Original Article

Medical Students' Perception of Online Learning – A Mixed Method Study

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ABSTRACT

Objective: To investigate medical students' views and opinions about the experience of online learning during the lockdown period.

Methodology: It was a mixed method study conducted at Azra Naheed Medical College, Lahore. Students of MBBS from 1st to final year were invited to complete a self-developed online survey . Participation was solely on voluntary basis. The survey was anonymous and consisted of 15 questions with multiple options and two open-ended questions in addition to three questions about demographics.

Results: A total of 407 students participated in the study. The main problems with the online learning experience were communication difficulties, no hands-on training, internet connectivity problems, and health problems related to the extended use of electronic devices. The main advantages of online learning were being able to use other resources simultaneously, being more at ease, feeling less shy asking questions, and being able to focus more. Students' suggestions to improve the online learning experience were to upload pre-recorded video lectures, provide improved internet access, equip teachers with the necessary training, provide study materials prior to the online teaching activity, and ensure greater participation of students in online learning activities.

Conclusion: A majority of students were unhappy with online learning but a significant number found it comparable to or better than on-campus learning. Online learning can, perhaps, not replace on-campus learning but can be a useful addition to traditional medical education. The experience of online learning can be improved by incorporating students' suggestions in the development of future online learning systems.

Keywords: *Medical education. Medical students. Online learning.*

INTRODUCTION

Online learning has been gaining popularity in the last couple of decades in a variety of disciplines, including the field of medical education. As the internet has become more accessible worldwide, the possibilities of online learning have grown tremendously. Online learning involves students learning study materials at home in the form of an online lecture, tutorial, group discussion, or by watching a pre-recorded video. Many platforms are available to conduct such activities on the World Wide Web including Skype, Google Meet, and more recently Zoom.[1]

For medical or allied health sciences students, it is certainly more difficult to rely on online learning as a sole resource for learning. This is because bedside teaching/lab training is an integral part of teaching in medicine and allied health professions. Studies, however, show that students from non-medical backgrounds also report that online learning does not compare favorably to on-campus learning.[2]

In Pakistan, colleges and universities were closed nationally from the middle of March 2020 onwards due to the COVID-19 pandemic. At Azra Naheed Medical College, Superior University, Lahore we were fortunate to have an established and thriving Department of Information Technology which meant that online classes started almost immediately after the lockdown. Online activities for medical students included three video lectures daily of one hour each, followed by a ward class/small group discussion where a limited number of students joined a teacher to have an online tutorial or group discussion about a given topic.

Many studies have previously investigated the usefulness of online learning resources in medical education.[3,4] According to the literature a higher number of preclinical students access and complete the assignment in online learning.[5] Nowadays, medical students have easy availability of a wide range of quality online learning resources. Transformations in traditional teaching methods switching to online teaching are inevitable and not easy. It will be a mandatory part of medical teaching in the near future.[6]

Some students have rated online learning resources more favorably than live lectures.[7] Students generally are in favor of a blended approach to medical education but do not want online learning to replace on-campus learning.[8] This survey of medical students was conducted after students had the chance to experience the online teaching activities for more than a month. The purpose of this survey was to assess students' perception of online learning and seek suggestions to

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improve the experience in the future.

METHODOLOGY

It was a mixed method study conducted at Azra Naheed Medical College, Lahore after approval from the Institutional ethical review board (Letter No: IRB/ANMC/2020/003, 07-05-2020). Students of MBBS from 1st to final year were invited to participate in the survey. A Google survey form was developed to investigate students' online learning experience and to seek suggestions for improvement in the online learning delivery methodology. The survey consisted of 15 questions with multiple options and two open-ended questions in addition to three questions about demographics. The survey was sent to two experts in the field of medical education who found all items of the questionnaire to be relevant & clear and did not recommend striking out any of the questions. The questionnaire was validated by a pilot study including 20 students. The survey was posted in each MBBS class' official WhatsApp group and students were invited to participate in the survey. Three reminders were posted for students to complete the form. The survey was anonymous, no email ID or any information by which students could be identified was sought. The study was conducted from 15th May to 15th June 2020. The participation was solely on a voluntary basis and confidentiality of the data was ensured. None of the questions was compulsory to answer. A total of 407 students were included in this study after giving informed consent.

