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## Live online lecture versus classroom lecture: perception of undergraduate medical and nursing students and faculty

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### Abstract

**Introduction:** During COVID-19 pandemic, live online lectures were offered for the first time to the undergraduate students. Due to its novelty, it was important to identify the effectiveness. Thus, the aim of this study was to compare the perception of students and faculty regarding the attributes of lectures delivered via live online versus classroom platform.

**Method:** In this descriptive study, after approval from the ethical committee, link to the validated questionnaire was sent via email to all participants. Quantitative data were expressed as numbers and percentage while thematic analysis was done for qualitative data.

**Result:** In this study 22 faculty members and 176 students participated. Twenty-one(95%) faculty and 159(90.3%) students agreed that it was a good initiative to start live online lectures during the pandemic, and 18(81.8%) faculty and 160(91%) students were satisfied or partially satisfied with online mode. Limitations identified were technical issues and lack of physical interaction. Both faculty members 18(81.8%) and students 116(65.9%) agreed or strongly agreed that online lectures were less interactive, and suggested ways to improve online lectures by making sessions more interactive, proper lecture scheduling and using different online media.

**Conclusion:** Participants identified various strengths of live online mode which is encouraging to use during adverse situations or even continue as a standard platform but it is not without limitations. Thus, for successful implementation, proper planning and designing of lectures are required.

**Keywords:** COVID-19, classroom lectures, faculty's perception, live online lectures, students' perception

## Introduction

Conventional classroom lecture is one of the common methods for providing education.<sup>1</sup> Advancement in technologies has provided alternative methods to deliver a lecture by using an online platform. Online lectures can be synchronous (live) or asynchronous type.<sup>2</sup> Several studies have compared the effectiveness of conventional versus online methods and mixed responses were obtained.<sup>3,4</sup> In developed countries, the use of online learning has been increasing each year. Whereas, developing countries including Nepal, still face huge challenges regarding implementation.<sup>5</sup> However, the outbreak of Coronavirus disease (COVID-19) provided the impetus for adopting online lectures globally.<sup>2</sup>

Patan Academy of Health Sciences (PAHS) also implemented the online platform to prevent gross academic loss. This platform has been used for delivering a lecture for the first time, so it is crucial to explore its effectiveness. Hence, this study aims to compare the perception of live online and classroom lectures of basic sciences courses of students and faculty at PAHS.

## Method

This is a single-center, cross-sectional, descriptive study, conducted during the period of August 2020 to April 2021. The online platform used for teaching-learning activities was the Zoom application. The respondents were first- and second-year MBBS students, first-year nursing students from Bachelor of Science in Nursing (BScN) and Bachelor of Nursing Science (BNS) programs, and faculty who were involved in teaching activities to deliver the basic science content in these programs at PAHS.

In this study, “live online lectures” denotes the lectures conducted in real-time using an online platform i.e., both the students and the teachers will be present online at the scheduled time. Henceforth, ‘live online lecture’ will be referred to as “online lecture”

in this study. Similarly, “classroom lectures” denotes the conventional interactive lectures conducted in classrooms of PAHS in the physical presence of both students and teacher in scheduled time.

The inclusion criteria for students were first and second-year MBBS students and first-year students of nursing (BSc nursing and BNS) of PAHS who have attended online lectures from May 3 to 22 Nov 2020 and classroom lectures before 20 Mar 2020 (before the first lockdown) and for faculty, the criteria was those who are involved in delivering online lectures from 3 May 2020 to 22 Nov 2020 and classroom lectures before 20 Mar 2020 (before the first lockdown) in basic science years. We excluded those students who were not responsive even after the two general reminder emails and those who were involved in pretest and for faculty, we excluded those who were not involved in delivering online lectures and those not responding even after the two general reminder emails.

Multiple online meeting sessions (Aug-Oct 2020) in the Zoom platform were used by the authors to develop an original questionnaire (Appendix I and Appendix II) related to lectures, each for students and faculty. The questionnaire contained ten multiple-choice, 19 Likert scales, and three open-ended questions for students and for faculty, it was nine, 16, and three respectively. The finalized questionnaire was then sent for face and content validation. Next, with the consent of the participants, a pretest was carried out among 10 students. Their responses were recorded and the feedbacks obtained from them were used to make some minor changes in the questionnaire.

After the approval from institutional review committee (IRC-PAHS), a google form was created using the questionnaire. The link to the form was sent to the participant’s personal email address. Seven days were given to all participants to fill out the form. After this, two general reminder emails were sent in a space of three days to encourage response.

