

Medical Education

## Virtual classes conducted during COVID-19 pandemic – Medical students' perspective

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### ABSTRACT

**Objectives:** The COVID-19 pandemic has resulted in shifting of medical education onto a virtual platform. This has provided us with an opportunity to assess and analyse the students perception of these virtual classes which otherwise did not form a significant part of the traditional medical education. The objective of the study was to assess medical students' perception on virtual classes conducted during the COVID-19 pandemic.

**Materials and Methods:** A questionnaire consisting of 21 questions was administered to students studying in all phases of MBBS in our college using Google Forms. A response rate of 73% was achieved.

**Results:** The response of the students when analysed showed limited perceived benefits of virtual classes, these included accessibility to recorded lectures and convenience of attending classes in the time of pandemic. Drawbacks include decreased levels of social interaction, internet connectivity issues and absence of practicals/clinicals to better correlate with theory topics. Low motivational levels to attend classes, decreased engagement in classes and decreased perceived knowledge gained were also significant limitations.

**Conclusion:** Better internet connectivity along with accessibility to recorded classes and increased student-teacher interaction could enhance the learning experience of the students in the virtual platform.

**Keywords:** Medical education, Online classes, E-learning

### INTRODUCTION

The spread of COVID-19 pandemic to India has posed a challenge to conventional class room teaching in medical educational institutes. Many institutes have shifted to virtual platforms for continuous uninterrupted teaching. Until now, virtual classes did not form a significant part of medical education. However, in times like this with the traditional classroom set up, it is not possible to allow social distancing, virtual classes are the one best modality available for teaching.

Some of the positive attributes of virtual classes are flexibility in the timing, ability to openly share ideas and communicate without fear of embarrassment, to study in a comfortable environment.<sup>[1,2]</sup> However, the virtual platform has its own importunities. Both the teachers and the students are required to have technical cognition for better efficacy. At the same time, the associated factors such as functioning of the platform and devices, social environment all play an important role in the success of the virtual classes.<sup>[3]</sup> Although most of the students are comfortable with the virtual classes, they do express certain limitations such as technical issues, lack of student teacher and student to student interpersonal relationship and social distractions.<sup>[1,2]</sup>

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Students are not satisfied by continuous lectures in their normal classroom setting nor are they able to withstand the same in virtual platform. They always expect something new and innovative which can involve the mixture of both virtual and face-to-face learning. Thus, learning modality offered to the students has to be learner centric.<sup>[4]</sup>

As both students and faculties adapt to this new teaching learning environment during this pandemic, it is important to evaluate the system currently being used. By obtaining students perception and attitude toward virtual classes, we can apply this knowledge to enhance effective learning in the future. As there is limited literature regarding the same especially in the Indian context, this study was undertaken to understand medical students perception about the virtual classes amidst a stressful pandemic.

## MATERIALS AND METHODS

An institution-based descriptive cross-sectional study was conducted after obtaining Institutional Ethics Committee clearance. A questionnaire was developed to know about the medical students perceptions of virtual classes that were conducted in our college. Virtual classes covered theory and tutorial portions.

### Participants and virtual platform

Undergraduate medical students who have attended virtual classes for about 3 months duration using IMPARTUS platform were included in the study. IMPARTUS is a video-based learning platform that enables to capture, edit and distribute content. The time table of the classes is uploaded on the platform and is visible to the students on their schedule. Students could join live lecture from home. Multi-broadcast camera and screen share features are available for the students to visualise the PowerPoint presentation or white board. Features such as text chat and hand raise are present to clarify doubts. Real-time polls could also be taken to test the understanding of the classes. Automated recording of live lectures occurred which was available to the students for future reference.

Each class was scheduled for the duration of 1 h during which the first 5 min were allotted for the students to log into the class, followed by 40 min of teaching and the last 10–15 min were assigned to clear doubts and ask questions. A break of 10–15 min was given between two classes.

### Questionnaire development

An in-depth literature review was conducted and a questionnaire was developed that would satisfy our study objectives. Questions were formulated to assess students demographic information and measures to evaluate

perception about virtual learning. Open-ended questions regarding the benefits and limitation of virtual classes were also included. These questions were then reviewed by subject expert. As per the recommendations of the expert, the questions were either rephrased or removed.

