Original Article

OPEN ACCESS

Through the Students' Lens: Comparing the Effectiveness of Face-to-Face vs. Online Learning for Undergraduate Medical and Dental Students in Islamabad

Sarah Ali[1], Naveen Farooq[2]

[1]Assistant Professor, Department of Dental Education and Research, HBS Medical & Dental College, Islamabad
[2]Assistant Professor, Department of Preventive and Community Dentistry, HBS Medical & Dental College, Islamabad

Author`s Contribution

[1] conception or design of the work, data collection, write up
[2]Data analysis, interpretation and Results, Discussion part, Write up

Funding Source: None
Conflict of Interest: None

Received: Sept 28, 2024
Accepted: Nov 15, 2024

Address of Correspondent
Dr. Naveen Farooq
HBS Medical and Dental College, Islamabad
dr.naveenwajid@gmail.com

ABSTRACT

Objective: To get an insight from the undergraduate medical and dental students regarding the effectiveness of online vs. face-to-face learning in terms of increasing knowledge, clinical skills and social competency.

Methodology: A cross-sectional descriptive study in which 391 students of a private medical and dental college in Islamabad participated from September, 2023 till December, 2023. Study participants were selected using consecutive sampling technique. Data was collected using a structured questionnaire that was adapted from a published study. Summary statistics for continuous variables and percentage and frequency was computed for categorical variables. Wilcoxon signed-rank test was used for comparisons between online and face-to-face learning.

Results: There were 33.2% male and 66.8% female students. The mean age of the participants was 20.75±1.57. Face to face learning was more effective in increasing knowledge as compared to online teaching (p =0.001). Similarly, Face to face learning was more effective as compared to online learning in increasing practical/ clinical skills and social competency (p =0.000). A majority of students (61%) reported that the primary advantage of online learning is the convenience of accessing education from home without the need to travel. This is a well-known benefit of online learning. The most significant disadvantage, cited by 70% of students, was technical or internet problems.

Conclusion: In conclusion, this study underscores the inadequacy of online learning alone in terms of increasing knowledge, clinical skills and social competency among medical and dental students. Our findings clearly demonstrate that face-to-face or blended teaching methods are essential for fostering comprehensive learning experiences that include hands-on practice, interactive learning environments, and the development of clinical skills.

Keywords: Online learning, Face to face learning, Knowledge, Clinical skills, Social competency.

Cite this article as: Ali S, Farooq N. Through the Students' Lens: Comparing the Effectiveness of Face-to-Face vs. Online Learning for Undergraduate Medical and Dental Students in Islamabad. Ann Pak Inst Med Sci. 2024; 20(4):705-709. doi. 10.48036/apims.v20i4.1245

Introduction

The growing usage of the web has accelerated the development of virtual learning environments (VLE) for undergraduate education. Online learning is transforming the teaching and learning experience throughout the world. It is defined as the transmission of course information through electronic media, including the Internet, intranets, websites, and audio/video links. Online instruction provides students with the flexibility to study when, where, and at their own pace, making it a well-known educational delivery method. Learners engage with organized knowledge resources in virtual communities tailored to their needs. Online learners solve challenges and develop new information, either individually or collaboratively.

Beginning in early 2020, the COVID-19 outbreak caused lockdowns around the country and the closure of

Pakistani institutions. For students at all levels, these disruptions had a major impact on the quality of education.[1] It has not only affected the students in school but has also affected undergraduate and postgraduate students of the Medical & Dental Colleges/ Universities in Pakistan.[2] At that point, online learning replaced traditional, in-person instruction as the primary method of instruction in Pakistan.[3] It was the basic mode of delivering the medical and dental curriculum during that time. Although it has some advantages that include; distance learning facilities, low cost, student convenience, flexibility in time management, availability of vast learning resources etc.[4] But it also possesses certain challenges like the required technological skills and familiarity with the software, availability of sound internet connection and electronic devices.

