



Covid-19 Pandemic: Analysis of E-learning Experience of University Students in Pakistan

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ABSTRACT

The lockdown of education institutions has not only caused a significant interruption in students' learning but also disturbed the entire academic system in terms of delivery of classes, examinations schedules, assignments, internal assessments, the admissions process for the commencement of new academic sessions, and job placement scenarios. To minimize the loss of studies and balance the increasing stress among academic stakeholders during the COVID19 lockdown, the Higher Education Commission (HEC) of Pakistan asked and motivated the educational institutions to establish a virtual learning platform and facilitate the delivery of online classes and education dissemination during March 2020, to avoid the educational loss of students during COVID 19 lockdown. Following the directives issued by HEC, Higher Education institutions specifically Universities instructed their faculty members to shift from on-campus classes to the virtual Learning platforms and resume classes through online teaching to avoid the loss of studies during the closure of educational institutes in lockdown. Even though this Technology-enabled learning is relatively new for universities, teachers, and students, its acceptance is widely growing throughout the world amidst corona crises. This research study was an attempt to identify the feedback of students regarding the delivery of education through an online learning platform and the delivery of online classes during COVID lockdown. In this regard, an Online questionnaire developed through Google forms was circulated using different social media platforms after a research questionnaire pretesting. Data collection was done from two major provinces. A total of 550 responses were received from Higher education enrolled students during 9 – 16 May 2020. Findings reveal that the education sector and particularly Higher Education Institution have performed best during this crisis scenario of the sudden closure of Educational Institutes and have utilized technology well to avoid the loss and interruption of Education delivery during the COVID -19 pandemic lockdown. There have been some challenges that have been faced due to online learning which have been analyzed in this study.

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Introduction

The enormous pandemic of COVID-19 originated

challenged the government establishments to balance the adverse epidemic cumulative occurrence and minimize the global financial and social outbreak. It has also controlled the education industry for argumentative decisions of indeterminate closure of academic institutions with uncertainty in the recommencement of contemporary classroom transformation of teaching and learning activities across the country. The global pandemic has predominantly distressed the higher education segment which is considered as a main future representative of the economic progress and development of Pakistan. This closure of schools, colleges, and universities, we witnessed during COVID 19 lockdown not only interrupted the teaching process for students globally but also severely impacted the key assessment period and schedule of and admissions in universities around the world. This caused a lot of stress and confusion for the smooth continuation of studies, not only for students but also for the faculty, administration, and authorities of educational institutions. Educational Institutes and Universities also faced the daunting task of completing semester curriculum goals and courses in a timely manner with the development, implementation, and proper execution of exams and assessment phases in an efficient manner, amidst corona crises.

The future and careers of thousands of schools, colleges, and university students, especially of final year students are severely expected and affected by the COVID-19 pandemic. Despite the fact, Government, and the Higher Education Commission (HEC) took various initiatives to continue the delivery of teaching, learning, and educating students and to mitigate the interruption in the provision of education and examination, Final year students will majorly be facing a hard time, their future seems unpredictable as they are graduating at the time of global recession prevailing due to poor Job market conditions during COVID 19 pandemic. The careers of graduating students are at stake as Universities and educational institutes majorly run education through the use of online learning platforms and are going through obstacles and challenges of delivering smooth Education. Moreover, the months of June till August is also an overly critical time for higher

from the Wuhan city of China and within a noticeably short span of time spread globally, has

education institutes and universities for planning and implementing the admissions process for the induction of new students and the commencement of new sessions. Hence, we are witnessing the struggle and pain educational institutions at all levels (i.e. primary, secondary, and Higher Education), students, their parents, and HEC and Government authorities are going through. Keeping in view, the panic and unrest prevailing due to this global spread of COVID 19, Government authorities, and regulators of schools (Private School Management Association) and Universities - Higher Education Commission (HEC) have issued various notifications and directives related to the continuation of education and related activities during and after COVID 19 lockdown, to alleviate the loss of education and continuation of studies through E-Learning and hybrid teaching models. Hence, Educational Institutes have moved to E-learning models along with hybrid and on-campus classes with complete implementation of SOPs, after the directives of HEC (Higher Education Commission, 2020) issued from time to time during and after the ease of Lockdown.

