (5th Ed.). Prentice Hall.

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research.* 287, 112934. https://doi.org/10.1016/j.psychres.2020.112934

Carey, K. (2020). Is everybody ready for the big migration to online college? Actually, No.*The New York Times*. https://www.nytimes.com

Christakis, D. A. (2020). School Reopening-The Pandemic Issue That Is Not Getting Its Due. *JAMA Pediatric. 174*(10), 928. https://doi.org/10.1001/jamapediatrics.2020.2068. PMID: 32401279.

Cojocariu, V. M., Lazar, I., Nedeff, V. & Lazar, G. (2014). SWOT analysis of e-learning educational services from the perspective of their beneficiaries. *Procedia-Social and Behavioral Sciences*, 116, 1999–2003Covid-19 Pandemic lockdown in India, https://en.wikipedia.org/wiki/COVID-19_pandemic_lockdown_in_India

Creswell, J. W. (1994). Research design: Qualitative and quantitative approaches. Thousand Oaks, CA: Sage. Fowler, J., Floyd J. (1995). Improving survey questions: *Design and Evaluation*. 38. Sage Publications.

Daniel, Sir J. (2020). Education and the COVID-19 pandemic. *Prospects,* 1-6. https://doi.org/10.1007/s11125-020-09464-3

Deshmukh, S. R. (2020). Social Realities of Higher Education in the Age of Uncertainties. *Smart Moves Journal IJELLH* e-ISSN: 2582-3574 p-ISSN: 2582-4406 8(4), https://doi.org/10.24113/ijellh.v8i4.10547

Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems.* 49(1), 5-22. https://doi.org/10.1177/0047239520934018

d'Orville, H. (2020). COVID-19 causes unprecedented educational disruption: Is there a road towards a new normal?.*Prospects*, 1–5. https://doi.org/10.1007/s11125-020-09475-0

Ghosh, P., Ghosh, R., & Chakraborty, B. (2020). COVID-19 in India: State-wise Analysis and Prediction. https://doi.org/10.1101/2020.04.24.20077792

Gupta, A., &Goplani, M. M. (2020). Impact of COVID -19 on educational Institutions in INDIA. *Purakala (UGC Care Journal),* 661-671. https://doi.org/10.13140/RG.2.2.32141.36321

Harry, N. B. Jr., & Deborah, A. B.(2012). Analysing Likert data. *Journal of Extension*. 50(2), v50-2tt2.

Jadhav, V.R, Bagul, T. D., &Aswale, S. R. (2020). COVID-19 era: students' role to look at problems in education system during lockdown issues in Maharashtra, India. *International Journal of Research and Review, 7*(5), 328-331

Jake, B. (2020). Safely back to school after coronavirus closure, https://www.mckinsey.com/industries/social-sector/our-insights/safely-back-to-school-after-coronavirus-closures#

Jena, P. K. (2020). Impact of Covid-19 on higher education in India. *International Journal of Advanced Education and Research*, 5(3), 77-81.

Joshua-Luther N. U. & Cornelius, B. U.(2020). The Impact of COVID-19 on Education in Ghana. *Asian Journal of Education and Social Studies*, 9(1), 23-33. https://doi.org/10.9734/AJESS/2020/v9i130238

Koawo, E., Francis, A., Ebenezer, D. & John, E. L. (2020). Stress and Its Impact on Academic and Social Life of Undergraduate University Students in Ghana: A Structural Equation Modeling Approach. *Open Education Studies*. 2, 37-44. https://doi.org/10.1515/edu-2020-0100

König, J., Jäger-Biela, D. J., &Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43(4), 608-622. https://doi.org/10.1080/02619768.2020.1809650

Kundu, P. (2020). Is Social Distancing Feasible for a Majority of Schools in India?.*The Wire*.