There are two primary types of online learning: synchronous and asynchronous. Synchronous learning involves real-time communication between the teacher and the students, whereas asynchronous learning involves online materials that the student can access at any time.[5] Before the pandemic, the use of online courses for medical and dental education was limited, and it was only used in an asynchronous format to help postgraduate students. This strategy was very rarely used by undergraduates because teachers were easily accessible to students in college/university and online teaching and learning was used only as a secondary mode of teaching to further acquaint the students with some information and learning material available on the internet. Technology's quick development and the rise of digital natives, especially Generation Z and Alpha, have drastically changed the educational scene. The need for creative and technologically advanced teaching methods has increased as younger generations depend more and more on technology for social connection and education.

Even though traditional in-person instruction is still essential to education, there are many benefits to combining online and blended learning modes. The efficiency of technology-enhanced learning in raising student involvement, critical thinking, and problem-solving abilities has been shown in numerous local and international researches. Many educational institutions, especially in Pakistan, struggle to successfully apply these strategies in spite of the possible advantages. The availability of dependable internet connectivity, high-quality online resources, and sufficient training for instructors and students is severely lacking(6). Although Online learning was less challenging to implement in pre-clinical years as compared with the clinical years which involved student-patient interaction as well as the development of practical skills. Medical/Dental Colleges/Universities have increasingly used e-learning tools like Learning Management Systems (LMS) and video conferencing to supplement traditional teaching methods. Pakistan must make significant progress in e-learning to meet international educational standards.

This study aims to assess the effectiveness of online versus face-to-face learning in enhancing knowledge, clinical skills, and social competency from the perspective of medical and dental students.

Methodology

This descriptive cross-sectional study was conducted from September, 2023 till December, 2023 at a teaching medical and dental college in Islamabad. Ethical approval was obtained from the Institutional Review Board of that Medical and Dental College vide letter no EC17/143,10th Nov 22. Students from 1st year to final year MBBS & BDS were invited to participate in this research. OpenEpi version 3.03 was used to calculate sample size by taking population proportion 50% at a 95% confidence interval and α=5.[7] The calculated sample size was 391 with a Confidence interval of 95%. Convenient sampling technique was utilized to get the data.[8] The involvement of participants in this study was voluntary. Those who provided the consent were part of this study. The questionnaire was shared with students via link in their official WhatsApp groups or through email for online submission.

A structured questionnaire was used to collect the data that was adopted from a published study.[9] The questionnaire was pilot-tested with a sample of 25 medical and dental students to test its reliability and validity in a similar setting. Students who took part in the pilot test were excluded from the formal study. The first section of questionnaire had demographic details, second section consisted of questions about the advantages and disadvantages of online learning, while latter section had five-point Likert scale-based questions to evaluate the effectiveness of face to face and online learning in terms of increasing knowledge, clinical skills and social competency. The last section consists of Likert scale question about level of interaction during face to face and online learning.

IBM SPSS "version 22" was applied for data analysis. Summary statistics for continuous variables and percentages and frequencies were computed for

categorical variables. Wilcoxon signed-rank test was used to evaluate the effectiveness of online vs. face-to-face learning in terms of increasing knowledge, clinical skills and social competency.

Results

Three hundred and ninety-one students participated in this study. Table I shows that there were 33.2% male and 66.8% female students. 40% BDS while 59% MBBS students gave response towards online and face-to-face learning. 88.7% students had past experience of online learning. Table II given below shows the advantages and disadvantages of online learning. A majority of students (61%) reported that the primary advantage of online learning is the convenience of accessing education from home without the need to travel. This is a well-known benefit of online learning. The most significant disadvantage, cited by 70% of students, was technical or internet problems. This highlights a critical barrier to online learning in many regions, particularly in developing countries. Reduced interaction with patients (57%) and teachers (54%) were the other significant disadvantages of online learning.

Table I: Characteristics of the study population. (n=391)

Variables	n (%)
Gender	
Male	130(33.2)
Female	261(66.8)
Mean Age	20.75±1.57
Age Yrs.	
17-20	199(50.9)
21-24	184(47.1)
25-28	8(2.0)
Students of	
BDS	157(40.1)
MBBS	234(59.8)
Year in Medical/ Dental School	
1st	76(19.4)
2nd	68(17.4)
3rd	146(37.3)
4th	89(22.8)
5th	12(03.1)
Experience with Online Learning before	
Yes	347(88.7)
No	44(11.3)
Skills in IT	
High	73(18.7)
Medium	272(69.6)
Low	46(11.8)

Table III given below shows the comparison of online vs. face to face learning in terms of increasing knowledge, practical/ clinical skills and social competency by using Wilcoxon signed-rank test. Face to face learning was more useful in increasing knowledge as compared to online teaching [4(3-4) for face to face vs. 3(2-3) for online; p =0.001]. Similarly, Face to face learning was more useful as compared to online teaching in increasing practical/ clinical skills [5(3-5) for face to face vs. 1(1-3) for online; p =0.000] and social competency [4(3-5) for face to face vs. 2(1-3) for online; p =0.001].

