

# Comparative Analysis of E-Learning in Private and Public Sector Medical and Dental Institutes in Pakistan

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## ABSTRACT

**Objective:** The aim of this study was to analyze the public and private sector medical and dental institutions' management of online education amidst the COVID-19 pandemic in Pakistan and to understand whether their respective modes derived satisfaction of e-learning from students.

**Methods:** We conducted a survey of 371 students of various public and private sector medical and dental institutions across Pakistan, investigating their experience, confidence, and satisfaction regarding e-learning. The survey was carried out using 'Google Forms', which was sent via email to students.

**Results:** In total, 371 responses were received. Despite the differences in resources and facilities, students of both sectors had not been confident in taking professional exams after the shift to online education: public (81.3%) and private (74.4%); very few students felt confident about their knowledge of basic medical sciences without labs/ practical work: public (10.8%) and private (10.3%); and more than 80% from both sectors also held the belief that e-learning is not sufficient to support academics.

**Conclusion:** Private medical and dental institutes in Pakistan have better funding but students still felt under-confident. Public sector institutes lacked a developed IT department and had an irregular and erratic schedule of online lectures with limited engagement from professors. Many felt that online and traditional learning can be blended to bring forth a form of learning known as "blended learning".

**Keywords:** Blended Learning; E-Learning; Medical Education; Pandemic.

## INTRODUCTION

The first ever case of the novel corona-virus was discovered in Wuhan, China, in December 2019, which had prompted a public health emergency that turned into a pandemic [1]. This pandemic led to worldwide lockdowns and triggered global health-care, economic, and educational systems to collapse in many countries. The COVID-19 virus is a highly contagious disease which primarily attacks the respiratory system and can lead to life threatening complications, especially amongst the elderly or immunocompromised patients [2].

COVID-19 not only brought severe humanitarian, financial, and educational crises but also affected everyday-life due to increased restrictions, social distancing, and lockdowns. Consequently, the world digitized and adapted to online systems for carrying out their daily mundane activities such as schooling, shopping, or socializing. This virus redefined work, technology, education, food supply, travel, and essentially every aspect of human life [3].

Education, like all other sectors, was also massively affected due to closure of all educational institutes. Furthermore, travel bans and border-shutdowns distressed many international students as they had been trapped/ stranded in foreign countries. The closure of schools and universities around the world necessitated the use of online teaching and learning methods, also known as 'e-learning' [4]. Therefore, a sudden shift from classroom-learning to e-learning was observed all around the globe with developed countries exhibiting an easier transition to e-learning as compared to developing countries [5].

In Pakistan, on the 26th of February in 2020, the first case of COVID-19 was confirmed [6]. Despite the rapid spread of the virus, Pakistan successfully imposed a strategy of 'smart lockdown' in focused hotspot areas. However, educational institutes were completely closed throughout the country and an online system of education was employed [1].

COVID-19 lockdown had a particularly negative influence on medical and dental education all around the world, as it involves patient-based skill learning in a clinical setting. Many existing online platforms were updated and new platforms were developed

to facilitate e-learning. Video lectures, online assignments, quizzes, and even problem-based learning with the use of 'telehealth' were some of the e-learning approaches used by the medical students. Furthermore, owing to technologies such as WebEx, Zoom, and other software applications were included into the curriculum to help the students understand complex subjects like anatomy. [7]

On the other hand, there were countries that certainly struggled more in terms of grasping onto e-learning [5]. The aim of this study was to analyze the public and private sector medical and dental institutions' management of online education amidst the COVID-19 pandemic in Pakistan and to understand whether their respective modes derived satisfaction of e-learning from students. The data collected from this research will help identify changes to improve the quality of online medical education for the future.

## METHODS

We conducted a questionnaire-based descriptive cross-sectional study after the approval of Institutional Review Board (IRB) of Institute of Dentistry at CMH Lahore Medical College (Case #624 /ERC/ CMH/ LMC) and with the permission of the respective administrations of participating institutes.

To identify a sample, we compiled a list of about ten medical and dental institutes in Pakistan, five of which were public and five were private. After conducting a thorough study of the literature on online medical and dental education during the COVID-19 pandemic, the authors designed a questionnaire using Google Forms and sent it via email. When this questionnaire was sent, students of the medical and dental universities had just returned from the pandemic's first lockdown, which lasted around 6 months, from March to September of 2020.