Lall, S., & Singh, N. (2020). COVID-19: Unmasking the new face of Education. *International Journal of Research Pharmaceutical Sciences.* 11(SPL)(1), 48-53. https://doi.org/10.26452/ijrps.v11iSPL1.2122

Linda, D. H., & Maria, E. H. (2020) Preparing educators for the time of COVID … and beyond. *European Journal of Teacher Education*, 43(4), 457-465. https://doi.org/10.1080/02619768.2020.1816961

Littlefield, J. (2018). The difference between synchronous and asynchronous distance learning. https://www.thoughtco.com/synchronous-distance-learning-asynchronous-distance-learning-1097959

Michael,. A. P., Fazal, R., Gary, M., Paul, G., Gorur, R., Hong, M., Hwang, Y., Zipin, L., Brennan, M., Robertson, S., John, Q., Malbon, J., Danilo,T.,Barnett, R., Wang, C., Peter, M., Rima, A., Marianna, P., Nick, B., Liz, J.,Jalote, P.,Kalantzis, M.,Bil,lCope,Fataar, A., James, C., Greg, M., Gert, B.,Petar, J., Suzanne, S. C., Michael, A., Lynda, S., Tierney, R., Marek, T.,Besley, T., &Misiaszek, L. (2020). Reimagining the new pedagogical possibilities for universities post-Covid-19. *Educational Philosophy and Theory*. https://doi.org/10.1080/00131857.2020.1777655

Rajhansa, V., Memonb, U., Patilc, V., & Goyal, A. (2020). Impact of COVID-19 on academic activities and way forward in Indian Optometry. *Journal of Optometry.* https://doi.org/10.1016/j.optom.2020.06.002

Rapanta, C., Botturi, C., Goodyear, P., Guàrdia, L., &Koole, M. (2020). Online university teaching during and after the Covid-19 crisis: Refocusing teacher presence and learning activity. *Postdigital Science and Education*, 2, 923–945. https://doi.org/10.1007/s42438-020-00155-y

Russell, M. V., Simon, J. R., Helen, C., Jessica, P., Joseph, W., Claire, S., Oliver, M., Chris, B., & Robert, B. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: A rapid systematic review. *Lancet Child Adolescent Health.* 4, 397–404. https://doi.org/10.1016/ S2352-4642(20)30095-X

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *The Internet and Higher Education*, 7(1), 59–70.

Sprague, D., Maddux, C., Ferdig, R., & Albion, P. (2007). Editorial: Online education: Issues and research questions. *Journal of Technology and Teacher Education*, 15(2), 157-166.

Strielkowski, W. (2020). How Can the COVID-19 Pandemic Help Higher Education?.http://dx.doi.org/10.13140/RG.2.2.11331.96804

Teräs, M., Suoranta, J., Teräs, H., &Curcher, M. (2020). Post-Covid-19 education and education technology 'solutionism': A seller's market. *Postdigital Science and Education*, 2(3), 863-878. https://doi.org/10.1007/s42438-020-00164-x

Tinggui, C., Lijuan, P., Xiaohua, Y.,Jingtao, R.,Jianjun, Y., &Guodong, C. (2020). Analysis of User Satisfaction with Online Education Platforms in China during the COVID-19 Pandemic. *Healthcare*. 8(3),200, DOI: 10.3390/healthcare8030200

Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending Classes Without Stopping Learning: China's Education Emergency Management Policy in the COVID-19 Outbreak, *Journalof Risk Financial Management*.13*(3), 55,* https://doi.org/10.3390/jrfm13030055

About the Author(s)

- Prakash Chandra Gope; pcgope@rediffmail.com; G B Pant University of Agriculture and Technology, India.https://orcid.org/0000-0002-9300-4603
- DeepayanGope; deepayangope@rediffmail.com; Independent Researchers, India.https://orcid.org/0000-0003-4556-7409
- Aditya Gope; adityagope1222@gmail.com; Biju Pattnaik University of Technology; India.https://orcid.org/0000-0002-7669-7751

Suggested citation:

Gope, P. C., Gope, D., & Gope, A. (2021). Higher Education in India: Challenges and Opportunities of the COVID-19 Pandemic. *Asian Journal of Distance Education, 16*(1), 54-73.
https://doi.org/10.5281/zenodo.4643552