Table II: Advantages and disadvantages of online learning.

Variables	
Advantages of online learning	
Access to online materials	200(51%)
Ability to stay at home	240(61%)
Learning at your own pace	198(51%)
Classes interactivity	45(12%)
Ability to record a meeting	153(39%)
Comfortable surrounding	157(40%)
Disadvantages of online learning	
Technical/ Internet problems	275(70%)
Reduced interaction with the teacher	213(54%)
Social isolation	128(33%)
Lack of interactions with patients	221(57%)
Lack of self-discipline	147(38%)
Poor learning conditions at home	129(33%)

Table III: Comparison of online vs. face-to-face learning

Items	Online learning Median Q-(25-75) th	Face to face learning Median Q-(25-75) th	P value for comparison
Online vs. face-to-face learning in terms of knowledge enhancement	3(2-3)	4(3-4)	0.001*
Online vs. face-to-face learning in terms of development of practical/clinical skills	1(1-3)	5(3-5)	0.000*
Online vs. face-to-face learning in terms of improving social competency	2(1-3)	4(3-5)	0.000*

Note: Table III shows the contents about perceptions of undergraduate BDS and MBBS students regarding online and face to face learning modalities. The particular columns are median along with Q indicates the location of data. Response options on Likert scale were as: 1= Not useful at all, 2 =Not useful, 3=Neutral, 4=Useful, 5= Extremely useful Wilcoxon signed-rank test is used for comparisons between online and face-to-face sessions: *statistically significant; the significance level was 0.05.

Figure 1 given below displays that approximately 50% students favoured the face-face learning, while 25% favoured the online teaching regarding the active interaction.

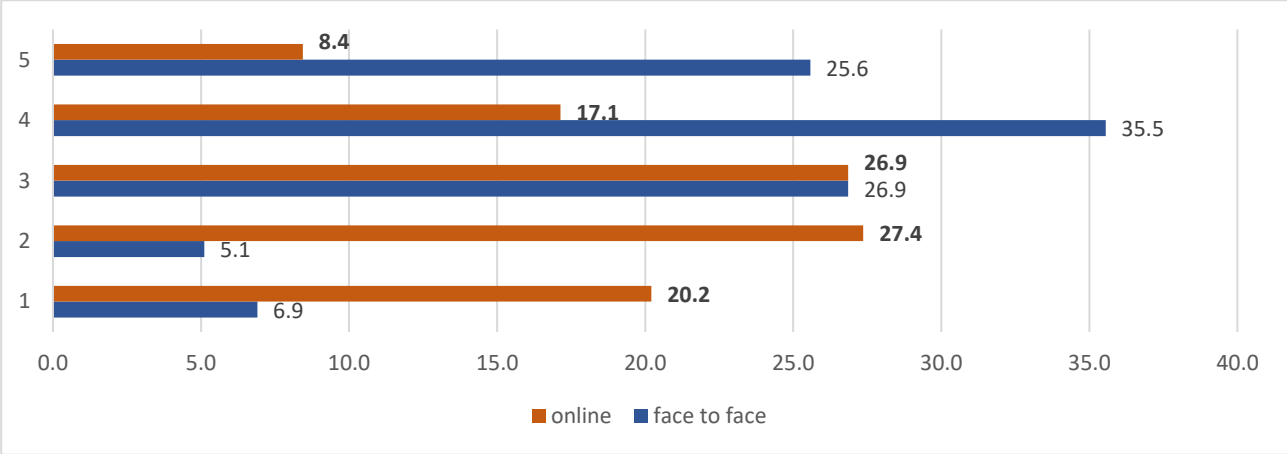

Figure 1. Students' interaction during face-to-face and online learning, where 1=extremely inactive, 2=inactive, 3=neutral, 4=active, 5=extremely active (Response in percentage)

Discussion

The main purpose of this study was to inspect the student's viewpoint and preference regarding the online and face-to-face learning. Our study showed that 42.7% of participants responded that face to face learning is extremely useful in terms of increasing clinical/ practical skills as compared to online learning (3.5%). This study reported a significant difference between both modes of teaching modalities in terms of clinical/practical skills.

