ORIGINAL ARTICLE
EXPLORING THE BARRIERS OF AND RECOMMENDATIONS FOR ONLINE TEACHING AND LEARNING IN UNDERGRADUATE MEDICAL EDUCATION: A DESCRIPTIVE PHENOMENOLOGICAL STUDY

Muhammad Junaid Khan, Ahsan Sethi
Department of Medical Education, Ayub Medical College, Abbottabad-Pakistan
Health Professions Education, QU Health, Qatar University, Doha-Qatar

Background: The advancement in science and technology has forced educational institutions worldwide to shift to online teaching and learning (T&L), including medical colleges in Pakistan. This qualitative study explores the barriers and recommendations for online classes among undergraduate medical students in Khyber Pakhtunkhwa, Pakistan. **Method:** The study included students from six medical colleges who were actively engaged in online T&L with a descriptive phenomenological approach. **Result:** The study resulted in a multitude of barriers hampering the overall quality of effectiveness of online T&L, including internet connectivity issues, communication gaps, health concerns due to prolonged screen time, challenges in joint family settings, and limited time for self-study. The lack of interactivity in online classes was a significant concern, as students felt they had limited opportunities to engage with their peers and instructors. The recommendation mainly targeted the fair and transparent assessment, and feedback mechanism with continuous monitoring that potentiate student engagement, training and improving resources that can increase the effectiveness and readiness of online medical education well for the transition to distance learning. **Conclusion:** It is important to modify and adopt meticulous methodical approaches like fair and transparent assessment methods, robust feedback mechanisms, improved resources, rigorous supervision, and thorough faculty development programs that will counterbalance similar barriers for a more effective and inclusive online learning environment.

Keywords: Online; Teaching and learning; Barriers; Qualitative

INTRODUCTION

With advancements in information, communication, robotic technology, artificial intelligence, doubling of knowledge every 18th month, and the after-effects of the COVID-19 pandemic, medical education is facing new challenges.[1] Teaching and learning in undergraduate medical education cannot evade such a subtle aspect of innovation in information and technology. To comply with an emerging digital era, it is necessary to move with the advancement. Likewise, the shift of teaching and learning (T&L) from onsite to online medium is a remarkable change.

Online or electronic learning is a form of distance learning defined as "learning experiences in synchronous or asynchronous environments using different devices (e.g., mobile phones, laptops, etc.) with internet access. In these environments, students can be anywhere (independent) to learn and interact with instructors and other students".[2] Moreover, the connectedness of student, instructor, and machine keeps the process of T and L intact. As explained by the connectivism learning theory, knowledge and learning processes are not confined to individuals but spread over connecting nodes of information sets.[3]

How students perceive such information sets via online T&L, remains a question mark.[4]

Different models, like Anderson's and Dabbagh's online learning models and particular dimensions of online learning readiness, have been documented elsewhere.[5–7] The former models explain the role or relation of instructional strategies, internet-enabled tools, and pedagogical aspects of electronic users (e-user; student, and teacher) in online education whereas the latter explains the readiness of governing body and e-user. They best depict the process and what, why, where, and how online T&L can be carried out. Yet, none of them have integrated the learner's perspective residing in low-resource countries. Furthermore, scientific advancement in such countries is also lagging at the pace of the digital era. Thereafter, knowing the students' opinions about online T&L is essential, especially for the practical implication of the principles of connectivism.[3]

The literature is full of articles discussing the pros and cons of online T&L in medical education. Yet, few authors have explored online T&L through students' perspectives with a qualitative approach. In an integrative review study, Diane O'Doherty

recommended exploring the digital literacy skills of e-users with a broader sample of study.[8] Azhari et al while studying non-medical students' perception about traditional and online classes suggested qualitative research for gaining more understanding the fors and againsts of online learning.[4]

In Pakistan, Seher *et al* studied a single medical college and recommended exploring multi-institute medical students' perception about online classes with a qualitative approach.[9] Mukhtar *et al* used a focused group approach and presented with advantages, limitations, and recommendations of online learning from only two institutes.[10] These research gaps are based for the current study. It aims to explore undergraduate medical students' viewpoints particularly the barriers and recommendation of their online T&L from more than five institutes in a resource-restricted country like Pakistan. Eventually the study will add an in-depth understanding of the students' lived experiences of online T&L and establish recommendations for playmakers of resource-restricted countries.