For quantitative analysis, collected data were entered into SPSS (Statistical Package for the Social Sciences) V. 20.0 statistical analysis software, and numbers and percentages are provided for continuous variables. For qualitative data analysis, the data was generated from open-ended questions. The obtained answers from Google Form were extracted to an excel sheet. Then thematic analysis was conducted using Braun & Clarke's six-phase framework.<sup>6</sup>

The ethical approval was obtained from IRC-PAHS (Ref: drs2103301509). Those participants who filled out the form were considered as consent given to participate. There was no harm to any participants throughout the study time. To maintain the privacy of the participants, data was stored in a password-protected electronic format.

## Result

Total 22 faculties (out of 30), and 63 nursing students (out of 80), and 113 MBBS students (out of 120) participated in this study. Among nursing students, all were female from the first year whereas, among MBBS students, 59(52.2%) were from the first year and 54(47.8%) were from the second year, Table 1.

A total of 159(90.3%) students and 21(95.5%) faculty members agreed that it was a good initiative to start the online lectures in this pandemic situation. Among the faculty members, 8(36.4%) were satisfied and 10(45.5%) were partially satisfied with the online mode of teaching whereas, among students, it was 91(51.9%) and 69(39.2%) respectively. A very few proportions of faculty and students were either not satisfied or were completely satisfied.

Twenty-seven (42.9%) nursing and 47(41.6%) MBBS students have strongly agreed that discussion among friends regarding lecture content after the online lecture was decreased in comparison to a classroom

lecture. A total of 30(47.6%) nursing students have either agreed or strongly agreed that they could concentrate better in online mode whereas 62(54.8%) MBBS students have shown complete disagreement. Similarly, 25(39.7%) nursing students have enjoyed online lecture more than classroom lectures. But on the other hand 54(47.8%) MBBS students have shown disagreement on this. On the other hand, a total of 31(49.2%) nursing students have agreed or strongly agreed that understanding of content is better in online lecture than classroom lectures, whereas, among MBBS students, 40(35.4%) have either found no difference or have disagreed to this statement (Figure 1).

On comparing the perception of faculty and students, disagreement was shown by both faculty (disagree: 14(63.6%), strongly disagree 4(18.2%)) (Figure 2) and students (disagree: 68(38.6%) and strongly disagree 48(27.3%)) (Figure 1) on online lectures being more interactive than classroom lectures. Likewise, both groups (faculty: 22(100%) and students: 115(65.3%)) have either agreed or strongly agreed that they felt less connected with each other in online mode.

Regarding preference of online lecture over classroom lectures, 21(33%) nursing students have given neutral response whereas 15(68.2%) faculty members have preferred classroom lectures and among MBBS students, 59(52.2%) did not prefer online lecture and only 34(30.1 %) have preferred this mode of teaching.

The study finding also depicted that that 109(61.9%) students and 12(54.5%) faculty members agreed that online lecture could be an alternative to classroom lecture.

A total of 154(87.5%) students and 18(81.8%) faculty members agreed or strongly agreed that students need to be more self-motivated to attend online lecture than in classroom lecture, Table 2.

## Qualitative analysis from open-ended questionnaire

Perception of students and faculty were analyzed based on the three open ended questions related to the advantages, limitations and suggestions on how to improve live online lectures. Within these three themes, 14 subthemes emerged from students and 11 subthemes from faculties,

Table 3 and 4. The quotation provided by nursing students are represented by S1N, S2N, and so on, by MBBS students are as S1M, S2M, and so on and those provided by faculty are represented by F1, F2, and so on.

**Table 1. Demographic data of faculty and students in a survey on perception for live online lecture versus classroom lecture**

Particulars		Faculty (22) N(%)	Student (176) N(%)
Gender	Male	12(54.5)	63(35.8)
	Female	10(45.5)	113(64.2)
Where did you stay during online lecture	Single in a room	19(86.4)	114(64.8)
	Shared room	2(9.1)	57(32.4)
	Others	1(4.5)	5(2.8)
Device used (multiple response possible)	Laptop	21/22(95.5)	132/176(75)
	Desktop	4/22(18.2)	5/176(2.8)
	Hand-held device (mobile/tablet)	7/22(31.8)	136/176(77.3)
Internet type	Data package	0 (0)	12(6.8)
	Wi-Fi	14(63.6)	74(42.0)
	Both	8(36.4)	90(51.1)
Internet stability (quality)	Unstable	2(9.1)	38(21.6)
	Average	15(68.2)	118(67.0)
	Stable	5(22.7)	20(11.4)
Electricity supply	Frequently Interrupted	0 (0)	21(11.9)
	Moderately interrupted	50 (11)	127(72.2)
	Uninterrupted	50 (11)	28(15.9)