Whereas this difference was less prominent in terms of increasing knowledge, where 32.7% students targeted the face to face learning and 20.9% targeted the online learning as a useful tool in terms of increasing knowledge. These results are in agreement with a study conducted by M. Bains et al that suggested that the effectiveness of face-to-face and blended learning may not be significantly different whilst e learning alone may be less effective.[10] Another study conducted in South Africa concluded that the blended learning group (2021) performed better in all clinical skill domains as compared to face to face learners (2019) only.[11] Since online learning is neither location- or time-bound, it gives greater flexibility. Yet majority believes that collaborative, skill-based, and in-person didactic sessions are necessary for medical training.[12]

Another research conducted by Bourzgui F et al to compare online and face-to-face teaching concluded that face-to face teaching was more accepted among students as compared to online/distance learning.[13] Another research done in undergraduate dental education ended up that online teaching is not a suitable choice for learning practical and clinical skills.[14] We observed that findings of our study are also comparable with results from some other studies.[15-18]

However, the results of our study are inconsistent with the studies conducted at Dow University of Health Sciences and at Lahore Medical and dental college.[19, 20] These studies concluded the positive perceptions and the readiness of students towards E-learning. Another cohort study reported that 74% of the students requested online teaching to be retained, with a majority of them reported a positive experience.[21]

Our research reported technical and internet problems as the most significant challenge of online learning, leading to reduced interaction with both patients and teachers. While the chief benefit of online learning was that you get knowledge at home and do not need to go anywhere.

These findings are comparable with the research conducted by Ali K et al that concluded the internet issue as the main obstacle while no travel need was taken as main advantage of online learning.[14] Another research emphasized that the virtual learning approach has limitations such as loss of networking. Furthermore, interactions between instructors and students during online session could result in incompetent communication skills.[22]

This study was limited to a single medical and dental college in Islamabad. Secondly use of convenient sampling is another limitation of this study. So the results cannot be generalized to all undergraduate medical and dental students in the city. Additionally, this research did not explore the perceptions and viewpoints of faculty members, which could have provided valuable additional insights.

Future research should focus on identifying and implementing innovative strategies within blended

learning frameworks that enhance the educational experience for medical and dental students.

Conclusion

clinical skills and social competency among medical and dental students. Our findings clearly demonstrate that face-to-face or blended teaching methods are essential for fostering comprehensive learning experiences that include hands-on practice, interactive learning environments, and the development of crucial clinical skills. It is very important to adapt teaching practices that suit the learning needs of the students.