A final questionnaire consisting of 21 questions was so formed which takes approximately 10 min to complete. At the beginning of the questionnaire, a section was included about the purpose of the study and seeking their consent. Only if they agreed to participate in the study, further questions were displayed. Most questions used a 5-point Likert scale response with strongly agree and strongly disagree as anchoring points. Two questions, about the benefits and limitations of online classes, allowed for free-text comments.

### Data collection

Questionnaire was shared with MBBS undergraduate students of all four phases through a web link using Google Forms. Google Forms is a web-based application used to create forms for data collection. Data gathered using Google Forms were stored in an Excel spreadsheet.

Medical student's participation in the survey was completely voluntary, responses were anonymous and did not influence grading and no personal information was collected. The study was advertised by word-of-mouth and through in-class announcements. A total of 436 MBBS undergraduates of all phases volunteered to complete the virtual survey following virtual informed consent. The response rate was 73%.

### Data analysis

Data were analysed using SPSS 23 statistical software. Mixed method data analysis was undertaken. Descriptive statistics were used to analyse the closed questions and responses to open questions were analysed using thematic analysis.

The closed-ended questions were graded on 5-point Likert scale. The options under each question were given scores ranging from 5 to 1. Mean and standard deviation for each statement was calculated. Mean value greater than 3 indicated overall agreement with the statement and values <3 indicated overall disagreement with the statement. Chi-square analysis was also used to explore the relationship between demographic variables and measures used in the questionnaire to evaluate perception on virtual teaching.  $P < 0.05$  (two tailed) was considered statistically significant.

The open-ended responses were analysed using Braun and Clarke (2006) method of thematic analysis.<sup>[5]</sup> The first open-ended question asked was perceived benefits of virtual classes. The following six steps were used to analyse the responses. First, we read and reread the responses to familiarised ourselves with it. Second, we coded the

responses based on similarity. Third, we identified broader themes from the coded data and collated the codes into these themes. Responses that were irrelevant to the question asked were removed. Fourth, the themes were further analysed to confirm accurate representation of the student's responses. Fifth, the themes were further refined and a clear definition was given to the themes. A total of seven themes were derived from 446 benefits reported by the students. Sixth, most representative statements from the response were selected which would accurately illustrate elements of each theme.

Similar method of analysis was performed for our next open-ended question where the students were asked to list the perceived limitation of virtual classes. A total of 538 limitations were incorporated into seven themes.

## RESULTS

Students from all phases of MBBS were included and responded to the study. Of the 600 eligible participants (150 students in each 4 phases of MBBS), a total of 436 students responded to the questionnaire. We achieved a response rate of 73%. The data regarding the student's demographics are presented in [Table 1] as total count and percentage. The majority of participants were female (61.2%) and 38.7% were male participants.

Responses of the students to the questions regarding their perception of virtual classes are presented in [Table 2]. The questions were scored on 5-point Likert scale. Engagement in the classes was perceived to be low. Similarly, majority of participants reported an apparent lack of interaction with the teacher and decreased motivation to attend classes. The perceived knowledge gained was less as compared to classroom teaching.

[Table 3] is a tabulation of the themes derived from responses to the open-ended question about the benefit and limitation of virtual classes. One major benefit which most of the participants identified is the availability of the recorded classes which could be reviewed at a later date. Majority of the participants reported internet connectivity issues as a significant limitation.

## DISCUSSION

This study attempts to assess the student's perception of virtual classes conducted during the COVID-19 pandemic. A mixture of both encouraging and unenthusiastic responses, with a larger percentage of disappointing and negative opinion toward the online environment, was received from the undergraduate students.