Literature Review

The novel coronavirus disease, also known as COVID'19 has severely impacted the global economy, the Education sector is no exception. The World Health Organization (WHO), due to the rapid worldwide spread of coronavirus declared it as a "pandemic" on 11th March 2020 (WHO Timeline - COVID-19, Pelmin, 2020) which has so far influenced more than 185 nations. This led to the sudden closure of the Educational institutions along with other industries. During this global crisis and implementation of lockdown to mitigate the spread of coronavirus, Technology emerged as a great enabler for the Education Industry and likewise for other businesses. Thus, technological development and the internet have immensely changed the lives of people and brought a drastic change in a number of different fields. (Nadikattu, 2020). Exclusively, in the education sector, E-Learning and online classes have been identified as an important tool for the continuity of learning and uninterrupted delivery of Education during the COVID -19 lockdown. Web-based learning and education have become an important mode of learning globally to access education free or



at a very feasible cost (Noor-Ul-Ain, 2013). COVID-19 emerged as a strong disruptive force and has greatly influenced the education industry by transforming the regular education mode and delivery with standard practices adapted for many years into virtual learning, it has immensely changed the way we teach, learn and communicate with students. (Sahu, 2020)

As per UNESCO, 185 HEIs were impacted by this pandemic by 1st April 2020, affecting more than 152,412,000 students and learners. According to the global survey findings of the International Association of Universities (IAU) about two-third of the HEIs replaced their traditional classroom teaching with virtual classrooms and learning (Almaiah, Al-Khasawneh, & Althunibat, 2020). The major challenge HEIs faced during this transition was the access to Technical Infrastructure, competence, and pedagogies for E-Learning. According to Eyles, Gibbons, & Montebruno, 2020, the most affected group of students & learners, in terms of education attainment during COVID-19 Educational Institutes closure will be those with a lack of access to Technological resources like Wi-Fi, internet & smart devices. This also reveals and predicts the short term and long-term impact this pandemic can have on the Education sector. Students who had access to internet still suffered during online learning specially because they failed to demonstrate self-control and were found in watching online videos and other entertainment channels rather than concentrating on their online class. This was especially true in the case of undergraduate level (Yu, 2021)

E-Learning has now made its mark, especially in the domain of modern education. Modern learners show different learning behavior and E-Learning platforms seem beneficial for satisfying their needs. Thus, the E-Learning and usage and principles of artificial intelligence are gaining popularity globally (Misko et al, 2004; Soni, 2020). It is giving an opportunity and solution to learners, who are unable to access traditional classroom studies during this COVID-19 education institutions closure to continue their education. This paper attempts to study and unfold different aspects and impact of HEIs students, E-Learning and online classes experience along with the teaching methodology and digital platforms HEIs are following in diverse fields during COVID-19 closure of Higher Education Institutes.

Objectives of the Survey

The present survey was aimed to achieve the following objectives:

1. To explore the extent to which the adopted strategy of teaching methods for distance learning and online programs during COVID-19 by the Higher Education Institutes (HEIs) is coping with the readiness of the students to deal with the headed adopted strategy.
2. To explore the medium and techniques adopted by the Higher Education Institution (HEIs) for the delivery of online learning programs during the lockdown.
3. To identify the extent to which various methods and techniques of online teaching used by the online infrastructure of HEIs have helped in covering the syllabus.
4. To know the challenges and difficulties faced by students in the use of various online learning methods.
5. To gather suggestions to make online learning more popular and effective in the future.

Research Methodology

The methodology to drive set objectives of the study, the primary source of data has been gathered and assembled by Google form that has been distributed with the help of social media (Facebook, Whatsapp, LinkedIn, Instagram, etc.) after conducting and administering a pilot test in a small group of 20 universities enrolled students. Some suggested revisions and modification have been made to the questionnaire as per the ideas and feedback of the pilot study participants.

The nature of the questionnaire used for this particular study is depending on 5 self-explanatory, concise, and focused aims to fulfill the required need of the mentioned and discussed agenda. Every question of the questionnaire is addressing one objective of the study at a time. The questionnaire is targeting all the streamlines of selected criteria for higher education students from multiple disciplines.

Four main groups have been identified and selected to align and sort the received data of the respondent students. The following four main groups are representing the main discipline of the student's higher education enrollment.