References

1. Farooq F, Khan J, Khan MUGJapa. Effect of Lockdown on the spread of COVID-19 in Pakistan. 2020.
2. 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. https://doi.org/10.12669/pjms.36.COVID19-S4.2785
3. Bączek M, Zagańczyk-Bączek M, Szpringer M, Jaroszyński A, Wożakowska-Kapłon B. Students' perception of online learning during the COVID-19 pandemic: a survey study of Polish medical students. Medicine. 2021;100(7). https://doi.org/10.1097/MD.0000000000024821
4. Huynh R. The role of E-learning in medical education. Academic Medicine. 2017;92(4):430. https://doi.org/10.1097/ACM.0000000000001596
5. Fadhilah M, Sutrisna S, Muslimah SN, Ihsan MTJEIJoR, Review E. An exploring method in online learning: Synchronous and asynchronous. Indones J Res Educ Rev. 2021;1(1):74-81.
6. Singh J, Steele K, Singh LJJoETS. Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19, post vaccine, & post-pandemic world. J Educ Technol Syst. 2021;50(2):140-71. https://doi.org/10.1177/00472395211047865
7. AG DJhwOc. OpenEpi: open source epidemiologic statistics for public health. 2007.
8. Emerson RWJJoVI, Blindness. Convenience sampling revisited: Embracing its limitations through thoughtful study design. J Vis Impair Blind. 2021;115(1):76-7. https://doi.org/10.1177/0145482X20987707
9. Rafique T, Molla GM, Liza MM, Ahmed A, Nath SK, Siddika A, et al. Student's Perceptions Regarding e-Learning during Covid-19 at Private Medical and Dental Colleges of Bangladesh. Updat Dent Coll J. 2023;13(1):3-8. https://doi.org/10.3329/updcj.v13i1.62977
10. Bains M, Reynolds P, McDonald F, Sherriff MJEjode. Effectiveness and acceptability of face-to-face, blended and e-learning: a randomised trial of orthodontic undergraduates. Eur J Dent Educ.2011;15(2):110-7. https://doi.org/10.1111/j.1600-0579.2010.00651.x
11. Enoch LC, Abraham RM, Singaram VSJBME. A comparative analysis of the impact of online, blended, and face-to-face learning on medical students' clinical competency in the affective, cognitive, and psychomotor domains. *BMC Med Educ.* 2022;22(1):753. https://doi.org/10.1186/s12909-022-03777-x
12. Omole AE, Villamil ME, Amiralli HJC. Medical education during COVID-19 pandemic: a comparative effectiveness study of face-to-face traditional learning versus online digital education of basic sciences for medical students.Cureus. 2023;15(3). https://doi.org/10.7759/cureus.35837
13. Bourzgui F, Alami S, Diouny SJEDS. A comparative study of online and face-to-face learning in dental education. EC DENTAL SCIENCE. 2020;19(3):1-11.
14. Ali K, Alhaija E, Raja M, Zahra D, Brookes ZL, McColl E, et al. Blended learning in undergraduate dental education: a global pilot study. Medical Education Online, 2023;28(1):2171700. https://doi.org/10.1080/10872981.2023.2171700
15. Ibrahim NK, Al Raddadi R, AlDarmasi M, Al Ghamdi A, Gaddoury M, AlBar HM, et al. Medical students' acceptance and perceptions of e-learning during the Covid-19 closure time in King Abdulaziz University, Jeddah. J Infect Public Health. 2021;14(1):17-23. https://doi.org/10.1016/j.jiph.2020.11.007
16. Vatier C, Carrié A, Renaud M-C, Simon-Tillaux N, Hertig A, Jéru IJAiPE. Lessons from the impact of COVID-19 on medical educational continuity and practices. Adv Physiol Educ. 2021;45(2):390-8. https://doi.org/10.1152/advan.00243.2020
17. Hanafy SM, Jumaa MI, Arafa MAJSMJ. A comparative study of online learning in response to the coronavirus disease 2019 pandemic versus conventional learning. Saudi Medical Journal. 2021;42(3):324. https://doi.org/10.15537/smj.2021.42.3.20200741
18. Arain SA, Ali M, Arbili L, Ikram MF, Kashir J, Omair A, et al. Medical students and faculty perceptions about online learning during COVID-19 pandemic: alfaisal University experience. Front. Public Health 2022;10:880835. https://doi.org/10.3389/fpubh.2022.880835
19. Jawaid M, Ashraf J. Initial experience of eLearning research module in undergraduate medical curriculum of Dow University of Health Sciences: Development and students perceptions. Pak J Med Sci. 2012;28(4)
20. Iqbal S, Shafiq A, Iqbal NJPJMHS. Perceptions of undergraduate dental students towards e-Learning in Lahore Medical and Dental College. 2016;10(4):1191-3.
21. Gatt G, Attard NJ. Undergraduate dental student preferences for learning: a three-year prospective cohort study. Research Square. 2023. https://doi.org/10.21203/rs.3.rs-2481740/v1
22. Elledge R, Williams R, Fowell C, Green JJBJoO, Surgery M. Maxillofacial education in the time of CO*VID-19: the West Midlands experience. British journal of Oral and Maxillofacial Surgery.*2022;60(1):52-7. https://doi.org/10.1016/j.bjoms.2020.07.030