**Table 2. Perception of faculty and students on some features specific to online version**

	N (%)			
	Strongly disagree	Disagree	Agree	Strongly agree
<b>Perception of faculties</b>				
I could self-evaluate and improve my lecturing skill by going through video records in online lecture.	0(0)	3(13.6)	12(54.5)	7(31.8)
Students attending online lectures must be more self-motivated than in classroom lecture	2(9.1)	2(9.1)	9(40.9)	9(40.9)
Mute/unmute feature in zoom platform helped me to deliver lecture with minimum disturbance	2(9.1)	0(0)	12(54.5)	8(36.4)
The online platform that you used for delivering lectures is user friendly	0(0)	0(0)	8(36.4)	14(63.6)
<b>Perception of students</b>				
The recorded video and the PowerPoint of lectures helped me in my study	4(2.3)	7(4.0)	46(26.1)	119(67.6)
Sending queries to faculty in online platforms for clearing out the confusions are easier than meeting personally.	22(12.5)	49(27.8)	73(41.5)	32(18.2)
Physical absence of teacher in online lecture, tempted me to get involved in other unrelated tasks (browsing/eating/ chatting etc.)	11(6.3)	29(16.5)	91(51.7)	45(25.6)
Students attending online lectures must be more self-motivated than in classroom lecture	4(2.3)	18(10.2)	61(34.7)	93(52.8)
The online platform that you use for attending lectures is user friendly	2(1.1)	10(5.7)	111(63.1)	53(30.1)

**Table 3. Theme, subthemes and code obtained from open-ended questionnaire of nursing and MBBS student's on perception for live online lecture versus classroom lecture**

Theme	Subtheme	Code
Advantages	Learning environment	Feared less when raising question; Easy to attend and access teacher; Safe learning environment in pandemic; Convenient; No visual or audio disturbance; No Side talks and distractions from friends; No classroom noise and *crowd
	Learning process	Easy to focus/concentrate and *understand; Lecture recording helped when lectures were missed due to unstable internet and during revisions; More time for self-study; Flexibility of time; Utilization of time and prevents academic loss during pandemic; Good alternative; Feeling of adult learners; Learning at own's pace
	Geographic flexibility	Can attend from anywhere; Saves travelling time; Can use the travelling time for self-study
Limitations	Learning process	Difficult to concentrate and understand; Easily distracted; Less effective; Less interaction with friends and teachers; Less retention of knowledge; Need more motivation to join online lectures; No access to library; Lack of physical gestures from the teacher hindered understanding; Lack of experiential learning
	Technical issues	Frequently disconnected due to unstable internet connection; Frequent use of data packs are not feasible and not effective; Power cuts/Electricity issues; Device problems; Did not receive online recording regularly; Distraction due to unstable internet connection; Missed the whole lectures/ certain portion due to lack of internet connection; Accidentally when someone un-mutes the audio, will cause disturbances in between classes; To manage the time due to connection problem, the lectures go too fast thus, sometimes it is difficult to understand; Not useful when internet connection is unstable; Not suitable for small screen devices
	Health issues	Internet instability added additional stress; Felt more tired; Irritation and burning of eyes due to prolonged screen time
	Learning environment	Social isolation; Monotonous; No classroom atmosphere; No feeling of being a student; Disturbance from external environment; Feel less connected to teachers;
	Effect of 'no face-to-face communication'	Made me less active; Less interaction with friends which could otherwise help in clearing the confusions; Physical absence of teachers make the lecture boring; Sometimes, teacher thinks we are not responding to their questions but the issue is unstable internet connection; Some things are well understood in physical presence of teachers;
	Suggestions	Would be better if academy could provide stable internet; If internet connection could be stable then it would be more interactive and could be good alternative
	Improving teaching-learning process	Turning on the camera; Use of online board while teaching; Less slides and more time for discussion and interaction; Making students involved in some activities like conducting workshop, asking frequent questions, Encouraging students to raise questions*, giving assignment; Conduct exams regularly* Doing one to one interaction with students regarding the problems faced by students
	Schedule planning	Short gap between lectures; Convert long lecture hours into short and increase the number of lectures; Separate question answer session and revision classes;
	Time management	Many slides in one-hour lecture should be avoided; Precise content delivery at a given time so that teachers do not have to hurry to complete the course
	# Utilization of technology	Use of other application apart from zoom which has more features; Should try to take more benefits of online version like using videos, 3D images during explanation
	Re-start classroom lectures	Should start classroom lectures; conduct teaching-learning activity in small groups; Can be used as a contingency but shouldn't be used as a granted study method

\*- Codes provided by nursing students; # - Codes provided by MBBS students

**Table 4. Theme, subthemes and code obtained from open-ended questionnaire on faculty's perception for live online lecture versus classroom lecture**