Majority of the respondents were females in the age group of 17–20 years. Most spent 3–4 h/day in virtual classes. Computer proficiency can hamper or assist learning. Studies

**Table 1:** Participant characteristics (data are expressed as total count and percentage distribution).

Student demographics	n	%
Age		
17–20 years	255	58.5
21–23 years	173	39.7
More than 23 years	8	1.8
Total	436	100.0
Gender		
Female	267	61.2
Male	169	38.7
Total	436	100.0
Phase of MBBS		
Phase I	128	29.4
Phase II	118	27.1
Phase III part I	98	22.5
Phase III part II	92	21.1
Total	436	100.0
Hours spent on virtual classes per day		
1–2 h	11	2.5
3–4 h	235	53.9
5–6 h	181	41.5
More than 7 h	9	2.1
Total	436	100.0
Device used to access virtual classes		
Both laptop and mobile	191	43.8
Laptop	67	15.4
Mobile	166	38.1
Others	12	2.8
Total	436	100.0

N – Total count

**Table 2:** Measures of students perceptions of virtual classes.

Statement n=436	Mean	SD	P-value
Your computer operational skills is	3.68	0.917	<0.001
Your motivational levels to attend online classes was	2.72	0.869	<0.001
It was convenient to attend online classes	3.05	1.124	0.33
I felt fully engaged in online classes	2.48	0.965	<0.001
Knowledge gained in online class was greater compared to classroom learning	2.11	1.067	<0.001
I feel more comfortable answering question in the online class	2.91	1.189	0.12
Student-teacher interaction was more in online class in comparison to classroom teaching	2.24	1.103	<0.001
I was able to concentrate more in online classes as there were no distractions from classmates	2.38	1.149	<0.001
Attending online classes were a lonely experience due to lack of social presence and interaction	3.72	1.065	<0.001
Online teaching provides the same benefits as classroom lectures	2.40	1.053	<0.001

P<0.05 considered significant

**Table 3:** Perceived benefits and limitations of online classes.

<b>Perceived benefits of virtual classes n=446*</b>		
	<b>n</b>	<b>%</b>
Accessibility to recorded lectures	128	28.6
Convenience to attend classes	87	19.5
Better concentration as no distraction by classmates	44	9.8
More time for self-studies	44	9.8
No benefits	44	9.8
Confidence in asking questions and answering	32	7.17
Means to complete portions	41	6.9
Others (enjoyed polls conducted during classes, new and interesting use of technology)	26	5.82
<b>Perceived limitations of virtual classes n=538*</b>		
Internet connectivity issues	149	27.6
Lack of concentration	124	23.04
Less student-teacher interaction	102	18.9
Content issues (no clinicals/practicals, long screen time and lectures)	82	18.8
Health issues (headache, eye problems, backache and lack of physical exercise)	44	8.17
Nil	24	4.46
Lack of knowledge to effectively use technology	13	2.41

\*This indicates the number of participants who provided more than 1 response shown in each respective category

have linked competence in using computers to student satisfaction and perceived knowledge gained.<sup>[6]</sup> In our study, majority of the respondents used a combination of laptop and smartphones to access the virtual platforms and rated their computer operational skills to be satisfactory, this being similar to a recent study.<sup>[7]</sup> We did not find any significant difference between perceived knowledge gained and computer operational skill. The previous studies have also emphasised similar views which showed no correlation between technical expertise and perceived knowledge gained.<sup>[8]</sup>

Research has shown limited interaction between teacher and student to be a common problem in distant learning environment.<sup>[2,9]</sup> Social interaction is one of the most important components of teaching and learning experiences.<sup>[10]</sup> Interaction between the students and teacher and also interstudent interaction helps to make learning more meaningful, productive and also enhances students knowledge.<sup>[11-13]</sup> A greater achievement of learning outcomes has been established due to increased learning engagement occurring as a result of social interaction.<sup>[14]</sup> In our study, to assess the interaction present, three statements were posed to them 'Student-teacher interaction was more in virtual class in comparison to classroom teaching,' 'I was able to concentrate more in virtual classes as there were no distractions from classmates.' The students were in disagreement to these and were in agreement to 'Attending virtual classes were a lonely

experience due to lack of social presence and interaction.' This indicates that the students were not satisfied with the levels of interaction. The response to 'I feel more comfortable answering questions in the virtual class' obtained indicated that they were not comfortable asking question which could further limit student-teacher interaction but *P* value for the same was not significant.