1. Social Sciences
2. Computer Science and Technology
3. Arts
4. Commerce and Business Management

The scope of the study has been restricted to the 2 most prominent provinces of Pakistan that are Sindh and Punjab, considering the size of the provinces, the higher education facilities, the number of universities, and students' career-oriented



determination. The domain of the study has been identified to cover all the perspectives and institutions of selected disciplines private, public and NGO owned universities and colleges. The questionnaire has been designed after considering the ethical consent of the students where their identity has been kept with confidentiality and the responses of the participants have been only used for study perspective. The sample was selected based on multiple sampling techniques, first purposive sampling was used and only students involved in online learning from above mentioned departments studying at different universities in Sindh and Punjab province of Pakistan was selected. Second, simple random sample was applied for selection of sample. In total 550 respondents were selected after eliminating invalids. The data has been collected in 7 days (9 – 16 May 2020). The results of the data have been presented as tables and charts. The received data has been concluded by Simple Statistics Descriptive Analysis tools.

Analysis, Findings and Discussion

Readiness headed for the Online Distant Learning Strategy adopted by HEI's:

The technological revolution has captured almost every aspect and activity of social life. It has a major impact on the education sector as well. Now the traditional approach of classroom study is somehow replacing and re-shaping along with new teaching aid and has been aligned with teaching pedagogy to meet the challenges of the new era. This global availability of technology has opened a new room for contemporary learning and turned into the most reliable solution as an online distance learning strategy during the pandemic of COVID-19.

E-learning is supporting the student's skill development on almost every level of their academic stage, this contemporary learning strategy is bridging the gap with some Digital technological devices which is easily available and intervened by every individual with easy access at their home with comfort. The following table 1 is reflecting the willingness and readiness of students towards online learning.

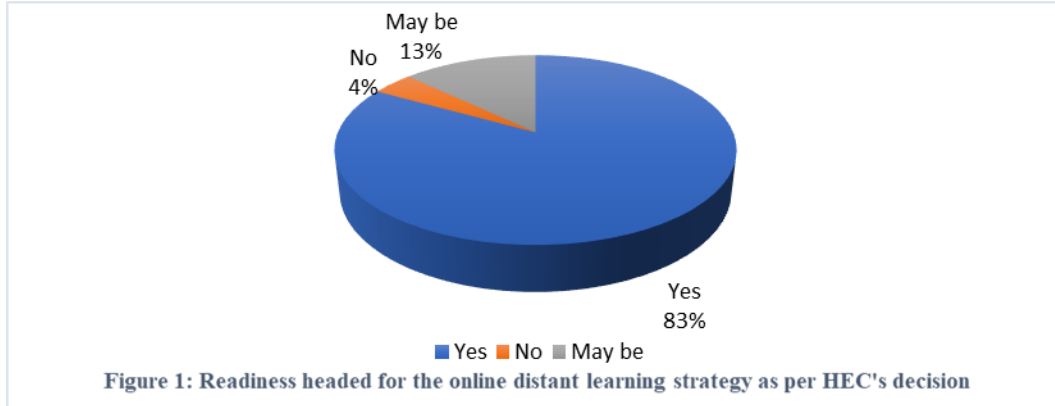
Table 1. Readiness headed for the Online Distant Learning Strategy					
Participant's Responses		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	Yes	457	83.1	83	83
	No	22	4	4	87
	May be	71	12.9	13	100
	Total	550	99.9	100	

Table 1. Readiness headed for the Online Distant Learning Strategy

Table 1 is representing the data of 550 respondents (university enrolled students). The data is reflecting that 83% of respondents reported their readiness and willingness towards online distant learning classes. 4% have reported unwillingness and readiness for online classes whereas 13% have conveyed may be opinion as there is no other provided possible solution to the agenda of distance learning.

HEIs has adopted the strategy of online classes as the byproduct of the corona lockdown pandemic, as the students were suffering from a huge educational gap and online education strategy is the only practical and logical solution.

The table reflects that the majority of the respondents have encouraged the online learning strategies whereas 4% of the participants are non-convinced with the implemented strategy due to their personal reasons.