Category	Sub-category	Code
Advantages	Learning environment	Provides safe learning environment during pandemic; Comfortable; No distraction
	Continuation of academic activity	Good alternative during pandemic; Prevents academic loss for students in pandemic situation and natural disasters; Physical absence will not be a barrier to continue academic activities
	Geographic flexibility	Allows students to attend classes from any location; Work from home
	Utilization of technology	Can explain the subject matter well with the help of videos for better understanding of students; Lecture recording could be important resource for students to review later and for those who were absent; Recordings helps the faculties to introspect and improve our teaching skills; Can monitor group work in break out rooms more easily; Scheduling flexibility
Limitations	Technical issues	Unstable internet connection; Power cuts/Electricity issues; Technical issues caused distraction to both students and faculty; Unable to assess students properly when their video is turned off; Difficult to monitor large number of students; Difficult to use the white board to explain the content
	Teaching process	Lack of physical interaction with students; Students are less interactive; Difficult to ask questions to student; Monotonous; Unable to use proper gesture which can hamper students understanding; Lack of experiential learning
	Outcome of lack of resources	Lack of proper infrastructure and resources can hamper student learning process; Requirement of multiple electronic gadgets may lead to an additional financial burden
	Socialization skills	Lack of communicational skill development
Suggestions	Upgrading teaching methods to make online lecture more interactive	Mandatory use of discussion boards, More assignments, Small group teaching; Well preparation before-hand including sharing of lecture slides/reading materials; Filling of pre- lecture knowledge and post- lecture knowledge form; Assigning topics/contents to students to be prepared for upcoming lecture; Ask student to share what they know/learnt; Raising questions frequently
	Utilization of technology	Turning on the video during lectures; Students should mute their mike when not speaking; Use of videos to explain the subject matter; to use different functions of online software and use other platform along with zoom; institute should provide internet facility to have equal access to online platform
	Re-start classroom lectures	Online teaching is appropriate for medical and nursing students

**Advantages****Learning environment**

Many students have agreed that they had a safe and convenient leaning environment and did not fear much while raising the questions. Also, in online mode, students did not feel that they were disturbed by other fellow students and could clearly hear and see the power points displayed by the faculty.

One important aspect highlighted by a nursing student was (S63N) *"In classroom of 80*

*students, there was unnecessary noise and teacher voice was not always audible but in online this problem was solved.*

One faculty said (F1) *"Those who are willing to get involved in teaching learning will not be hampered by communicable diseases."*

**Teaching-Learning process**

Both the students and faculty have agreed that online lectures were good alternative to

classroom lectures in the time of pandemic and have helped to prevent academic loss and students found it useful to receive lecture recording.

One of the participants said (S21M) *“Online lecture has helped us to stay in track during this lockdown. It would have been a huge loss of valuable time if there was no alternative to the regular lectures. In such scenario, online lectures were crucial.”*

Next advantage identified by MBBS students was with the start of online lectures, they had an actual feeling of being an adult learner. They have adopted various traits of adult learners like self-directed learning and one participant (S28M) has added that online lectures have *“Increased self -motivation to learn.”*

#### **Geographic flexibility**

With the start of online mode, students could attend the lectures from any convenient place where they have access to internet and this was one of the main advantages identified by most of the students and faculty.

In this regard one of the faculty said (F17) *“Online lectures provides you the opportunity to attend and deliver classes from any place despite of your location.”*

#### **Utilization of technology**

Faculty believe that they can make use of various online features while teaching in online platform.

One of the faculty members has elaborated this as (F3) *“I could use the video recordings to know the areas I could improve on to make my lectures more effective. I used the various you tube videos to explain the content to the students for their better understanding. I had faced technical difficulties trying to do so during the classroom lectures.”*

#### **Limitations**

##### **Teaching-Learning process**

A greater portion of the MBBS students agreed that they had difficulty in

concentrating and understanding the online lecture however, a small portion of the nursing students agreed to this. Some of the faculty members had highlighted the lack of experiential teaching as it was difficult to demonstrate in online mode and students had felt that without practical knowledge the retention was less and was not helpful for their learning.

In this concern, one of the faculty said (F20) *“It is very difficult to impart skills like analysis and use of statistical software.”*

##### **Technical issues**

Frequent power cuts, unstable internet connection and device issues were the major challenges faced by majority of the students and faculty. In this connection, one of the students said (S9M) *“Due to electricity and network issue in my village, I am not able to attend classes regularly even for an hour. So, I am not able to know many things from lectures.”*

Another participant shared that (S16M) *“The lecture could not be smooth and continuous when internet connection is lost. When we reconnect after a gap, further lecture becomes confusing and difficult to understand.”*

One of the faculty said (F1) *“When the students do not respond timely, we feel we are delivering lecture to laptop”.*

##### **Health issues due to increased screen time**

With the start of online lectures, the screen time went up tremendously for everybody. As there was no alternative to lower the screen time, it ultimately lead to various health issues among students.