MATERIAL AND METHODS

This qualitative study with a descriptive phenomenological method was conducted from January to July 2022. For undergraduates' medical students online T&L was a new phenomenon. To explore how they have experienced it establish the purpose of using the phenomenological method.[11] It set up a novel and detailed understanding of the lived experiences of undergraduate medical students about the said objective. Also, due to the topic's novelty, this approach seems the best way to answer the literature gap.

As per the recommendation of an author from the same region[9,10], it was decided to include a few (six) medical institutes from Khyber-Pakhtunkhwa, Pakistan. Keeping the purpose of the current study and its design in mind and as suggested by Smith and Osborn[12], selecting the target sample from the same pool who share the same phenomenon with different experiences was necessary. Therefore, a homogeneously focused purposive sampling technique was adopted as a sampling technique. This enabled the researcher to interview various participants with their lived experience of online T&L.

Undergraduate medical students of either gender and any age who have engaged in synchronous T&L of MBBS/BDS courses for more than six consecutive months were approached. Then, those having reliable access to the internet and computer or other devices and are tech-savvy were included in the study. Institutes equipped with a computer lab and proper staff and using online mediums of diverse types for T&L purposes were included. Those students with troubles with screen or detained or retained in previous classes due to failure in a professional examination were excluded from the study.

After obtaining ethical approval from the institutional review board and administrative permission from included institutes, students from different academic years were approached via an online form. It was to make sure the selection of participants should meet the study criteria therefore a "screening online Google form" was developed and shared through WhatsApp with snowball technique. Those who qualified the criteria were emailed with the date, time, and Zoom link for online interviews. During online interviews, they were briefed on the purpose of the study and a statement of confidentiality was narrated. After agreement for participation, data was collected through semi-structured interviews. Based on Mark TB's recommendation, an interview guide was developed and modified after piloting the study.[13] The interview guide contained topics and open-ended questions. The purpose of the semi-structured interview was to facilitate the participants sharing their lived experiences of online T&L. In this way, each topic's depth of meaning and perspectives was appropriately gained. A Zoom audio recorder was used to tap the interviews.

The principal author and a colleague (MG) translated the voice recordings separately. Then both transcriptions were combined and discussed for the differences. In this way, a final version was created and uploaded to ATLAS.ti9® software. Every participant was assigned a pseudo name. Inductive thematic analysis was used to reach the essence of the participants' shared experiences.[14] It included: familiarizing with the data by line-by-line reading with identification of the meanings (codes), organizing the codes into patterns or themes, and cross-checking the relation of themes with the codes like moving back and forth between whole and its part, and lastly, writing descriptive themes about the study objectives. Firstly, the whole process of data analysis was done by the principal and a co-author (AS) independently, and in the end, both corroborated. This ensured the validity and triangulation of data analysis.

RESULTS

A total of 21 participants with a mean age of 20±1.0646 years and 21±4,763 hours of per week online T&L from 6 medical colleges of Pakistan were interviewed in this study. Table-1. A total of 7 themes with varying numbers of sub-themes were abstracted from the participants' interviews. Table-2.

Table-1: Descriptive detail of the participants n=21

Variables	Frequency	Percentage
Gender		
Female	13	61.9
Male	8	38.1
Age (in years)		
20	3	14.3
21	6	28.6
22	8	38.1
23	3	14.3
24	1	4.8
Residency		
Rural	3	14.3
Urban	18	85.7
Course of study		
BDS	6	28.6
MBBS	15	71.4
Year of study		
2nd Year	3	14.3
3rd Year	9	42.9
4th Year	5	23.8
Final Year	4	19.0
Institutes		
Ayub Medical College Abbottabad	6	28.6
Frontier Medical & Dental College	2	9.5
Khyber Girls Medical College	2	9.5
KMU-IMS Kohat	4	19.0
Rehman College of Dentistry, Peshawar	4	19.0
Women Medical College Abbottabad	3	14.3
Total	**21**	**100.0**