Individual learner characteristic also plays an important role in the success of virtual classes. Low motivation to attend the virtual classes was found among the students in our study. Female students had higher motivation than male students in our study. Motivation to attend classes has been positively correlated to academic achievements.<sup>[15]</sup> Lack of motivation has been shown to be associated with learner attrition in virtual classes.<sup>[16]</sup> Furthermore, in our study, students felt less engaged in the virtual classes. Effective student engagement in online courses was studied by Dixson, it was concluded that student-student and instructor-student communication were strongly correlated with engagement.<sup>[17]</sup> As previously explained, students in our study have reported a deficit in the levels of interaction which could have further resulted in the lack of engagement.

In open-ended responses, participants were allowed to freely express what they considered were the benefits and limitations of virtual learning. Thematic analysis performed resulted in seven themes for perceived benefits of online classes. The most commonly reported benefit of the virtual class, which was noted by more than one-third of the subjects, was the accessibility to the recorded lectures classes. One participant wrote 'There's availability of recorded lectures, so that we could revisit any of the sessions while in doubt.' Another user observed 'I can also watch recorded classes if unable to attend during live sessions.'

Many students mentioned that they were comfortable in the home environment, sitting alone and listening to class felt more engaging than the lecture class. A study done by Lall and Singh found that 74% of students liked online classes and reported the flexibility in study place and time to be a major advantage.<sup>[18]</sup> However, another study done on medical and dental students showed that 77.4% of students showed negative perception toward e-learning and preferring face-to-face learning.<sup>[19]</sup> Students in our study felt that they could concentrate more without distractions from the peers and it provided them with additional study time. The benefit of more time being available for self-studies with online classes was also reported in a study by Sharma and Agarwal.<sup>[20]</sup> Additional benefits reported in our study included 'Given the pandemic situation at least we are in touch with our portions and studies,' 'Good way to impart education in times of pandemic' and another participant wrote 'During a pandemic the scope of learning and motivation to study was kept alive.'

The open-ended responses about the limitations and issues faced during virtual classes are organised into following categories: Internet connectivity issues, issues due to technical skills, communication barriers, health issues and content issues. The most commonly reported limitation of virtual classes was internet connectivity issue. Although many students have the privilege of latest android devices to attend virtual classes, not all had the privilege of the good internet connectivity, which made it hard for students to concentrate in virtual classes. Communication barrier due to lack of interaction between teacher and student as in traditional lecture classes were lacking in virtual classes was also stated by the students. Similar disadvantage has also been reported in a study by Kemp and Grieve where undergraduate psychology students studied two topics, one in a face-to-face class and the other online. Students reported that interaction in face-to-face classes encouraged learning, which was not achieved through virtual classes.<sup>[21]</sup>

Students reported that the absence of practical classes and clinical postings made their interest in theory class to deteriorate over a period of time. One participant responded 'While in college the lectures went hand in hand with dissection and practical's which helped to understand theory, but in virtual classes, it was difficult to keep pace.' Another final year medical graduate wrote 'Medicine is more about practical's and implementation of our knowledge in clinicals which is lacking in virtual classes.'

Participants reported about the health issues such as eye strain, headaches, excessive watering of eyes and backaches due to long hours of screen time. One user reported 'I had a constant headache staring so intently at the screen. I didn't grasp much because of headache,' 'Many times the audio-video quality isn't that great and its small screen (mobile) so it's a strain on my eyes.'

In spite of these limitations, 56% of the students wanted a combination of both virtual and classroom teaching for the future, 39.4% only classroom and only 4.4% wanted only virtual classes.

The COVID pandemic resulted in rapid shift from classroom teaching to virtual teaching to maintain continuous uninterrupted learning for the students. Insufficient time was present to modulate the curriculum to fit into the framework of virtual teaching. Both teachers and students had to rapidly learn to adapt to this new environment of distance teaching and learning.

## CONCLUSION

Accessibility to recorded lectures, convenience of attending classes and uninterrupted learning during pandemic were the most frequently reported advantages of virtual classes. Learning in the virtual platform was hampered by internet

connectivity issues, decreased levels of interaction perceived by the students and absence of practical's/clinical postings to better correlate with the theory topics.

## Limitations

Although care has been taken to report the responses accurately, an element of bias is always said to be associated with questionnaire-based studies.

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## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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## Conflicts of interest

There are no conflicts of interest.

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