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Online Teaching-Learning Experience During COVID-19 Pandemic – A Case Report

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Abstract : On the backdrop of COVID-19 pandemic lockdown in India that was implemented suddenly since 24th March 2020, the educational institutes faced the challenge of course delivery and academic engagement of the students. Many institutes responded through online teaching-learning mode. However, the transition from physical classes to virtual mode course delivery was all of a sudden for both; student as well as faculty community. Hence, it is important to develop an understanding of perception of students and faculty members to this experience of online teaching. This work reports preliminary findings on an online course delivery initiative at an autonomous institute during the lockdown period and efficacy of the virtual model in order to validate the hypothesis that virtual course delivery is well received by the students and proves beneficial. Also, an effort is made to investigate whether the students' acceptance to online teaching is influenced by the stream they belong to and if there is any correlation between the academic achievements of students and their acceptance to online mode. In view of growing trend towards online learning post COVID-19 scenario, the findings offer valuable insights. From the view point of overall experience and benefits from online teaching-learning, a clear division is found among the students' opinions. Nearly half of the students (48.08%) have found to be benefitted through online classes while the remaining don't seem to have satisfied and thus benefitted from the initiative. The authors propose a hybrid approach combining physical and virtual experiences for future purposes, owing to inherent limitations of online teaching being reflected through the students' responses.

Keywords : COVID-19 pandemic; online teaching-learning; course delivery; student engagement; student perception

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1. Introduction and background

The whole world is witnessing the unprecedented times owing to COVID-19 pandemic since the beginning of 2020. India started reporting the COVID infection cases from February 2020 and subsequently announced the lockdown since March 24, 2020. As with many other organizations, the schools and colleges were closed right in the middle of the academic year/semester. Typically, the engineering colleges in India resume the even semesters sometime in the month of December or early January. All the academic activities like course delivery and evaluation were disrupted owing to the lockdown which continued till May/June 2020. To compensate for the academic loss and continue the teaching-learning process during the lockdown period was the major challenge in front of the college administration and community in general.

In their quest to find the approaches and the experiences world over and especially in India, the authors reviewed the literature which throw some light on online mode of teaching-learning adopted during the COVID-19 pandemic. Kerres [1] has commented on the challenges being faced by the educationists in Germany during the COVID-19 times. Peters et al. [2] presents experiences of China's higher education world during the COVID-19 pandemic through students' collective auto ethnography. Teras et al. [3] have reflected on "possible problems arising from hasty adoption of commercial digital learning solutions whose design might not always be driven by best pedagogical practices but their business model that leverages user data for profitmaking" post COVID-19 era. Rapanta et al. [4] have offered expert insights into pedagogical content knowledge (PCK) for online classes when all of sudden we move from face-to-face to online teaching due to the COVID-19 pandemic. Dhawan [5] has presented SWOC analysis of online mode of learning and offered suggestions for institutions dealing with challenges of online teaching.

Recently, there have been few works presenting the findings about online teaching experiences during the COVID-19 times in Indian context. Ahmad and Rahi [6] have reported the students' perception towards online learning during the pandemic in the state of Uttarakhand in Indian context. However, this study is mainly focused on non-engineering students. Agarwal and Kaushik [7] reported the post-graduate medical students' response to online learning during the COVID-19 pandemic. Singh et al. [8] have also shared their findings of online teaching for AIIMS, Jodhapur students during the COVID-19 pandemic. Similarly, Mohalik and Sahoo [9] investigated e-readiness and perception of students of education faculty across India. Jena [10] has discussed impact of COVID-19 on Indian higher education, emerging approaches and trends in higher education post COVID-19. There have been few studies reporting the experiences of primary and intermediate school-level students about the online education during the lockdown period. These works share the online teaching experiences for either mixed category of students from various faculties like arts, commerce, education etc. or of the medical faculty students. The present work focuses on engineering students belonging to different streams and years of an autonomous engineering institute and makes an effort to present the experiences.