The questionnaire was divided into four sections, with 25 closed-ended questions in total. The first section addressed demographics such as gender, institute, discipline, and year of study. The second section dealt with the experience of e-learning and the modes frequently used for it to signify the variation between public and private sector institute. The third section contained items exploring the satisfaction of e-learning amongst

students facing the pandemic. The fourth and final section was specifically designed for students in clinical years to assess the consequences brought by this sudden shift to e-learning. The draft of the questionnaire was presented to a panel of three senior researchers. The questionnaire went through many phases of revisions under their guidance before it was finalized. Later, a pilot study was performed on fifty respondents and modifications were made accordingly.

The data was analyzed using IBM Statistical Package for Social sciences (SPSS version 20 IBM corporation, USA, New York, 2011). Descriptive statistics were used to summarize the results and were presented as frequencies and percentages. Chi Square tests were used to compare the experience and satisfaction of students regarding e-learning between private and public sector medical institutes. P value <0.05 was taken as significant.

**RESULTS**

The demographics criteria evaluated in this study included gender, institutional sector, and educational year. There was a total of 371 participants, 126 were male and 245 females. More than half of the respondents were from private sector medical and dental colleges.

Table 1 shows the experience and satisfaction of e-learning amongst students during COVID-19 pandemic.

Table 2 compares of satisfaction regarding e-learning between students of public and private sector medical and dental colleges, whereas, Table 3 compares the experience regarding e-learning between students of public and private sector medical and dental colleges during the COVID-19 pandemic. More than 80% of students from public and private sector medical and dental colleges responded that e-learning is not sufficient to support academics. Many students, about 77.6%, were not confident in taking professional exams after the shift to online mode of education. 72.8% of the students acknowledged that distant learning creates a communication barrier amongst class students and a significant proportion of them were from private institutes. However, private students were significantly more confident when compared to the public students. Very few students from public (10.8%) and private (10.3%) medical and dental colleges felt confident about their knowledge of basic medical sciences.

Table 1: Experience and satisfaction of e-learning amongst students during COVID-19 pandemic

Statements	n (%)
Developed IT department	
Yes	231(62.3%)
No	85(22.9%)
Unaware	55(14.8%)
Faced the issue of electricity shortage or power failure/blackout in area of residence	
Yes	206(55.5%)
No	161(43.4%)
Unaware	4(1.1%)
Had constant internet service	
Yes	249(67.1%)
No	118(31.8%)
Unaware	4(1.1%)
Had regular online lectures during the COVID-19 lockdown	
Yes	264(71.2%)
No	104(28.0%)
Unaware	3(0.3%)
Lectures recorded and made available to view later	
Yes	200(53.9%)
No	164(44.2%)
Unaware	7(1.9%)
Had online quizzes and tests	
Yes	324(87.3%)
No	46(12.4%)
Unaware	1(0.3%)
Had online assignments	
Yes	316(85.2%)
No	29(7.8%)
Sometimes	26(7.0%)
Introduced to online interactive 3D simulations apps to aid in clinical knowledge	
Yes	43(11.6%)
No	317(85.4%)
Sometimes	11(3.0%)
College focused on online problem-based learning	
Yes	131(35.3%)
No	240(64.7%)
Teachers requested to turn cameras on while having online lectures	
Yes	139(37.5%)
No	105(28.3%)
Sometimes	127(34.2%)

Table 2: Comparison of satisfaction regarding e-learning between students of public and private sector medical and dental colleges during the COVID-19 pandemic

Statements	N (%)	Institute		X <sup>2</sup>	Sig
		Public	Private		
Confident in taking professional exams after the shift to online mode of education					
Strongly Disagree	108(29.1%)	36.4%	22.6%	9.84	0.02
Disagree	180(48.5%)	44.9%	51.8%		
Agree	66(17.8%)	15.9%	19.5%		
Strongly Agree	17(4.6%)	2.8%	6.2%		
E-learning is a fool-proof method of evaluating students' knowledge					
Strongly Disagree	90(24.3%)	29%	20%	5.69	0.223
Disagree	128(34.5%)	33%	35.9%		
Neutral	68(18.3%)	15.3%	21%		
Agree	53(14.3%)	13.1%	15.4%		
Strongly Agree	32(8.6%)	9.7%	7.7%		
E-learning sufficient to support academics					
Strongly Disagree	136(36.7%)	42%	31.8%	4.24	0.236
Disagree	180(48.5%)	44.3%	52.3%		
Agree	38(10.2%)	9.7%	10.8%		
Strongly Agree	17(4.6%)	4%	5.1%		
Confident about knowledge of basic medical sciences without labs/practical work					
Strongly Disagree	183(49.3%)	55.1%	44.1%	5.69	0.128
Disagree	141(38.0%)	31.8%	43.6%		
Agree	39(10.5%)	10.8%	10.3%		
Strongly Agree	8(2.2%)	2.3%	2.1%		
Teachers were effectively using e-learning platforms					
Strongly Disagree	62(16.7%)	20.5%	13.3%	5.96	0.202
Disagree	76(20.5%)	21%	20%		
Neutral	154(41.5%)	41.5%	41.5%		
Agree	63(17.0%)	13.1%	20.5%		
Strongly Agree	16(4.3%)	4%	4.6%		
Confident with clinical skills during lockdown and with an online mode of education					
Yes	18(4.9%)	2.7%	2.2%	3.43	0.33