STATISTICAL ANALYSIS

Quantitative data generated was studied by the use of descriptive methods like frequencies & percentages. Data from open-ended questions was analyzed using recommended methods for the analysis of qualitative/semi-qualitative data in the literature.[9,10] All the data from open-ended questions was coded line by line and all the entries that expressed a similar content were grouped to make a single sub-theme. Continuous coding was performed to connect all established relationships between similar sub-themes and to develop themes. Two authors independently coded the data and the coding trees generated were compared and consolidated after extensive discussion among the authors. Results thus compiled were again reviewed by the authors once the write-up of the results section of the manuscript was completed. Triangulation of the data was ensured by using both qualitative and quantitative methods to understand students' perception of the experience of online learning as well as by using two investigators independently to interpret and analyze the data.

RESULTS

A total of 407 students responded to the survey & the response rate was 54.26%. The study included 119(29.24%) students of the final year, 60(14.74%) students of the fourth year, 44(10.81%) students of the third year, 72(17.69%) students of the second year, and 68(16.71%) students of the first year class. Some students (n=44, 10.81%) did not provide their year of study details. The study included 245(60.3%) male and 162(38.7%) female students. The individual responses of the students to the multiple choice questions are described in Table 1 and Figure 1, 2 & 3.

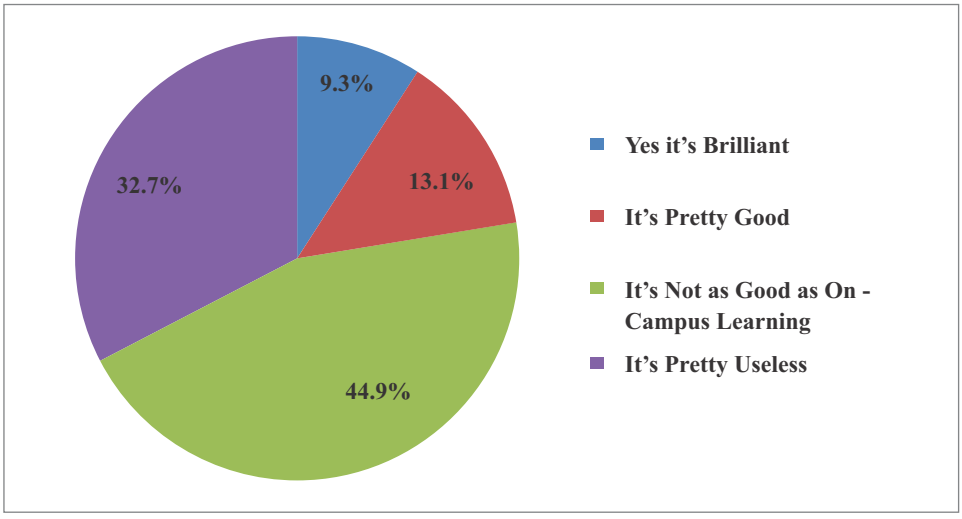

Figure 1: Online Learning/A Good Form of Learning

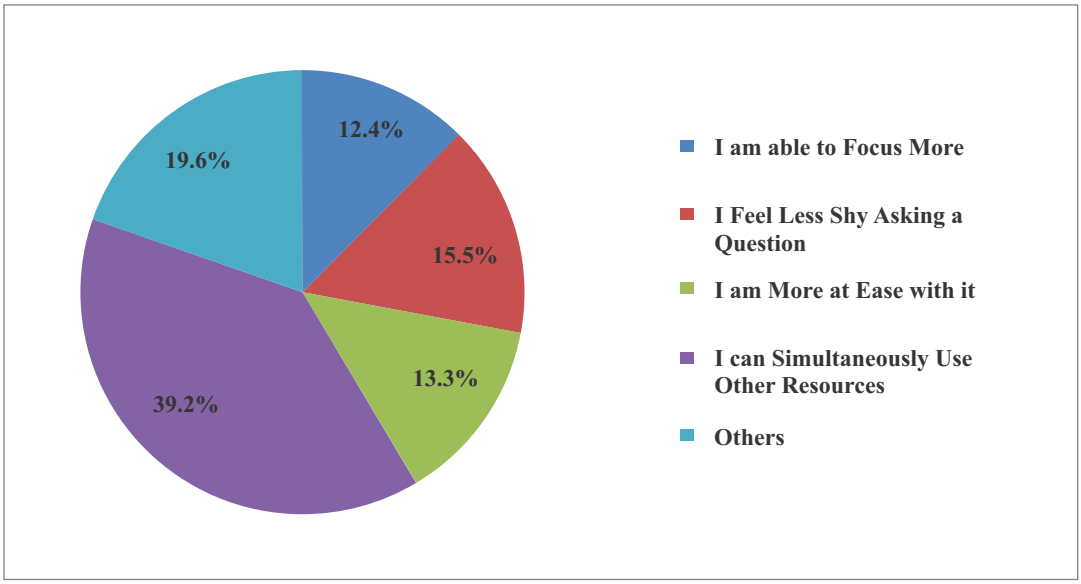

Figure 2: Good Aspects of Online Learning

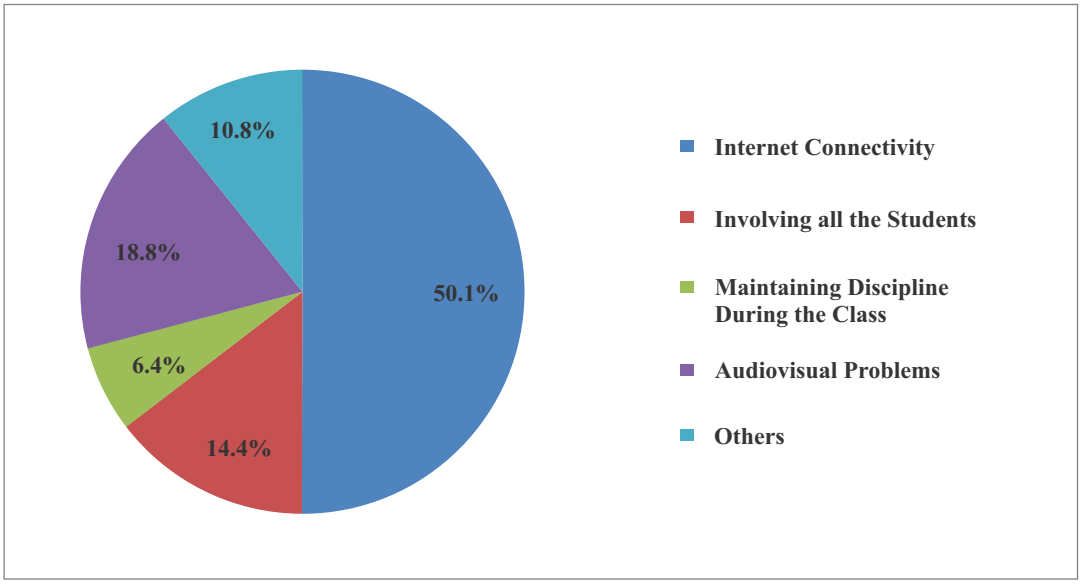

Figure 3: Online Learning/Difficult to Grasp for the Teachers

The last two questions of the survey were open-ended questions. The first question stated, "Do you have any other comments regarding online learning". The total number of words written by students in reply to this question was 6,742, while the total number of replies was 242. Four themes emerged from students' replies. These included technology related issues, pedagogy related issues, comments that exhibited unhappiness or dissatisfaction with online learning, and comments that exhibited satisfaction or a preference for the online learning experience. Major themes and sub-themes generated by students' replies to the first open-ended question are given in Table 2.

The second open-ended question was "Do you have any suggestions on how to improve the online learning experience". The total number of words written by students in reply to this question was 4,253 and the total number of replies was 188. In total, 24 valuable suggestions were offered by students. Two higher themes emerged from these suggestions for improvement; aspects that can be improved on an institution-wide basis and aspects that can be improved by teachers (Table 3).