This article presents a case report of an autonomous institute who made an effort to engage the engineering students by offering the courses using virtual platform during the lock down period and the students response recorded through online mode offers some interesting insights into the experience. The findings of the survey are used to validate the hypothesis that virtual course delivery is well received by the students and proves beneficial. The findings of the initiative are important because of the scale of this virtual course delivery initiative ranging from First year to Final year of various undergraduate programs across the institute covering more than 2000 students and 150 faculty members. Another hypothesis that students' acceptance to online teaching and the benefits drawn from the same is influenced by students' streams/branches they belong to, is also validated based on this survey. An effort is made to investigate if there is any correlation between the academic achievements of students and their acceptance of the online mode of teaching and learning. Especially on the backdrop of less penetration of online mode of Teaching-Learning in India, this study assumes significant importance, the authors believe. The findings paves the way for future virtual educational experiences which possibly will become the norm in post COVID-19 era.

Online Course delivery

Sensing that the lockdown will remain for prolonged time, the institute decided to switch over to digital mode for delivering the courses. ZOOM video conferencing platform was selected for the sake of convenience and affordability. A two-hour orientation program for the faculty was carried out which was followed by similar program for the students. The classes were scheduled online during 26th March 2020 till 3rd May 2020, as per the timetable existing then. Nearly 12-14 lectures were engaged for every course during this period to cover the syllabus. The conduct of lectures, student attendance and progress towards course completion were monitored. The sessions were recorded using the recording facility on ZOOM and these recordings were made accessible on MOODLE server. Total 190 courses and around 130 online sessions per day were delivered across the programs and years during this period. Across the institute, 210 faculty members delivered the online sessions for more than 2000 students. The Heads of the departments and the class monitors held meetings with the students intermittently to address their problems and difficulties. Though the students

showed some reluctance in the beginning to adapt to the online learning, later on, after the realization that the lockdown will stay on for prolonged period, they gradually started attending the classes. After the initial teething problems for a couple of weeks, the online course delivery was streamlined.

Capturing the students' voice

An online survey was taken using institutional ERP software to record the student opinions anonymously. A simple questionnaire comprising of six questions/statements with three options viz. Agree/Disagree/Not sure; was designed and administered to the students. The questionnaire is generic and not course–specific as the objective is to confirm the efficacy of the initiative of online course delivery. Total 2018 (76%) students across various programs and classes responded to this online survey and registered their feedback. Table 1 and Table 2 presents the demographic of the respondents while Table 3 presents the questionnaire/statements the students responded to.

Table 1 : Demographic of respondents - branch wise

Automobile Engg.	Mechanical Engg.	Civil Engg.	Electrical Engg.	Eln. and Tele. Engg	Comp. Sc. and Engg.	Info. Tech.	MBA
195	388	315	233	259	278	247	103

Table 2 : Demographic of respondents – undergraduate and postgraduate

Undergraduate	1775
Postgraduate	243

Table 3 : Questionnaire used for the student survey for Online Course Delivery initiative during the lockdown period

Sr. No.	Statements	Agree	Disagree	Not sure
1.	You attended the ZOOM lecture sessions during the lockdown period.			
2.	You could overcome the technical problems (viz. connectivity, access to internet) in order to attend the ZOOM lectures.			
3.	The faculty, within the constraints and circumstances, tried their best to deliver the content.			
4.	The faculty shared the lecture recordings/links with you.			
5.	The lecture recordings were useful for you as a resource.			
6.	Overall, you were benefitted by the online ZOOM lectures.			

Results and Discussions

This section makes an effort to articulate the findings of the survey and derive certain insights that help validate the hypothesis. Since the process of ZOOM delivery adopted was common across the institute viz. streams, departments and classes and the survey questionnaire used for recording the student response was also the same across the institute, it is argued that the results have not been influenced or biased by certain factors related to the delivery practice or by nature of the survey and thus the results are reliable. Table 4 presents the student responses to the questionnaire.