Medium and Techniques Using for the Delivery of Online Learning program+

As per the set agenda 2 of the objectives, it has been explored that what are the medium has been used by

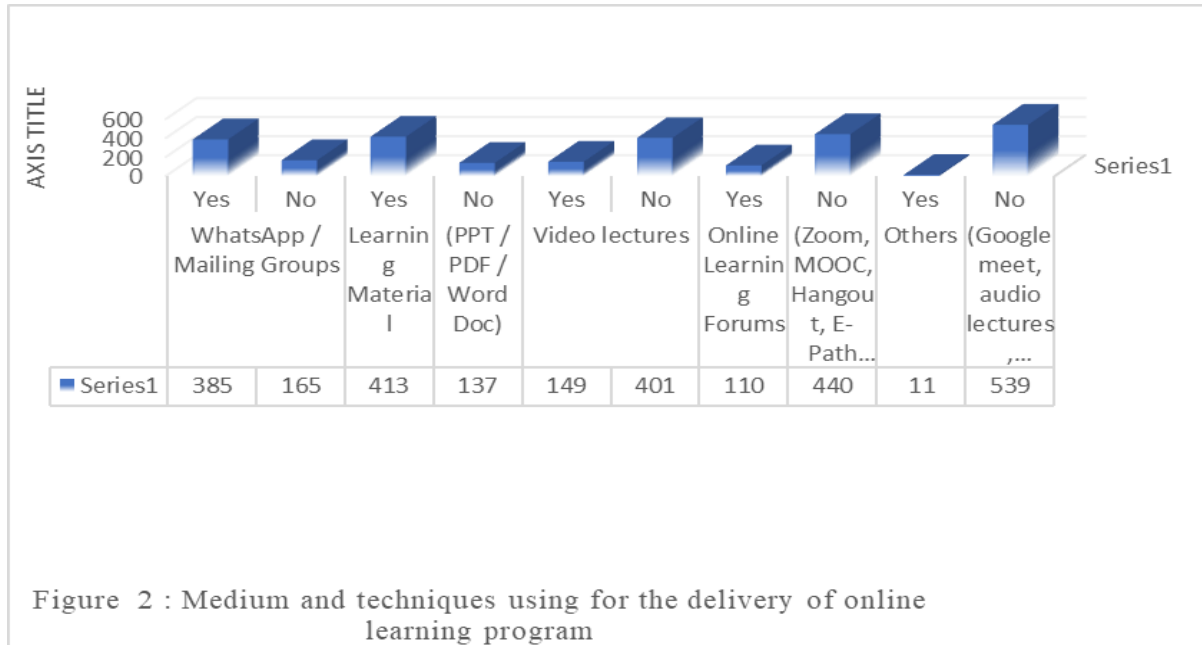
higher education institutions to deliver and maximize the set agenda of online teaching.

Table 2. Medium and Techniques Using for the Delivery of Online Learning program

Medium and Techniques		Participant's Responses	Frequency	Percentage	Cumulative Percentage
Valid	WhatsApp / Mailing Groups	Yes	385	70	70
		No	165	30	100
		Total	550	100	
	Learning Material (PPT / PDF / Word Doc)	Yes	413	75	75
		No	137	25	100
	Total	550	100		
	Video lectures	Yes	149	27	27
		No	401	73	100
	Total		550	100	
	Online Learning Forums (Zoom, MOOC, Hangout, and E-Path etc.)	Yes	110	20	20
		No	440	80	100
	Total		550	100	
	Others (Google meet, audio lectures, quizzes, assignments, projects, etc.)	Yes	11	2	2
		No	539	92	100
	Total		550	100	



Table 2. Medium and Techniques Using for the Delivery of Online Learning program



The above data of table no. 2 (Figure 2) reveals that the WhatsApp app and mailing groups have been used by 70% of respondents to communicate by their respective higher educational institutes in the pandemic of COVID-19. It reflects that 75% of the student’s respondents have received Learning material from their institutions for distance learning. The format of the provided study resource is ppt. pdf and word doc. It represents that 27% acknowledged the reception of video lecture that has been recorded by the faculty of their institutions while the majority of 73% respondents reported that no such activity has been received by them by their institutions.

Selection of online education forums like Zoom, MOOC, Hangout. E-Path etc. has been reported by

110 students representing the 20% population of the selected sample while the majority of 80% responded as the least popular option for such online education forums. 02% of the respondents of the study declared for other options of online learning methods used by their institutions. The mode varies other options such as Google meet, audio lectures, quizzes, assignments, projects, etc.

Course Outline Covered Through Online Learning Strategy

Table 3 is exploring the data for objective no.3. The data is collected with a Likert scale where students selected the best fit option for their covered course outline status after the adoption of an online learning strategy by the higher education institutes.

