Title: Teachers’ View on Online Classes during COVID-19 Lockdown – A Cross-Sectional Study

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Authors Contribution Statement:

<table>
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<tr>
<th>Contributor Role</th>
<th>Role Definition</th>
<th>Authors</th>
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<tbody>
<tr>
<td>Conceptualization</td>
<td>Ideas; formulation or evolution of overarching research goals and aims.</td>
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IJMS
International Journal of Medical Students – Original Article.

Data Curation  Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.  
Formal Analysis Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.  
Funding Acquisition Acquisition of the financial support for the project leading to this publication.  
Investigation Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.  
Methodology Development or design of methodology; creation of models  
Project Administration Management and coordination responsibility for the research activity planning and execution.  
Resources Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.  
Software Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.  
Supervision Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.  
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Visualization Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.  
Writing – Original Draft Preparation Creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).  
Writing – Review & Editing Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.  

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Discussion Points:  
1. Teachers’ perception of online classes during COVID19  
2. Do teachers want to continue online classes after lockdown?  
3. Problems in conducting online classes in India!  

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ABSTRACT.

Background: Online classes have been started in many colleges amidst the COVID-19 lock-down. Our study aimed to evaluate the opinions of medical teachers who conducted online classes and to determine their views on the viability of these classes in a post-COVID-19 era.

Methods: We carried out a cross-sectional study using an online survey. Teachers working in medical colleges who conducted online classes during COVID-19 lockdown were included. Questionnaires were shared in the WhatsApp groups of the medical teachers belonging to the states of Kerala and Tamil Nadu, India. Sampling was consecutive and convenient.

Results: Respondents were 101 teachers among which 89 were included in the analysis. The majority of the teachers gave classes after intense preparation. The participants felt that the quality of their work would have been better with enhanced Information Technology (IT) infrastructure. One of the major reasons for favoring online classes was the opportunity it gave them to access the content later (56.2%, n=50). More than half 63% (n=56) of the teachers faced network issues and felt discouraged by lack of interaction. 36% (n=32) of the teachers opined that online classes were very poor, compared with regular classes. However, 49.4% (n=44) favored the continuation of online classes after the COVID-19 lockdown.

Conclusion: Despite experiencing problems, most participants in our survey wanted to continue online classes in the future. The participants felt that the classes were less interactive and educational institutions should improve their IT infrastructure to address the increasing need for online education.

Key Words: Medical Faculty; Online education; Attitudes; COVID-19 Pandemic (Source: MeSH-NLM)
INTRODUCTION.

On 31 December 2019, the World Health Organization (WHO) was notified about several cases of pneumonia with unknown etiology in Wuhan city of Huaibe province, China. This was found to be caused by a single-stranded RNA virus of the Coronaviridae family. As this infection spread to other countries, the WHO declared a public health emergency and subsequently declared this outbreak a pandemic. Most countries around the world closed their universities and colleges as part of lockdown in a bid to contain the spread of this infection which impacted almost 70% of the world’s student population. As a result of this, the COVID-19 pandemic necessitated migration from regular to online classes in many countries.

Peter H. Martorella, described technology in education as a “sleeping giant” over two decades ago. However, low and middle-income countries like India have inadequate internet coverage and network infrastructure, which seriously affect the quality of online classes. Also, replicating pedagogic teaching is difficult in online education. One way of improving the efficiency of online classes is to promote interactive activities and conversations using virtual discussion groups on social media.

A student-centered approach in education, with embedded opinions from teachers, is vital to sustaining the quality of education. Unfortunately, the opinions of teachers are often overlooked. Motivating the teaching staff to give online classes seriously and improving IT infrastructure are necessary for the success of online education. IT infrastructure refers to hardware, software and network tools that support delivering certain services (e.g., online classes). The use of technology is no longer unusual among teachers. They use social media platforms, converse in WhatsApp and have basic knowledge regarding video editing and sharing.

Knowledge-sharing through social media networks, along with enrolment in web-based courses, will help increase interest and maximize participation in virtual teaching. The net result will be that teachers will be motivated to improve the quality of their online classes. As medical colleges have been actively involved in online teaching for more than a month now, we designed a study to capture the opinions of medical teachers who have conducted online classes and assess their views on whether to continue these classes, post COVID-19 lockdown in India.

IJMS
MATERIALS OR PATIENTS AND METHODS.