Table 1: Responses of Students to Individual Items

Do you think online learning is a good form of learning 396(97.3%)	Yes it's brilliant	It's pretty good	It's not as good as on - campus learning	It's pretty useless				
	9.3%	13.1%	44.9%	32.7%				
Which learning method do you prefer? 394(96.81%)	Online learning		On-campus learning					
	12.2%		87.8%					
Which technique is more conducive to online learning 372(91.4%)	Being given a task	Online lecture	Audio conferencing	Video conferencing				
	22.6%	30.4%	26%	21%				
What are some of the difficulties associated with online learning? 392(96.31%)	No hands-on training	The noisy atmosphere at home	Difficulties in understanding the teacher	Difficulties in learning from other students	Others			
	31.1%	7.1%	35.5%	4.1%	22.2%			
What are some of the good aspects of online learning? 362(88.94%)	I am able to focus more	I feel less shy asking a question	I am more at ease with it	I can simultaneously use other resources	Others			
	12.4%	15.5%	13.3%	39.2%	19.6%			
Have you tried using an online discussion with your peers? 394(96.81%)	Yes	Occasionally	No	I didn't find it useful				
	21.8%	23.9%	24.4%	29.9%				
To what percentage do you think online learning is comparable to on-campus learning 394(96.81%)	It's better than on-campus learning	It's about the same	80-90% effective	70-80% effective	60-70% effective	Less than 60% effective		
	6.1%	3%	2.8%	5.1%	9.4%	73.6%		
What aspect of online learning was difficult to grasp for teachers? 389(95.58%)	Internet connectivity	Involving all the students	Maintaining discipline during the class	Audiovisual problems	Others			
	50.1%	14.4%	6.4%	18.3%	10.8%			
How well were online teaching activities executed for your class/group? 385(94.59%)	As well as they could have been	There was room for improvement	Not very well executed	Poorly executed				
	21.8%	28.1%	22.6%	27.5%				
How much time do you study by yourself after the online class? 393(96.56%)	1 to 2 hours	2 to 3 hours	3 to 4 hours	More than 4 hours				
	52.4%	22.8%	11.4%	13.4%				
How well has online teaching prepared you for the final examinations 396(97.3%)	Very well prepared	Quite well prepared	Not that well prepared	Not prepared at all				
	3.3%	12.9%	27.3%	56.5%				
Is this your first experience of online learning? 396(97.3%)	Yes		No					
	92.2%		7.8%					
If this continued for longer periods do you think it would be okay or not? 393(96.56%)	It would be definitely okay	I think my studies would suffer	I would have a hard time passing final exams	It would be very difficult to pass the exams				
	12%	19.3%	22.4%	46.3%				
Did you find yourself doing unrelated tasks (e.g. checking messages on your phone, surfing the web, etc.) during online teaching? 397(97.54%)	Quite frequently	Frequently	Not that often	Not at all				
	24.7%	27.7%	33%	14.6%				
Distraction (mind wandering) is easier in 396(97.3%)	Online learning		On-campus learning					
	83.1%		16.9%					

Table 2: An Overview of the Themes, Sub-Themes (with Extracts) Generated from Inviting Open-Ended Comments from Students about the Experience of Online Learning

Themes	Sub-Themes	Extracts from Answers
Technology related issues	• Internet connectivity • Audiovisual quality • Lack of regular tests	*"It (online learning) is very useless. Not all the students have a good internet connection because almost 60 percent of students belong from peripheries "* *"Internet connectivity is a major problem as many students are from backward areas where internet is not available. We cannot focus on lectures"*
Pedagogy related issues	• Lack of hands-on-training/bedside teaching • Health related issues due to continued use of electronic devices • Non-availability of books • Atmosphere at home • Lack of interaction • Lectures continuing beyond the allotted time	*"Using a phone for straight 5-6 hours is affecting eyesight. We become exhausted and cannot make our mind to study by ourselves"* *"When we don't have bones then how could we study the anatomy of that particular bone"*
Unhappiness or dissatisfaction with online learning		*"Please we want campus learning. Online learning is useless and if this will continue we would never pass our final examination"* *"Online learning is not useful for at least MBBS students. HOW can we learn bones without having them in hand?"*
Satisfaction or a preference for the online learning experience		*"This online learning is more attentive less interaction with my class fellows make me focus more on the class it is really helpful to us for the time being and we are enjoying it thanks for doing this all for us so our studies don't get affected"* *"Everything is going good, teachers are trying their best, university is taking a good initiative"*