Course Covered (%)		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	1 – 25	66	12	12	12
	26 – 50	172	31.2	31	43
	51 - 75	117	22.2	22	65
	76 – 100	195	35.4	35	100
	Total	550	100.8	100	

Table 3: Adopted Strategy of Online Learning is Constructively covering the Course Outline

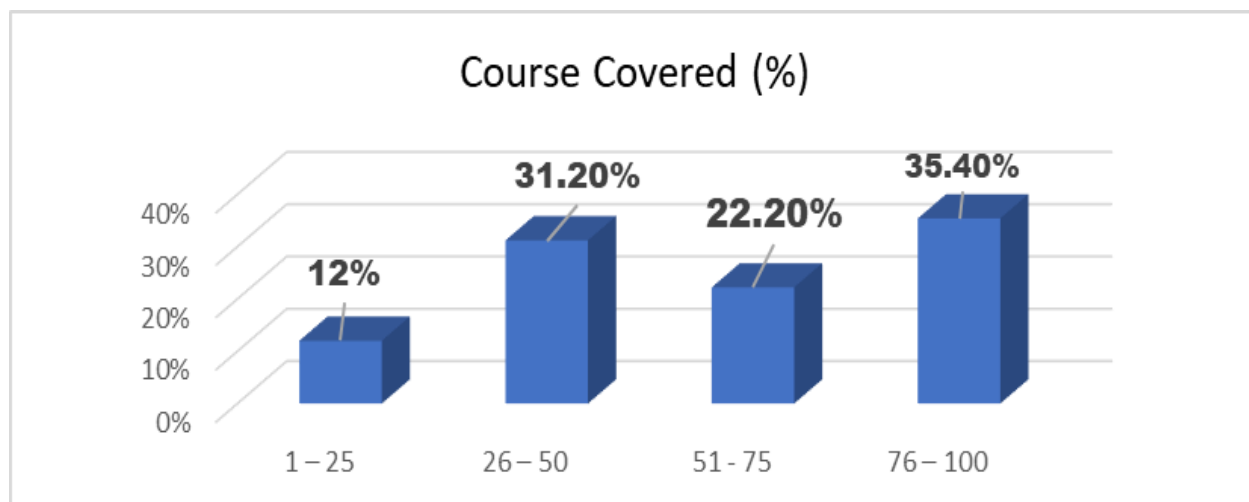


Figure 3 Adopted strategy of online learning is constructively covering the course outline

As per the reflection of the above data of table no 3 & Figure 3, the majority of the students (n 195 i.e. 35%) reported that they have successfully covered 76-100% of course outline through online learning strategy adopted by their higher academic institutions led by the faculty members. 117 students representing 35% of the data are reporting that they

have covered 51-75% course whereas there are only 66 students (12%) who report for 25% or less successful coverage of course outline. Challenges faced and encountered by students in an online learning strategy of the higher education institution.



As per set objective 4, the challenges faced and encountered by the students during online learning strategy have been identified with respect to the methods and tools used by students (Laptop, computer, ios or android cell phone, tablet, etc.) to implement the distant learning strategy productively. The identified options of challenges and hurdles have been identified by secondary sources of available literature and the author's discussion on the related topic. The challenges were treated as follows:

- Inadequate internet electronic device (Laptop, computer, ios or android cell phone, tablet etc.)

- Load shedding (electricity)
- Inadequate Internet Connection
- Inadequate Technical Skills
- Others

The responses of the students have been collected by 5 points Likert scale as

- Very Low
- Low
- Moderate
- High
- Very High

Table No. 4 Challenges faced and encountered by students in online learning strategy

Table No. 4 Challenges faced and encountered by students in online learning strategy					
Medium and Techniques		Participant's Responses	Frequency	Percentage	Cumulative Percentage
Valid	Inadequate Internet electronic device (Laptop, computer, ios or android cell phone, tablet etc.)	Very Low	346	63	63
		Low	85	15	78
		Moderate	13	2	80
High		62	11	91	
Very High		44	9	100	
Total			550	100	
	Load Shedding (electricity)	Very Low	116	21	21
		Low	22	5	26
		Moderate	309	56	
High		68	12		
Very High		35	6	100	
Total			550	100	
	Inadequate Internet Connection	Very Low	217	39	39
		Low	96	17	56
		Moderate	103	18	74
High		122	22	94	
Very High		22	4	100	
Total			550	100	



Inadequate Technical Skills	Very Low	150	27	27
	Low	125	23	50
	Moderate	134	25	75
	High	87	16	91
	Very High	54	9	100
	Total	550	100	
Others	Very Low	258	47	47
	Low	111	20	67
	Moderate	98	18	85
	High	52	9	94
	Very High	41	6	100
	Total	550	100	

Table No. 4 Challenges faced and encountered by students in online learning strategy

Table 4 represents the data of responses collected by the students for the challenges they encounter and their respective intensity of highlighted challenges in adopting online learning strategy. The data reflects that.