One participant shared that (S17M) *“Due to frequent use of mobile or computer, sometimes there was burning sensation in my eyes. Along with this, when the mobile data or Wi-Fi does not work or become unstable, during online lecture, then it irritates us.”*

##### **Learning environment**

Many students considered online learning to be boring, monotonous and they had a feeling of social isolation. Participant's experience reflected that they were easily distracted by their external environment and had difficulty in concentrating.

In this regard, one of the students said (S3N) *"I was easily distracted in home environment due to family members and I could use different social media in between the lectures which was another source of distraction."*

#### **Effect of 'no face-to-face communication'**

Another major limitation identified by most of the students was the absence of face-to-face interaction between teachers and students which hampered them in understanding the lectures properly.

One participant said (S60M) *"The feeling of physical presence, direct eye contact and face-to-face interactions with teacher in the real classroom settings made me personally very active during the lecture and also helped me to retain much information. In online lectures this is not possible."*

#### **Suggestion**

##### **Solving technical problem**

Some of the students and faculty members proposed to make provisions for improved internet facility by the academy which would help them to attend and teach online lectures without any interruption and in more efficient manner.

One of the participants said (S10M) *"If the college could consider providing the students with internet data packages it would be of great help."*

##### **Improving teaching-learning process**

Most of the students and faculty recommended turning on their camera, which might reduce distraction. Many of the faculty members suggested that while delivering the lectures, faculty should try to engage students in some activities which will make the lectures more interactive and effective.

One of the faculty stated (F5) *"We should try to improvise more ideas on how to involve students and make them participate actively in some tasks and not just make it a one-way session"*

Student's experience also reflected the same thing and to increase interaction they have proposed that (S54N) *"Teacher should encourage students to raise questions"* and (S63N) *"should frequently ask questions by calling individual's name (S2N) to draw attention"*

Another student has suggested (S92M) *"To provide pre-recorded videos of lectures beforehand and during the lecture hour we could have a 30 minutes – one hour interactive session regarding the lecture. This could help to retain more."*

##### **Planning while scheduling the lectures**

Many aspects should be considered while scheduling the lectures in online mode. Those students who are dependent on hand-held devices, battery may drain out quickly, those depending on mobile data, the package might not support for long hours and also health hazards due to prolonged screen time should be considered. In this aspect, students have suggested that the lecture hours should not be very long and should have short frequent breaks in between. Along with lectures, there should be separate slot for interaction.

One participant said (S53M) *"Short breaks or gap between every two lectures should be included in the schedule and long lectures hours should be made short."*

##### **Maximum utilization of technology**

Some of the MBBS students and faculty have suggested that to deliver lectures, one should not depend on single application and have suggested utilizing different options available in online version.

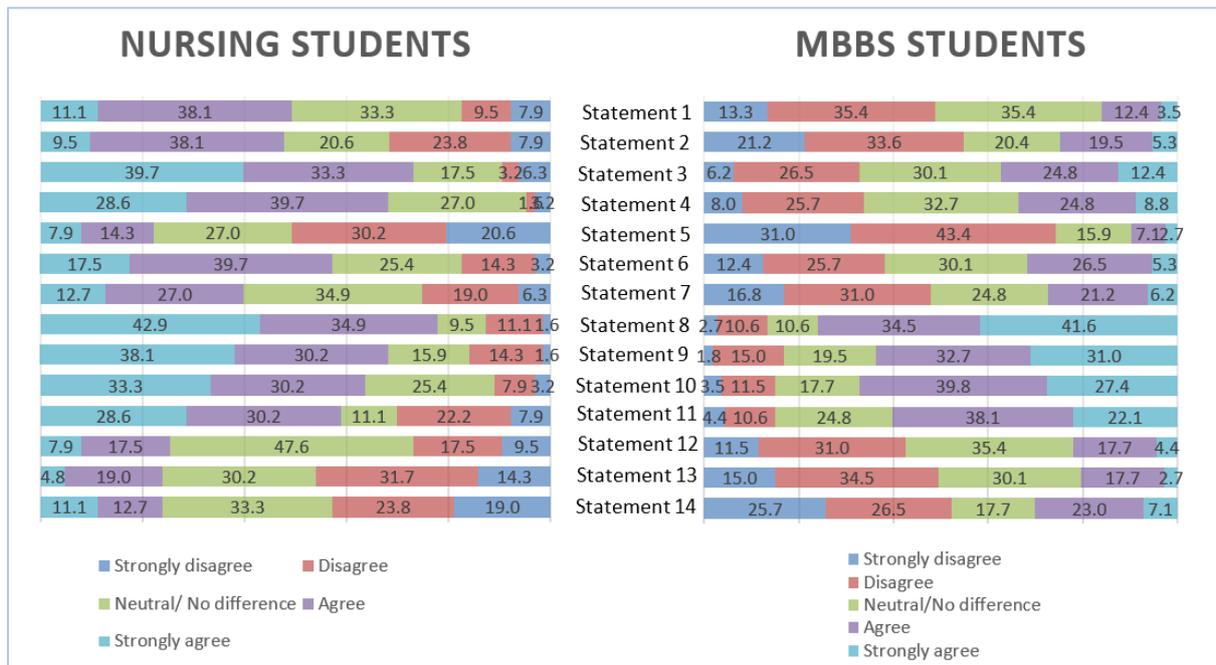
In this regard one of the students said (S60M) *"I think we should take more benefit of online teaching method by presenting videos during lecture, using 3D images when possible,"*

