

## Anatomy learning made easy in COVID-19 pandemic: Online medical teaching system among the 1<sup>st</sup> year MBBS students: A Descriptive cross – sectional study

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Received: 11-11-2021 / Revised: 12-12-2021 / Accepted: 09-01-2022

### Abstract

**Introduction:** Many teaching institutes adopted the online teaching system during COVID-19 pandemic. The Department of Anatomy Armed Forces Medical College had also shifted to online platform for teaching anatomy in a better way. This study was undertaken with an aim to get the student's perspective about the efficacy of online teaching system for learning anatomy and to explore and rectify the lacunae and address the challenges faced by students and teachers. **Methodology:** a total of 300 students were enrolled, 150 each from 1<sup>st</sup> year MBBS of batches 2019 and 2020. **Results:** Findings suggested that student's perception towards online learning was better than offline learning. However, the major challenges were problems in internet connection, practical anatomy, having to learn more points related to the topic in a short allocated time and difficulties in logging onto the online platforms. The reliability of internet connection was a major factor affecting their study of anatomy and selecting learning resources. Social media platforms especially WhatsApp were helpful in assisting students in their study and communication between themselves and their teachers, may be because of lesser use of bandwidth. However, assessments and practical demonstrations in anatomy were not same as during offline teaching mode. **Conclusion:** COVID-19 pandemic was disruptive to medical education. Poor Internet connection was the major bug bear faced by the students, while the social media platforms especially WhatsApp was a helpful tool in study and communication. Students urged improvement in the modes of practical teaching of anatomy and assessment.

**Keywords:** Anatomy, medical education, online teaching.

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### Introduction

The deadly and infectious disease Corona Virus also known as Covid-19 has deeply affected the global economy. This medical catastrophe has also shaken up the education sector, and this fear is likely to resonate across the education system globally [1]. Educational units are struggling to find options to deal with this challenging situation. These stressful situations have made us more apprehensive about the urgent need for online medical teaching [2]. This is a scenario that reinforces the need to protect and save our students, faculty, academic staff, communities, societies, and the nation from this deadly pandemic. Various schools, colleges, and universities have discontinued offline teaching. As per the recent researches, it is unlikely to get back to normal offline teaching mode anytime soon. As social distancing is also important during this pandemic this will effect learning opportunities.

During previous pandemic of SARS, few medical colleges in China, Canada had discontinued offline teaching. During this pandemic, to follow social distancing norms, most of the medical colleges have adopted the method of showing recorded lectures or online teaching using various platforms to complete the syllabus and the same has been gaining popularity [3].

The first cases of COVID-19 in India were reported on 30 January 2020 in three towns of Kerala, among three Indian medical students who had returned from Wuhan, the epicentre of the pandemic [4]. After this incident and following an increase in number of cases a nationwide lockdown was imposed on 25<sup>th</sup> march 2020. On 10 June, India's recoveries rate exceeded number of emerging active cases, for

the first time Infection rates started to drop from September onwards i.e. from 90,000 cases reported per-day, dropping to below 15,000 in January 2021 [5]. A second wave commencing in March 2021 was much more distressing than the first, with shortages of medical supplies in different parts of the country. By late April, India headed the world in new and active cases. On 30 April 2021, it became the first country to report over 400,000 new cases in a 24-hour period. In August 2021, experts stated that the virus may reach an endemic stage in India rather than completely disappear [6,7].

With the discontinuation of offline teaching in the country, the need of online teaching system started to grow exponentially. Research suggested that well planned anatomy teaching solely based on online resources and textbooks is possible [8].

Many universities around the country have fully digitalized their teaching system. Online teaching is emerging as a means of effective learning in this scenario. Therefore, quality enhancement of online teaching is one the most important concern at this point of time. The main issue is not about whether online teaching methods can provide quality education, it is rather how the institutions will be able to adopt online learning on such a massive scale [9]. The aspects that are worth looking are the assessment of anatomy courses during online teaching methodology, submission of online assignments and covering all the relevant points precisely in the allocated time limit. In normal situations, these issues are addressed in an efficient way through offline viva and spot identification, submission of assignments by hand and giving additional time to cover some extra points related to the topic [10].