DISCUSSION

There has always been a strong emphasis on hands-on training/bedside teaching in the field of medical education.[2] It was therefore not surprising that most of the students were not happy with online learning as the sole form of learning. However, there is a subset of students that find online medical education either brilliant (9.1%) or pretty good (13.1%). Also, 12.2% of the students would prefer online medical education to on-campus learning. This means that for a significant number of medical students, online learning can be a useful addition to the medical college's curricula. Perhaps the ideal curriculum would be a mix of traditional medical education and good quality online learning system where students have the choice to attend lectures or tutorials either on-campus or online, depending on their preference. Physical attendance for laboratory training/bedside teaching would, however, be mandatory for all students. A combination of traditional and e-learning, for example, can be more effective in teaching radiological interpretation skills to medical students as compared to controls.[11]

Multiple useful suggestions were given by students to improve the experience of online learning. These included uploading pre-recorded lectures on YouTube or University's learning management system, training of teachers, better internet services supervision, study materials to be provided before the online activity, implementation of online tests/viva, and demonstration of clinical skills on patients/actors by teachers during online sessions. Some of the challenges associated with online learning can be overcome by incorporating these suggestions in the development of future online learning systems.

Findings that are similar to our study were reported in an integrative review of ten papers on medical

Table 3: Themes, Sub-Themes (with Extracts) Generated from Open-Ended Comments from Students about Suggestions on How to Improve the Online Learning Experience

Themes	Sub-Themes	Extracts from Answers
Institution Related Factors	Restarting classes	*"Just open the university please, online learning is not at all supportive, MBBS CANNOT be studied with online classes. I am really depressed and worried about my final exams"*
	Break from studies	*"We request to cancel these classes and give us time so that we can study on our own. This will be better because we can focus with a relaxed mind without fear of any attendance"*
	Recorded lectures should be uploaded on video sharing platforms	*"Kindly focus more on audio and video recorded lectures from teachers instead of Zoom which is very difficult for people from the periphery and those having bad internet connections. Recorded lectures will also help us after lecture timings"*
	Shorter study hours	*"Kindly keep the scheduled time short. It is very difficult to take a class at home from 8 am-2:30 pm. It should be from 8 am-12 pm or 9 am-12 pm, and tutorials or labs should be only for two days of the week"*
	Better internet services provision	*"Proper platform should be arranged and devices with recharged internet packages should be given by the university to the students. Teachers and students should use 16 Mbps data connection for a better internet"*
	Revision/practical classes	*"Special classes should be arranged after this lockdown to cope with clinical classes"*
	Online tests	*"Teachers should try making a good online system for the test as well because tests are a necessity"*
Teacher Related Factors	IT training for teachers	*"By helping some of our teachers in managing the whole environment they must be taught some IT classes"*
	Improving attendance marking system	*"Improved system of marking attendance is required"*
	List of topics/soft copies to be provided	*"List of topics to be studied with their references from where to study them should be given"*
	Regular assignments to be given	*"Regular assignments should be given and next day it should be submitted and discussed"*
	Observing time limits	*"Kindly make some strict rules for students and teachers to be on time for class, this could reduce many of the problems regarding online learning"*
	Teachers should demonstrate clinical methods	*"For ward teaching, the facilitator must show the examination on the patient so we can easily understand as in online class patient and examination problem matters a lot so this can be solved. Moreover, it would be best to understand if the teacher is in the ward with the patient and the teacher should tell us about the important viva & OSCE questions and patterns for practical"*

education in which the main barriers to implementing online learning in medical education were time constraints, poor technical skills, inadequate infrastructure, and absence of institutional strategies.[12] A survey conducted in 30 medical colleges in India reported that the main reason students liked online classes during the COVID-19 pandemic was that they were able to learn at leisure. The main reasons students did not like online classes were network problems and lack of sufficient interaction.[13]