A cross-sectional survey was conducted from May 2020 to June 2020 during the COVID-19 lockdown. The survey questionnaire was distributed among medical teachers currently working in medical colleges in the states of Kerala and Tamil Nadu, India. These states were selected because they were the first to start online classes during the COVID-19 lockdown. Teachers who conducted at least one virtual class, gave assignments or uploaded videos on social media platforms were included in the study. The sampling was consecutive and convenient.

The questionnaire was self-administered in English using Google Forms (Google LLC, CA, U.S.A). WhatsApp (WhatsApp Inc, CA, U.S.A) was used to distribute the survey links. The authors met with the Head of the departments (HOD) and used help from their fellow medical students to collect the mobile phone numbers of the medical teachers who were taking online classes. The links were shared in the WhatsApp groups used by the teachers. Furthermore, the respondents were encouraged to share the links to the questionnaire with their colleagues. The questionnaire was online for one week (03 to 10 May 2020). The participants were informed about the aims, benefits and implications of the study, and their consent was sought before beginning the survey. We included all eligible respondents who responded to the survey questionnaire. Restricting the number of responses from a single e-mail id was put to ensure there was no double entry. Participants who did not complete the survey questionnaire in its entirety and respondents who were not medical teachers were excluded. The study was conducted after getting approval from the Institutional Research Cell (IRC) of Sree Gokulam Medical College and Research Foundation, Trivandrum, India. (SGMC/ IRC No:283/05/2020)

Sampling bias was addressed by including all the respondents who satisfied the inclusion criteria and who had completed the questionnaire in its entirety. There was no recall bias since we included respondents who were currently involved in giving online classes. The recall period was 2 months. There was no grouping and the variables analyzed were qualitative except the age of the respondents.

Questionnaire

The participants were asked to fill out a semi-qualitative questionnaire, comprising 26 questions. The questionnaire was pilot tested and face validated among a group of ten teachers.

The questionnaire had four sections. The first section sought information on the age, gender, and area of specialization of the participant, the type of institution (government or private) they are affiliated to and the pin code of the institution. The second asked for details about the participants’ previous experiences in online education and training. This included questions on the characteristics of the online classes that were conducted over the last two weeks (from 18 April to 02 May 2020), specifically about the duration of online classes, the time taken for preparation, the devices, platforms and type of accounts used, the place where they conducted their classes from. IT department referred to rooms made available for teachers for conducting online classes. The third section demanded that the participants rate their online classes. The Likert responses were organized under five categories: very poor, poor, average, good and excellent. These were used to determine the quality of audio, video/image/slide quality, the content, the extent of interaction
and the opportunities given to students for clearing doubts at the end. Questions were also asked about how online classes compared with regular classes, and this was done on the scale of five (with ‘one’ favoring regular and ‘five’ favoring online classes). The fourth section was on what they liked or disliked about online classes and sought suggestions to improve online classes. Finally, they were asked whether they wished online classes to continue after the COVID-19 lockdown. The participants were encouraged to select multiple answers for questions regarding experience, likes and dislikes, devices, platforms, practice and suggestions for online classes.

Data Analysis
Specialties were classified into clinical (Ophthalmology, Otolaryngology, Medicine, Surgery, Obstetrics and Gynecology (OBGYN), Pediatrics, Orthopedics and Radiology) and para/non-clinical groups (Anatomy, Biochemistry, Physiology, Pharmacology, Microbiology, Pathology, Forensic medicine and Community medicine).

The data was exported from Google forms to Microsoft Excel (Microsoft Corp, WA, U.S.A). Descriptive statistics were used for data presentation because there was no prior hypothesis.

The degree of association was calculated using the Chi-square test and a p-value of less than 0.05 was taken as statistically significant. SPPS v25 for Windows (Statistical Package for the Social Sciences, SPSS Inc, U.S.A) was used to compare the outcomes of clinical and para/non-clinical departments.

Ethical approval for the study was granted by Institutional ethics committee (IEC), Sree Gokulam Medical College and Research Foundation, Trivandrum, India.
RESULTS.

Respondents’ Characteristics
A total of 101 medical teachers responded to our survey questionnaire. We excluded 12 participants from the analysis because they did not satisfy the inclusion criteria. Out of 89 participants, 65% (n=58) were females and 35% (n=31) males. Those from the private sector constituted 93.3% (n=83) whereas the government sector came to only 6.7% (n=6). 43.8% (n=39) had no idea about online classes before COVID-19 lockdown. 46.1% (n=41) had attended online classes earlier, and 18% (n=16) had the experience of conducting online classes before lockdown.