63% of Students reported that they have adequate Internet electronic devices (Laptop, computer, ios or android cell phone, tablet, etc.)

56% of student's respondent load shedding as a hurdle for online education

22% students reported internet connectivity as high intense difficulty.

25% of students reported inadequate technical skills as a moderate-intensity difficulty for online education strategy

20% of the students' data reflects that they face other hurdles, and its intensity is low.

Exploring More Efficient and Effective Strategy

An open-ended question has been added to the questionnaire to get a broader vision for future are efficient and effective strategies for online learning strategy by the participants of the study. Some highly effective suggestions shared by the students are as follow:

Introduction to computer technology should be treated as an important course for higher education institutions. Proper assignments and related strategies

should be delivered to students for their assessment-related online educational strategy.

Proper training of higher education faculty for online education strategy and use of technology so that they can solve the student query

Institutions should develop their customized online study material precisely,

The concerned faculty should prepare their own study material precisely, it should be easy to understand, effective, short, and to the point. Excessive information or reading material of unknown individuals distracts the interest of the students and dislocates instructor and course perceptions for learning objectives.

Video lectures can somehow be identified as an effective way of online learning as it enhances attentiveness and nonverbal communication also helps in creating understanding and more effectively as compared to ppts and pdfs.

Interactive lectures and two-way communication during online sessions are more desirable

Irrelevant and out of syllabus learning material should be avoided

The instructor should use some study aid for delivering the lecture



As there is a problem of electricity and poor internet connectivity, the total dependence on online learning devices should not be imposed rather a proper balance should make between the classroom teaching and e-learning.

- Courses should be designed with conclusive utility and implementation of online activities and assignments.
- Online material should have English as well as Urdu version for better understanding of the instructions.
- Academic institutions should introduce online assessment strategies so that the students can get familiar with the technology, improve their identified deficiencies.
- The faculty should provide the schedule of online classes activities plan along with daily plan along with the medium of an online class (e.g., PDF, PPT, video lectures, etc.)

Conclusion

E-Learning is becoming a global trend for schools, colleges, and HEIs (universities) and has successfully been replaced as an alternate option for continuing education during COVID 19 lockdown, to avoid the loss of education during the lockdown. In our study, we found out the feedback of students through online surveys regarding their E-Learning experience, their readiness, and acceptability towards adopting online learning platforms and quality of E-Learning tools adopted by Higher Education Universities as per the directives of HEC. Our research study highlighted and brought into light different facts related to E-Learning initiatives of higher education, it reflects students' experience of attending online classes and Quality of learning through HEC's adopted online learning platform during COVID'19 platform. Overall results show that HEIs and Faculty of respective institutes and universities have made commendable efforts and have contributed their efforts successfully to compensate for the loss of studies during the lockdown. Moreover, HEIs have adopted several tools for the continuation of studies through online classes like creating WhatsApp and mailing groups for smooth coordination with students during COVID lockdown, using PowerPoint slides, pdf files, and word files for preparing and sharing lecture notes with students, developing and recording video lectures, developing video lectures and LMS for smooth delivery of online classes using ZOOM, MOOC, Hangout, E-Path, etc. using (Google meet, audio lectures, quizzes, assignments, projects, etc.) for online classes during the lockdown. Our survey

indicated, 35.4 % of students said that they were able to cover 76-100% of their course contents, while 31.2% and 22.2% said they covered 26-50 and 51-75 % course contents or syllabus through online classes conducted by HEIs both public and private sector universities, respectively. However, the major hurdle students faced during online classes was poor internet connectivity, electricity & power failures with unannounced load shedding. Our survey findings also highlighted several suggestions made by students of both public and private sector HEIs to make the online learning process more efficient and effective learning platform for students.