Table 4 : Institutional feedback from students on Online Course Delivery initiative during the lockdown period

Sr. No.	Statement	Answer	No. of Responses	Percentage
1	You attended the ZOOM lecture sessions during the lockdown period.	Disagree	109	5.12
		Not Sure	132	6.20
		Agree	1887	88.68
2	You could overcome the technical problems (viz. connectivity, access to internet) in order to attend the ZOOM lectures.	Disagree	360	16.92
		Not Sure	445	20.91
		Agree	1323	62.17
3	The faculty, within the constraints and circumstances, tried their best to deliver the content.	Disagree	185	8.69
		Not Sure	446	20.96
		Agree	1497	70.35
4	The faculty shared the lecture recordings/links with you.	Disagree	316	14.85
		Not Sure	313	14.71
		Agree	1499	70.44
5	The lecture recordings were useful for you as a resource.	Disagree	372	17.48
		Not Sure	478	22.46
		Agree	1278	60.06
6	Overall, you were benefitted by the online ZOOM lectures.	Disagree	514	24.15
		Not Sure	591	27.77
		Agree	1023	48.08

Despite the initial resistance, the students seemed to have accepted the online learning mode which gets reflected through their high attendance (88.68%) to the online classes in general. A considerable number of students (37.83%) faced technical problems like network issues, internet connectivity, less amount of data availability etc. while attending the classes. This seems obvious looking at the communication infrastructure available across the region; especially in rural areas. By and large, students seemed to be appreciative of the faculty efforts (70%) as it was all of a sudden that the faculty members were required to adapt to the demands of the online classes with limited resources at hand. From the response to the statement no. (4) and (5), lecture video recordings have served as one of the learning resources for moderate number of students. However, with regard to overall experience and its benefits, there is clear division among the student opinions. Nearly half of the students (48.08%) have found to be benefitted through online classes while the remaining don't seem to have satisfied and thus benefitted from the initiative. A study by Shrivastava et al. [11] which presents the results of the survey made to understand the outcome of online

teaching-learning activity carried out for undergraduate dental students all over India during the Covid-19 pandemic reveals that 48.2% of students were satisfied while 34% of students were partially satisfied. Hasan and Khan [12] from Manipur University (India) collected responses from students of Manipur University, Aligarh Muslim University and their affiliated colleges and centers from India observed that 71.6% of students enjoyed the online teaching-learning. In the context of present study, the probable reasons why the students felt that the purpose has not been served to the fullest could be the technical and social. As mentioned earlier, the poor digital connectivity and limited internet data have robbed the digital experience. However, the social aspects though implicit, appeared through the informal communication with few of the students. The absence of physical classroom experience, emotive disconnect with faculty and peers, the lockdown pressure along with sense of insecurity and lack of quality ambience for learning appeared to be the reasons the students were deprived from the benefits of virtual classroom experience. It is to be noted that the lock down was announced all of a sudden; hence many students used their cell phones instead of laptops/desktops/tablets to attend the classes. In the absence of prior experience or training, suddenly the faculty and students had to switch over to virtual mode from the face-to-face mode of teaching-learning.

Based on the survey, the authors also verified another hypothesis that the stream/branch of students influences the acceptability of online teaching and thereby benefits derived from online teaching. To test this hypothesis, the survey data was broken down with respect to branches of the students, they belonged to. The stream wise breakup of the students' response for the statement 'Overall, you were benefitted by the online ZOOM lectures' is presented in Table 5.