No	241(65.0%)	30.2%	34.8%		
Unsure	59(15.9%)	6.5%	9.4%		
Distant learning creates a communication barrier amongst class fellows					
Yes	270(72.8%)	32.3%	40.4%	7.44	0.059
No	43(11.6%)	7.3%	7.3%		
Unsure	15(4.0%)	1.3%	2.7%		
Will be able to perform in clinics effectively after re-opening of institutions					
Yes	73(19.7%)	7.3%	12.4%	4.81	0.186
No	126(34%)	16.7%	17.3%		
Unsure	118(31.8%)	15.4%	16.4%		

Regarding the transition to online learning systems following lockdown, the majority of the medical and dental colleges shifted within 2 months (42%), whereas, 35.8% shifted immediately, and 12.1% shifted after 4 months. Private sector shifted earlier when compared to public institutes. Majority of the participants reported that their medical institutes have a well-developed IT (information technology) department (62.3%) and significant majority of them were from private institutes. Majority of the participants responded that they had regular online lectures (71.2%) and a significant proportion of these students were from private sector institutes. About 65% of the students responded that their colleges did not focus on online problem-based learning and a significant majority of them were for public medical institutes. There was a statistically significant difference between private and public medical institutes when it came to use of different e-learning applications. The top three e-learning platforms or applications medical and dental colleges utilized were Zoom (77.9%), Google classroom (14.6%) and WhatsApp (3.5%).

Table 3: Comparison of experience regarding e-learning between students of public and private sector medical and dental colleges during the COVID-19 pandemic

Statement	Institute		X <sup>2</sup>	Sig.
	Public	Private		
Developed IT department with a technical staff				
No	39.2%	8.2%	77.73	0.00
Yes	39.2%	83.1%		
Don't Know	21.6%	8.7%		
Shifted to e-learning				
Immediately	29.0%	42.1%	21.00	0.00
2 months	39.8%	44.1%		
4 months	14.8%	9.7%		
Had regular online lectures during the COVID-19 lockdown				
No	39.8%	17.4%	22.92	0.00
Yes	59.7%	81.5%		
Don't Know	0.6%	1.0%		
Platform utilized for online lectures				
Zoom	71.0%	84.1%	29.36	0.00
MS Teams	1.7%	5%		
Google classroom	19.3%	10.3%		
WhatsApp	7.4%	0.0%		
Other	6%	5.1%		
Introduction to online interactive 3D simulations apps				
No	88.1%	83.1%	3.21	0.20
Yes	8.5%	14.4%		
Don't Know	3.4%	2.6%		
College focused on online problem-based learning				
No	72.7%	57.4%	9.47	0.00
Yes	27.3%	42.6%		

## DISCUSSION

The developed countries were able to quickly adapt to e-learning under the pressure of COVID-19 [8]. In comparison, for developing countries the abrupt disruption in education was not as smooth-sailing but instead resulted in short-term delays in teaching while adjustments were being made to conform to an online system. As reported by our study, many of the institutions in Pakistan shifted to e-learning within 2 months and some even after 4 months. Some of the problems faced include lack of faculty training in order to effectively navigate e-learning platforms, poor internet

connectivity, electricity shortages, and even the internal turmoil such as civil war and financial crises [4].