Recommendation

The findings from the sample revealed that adequate training regarding the use of various tools and software for e-learning will further make dissemination of knowledge more effective. It is also important that HEIs should develop resource materials related to subject taught which will be helpful in online learning. Similarly, homebased assignments need to be developed and faculty should be provided training as to develop these assignments specially in the case of online learning. It is also proposed that assessment of work in an online environment should be different from the traditional system of assessment. HEI should incorporate more software related to online classes and other related activities, this will enhance efficiency of education delivery and students' learning. Classes conducted online should be recorded and these recordings should be made available to all students for referencing purpose.

Limitation

No study is free from limitation, similarly our findings are also subject to limitations. First of all, this research focused on a particular level of study which was the higher education. It is important that all level of education should be assessed for their effectiveness in conducting online classes. Because of different level of studies their could arise discrepancies in findings and ultimately in effectiveness of online classes. Another issue was there was no comparison done with respect to demographic characteristics specially age and gender. These factors have been found to influence the findings and needs to be incorporated in future studies. The findings of this research also do not incorporate the skills of the students and faculty with respect to use of software and other technology, previous knowledge will certainly impact on effective conduction of online sessions thus needs to be incorporated.



References

1. Almaiah, M. A., Al-Khasawneh, A., & Althunibat, A. (2020). Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-020-10219-y>
2. Eram Agha (News18.com: April 3, 2020). *Learning Rebooted: Online Education during Covid-19 Lockdown Puts Spotlight on India's Digital Divide*; retrieved On April, 24, 2020. <https://www.news18.com/news/india/learning-rebooted-online-education-during-covid-19-lockdown-puts-spotlight-on-indias-digital-divide-2563265.html>
3. ETGovernment (March 29, 2020). *Lockdown Impact: Government's e-learning platforms witness surge in subscribers*. <https://government.economictimes.indiatimes.com/news/education/lockdown-impact-governments-e-learning-platforms-witness-surge-in-subscribers/748708>
4. Eyles, A., Gibbons, S., & Montebruno, P. (2020). Covid-19 school shutdowns: What will they do to our children's education? *Centre for Economic Performance*, (001).
5. Fredriksson, P, L Hensvik, and O Nordström Skans (2018), Mismatch of Talent: Evidence on Match Quality, Entry Wages, and Job Mobility, *American Economic Review* 108(11): 3303-38.
6. Nadikattu, R.R., *Information Technologies: Rebooting the World Activities during COVID-19 (June 9, 2020)*. Available at SSRN: <https://ssrn.com/abstract=3622733> or <http://dx.doi.org/10.2139/ssrn.3622733>
7. Nell Lewis, CNN Business (April 8, 2020). *Coronavirus lockdown could give online education a lasting boost in India*. <https://edition.cnn.com/2020/04/08/tech/online-education-india-coronavirus-spc/index.html> retrieved on 21 April, 2020
8. Noor-Ul-Amin, S. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research and experience: ICT as a change agent for education. *Scholarly Journal of Education*, 2(4), pp38-54
9. Oreopoulos, P, T von Wachter, and A Heisz (2012), The Short- and Long-Term Career Effects of Graduating in a Recession. *American Economic Journal: Applied Economics* 4(1): 1-29.
10. Pelmin, 2020 Pelmin, M. (2020). *Readings on Coronavirus Disease (COVID-19) and the Higher Education Institution (HEIs) Emergency Preparedness in the Philippines*. Available at SSRN 3573896. <https://ssrn.com/abstract=3573896>.
11. Piopiunik, M, G Schwerdt, L Simon and L Woessman (2020), Skills, signals, and employability: An experimental investigation, *European Economic Review* 123. 103-374.
12. Puja Awasthi (April 17, 2020). *Experts question quality, reach of e-learning amid COVID-19 lockdown*. <https://www.theweek.in/news/india/2020/04/17/experts-question-quality-reach-of-e-learning-amid-covid-19-lockdown.htm>
13. Sahu, P. K. (2020). Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): Impact Closure of Universities Due to Coronavirus Disease 2019 (COVID-19): *Impact on Education and Mental Health of Students and Academic Staff*. *Cureus*, 12(4). <https://doi.org/10.7759/cureus.7541>
14. WHO Timeline - COVID-19, 2020 WHO Timeline - COVID-19, April 2020, <https://www.who.int/news-room/detail/27-04-2020-who-timeline-covid-19>. World Health Organization
15. Yu, Zhonggen, (2021). The effects of gender, educational level, and personality on online learning outcomes during the COVID-19 pandemic. *International Journal of Education Technology in Higher Education* 18. *ntiers in Psychology*, 8, 1754.