Table 5 : Stream wise breakup of student response to Online Course Delivery initiative during the lockdown period

Stream	Agree (%)	Disagree (%)	Not sure (%)
Automobile Engineering	34.94	43.98	21.08
Civil Engineering	40.82	25.51	33.67
Mechanical Engineering	38.90	28.38	32.72
Electrical Engineering	44.80	22.62	32.58
Electronics and Telecommunication Engineering	44.35	23.01	32.64
Computer Science and Engineering	39.18	30.22	30.6
Computer Science and Information Technology	45.41	30.29	24.3

The range of response for the option 'Agree' varies from around 35% to 45% and the maximum response is recorded by Computer Science and Information Technology students though response from students from Electrical Engineering and Electronics and Telecommunication Engineering is not far behind. However, based on the statistics presented in Table 5, the hypothesis that the stream/branch of students influences the acceptability of online teaching and thereby benefits derived from online teaching cannot be validated. The level of acceptance to online teaching and benefits drawn from it is independent of students' streams.

An effort is made to correlate the student responses with their academic achievement level based on their SGPA (Semester Grade Point Average). The branch wise SGPA scores based on December 2019 examinations - just before the onset of the pandemic, presented in Table 6 are considered for the investigation.

Table 6 : Branch wise average SGPA scores

Sr. No.	Branch (undergraduate programs)	Average SGPA
1	Mechanical Engineering (Automobile)	6.4
2	Civil Engineering	7.48
3	Computer Engineering	7
4	Computer Science and Information Technology	7.42
5	Electrical Engineering	7.42
6	Electronics and Tele-Communication Engineering	7.01
7	Mechanical Engineering	7.3

As the number of students are less, post graduate programs have not been considered for the analysis. Considering the program Mechanical Engineering (Automobile) as an outlier, the remaining programs could be divided in two groups based on the average SGPA scores. Civil, CSIT and Electric Engineering can be considered as a group having higher average SGPA score while the other group comprising of Computer, ETC and Mechanical Engg. scores comparatively less. However, it is evident from the data that the academic achievement levels of the students cannot be correlated with their acceptance or

rejection of online teaching-learning process; or the benefits they perceive thereof.

These preliminary findings emphasize the need for hybrid approach where the virtual mode for course delivery could be used for supplementing the physical, live classroom experience. It also indicates that the post-COVID time shall witness this dual mode approach on a large scale. However, during the lockdown period the only viable option for course delivery was online mode and when it was used, it received mixed response from the students. However it would be a good idea to make an effort and modify the ZOOM delivery to mimic the classroom environment to the possible extent so as to bring the classroom feel to the sessions. Thus the first part of the hypothesis i.e. 'virtual course delivery is well received by the students' is acceptable however, the later part i.e. 'it proves beneficial' may require correction viz. 'it proves beneficial to certain extent'.

These preliminary findings also highlight the need to train the faculty for online teaching and augmentation of digital infrastructure to reap the benefits of the digitization in the future. Finally, the significance of human touch which is largely missing during virtual mode course delivery is realized. Before concluding, the authors would like to mention that though the survey is objective and unbiased, being online and focused, its scope is limited in terms of population and nature as the survey findings are limited to an autonomous institute offering programs in engineering and technology. It would be interesting to scale up similar work spanning across the regions and institutes to corroborate the findings. Also, another interesting question could be 'Is there any difference between engineering students' response to online teaching-learning with regards to students of other professional courses?' The future work may address the differences and compare the experiences.

Conclusion

The work reports an experience of online course delivery during the COVID-19 lockdown period at an autonomous engineering institute. One hundred and ninety courses ranging from First year to Final year belonging to various engineering programs were delivered online for the even semester during 26th March to 3rd May 2020. An online survey of students' opinion was carried to test the efficacy of the initiative. Nearly half (48.08%) students indicated that they were benefitted from the online teaching experience. It is revealed that though the students are willing to embrace the online mode, when used in isolation, it offers benefits to certain extent only owing to various technical and social reasons. Also, it is found that acceptance to online teaching and benefits drawn from the same do not depend on the students' streams. Thus a blended approach comprising physical and virtual mode delivery is advocated for future experiences during normal circumstances. However, during the COVID-19 lockdown period the initiative has brought some success regarding continuation of teaching-learning and student engagement.

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