Our results show the main advantages of online learning were being able to use other resources simultaneously, being more at ease, feeling less shy asking questions, and being able to focus more. A qualitative study from Lahore, Pakistan which included faculty members as well as medical students reported that the advantages of online learning were comfort, accessibility, and remote learning while the disadvantages were inefficiency and lack of academic integrity.[14] A study from Saudi Arabia reported that the major issues related to online medical education were related to communication, use of technology, student assessment, pandemic related mental health problems, time management, and technophobia.[15]

Experts in the field of medical education favor the addition of emerging interventions such as the flipped classroom model, massive open online courses, and digital batches to the traditional medical education programs.[16,17] Other studies have investigated the use of online resources in addition to traditional medical education. Students who experienced a blended learning approach for studying pharmacology wished for more blended learning in their courses but only if it was of high quality, highly structured, and supported by tutorials.[18] Most of the students participating in an online general embryology course in Egypt were strongly satisfied with the efficacy of the instructional method and the clarity of the offered course.[19]

A literature review of studies from 2010 to 2020 suggested that online learning will continue to play an important role in medical education in the coming future and that there is a need to develop secure, cost-effective, and reliable academic systems to achieve this goal.[20] A study from Liaqat College of Medicine and Dentistry reported that more than three quarters of the students were unhappy with the experience of online learning.[1] Our study reported very similar percentages of students who did not like the experience of online learning. Another survey of medical students from Ayub Medical College reported very similar percentages.[21] Experts in the field of medical education favor a collaborative approach that involves all the stakeholders in the field of online medical education.[22]

LIMITATIONS & STRENGTHS

Following are a few limitations & strengths of this study. All the respondents were from one private medical college. A larger sample from both public & private medical colleges would have given a better understanding of the topic.

Major strengths are; participation by a reasonably large number of medical students from first to final year MBBS. Both quantitative and qualitative questions were asked. The questionnaire was designed by senior medical teachers with good experience in online teaching & learning. Anonymity was assured to get honest responses. Even two qualitative questions generated huge responses to obtain rich data.

RECOMMENDATIONS

To improve online learning there are a few recommendations;

- Faculty development programs should be conducted to equip the faculty with the skills in the use of information technology and online resources.
- Better internet service provision at the college/university as well as the national level.
- Recorded lectures should be uploaded on popular video sharing websites or college/university's learning management system.
- Students should be provided with learning material a day or two before the online activity.
- Small group discussions should be incorporated into the timetable instead of lectures.

CONCLUSION

Although a majority of medical students were unhappy with the experience of online learning, around one fifth of medical students found online learning either comparable or better than traditional learning. Online learning will continue to play an important role in the field of medical education in the coming days. It is important to incorporate suggestions generated by students as a result of this as well as previous studies to improve the experience of online learning for medical students.

REFERENCES

1. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding e-learning during COVID-19 at a private medical college. Pak J Med Sci. 2020; 36(COVID19-S4):S57-61. doi:10.12669/pjms.36.COVID19-S4.2766.

2. Adnan M, Anwar K. Online learning amid the COVID-19 pandemic: students' perspectives. JPSP. 2020; 2(1):45-51, doi:10.33902/JPSP.2020261309.

3. Han H, Nelson E, Wetter N. Medical students' online learning technology needs. Clin Teach. 2014; 11(1):15-9. doi:10.1111/tct.12092.

4. Pei L, Wu H. Does online learning work better than offline learning in undergraduate medical education? a systematic review and meta-analysis. Med Educ Online. 2019; 24(1):1666538. doi:10.1080/10872981.2019.1666538.

5. Kay D, Pasarica M. Using technology to increase student (and faculty satisfaction with) engagement in medical education. Adv Physiol Educ. 2019; 43(3):408-13. doi:10.1152/advan.00033.2019.