Taking that into consideration, online assessment methods and completing the topic in detail were challenges to the facilitations as they needed to make these modalities more analytical. Hence, the current COVID-19 pandemic has provided us with a great opportunity to be innovative, adaptive and comprehensive in formulating good

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online teaching methods by which accurate representation of students understanding and knowledge of anatomy can be assessed and verified in an effective way. In our method of the online teaching we used various platforms (a) Gmail, (b) Google Forms, (c) G-Drive, (d) MOOCs (massive open online courses) platform to introduce presentations and upload virtual images, as alternatives to the offline teaching methods which seem to running at a very successful rate. Although there were many challenges faced as there was a sudden shift from offline class to online mode, the rapid adaptive methods and innovations in the online system have made the learning of anatomy easy and more understandable. In this article we have tried to explore the student’s perspective of this transition which not only pave the path to newer innovations and adaptations but also it will be very helpful to the examiners for the conduct of online examination for better assessment of the students.

**Aim of the study**

The aim of the study is to explore the student’s perception of online teaching system and give suggestion for new innovations and adaptations in the same.

**Material and Methods**

1. Study setting: Department of Anatomy, Armed Forces Medical College, Pune, Maharashtra.
2. Study population: 300 students from 1<sup>st</sup> MBBS of year 2019 and

2020 (Due to COVID-19 scenario the 2021 batch admission was delayed)

3. Study design: A descriptive cross-sectional survey.
4. Study period: 1 year
5. Methodology: A set of questionnaire was given to the students of 2019 and 2020 batch [Appendix-1]. The questionnaire included four to five options with semi-open ended type questions and the statement for opinion given in some of the questions. These questionnaires were based upon the classes taken on MOOCs (massive online open courses) platform and google meet platform
6. The questionnaire also comprised of an open-ended question towards the end so as to gather qualitative data for this study. The students filled up the questionnaire on google drive and submitted it online. The quantitative data obtained from the semi-open ended questions was analysed and the details of the participants and the questionnaire were kept anonymous to remove bias and to ensure the reliability of data.

**Results**

The response rate of the questionnaire was 71.3% with 214 students returning a complete response out of 300 students. The modalities of teaching before and after the introduction of online teaching methods is elucidated in the table below [table 1].

**Table 1:** Format of teaching before and after the introduction of online teaching class

Training activities	Offline class	Online class
Anatomy theory	Offline lectures with power-point presentations	Power-point presentations uploaded on MOOCs platform and google meet platform
Anatomy practical	Offline demonstration in lab and demonstration room with histology slides and specimen	Virtual images and videos through power-point presentations on MOOCs and google meet platforms
Dissection class	Demonstration on dissected specimen and enumeration of steps if dissection by faculty, followed by actual dissection by students on respective tables	Virtual images and videos of already dissected specimen to be shown through power-point presentation on MOOCs & google meet platform
Written exam	In the campus examination hall using pen and paper under invigilation	Question paper uploaded on goggle drive and answers given by students without any invigilation with an open book format
Oral viva	Face-to-face interaction with the examiner with student actually handling the specimen and giving on the spot answers to the question asked	Interaction with the students through social media platform esp. WhatsApp /google meet, one by one on specific day and time for a specific group. And recording the responses given without handling the specimen