Table-2: Summary table of the participants' transcript showing master themes and their subthemes with quotations

Themes		Sub-theme	Quotation of participants
General Opinions		Positive	"It was good to save my time and get updated about what should be studied daily. Some aspects of online classes were better than onsite which I liked."
		In-between	"Depends upon the teacher, if the teacher is good, it helps you." "The theoretical part is best learned online in my view ".
		Negative	"Face to face learning is much much easy and better than online learning."
Barriers	**Common Barriers**	Restricted resources	"But my bad experiences depict as online T&L is not for everybody because of restricted resources, like has proper internet access, lack of gadgets."
		Assessments issues	"Online tests should be minimized or just an evaluation can be done by only MCQS but then again if there's internet problem no one can do these tests"
		Communication gap	"Online classes with no or less student engagement means nothing."
		Less attention span	"Concentration issue was main problem with continues online classes"
		Joint families	"First one needs a suitable place for learning which is not available at ease in joint families. Second family members may disturb you during lecture due to noises, random voices, kids etc".
	Student related concerns	No time for self-study	"The other things they (teachers) can let us do is self-directed learning. we are unable to schedule our-own study with these online classes."
		Annoying behaviour	"Entry of unwanted intruders into a class sessions destroying the class atmosphere and causing problems for the teacher by disturbing them".
		Less tech savvy	"Some student who are not tech savvy they don't know how to control the devices: they get troubled during the class timings"
		Lack of interest or responsibility	"There's very little commitment from students all around because there is very little l interest and motivation."
	Teacher related concerns	Punctuality	" Extremely unprofessional for a teacher to come to a class late. If you can't respect our time, why should we respect yours? "
		Lack of technical skills	"Teachers didn't know how to work on those apps and sometimes, teacher leave the online class accidentally and we would waste 1 or 2 hours waiting for them to join the class again."
		Need for teacher training	"If facilitators are not properly trained in online delivery and methodologies, the success of the online program will be compromised.".
	Administration related concerns		"Furthermore, speaking from an administrative point of view, if students cannot afford the technology, then why an institution employs it for online teaching and learning. this makes no senses."
Managing online classes			"I usually set my alarm for the classes and then take classes. My family members make sure to make me take my classes so I don't have to manage much." "Class schedules are synced with my calendar due to which I get alerts on all my devices."
Recommendations		**Assessment**	"Papers should not be conducted online because everyone has a different attempting style"
		Feedback mechanism	"Utmost, proper evaluation of ongoing online T&L from students, teachers and technical staff and bringing changes accordingly is very very needed."
		Improving resources	"Please try to get a better internet connection in college so that the teachers can use that to give lectures that will not be lagging, and we will be able to hear them clearly and learn more effectively."
		Monitoring	"There should be strict rules for students who are troublemakers and disrupt the normal class dynamics."
		Student engagement	"Moreover, teachers should engage the students by encouraging them to participate in online classes"
		Aiding the self-directed study	"The other things they can let us do is self-directed learning. we are unable to schedule our-own study with these online classes."
		Prior planning	"There must be a prior proper planning and piloted policy for implementing online classes."
		Train the trainer	"Please, teach the teachers how to teach first. They can't handle the app, nor is their connection clear, ancient slides and poor presentation skills."
		Student online learning management	"Students should be notified through SMS/email about schedule, Assignments, Low Attendance etc."

DISCUSSION

The paradigm shifts towards online education pertaining to advancement in science and technology, artificial intelligence, and after-effects of the global pandemic and by the global pandemic, has caused the intricate challenges encountered by undergraduate medical students in their pursuit of academic course. These cover a wide spectrum ranging from concerns about communication networks and signal reliability to changing factors such as network, health, and long-term effects, and impacts on student behaviour. This section, as we have explored these challenges in detail, aims to provide practical solutions for each, while corresponding to our research question in the context of existing research.