especially during anatomy lectures, or any other kind of technology to aid our learning process. This was not easily possible during real classroom settings.”

**To re-start classroom lectures**

Very few students and faculty have highly recommended to re-start classroom lectures using appropriate health safety precaution majors. They felt that online teaching is not appropriate for medical and nursing students.

In this regard, one of the faculty said (F19) “If you want to teach properly than there are no advantages of online lectures for medical and nursing students.” In this connection, one of the students said (S73M) “Classroom lectures should be started immediately. If delivering lectures in common hall is not possible, then we should try it in small groups using appropriate precautions.”



## Discussion

Due to COVID-19 safety guidelines, all in campus activities involving gathering etc. were suspended. In this situation, majority of the students and faculty had agreed that it was a good initiative to start the live online lectures and were satisfied with the online program. They have identified various advantages and the one highlighted by most students was to receive recorded lecture videos. Being a synchronous online mode, students can miss their lectures due to many technical issues. In this situation, recorded video could be of great help. Also, these videos could be later used during revisions, repeated as many times as wanted and pause and replay when there are confusions.<sup>7</sup> But, due to this easiness of recorded videos, students may develop a tendency to miss the live lectures on purpose and depend on these videos. Studies have shown that live lectures are better for retention of information, deeper understanding of the content and better performance in the exam in comparison to recorded lectures alone.<sup>8,9</sup> Faculty also took the benefit of recorded video to self-evaluate their teaching skills. This reflective method of evaluation is considered effective and good for professional growth.<sup>10</sup>

Both students and faculty agreed that for an effective online lecture, students need to develop some traits of adult learners like becoming active learners, motivating oneself to learn, self-directed learning, etc. This finding is consistent with other studies.<sup>11, 12</sup> These traits are important in online learning because there can be many excuses to not to join the lectures. Despite knowing the importance of these traits, there are some students who considered it to be one of the disadvantages in online mode.

Another major advantage of online learning identified by many studies is geographic flexibility<sup>13, 14</sup> and similar response was obtained in this study. Due to the pandemic, travelling was not allowed, and the participants could continue teaching-learning

activity from home. Students have also emphasized that they could use the travelling time for their study.

Both nursing and MBBS students stated that online lectures were monotonous and that they felt socially isolated, an argument many studies support.<sup>15,16</sup> Though the students felt less distracted by physical absence of other students, they have agreed that they were easily distracted in online lectures than in classroom environment. Students have shared many reasons for distraction in home environment like their family members being constantly around and some students had to share room during lecture hours. Along with this, another major cause of distraction was temptation to use the social media and actually using it during the online lecture hour. Other study has shown that use of social media during lecture hours not only causes distraction but also diminishes student's performance in exams.<sup>17</sup>

One major disadvantage identified by most of the participants was the technical issues and the finding is consistent with other finding is consistent with other studies.<sup>15,18</sup> Unlike asynchronous online lecture, in synchronous mode, stable electricity supply and internet connection is must. Those students who have these facilities will be in advantage in comparison to those who do not, a gap known as digital divide.<sup>19</sup> The results of this study revealed that very few participants could enjoy these uninterrupted facilities. With frequent internet disruption, students can miss portion of their lectures. When they reconnect, it is difficult for them to understand and follow the discussion. This can cause distraction and loss of interest in online lectures. Likewise, from faculty point of view, due to technical issues, students were not able to turn on their camera and this made it difficult for faculty to notice the expression or gestures from students and to monitor them unlike in classroom lecture where this is not an issue. Also, both faculty and students experienced that online lectures can increase financial burden and this is in agreement with other study.<sup>18</sup>