6. Judd T, Elliott K. Selection and use of online learning resources by first-year medical students: cross-sectional study. JMIR Med Educ. 2017; 3(2):e17. doi:10.2196/mededu.7382.

7. Emanuel EJ. The inevitable reimagining of medical education. JAMA. 2020; 323(12):1127-8. doi:10.1001/jama.2020.1227.

8. Sheringham J, Lyon A, Jones A, Strobl J, Barratt H. Increasing medical students' engagement in public health: case studies illustrating the potential role of online learning. J Public Health (Oxf). 2016; 38(3):e316-24. doi:10.1093/pubmed/fdv140.

9. Busetto L, Wick W, Gumbinger C. How to use and assess qualitative research methods. Neurol Res Pract. 2020; 2:14. doi:10.1186/s42466-020-00059-z.

10. Linneberg MS, Korsgaard S. Coding qualitative data: a synthesis guiding the novice. Qual Res J. 2019; 19(3):259-70. doi:10.1108/QRJ-12-2018-0012.

11. Salajegheh A, Jahangiri A, Dolan-Evans E, Pakneshan S. A combination of traditional learning and e-learning can be more effective on radiological interpretation skills in medical students: a pre and post-intervention study. BMC Med Educ. 2016; 16:46. doi:10.1186/s12909-016-0569-5.

12. O'Doherty D, Dromey M, Lougheed J, Hannigan A, Last J, McGrath D. Barriers and solutions to online learning in medical education - an integrative review. BMC Med Educ. 2018; 18(1):130. doi:10.1186/s12909-018-1240-0.

13. Thomas A, Shenoy MT, Shenoy KT, Kumar SS, Sidheeque A, Khovidh C, et al. Survey among medical students during COVID-19 lockdown: the online class dilemma. Int J Med Students. 2020; 8(2):102-6. doi:10.5195/ijms.2020.571.

14. Mukhtar K, Javed K, Arooj M, Sethi A. Advantages, limitations and recommendations for online learning during COVID-19 pandemic era. Pak J Med Sci. 2020; 36(COVID19-S4):S27-31. doi:10.12669/pjms.36. COVID 19-S4.2785.

15. Rajab MH, Gazal AM, Alkattan K. Challenges to online medical education during the COVID-19 pandemic. Cureus. 2020; 12(7):e8966. doi:10.7759/cureus.8966.

16. Prober CG, Khan S. Medical education reimagined: a call to action. Acad Med. 2013; 88(10):1407-10. doi:10.1097/ACM.0b013e3182a368bd.

17. Ramnanan CJ, Pound LD. Advances in medical education and practice: student perceptions of the flipped classroom. Advances in medical education and practice. 2017; 8:63. doi:10.2147/AMEP.S109037.

18. Morton CE, Saleh SN, Smith SF, Hemani A, Ameen A, Bennie TD, et al. Blended learning: how can we optimise undergraduate student engagement? BMC Med Educ. 2016; 16:195. doi:10.1186/s12909-016-0716-z.

19. Al-Neklawy AF. Online embryology teaching using learning management systems appears to be a successful additional learning tool among Egyptian medical students. Ann Anat. 2017; 214:9-14. doi:10.1016/j.aanat.2017.07.001.

20. Mumtaz N, Saqulain G, Mumtaz N. Online academics in Pakistan: COVID-19 and beyond. Pak J Med Sci. 2021; 37(1):283-7. doi:10.12669/pjms.37.1.2894.

21. Ansar F, Ali W, Khattak A, Naveed H, Zeb S. Undergraduate students' perception and satisfaction regarding online learning system amidst COVID-19 Pandemic in Pakistan. J Ayub Med Coll Abbottabad. 2020; 32(Suppl 1)(4):S644-50. Available from: https://applications.emro.who.int/imemrf/212/J-Ayub-Med-Coll-Abbotabad-Pak-2020-32-4supp1-644-650-eng.pdf.

22. Farooq F, Rathore FA, Mansoor SN. Challenges of online medical education in Pakistan during COVID-19 pandemic. J Coll Physicians Surg Pak. 2020; 30(6):67-9. doi:10.29271/jcpsp.2020.Supp1.S67.