The developed countries have more technologically-advanced systems and infrastructure set in place to accommodate the sudden shift to e-learning. The online education in the USA and UK was in no time up and running smoothly through platforms such as Zoom, WebEx, 'Aquifer', Anatomy TV, TeachMeAnatomy, and so forth which helped students in developing their clinical skills through virtual learning and case-based questions [10][11]. In Pakistan, Zoom was also the front-runner in terms of the software being used to deliver live lectures to students in medical and dental colleges, however, there was a lack of interactive sessions. According to our study, many of the students were not asked to turn on their cameras which automatically results in poor communication amongst the students as well as with their professors. The feature, breakout rooms, on Zoom was frequently used in the USA for individual student group discussions regarding clinical cases [12]. However, problem-based learning was deficient in the era of e-learning in Pakistan during COVID-19, as highlighted by this study. A medical college in Delhi, India, selected 'GoToWebinar' as the primary e-learning platform in combination with WhatsApp groups being created to aid in student interactions [9]. Similarly, as underlined by this study, WhatsApp was being utilized by the faculty of public medical and dental institutes in Pakistan to relay to students their daily lectures. This app's primary purpose is quick communication via texting and video calling.

In addition to the large number of differences existing between the education standards of developed and developing countries during the pandemic, there remains a gap between public and private medical and dental institutes within the country as well. This study highlighted the many discrepancies that seemed to exist between the public and private medical and dental institutes in Pakistan.

The private medical and dental institutes in Pakistan have better funding which then inevitably results in advanced equipment and resources [13][14]. Private colleges have a well-developed IT department. This led to a relatively quicker and easier adaptation of the online learning system, ultimately preventing the students from going off-track in their studies. To add to this, an exceedingly large number of students from private universities reported that they had regular online lectures during the COVID-19 lockdown as opposed to public universities. This signifies that the facilitators of private universities were very apt to make the e-learning environment very educational and useful for their students during the sudden shift. Similarly, more facilitators from private universities engaged with their students through online quizzes, tests, and assignments. Such resources not only have continuously proven to be a key component in learning but also are a great source of motivation and accountability for students.

Some similarities found between public and private universities were related to the use of Zoom and lack of incorporation of 3D simulation apps and problem-based team learning. Majority of the students of both sectors used Zoom as the primary application for online learning as this app has proven to be quite advantageous in many aspects such that it is user-friendly and provides the highest maximum participant capacity.

A large portion of participants from both sectors agreed to the lack of online interactive 3D simulation apps to aid clinical knowledge. The rapidly growing utilization of interactive applications on mobile phones is being witnessed across the globe

to further aid in the traditional classroom learning. Some examples of these apps that are being used to revolutionize the way medicine and dentistry are learned and understood are 'Palp-Sim', 'ElderQuest', and 'MIST-VR'<sup>[15]</sup>. However, the large majority of the students in Pakistan did not get introduced to medical and dental apps that would have assisted in making online education more correlated to clinical practice.

In the same manner, a preponderance of students from public and private sector medical and dental colleges reported that their colleges did not focus on online problem-based team learning. It is unfortunate that the inclusion of team-based problem learning was only by a small number of universities because this method not only would have sustained the communication amongst class fellows but also would have provided the students to attain comprehensive understanding through discussing, sharing, and questioning.

As emphasized by our study, private universities adjusted better to the online system of learning, yet, students of both sectors did not feel confident in taking their professional examinations and certainly were not under the impression that e-learning is sufficient to support academics. Surprisingly but understandably, students of well-developed nations also agreed to the statement that there is no replacement for traditional in-person learning<sup>[10]</sup>. The two methods of learning can coincide, which is referred to as "blended learning", to bring forth the best quality and standard of education<sup>[8]</sup>. The advantage of this method is that it merges the best of both worlds by providing students a cost effective and efficient way of attending lectures while simultaneously providing a platform for in-person interactions with their class fellows and facilitators.

**Limitations:** An open-ended question could have been put forth in the questionnaire to understand how the e-learning system could be improved in the future so as to see the rising confidence levels that could potentially be associated with it. Another limitation of this study is that it was carried out in only one country. Therefore, the results of this study cannot be used to understand the differences, if they exist, between public and private medical and dental universities in other countries. It is important to carry out more thorough research involving various other countries

## CONCLUSION

The sudden shift to E-learning as a result of the COVID-19 pandemic was challenging for many of the medical and dental universities in Pakistan, but more so for the public sector. The private sector universities adjusted more easily as a result of better infrastructure and more well-trained staff and faculty. However, students of both sectors did not feel confident in their annual examinations and clinics. E-learning is a great tool to be utilized if it is combined with the in-person classroom learning as well, which is referred to as "blended or hybrid learning". This will provide

students the opportunity to interact effectively with their class fellows and professors, while independently learning and understanding concepts, which delivers the best quality of education.

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