Interaction has been considered as one of the core components of deep learning and classroom environment has been considered ideal for all types of interaction.<sup>20</sup> In this study, lack of physical interaction between teacher-student and student-student during the lecture has been perceived as one of the main disadvantages. This could be the reason why both faculty and students felt less connected with each other in online platform in comparison to classroom lecture. Moreover, students also agreed that discussion with friends regarding the lecture content in off hours is less in online mode than in classroom lecture, which could otherwise help them in clearing the confusions. Study has shown that for better learning, discussion among friends are important and can help them in conceptual understanding and applying knowledge into real life scenario.<sup>21</sup>

To overcome the limitations, faculty and students have suggested various ways to make online lecture more interesting and effective. One of the suggestions was to use various features that are available in online platform. Both faculty and students felt that during online delivery of the lectures, faculty should always try to involve students in some activities which will prevent them from losing focus. The lectures should be designed in such a way that it will be student-centred which will motivate them to learn rather than focusing on content. A recent method that has emerged is gamification, in which the concept of game is used in education where certain targets are given and their progress is continuously monitored and awarded.<sup>22</sup> Similar concepts can be implemented in our context to make students motivated and to make learning fun.

Studies have shown that to make online teaching effective, there should be proper planning and during planning, faculty should think about the objectives that needs to be covered, workload, ways of assessment, time management and proper scheduling of lecture slots.<sup>23,24</sup> Regarding lecture schedules, students have suggested providing short gaps

between every lecture rather than long hours of two or three lectures. To make it more interactive, students have proposed that lectures can be of 30 minutes for specific content delivery followed by discussion for another 30 minutes. Studies have shown that human attention span is around 10-15 minutes at any given time and median engagement time in 12-40 minutes video is only 20%. Thus, short duration of lecture hours helps student to retain more and prevent mind from wandering.<sup>25,26</sup> Another important factor to consider during scheduling is the health issues related to prolonged screen time. Many of our students have raised the issues related to ocular health and study has shown that with just two continuous hours of screen time, it caused eye and vision problems.<sup>27</sup> Apart from ocular health, studies have shown that with prolonged exposure to screen time, the risk of depression and anxiety disorder increases later in life and also hampers the learning and memory, ultimately affecting the academic performance.<sup>28,29</sup> Students in this study have also shared that their batteries in mobile or laptop often do not support long hours of operation and it is a huge problem for those students who have issues with stable electricity supply.

Another important concern of both students and faculty was the lack of experiential learning during online lectures. Practical sessions are important aspect of medical education and in basic science years, these are associated with laboratory practical, demonstration of specimens, skills related to statistics and many more. But due to the pandemic, gathering was not possible, so these practical sessions were stopped. Similar concern has been raised in other studies but on the bright side, there are studies that have shown that practical skills can be imparted through online mode if designed properly. Students have also liked these online sessions and have suggested that retention of knowledge would be better if blended approach is used for practical.<sup>30-32</sup>

## Conclusion

This study presents evidence that live online lectures can be a good alternative to classroom lectures in situations when regular classroom lecture is not feasible during adverse situation such as pandemic times. The advantages of online lectures were also identified that included geographical flexibility, continuation of academic activity in pandemic and receiving of the lecture videos. However, it was not without limitations which included technical and health issues, and lack of face-to-face interaction.

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## Conflict of Interest

None

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## Author Contribution

Concept, design, planning: all authors (RB, RPD, PP, JB, SA, BRM); Literature review: RB, BRM, SA; Data collection: RB; Data analysis: RB, RPD, PP, JB, SA, BRM; Draft manuscript: RB; Revision of draft: RB, RPD, PP, JB, SA, BRM; Final manuscript: RB, RPD, PP, JB, SA, BRM; Accountability of the work: RB, RPD, PP, JB, SA, BRM

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## Supplement

### Appendix I: Questionnaire for students

#### Part I Demographic profile

##### Year

- a. First
- b. Second

##### Gender:

- a. Male
- b. Female

##### Where do you stay during online lecture?

1. Single in a room
2. Shared room
3. Others (Please specify)

##### Device used: Multiple answers possible

- a. Laptop
- b. Desktop
- c. Hand held device (Mobile/Tablet)

##### Internet type:

- a. Data package
- b. Wi-Fi
- c. Both

##### Internet stability (quality):

- a. Unstable
- b. Average
- c. Stable

**Electricity supply:**

- a. Frequently Interrupted
- b. Moderately interrupted
- c. Uninterrupted

**Part II**

1. Do you think, it was a good initiative to start the online Lectures?
  - a. Yes
  - b. No
2. How satisfied are you with the online lectures?
  - a. Fully satisfied
  - b. Satisfied
  - c. Partially satisfied
  - d. Not satisfied