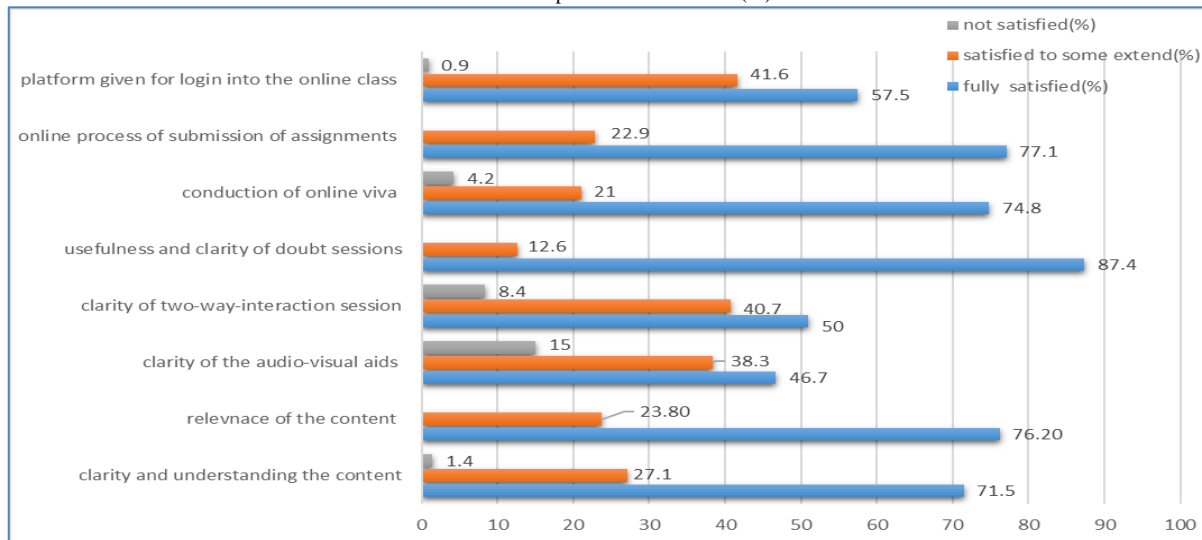
During the online teaching mode some of the students were attending the online class from rural areas where the stability and bandwidth of internet connection was poor. As per the results given in table below [table no.2] the percentages of response against the questionnaire was recorded and opinions were noted which are as follows:

1. About understanding the content and clarity of the presentation: 71.5% of the students reported that the presentation was clear and understandable and 27.1% of the students believed that it was clear up to some extent. In this regard students reported that due to network issues the continuity of the presentation was hampered to some extent
2. Relevance points of the topic: 76.2% believed that the topic covered all the relevant points and 23.8% believed that the topic had some extra points which was difficult to follow-up and they expressed it as *“Keep the presentations brief, it’s difficult to grasp a lot of information in online classes”*
3. About the audio-visual aids: 46.7% of the students have reported no problem in the audio – visual aids 53.3% of the students had issues with either visual or audio aids. They have expressed it in certain words like *“More audio clarity required”*, *“Connection issues can be eliminated a bit more”*, *“Audio problem”*.
4. The two-way interaction between teacher and students: 50.9% of the students believed that the two-way communication was clear and helpful and was well conducted whereas 49.1% believed that it was clear to some extent and it was not helpful.

5. The doubt session: 87.4% of the students believed that their doubts were cleared during the online session whereas 12.6% believed that their doubts were cleared up to some extent.
6. Difficulties faced during online viva session: 74.8% of the students were satisfied with the online conduction of viva and 25.2% of students had problem to some extent because of the network issues and one student expressed the same as *“Practical part is not well conducted”*
7. Submission of online assignments: 77.1% of the students had no issues regarding the submission of online assignments whereas 22.9% of students had issues like delayed uploading of the assignment.
8. Login into the platform: the platform used for the online teaching class was google meet and 57.5% of the students had no problem in logging into the platform for the class. 42.5% of the students faced some difficulties in login and they expressed it as *“faced a lot of loss in internet connection”*, *“Network improvement”* or gave some suggestions to use alternate platforms i.e. *“Other platforms- zoom, Cisco-WebEx, can be used”*
9. Preparation for examination: 66.8% of the students believed that there was no problem in preparing for the university examination through online sessions whereas 33.2% faced problem to some extent because of the connectivity issues and not being able to access recorded lectures after the completion

of online session.

**Table 2:** Response of the students (%)



### Discussion

This study represents the medical students' perceptions about the impact of the transition from offline teaching to online teaching during the COVID-19 pandemic in 2019, 2020 and 2021, on their learning of anatomy. Public health emergencies not only cause the fear of psychological issues they also affect the learning of anatomy in 1<sup>st</sup> year medical students. In the present study internet connection availability during online assessments and grasping all the extra points in the short allocated time were among the common concerns and challenges encountered while adopting online teaching and learning [11-12].