Online Class Characteristics
Table 1 shows the devices and platforms used for conducting online classes. Among the devices used, tablet use was significantly different between clinical and non-clinical teachers. (p= 0.47). Among the platforms used, Skype and WhatsApp use differed significantly between the clinical and non-clinical teachers (p=0.000; p=0.009) A total of 66.3% (n=59) used basic or free software, 23.6% (n=21) used premium or paid accounts and 10.1% (n=9) of the participants did not know the details. There was no significant association between the time taken for the preparation and duration of online classes (Figure 2). While 70.8% (n=63) conducted classes from the IT department of their institution, 58.4% (n=52) taught from home and 22.5% (n=20) from their personal office.

Teachers’ Opinions on Online Classes
The reasons for liking and disliking online classes are summarized in Table 2. The participants were asked to give suggestions for improving online classes. The top suggestions were: improve IT infrastructure in the educational institution59.6%,n=53), ensure good lighting in the environment [57.3% (n=51)]. A total of 57.3% (n=51) felt they would do better with training from peers, whereas 41.6% (n=37) felt having light refreshments would improve the online classes. The participants’ rating of online classes as per the results of the Likert scale is summarized in Figure 3. 49.4% (n=44) wanted to continue online classes after lockdown. 38.2% (n=34) were neutral whereas 12.4% (n=11) were against continuing online classes.
DISCUSSION.

We conducted a cross-sectional survey among medical teachers who gave online classes during COVID-19 lockdown. Most of the participants – 93.3% (n=83) – were from private medical colleges. This was expected because many government medical colleges have not started online classes during the study period. The delay in starting online classes may be due to increasing admission of COVID-19 patients in government set-ups, and lack of basic resources for starting online classes.

More than half – 56.2% (n=50) – of the participants told they liked online classes because it allowed them to access the contents of their class later. Network problem 62.9% (n=56) was the top reason for disliking online classes. India is the second-largest online market with over 560 million internet users. However, the internet penetration rate in 2020 is only around 50 percent. This means that only half of the country's population has access to the internet. The internet speed in India also poses a problem. The average mobile download speed is 12 Mbps, which is significantly lower than the global average of 35 Mbps. India ranks 130th in mobile and 71st in broadband usage, globally. This might be the cause of network problems experienced by the participants. Another interesting observation was that even though the participants voted ‘average’ for interactions in their class, lack of interaction, felt by 62.9% (n=56), was also the top reason for disliking online classes, which was equal to the network problem. Interaction is an essential characteristic and a critical indicator of an effective online class. An interactive class requires participation from both teachers and students. Discussion through messages via platforms, giving assignments and timely feedback may be useful. When conducting virtual classes, interacting with students personally, permitting them to ask questions or raise doubts, and encouraging them in chat participation may increase the overall effectiveness of the class.

Unfortunately, 36% (n=32) of the teachers felt that online classes were very poor when compared to regular classes. Medical subjects are often discussed with cases observed and studied inwards. Even theory topics are complex to understand. Adding time constraints and network problems to this, and the overall efficiency of the online classes is reduced further. Online education is not inferior to regular classes. In a meta-analysis on undergraduate medical education, which included 16 studies, none concluded that online learning was less effective than regular learning. Some aspects of online classes may not be as good as those of regular classes. However, this shortcoming can inspire students to develop self-learning capabilities through the internet. There is a wide disparity in the resource types and subjects. Addressing these will have good implications on online learning. Mahadevan, a senior professor of Ophthalmology in Kerala, India writes, “Online classrooms are here to stay and it has begun taking baby steps to become an integral part of education.” His view is consistent with our findings. Almost half of the participants – 49.4% (n=44) – wanted to continue online classes after COVID-19 lockdown compared with 12.4% (n=11) who did not want to continue.

Our study has some limitations. This was a one-sided study exploring only teachers’ opinions. The sampling was not random thus limiting the generalization of the results. The studied population is not representative of India nor those regions so results must be interpreted with care. There were no studies before the COVID-19 lockdown to compare our findings. We calculated the sample size of teachers and students to be 1:10. We anticipated 108 teachers and got 101 responses. However, we included only two states in the country...
because firstly, these states were the first to start online classes and secondly, they were relatively easier to access for data collection during the lockdown.