Many undergraduate medical students studying online face severe connectivity disruption due to disconnected internet connections and signals. These findings are consistent with previous studies which also identified Internet non-availability as a disadvantage of online T&L.[15,16] To address this problem, institutes should prioritize investments to improve network usage ensure seamless online T&L environment. In addition, Anderson *et al.* and Hussain *et al.* emphasized the importance of a strong internet connection for the success of online learning.[17,18]

In online medical education, in addition to Internet-related problems, students often face communication gaps, health problems caused by excessive screen-time, and living in joint family limiting their learning opportunities and boundaries. Almeia *et al.* and Plakhotnik *et al.* have similarly documented these challenges.[19,20] To address many of these problems, medical colleges must provide cultural explanations for health time, provide mental health services, and ensure families provide a supportive environment. Furthermore, research by Conrad *et al.* highlights the need for schools to consider the overall wellbeing of online students beyond academics.[21]

Nuisance students, their behaviour, and lack of motivation are other factors affecting the entire online learning environment, as in Dhawan et al. study[22]. Setting clear expectations for students that encourage engagement through discussion is critical to addressing these issues. Compliance with 'disruptive behaviour rules' is vital to managing a normal classroom environment. Furthermore, studies such as Kim and Jung have emphasized the role of online learners' engagement in online learning outcomes.[23]

Studies conducted by Dhawan and Hodges et al address the issue of teacher preparation and poor teacher practice as barriers to effective online learning.[15,22] To address this problem, medical schools should implement teacher development programs that focus on equipping teachers with the skills necessary for online learning, with the adoption of technology and affective strategies so involved. In addition, teachers should also be encouraged to be professional and punctual when teaching online. Hrastinsky's study highlights the importance of instructor presence and interaction in online learning.[24]

As noted by Means *et al.*, professional support and resource allocation are essential for successful online learning [16]. Schools should take the lead in providing teachers and students with the resources they need for online learning, including technology and training. In addition, developing clear guidelines for online T&L and student behaviour can help create a more collaborative and affective online learnings experience. Allen and Seaman's study highlights the role of organizational structure and support in achieving affective online learning. [25]

CONCLUSION

The study revealed an array of barriers impeding the effectiveness of online learning, ranging from limited resources and assessment challenges to communication gaps, health concerns, and disengaged students. To alleviate these barriers, it is imperative to adopt a versatile approach that includes fair and transparent assessment methods, robust feedback mechanisms, improved resources, rigorous supervision, and thorough faculty development programs.

Additionally, nurturing student engagement and self-directed study, along with methodical planning and better communication, can contribute to a more successful online learning experience. By overcoming these obstacles and applying the suggested techniques, educational institutions can improve online education for everyone involved, creating a more effective and inclusive online learning environment.

Limitation and suggestion:
The limitations of the study could include the small sample size and the specific context of the study. The study only included undergraduate medical students from various medical colleges in Khyber Pakhtunkhwa, Pakistan. Therefore, the findings may not be generalizable to other populations or contexts. Additionally, the study relied on self-reported data from the students, which may be subject to bias or inaccuracies. The study did not include the perspectives of teachers or administrators, which could have provided a more comprehensive understanding of the challenges and remedies for online learning. Finally, the study did not explore the long-term impact of online education on medical students' academic performance and overall learning experiences. These limitations should be considered

when interpreting the study's findings and applying them to other contexts.

Conflict of interest: The authors declare no financial or any other conflict of interest to disclose.

AUTHORS' CONTRIBUTION

MJK: literature search, conceptualization of study design, data collection, data analysis, data interpretation, write-up. AS: conceptualization of study design, data analysis, data interpretation, and proof reading.