Internet connectivity during the pandemic is a continuing issue of concern in many sectors, especially those related to learning at the college and university levels. This issue needs to be dealt with while planning for online teaching in the future, especially if live sessions, live activities, and synchronous assessments are used. In this study we found that more than 50% of the students have reported issues with the two-way communication and audio-visual aids because of internet connectivity. Some students were not able to communicate with the teacher in online teaching and some were either not able to hear the audio during the online class or not able to see the video clearly. Also there was a problem faced by the students during logging in to the platform because of internet issues. This study also shows that the use of cadavers and models during the practical classes is considered the most effective method of learning anatomy.

The feedback from some students also suggested that recorded lectures should be provided as a repository on the platform used for teaching so that they can be accessed during their own time for future reference while preparing for the examinations. We presume that the unreliable internet connection, which made it difficult to keep pace with live sessions, could be the reason behind this preference apart from the advantage of reinforcement of memory. In addition, two points of concern are the relevance and fairness of synchronous online exams in assessing the actual students' performance. The reason for been is that the exams were not given under direct invigilation and additional time had to be given in some cases to circumvent internet connection issues. A recent study found that academic dishonesty and technical infrastructure were among the main challenges of online teaching system. [13]. Therefore, more work and curriculum modification are needed to make the online assessment suitable for

correctly assessing student's performance and maintaining the integrity of the assessment process. There have been reports that during the online sessions some additional points related to the same topic was discussed however, the students were not able to grasp them or somehow, these points were missed during the online sessions. According to the response of the students we presume that these issues arose due to intermittent loss of internet signals. The solution and way forward can be to keep the session as brief as possible so that more clarity can be achieved by the student in the allotted time of the session.

There were many positives in the feedback given by the students. In terms of using online technology the skills of the students in this area have improved markedly. These skills and abilities are a great asset subsequently on as medical professionals. [14-15]. Literature suggested that more than 70% of the students were satisfied with the clarity in terms of concept and relevance of the content of presentation. And also more than 80% of students reported that this not only helps in motivating the students towards learning but also helps in clearing the doubts regarding the online classroom session. The qualitative assessment [table no.3] was also made in this study wherein responses were recorded giving a perception of the students towards online learning system.

Technology provides innovative and robust solutions during times of crisis to combat disruption and helps people to communicate and even work virtually without the need of face-to-face interaction. This leads to many system changes in organizations as they adopt new technology for interacting and working. [16]. Preferences of more than half of the students to use social media platforms to communicate with their classmates correspond with the role played by social media platforms during the pandemic for social, learning, and work purposes. The communication between the students and their instructors is very much required for a good learning outcome. It has been shown that this is a challenge in online teaching as direct communication and feedback is disrupted compared to face-to-face teaching and learning. [17]. Although majority of the students were satisfied with the online teaching system, there are many challenges that exist. There is need to address online assessment issues as brought out earlier and suitable modifications may be undertaken in the same to make it a true representation of the student's capability and understanding.

**Table 3:** Students perception about online learning system

Students perception of learning anatomy through online sessions	Prime challenges	Online methodology	Assessment
	Internet connectivity	Live lectures on MOOCS platform and google meet	Motivates a student towards learning
	Conducting practical examination	Virtual images	Develops skills to use online technology
	Audio – visual aids	Audio – visual presentation	Helps in future use of online medical education
	Online viva	Online submission of assignments	Reduces the stress of examination
	Time management during online exams	Online viva	Monitors learning objective
	Issues with understanding extra concepts during online teaching	Doubt clearing sessions	Some extra points of the topic discussed
			Vigilance for online examination

### Conclusion

The stability of internet connection was a major hindrance that influenced learning and teaching strategies. Students were mostly concerned about not having proper establishment of two-way communication, audio-visual aids and enough exposure to resources in the anatomy lab and demanded the implementation of more suitable alternatives. Therefore, careful planning for such alternatives should be seriously considered for future online anatomy courses.

Overall, students were satisfied with the online teaching system adopted by the department. But a minor concern was raised about the fairness of un-proctored synchronous online exams, issues with learning extra amount of points in allocated time interval and issues with online assessment including submission of assignments which are a known deficiency of such assessment methods. Moreover, further research is warranted to trace the long- and medium-term consequences of the impact of COVID-19 pandemic on anatomy teaching locally and globally.

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**Conflict of Interest: Nil Source of support: Nil**