Please tick the appropriate option in the following features that are common to both Online and classroom lecture

	Items	Strongly disagree	Disagree	Neutral/ No difference	Agree	Strongly agree
1.	Understanding of content is better in online lecture than classroom lectures					
2.	I could concentrate better in online lectures than classroom lectures					
3.	Physical absence of other students around me in online lecture made me less distracted than in classroom lecture					
4.	I feared less while raising a question during the online lecture than in classroom lectures					
5.	Online lectures are more interactive than classroom lectures					
6.	Online lecture provides more conducive (right, good, safe) learning environment than classroom lecture					
7.	I enjoy attending online lecture more than classroom lecture					
8.	Discussion among friends regarding lecture after online lecture is less than classroom lecture					
9.	I feel less connected with teacher in online lecture than classroom lecture					
10.	Gesture from teacher is less in online lecture than in classroom lecture					
11.	I am easily distracted in online lecture than in classroom lecture					
12.	Online Lectures are more effective in fulfilling the learning objectives than classroom lectures					
13.	Online Lecture promotes better retention of knowledge than classroom lectures					
14.	I prefer online lecture more than classroom lecture					

Please tick the appropriate option to provide your perception regarding the some features specific to online version

	Items	Strongly disagree	Disagree	Agree	Strongly agree
1.	The recorded video and the PowerPoint of lectures helped me in my study				
2.	Sending queries to faculty in emails/viber/other online platforms for clearing out the confusions are easier than meeting personally.				
3.	Physical absence of teacher in online lecture, tempted me to get involved in other unrelated tasks (browsing/ eating/ chatting etc.)				
4.	Students attending online lectures must be more self-motivated than in classroom lecture				
5.	The online platform that you use for attending lectures is user friendly				

1. Can online lecture be the alternative to classroom lecture?

- a. Yes
- b. No

### Part III

Kindly answer the following open-ended questions in your own words.

1. What are the advantages of online lectures?
2. What are the limitations of online lecture?
3. Do you have any suggestion on how we can improve our online teaching learning activities related to lectures?

### Appendix II: Questionnaire for faculty

#### Part I

##### Demographic profile

##### Gender:

##### Where do you stay during online lecture?

1. Single in a room
2. Shared room
3. Others (please specify)

##### Device uses: (Multiple answers possible)

- a. Laptop
- b. Desktop
- c. Hand held device (Mobile/Tablet)

##### Internet type:

- a. Data package
- b. Wi-Fi
- c. Both

##### Internet stability (quality):

- a. Unstable
- b. Average
- c. Stable

##### Electricity supply:

- a. Frequently Interrupted
- b. Moderately interrupted
- c. Uninterrupted

#### Part II

1. Was it a good initiative to start the online Lectures?

- a. Yes
- b. No

2. How satisfied are you with the online lectures?

- a. Fully satisfied
- b. Satisfied
- b. Partially satisfied
- c. Not satisfied

Please tick the appropriate option in the following features that are common to both online and classroom lecture

	Items	Strongly disagree	Disagree	Neutral/No difference	Agree	Strongly agree
1.	Online lectures are more interactive than classroom lecture					
2.	Students send more queries by online platform after online lectures than in classroom lecture					
3.	Online lecture provides more conducive learning environment than classroom lecture					
4.	Monitoring of students is difficult in online lecture than in classroom lecture					
5.	I feel less connected with students in online lecture than in classroom lecture					
6.	Gestures are difficult to use in online lecture than in classroom lecture					
7.	Expression from students are difficult to notice in online lecture than in classroom lecture					
8.	Completion of the lecture in specified time is difficult in online lecture than in classroom lecture					
9.	Distractions are more in online lecture than in classroom lecture					
10.	I feel more tired after delivering online lecture than classroom lecture					
11.	Online Lectures are more effective in fulfilling the learning objectives than classroom lectures					
12.	I prefer online lectures more than classroom lectures					

Please tick the appropriate option to provide your perception regarding the some features specific to online version

	Items	Strongly disagree	Disagree	Agree	Strongly agree
1.	I could self-evaluate and improve my lecturing skill by going through video records in online lecture.				
2.	Students attending online lectures must be more self-motivated than in classroom lecture				
3.	Mute/unmute feature in zoom platform helped me to deliver lecture with minimum disturbance				
4.	The online platform that you use for delivering lectures is user friendly				

1. Can online lecture be the alternative to classroom lecture?

- a. Yes
- b. No

### Part III

Kindly answer the following open-ended questions in your own words.

1. What are the advantages of online lectures?
2. What are the limitations of online lecture?
3. Do you have any suggestion on how we can improve our online teaching learning activities related to lectures?