REFERENCES

1. Alsoufi A, Alsuyihili A, Msherghi A, Elhadi A, Atiyah H, Ashini A, *et al.* Impact of the COVID-19 pandemic on medical education: Medical students' knowledge, attitudes, and practices regarding electronic learning. PLoS One. 2020;15(11): e0242905.
2. Singh V, Thurman A. How Many Ways Can We Define Online Learning? A Systematic Literature Review of Definitions of Online Learning (1988-2018). Am J Distance Educ. 2019;33(4):289–306.
3. Goldie JGS. Connectivism: A knowledge learning theory for the digital age? Med Teach. 2016;38(10):1064–9.
4. Azhari T. Students' Perception on Online Learning During the Covid-19 Pandemic. In: International Conference on Social Science, Political Science, and Humanities. Atlantis Press; 2021. p. 46–50.
5. Linjawi AI, Alfadda LS. Students' perception, attitudes, and readiness toward online learning in dental education in Saudi Arabia: a cohort study. Adv Med Educ Pract. 2018; 9:855–63.
6. Dabbagh N. Pedagogical models for E-Learning: A theory-based design framework. Int J Technol Teach Learn. 2005;1(1):25–44.
7. Anderson T. Towards a theory of online learning. In: Anderson T, editor. The Theory and PracTice of online learning. 2nd ed. Athabasca: AU Press; 2008. p. 61.
8. 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.
9. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding e-learning during covid-19 at a private medical college. Pakistan J Med Sci. 2020;36(COVID19-S4): S57–61.
10. Mukhtar K, Javed K, Arooj M, Sethi A. Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era. Pakistan J Med Sci. 2020;36(COVID19-S4): S27–31.
11. Moustakas C. Phenomenological research methods. Sage publications; 1994 Jul 27.
12. Smith JA, Osborn M. Interpretative Phenomenological Analysis. In: Smith JA, editor. Qualitative Psychology: A Practical Guide to Research Methods. 2nd ed. London: Sage Publications; 2008. p. 53–80.
13. Bevan MT. A method of phenomenological interviewing. Qual Health Res. 2014;24(1):136–44.
14. Sundler AJ, Lindberg E, Nilsson C, Palmér L. Qualitative thematic analysis based on descriptive phenomenology. Nurs Open. 2019;6(3):733–9.
15. Hodges BD, Maniate JM, Martimianakis MA, Alsuwaidan M, Segouin C. The effects of COVID-19 on academic progression and career planning: A systematic review. Int J Med Educ. 2020; 11:213–21. doi: 10.5116/ijme.5f24.6e7b
16. Means B, Toyama Y, Murphy R, Bakia M, Jones K. Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. US Department of Education; 2010.
17. Anderson T, Yau JY, Hinze A. Internet access and digital inequality: Availability and use of technology-enabled learning during the COVID-19 pandemic. Information and Learning Sciences. 2021;122(7/8):1–21.
18. Hossain MZ, Tasnim S, Sharma R, Sultana A, Shaikh A. Digital inequity in education amid COVID-19 pandemic: A comparative case study. Journal of Education and Social Sciences. 2021;5(2):126–38.
19. Amelia R, Kadarisma G, Fitriani N, Ahmadi Y. The effect of online mathematics learning on junior high school mathematic resilience during the COVID-19 pandemic. J Phys Conf Ser. 2020; 1657:012011. doi:10.1088/1742-6596/1657/1/012011
20. Plakhotnik MS, Volkova NV, Jiang C, Yahiaoui D, Pheiffer G, McKay K, *et al.* The Perceived Impact of COVID-19 on Student Well-Being and the Mediating Role of the University Support: Evidence From France, Germany, Russia, and the UK. Front Psychol. 2021 Jul 12;12:642689. doi: 10.3389/fpsyg.2021.642689.
21. Conrad D. Experience and learning in virtual communities: Beyond a tool metaphor. Routledge. 2019.
22. Dhawan S. Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems. 2020;49(1):5–22.
23. Kim J, Jung J. Investigating factors that influence social presence and learning outcomes in distance higher education. Computers & Education. 2014;71:92–100.
24. Hrastinski S. Asynchronous and synchronous e-learning. Educause Quarterly. 2008;31(4):51-55.
25. Allen IE, Seaman J. Digital Learning Compass: Distance Education Enrollment Report 2017. Babson Survey Group. 2017.

Address for Correspondence
Dr Ahsan Sethi, Building H06, Qatar University, Doha, P.O. Box 2713, Doha-Qatar
Tel: +974 4403 6455
Emal: asethi@qu.edu.qa