Though India has some experience in online education, the country is not equipped to handle this sudden and massive transition. However, our survey finds that even though more participants had network problems and had to endure a lack of sufficient interaction, they wanted to continue online classes after the COVID-19 lockdown. This shows teachers’ willingness to adapt and incorporate newer modalities into the curriculum. But if this is to succeed, educational institutions should improve their IT infrastructure and consider training teachers to conduct online classes more efficiently. They should also try to incorporate online classes into the curriculum. Further studies should be conducted to evaluate the efficiency of online education in India.
REFERENCES.


FIGURES AND TABLES.

Figure 1. Age Distribution of Clinical and Non-Clinical Medical Teachers Conducting Online Classes

![Bar chart showing age distribution of medical teachers conducting online classes.](image-url)
Figure 2. Duration of Classes and Time Taken for Preparation of Online Classes by the Medical Teachers (Clinical and Non-Clinical Teachers).
Figure 3. Opinions of Clinical and Non-Clinical Medical Teachers on Online Classes

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Non-clinical</th>
<th>Clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>Very poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Video</td>
<td>Very poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Clearing doubts</td>
<td>Very poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Online class compared to regular classes</td>
<td>Very poor</td>
<td>Poor</td>
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Table 1. Devices and Platforms used by Medical Teachers for Online Classes

<table>
<thead>
<tr>
<th>Devices used for online classes</th>
<th>Total (N=89)</th>
<th>Clinical (n=36)</th>
<th>Non clinical (n=53)</th>
<th>p-value</th>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Smart Phones</td>
<td>50</td>
<td>56.2</td>
<td>16</td>
<td>44.4</td>
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<tr>
<td>Tablets</td>
<td>12</td>
<td>13.5</td>
<td>8</td>
<td>22.2</td>
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<tr>
<td>PC (Personal computer)</td>
<td>80</td>
<td>89.9</td>
<td>32</td>
<td>88.9</td>
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<tr>
<td>Platforms used</td>
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<td>Google platforms</td>
<td>41</td>
<td>46.1</td>
<td>13</td>
<td>36.1</td>
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<tr>
<td>ZOOM</td>
<td>52</td>
<td>58.4</td>
<td>23</td>
<td>63.9</td>
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<tr>
<td>Skype</td>
<td>24</td>
<td>27</td>
<td>17</td>
<td>47.2</td>
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<tr>
<td>YouTube</td>
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<td>25.8</td>
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<td>22.2</td>
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<td>WhatsApp</td>
<td>47</td>
<td>52.8</td>
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<td>36.1</td>
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<tr>
<td>Others</td>
<td>12</td>
<td>13.5</td>
<td>7</td>
<td>19.4</td>
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Table 2. Likes and Dislikes of Online Classes.

<table>
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<th>Non-clinical (n=53)</th>
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<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Can access contents later</td>
<td>50</td>
<td>56.2</td>
<td>19</td>
<td>52.8</td>
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<tr>
<td>More relaxed/ Flexible working hours</td>
<td>26</td>
<td>29.2</td>
<td>12</td>
<td>33.3</td>
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<tr>
<td>Students are more regular/ attentive</td>
<td>40</td>
<td>44.9</td>
<td>23</td>
<td>63.9</td>
</tr>
<tr>
<td>None</td>
<td>7</td>
<td>7.9</td>
<td>2</td>
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<tr>
<td>Reasons to dislike online classes</td>
<td>Total (N=89)</td>
<td>Clinical (n=36)</td>
<td>Non-clinical (n=53)</td>
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<tr>
<td>Network problems</td>
<td>56</td>
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<tr>
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<td>15</td>
<td>16.9</td>
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<td>Lack of expertise</td>
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<tr>
<td>Visual/ auditory fatigue</td>
<td>24</td>
<td>27.8</td>
<td>10</td>
<td>27.8</td>
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<tr>
<td>Lack of interaction</td>
<td>56</td>
<td>62.9</td>
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<td>58.3</td>
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<tr>
<td>Too casual</td>
<td>43</td>
<td>48.3</td>
<td>16</td>
<td>44.4</td>
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<td>8</td>
<td>9</td>
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