FACTORS INFLUENCING THE PARTICIPATION AND ENGAGEMENT OF DENTAL STUDENTS IN E-LEARNING DURING COVID-19 PANDEMIC

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ABSTRACT:

OBJECTIVES:

To assess the factors that influences the participation and engagement of dental students in online classes.

METHODOLOGY:

A descriptive cross-sectional study was conducted using a pre-validated questionnaire with 45 barriers items used. The Cronbach Alpha value after removing certain items in our study was calculated to be 0.934, which resulted in 35 barrier items. Recorded data were coded and entered using SPSS version 23.0. Nominal data were presented as frequency and percentage, whereas all numerical data was entered as mean and standard deviation. Factor analysis on questions pertaining to barriers to e-learning was done.

RESULTS:

The underlying construct of the data was identified using principal component factor analysis. The type of rotation used was Varimax. The value of Kaiser-Meyer-Olkin measure for sampling adequacy (MSA) was 0.880. The criteria used for identifying factors were the latent root criteria. A total of six factors were identified. The overall variance explained by these factors was 61.9%. The barriers ranked the highest were those pertaining to motivational problems and time interruptions (2.8667±0.88524). The barriers that were ranked the lowest were those pertaining to instructors and personal problems (2.3894±0.81059).

CONCLUSION:

The biggest barrier was found to be motivational problems in attending online classes. The second-highest ranked barrier was social problems. The third barrier included a lack of support services. Technical barriers were ranked fourth. The barrier that was ranked fifth was a lack of pre-requisite skills. The barriers that were reported to be the least were problems pertaining to the instructor and personal problems.

KEYWORDS: *Motivational Barrier, Social Barrier, Technical Barrier, Instructor and Personal Barrier, Pre-requisite Skill, Kaiser-Meyer-Olkin (KMO)*

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INTRODUCTION:

Using the Internet and electronic technology to facilitate the teachers and students by providing them access to an approachable and easy mode of learning, teaching, and communication, which in turn augments comprehension and improves outcomes is known as online learning or e-learning[1,2]. Considering various social, scientific, and educational challenges in today's world, the role of e-learning in academia has gained tremendous significance and can be used as a tool to ameliorate the productivity of educational interventions[3]. Some studies advocate the implementation of online learning[4, 5,] mainly attributing it to ease of use, administrative management and maintenance, accessibility, and interactivity for geographically or temporally separated students6. On the contrary, some factors hinder the use of e-learning and render it unsatisfactory for students, like social isolation from peers, insufficient skills and experience in distant learning, unavailability or disruptions in internet connections, and lack of teacher-student interaction or engaging in various activities online other than studying[7,8-10]. One of the biggest problems in delivering online education is the lack of technical training of the teachers as a result of which the students are unable to benefit from online teaching sessions[11]. The provision of excessive, and unstructured information provided in online classes, lack of skills required for learning online, and inadequacy to cope with the burden of assignments have also been reported as problems faced during online learning[12]. It has also been reported that a limiting factor that keeps the students from actively engaging in online sessions is the language barrier[13]. A study investigating barriers to e-learning highlighted lack of learner motivation to the extent that students procrastinate or solve part of the assignments they find easy, unavailability of time and support from surrounding people, the deficit of academic advisors online and timely feedback consequently reducing the probability of student willing to attend future online classes[14]. Although online learning has been a common practice worldwide with far more acceptance than this part of the world, the majority of educational institutions, including undergraduate and postgraduate level in Pakistan, mainly resorted to it during the lockdown period owing to the pandemic[7, 8, 15, 16]. All personnel involved in the field of medical education, such as institutional administrators, teachers, and students need to utilize information technology to the best of their abilities, to fill in the gaps that might result as a repercussion of the current scenario and remove all possible barriers of online learning to promote comprehensive learning by students [4, 7, 8]. For which there is a dire need to explore students' preferences regarding various teaching modalities during this abrupt transition to online learning, in case the students want any modification in this system or prefer a blended system of traditional and online classes[17]. The objective of the study was to assess the factors that influence the participation and engagement of dental students in online classes.

METHODOLOGY:

A descriptive cross-sectional study was conducted on students of Bachelors of Dental Surgery from Sharif Medical and Dental College Lahore. Dental students from all four years were included in the study irrespective of their academic record. Students who did not attend the online classes or refused to give consent were excluded from the study sample. A pre-validated questionnaire with a Cronbach Alpha 0.94 was used[14]. To assess various barriers to online learning faced by the students, item analysis was performed in the pilot study on the 45 variables pertaining to barriers. The Cronbach Alpha value after removing certain items in our study was calculated to be 0.934, which resulted in 35 barrier items. The questionnaire was distributed among 200 dental students of Sharif College of Dentistry, SMDC, after obtaining permission from Sharif Medical Research Center (SMRC). Informed consent

was taken prior to data collection. Recorded data were coded and entered using SPSS version 23.0. Nominal data were presented as frequency and percentage, whereas all numerical data was entered as mean and its respective standard deviation. Factor analysis on questions pertaining to barriers to e-learning was done.

RESULTS:

A cross-sectional descriptive study was conducted on 200 students of all four years of Bachelor of Dental Surgery (BDS) of Sharif College of Dentistry, SMDC, out of which (31.6%) were males while (67.9%) were females. The majority of the students (93.3%) belonged to the age range of 18 to 24 years, (5.7%) were below the age of 18 while only (1%) belonged to the age range of 25 to 31 years. The underlying construct of the data was identified using principal component factor analysis on 35 items pertaining to barriers. The type of rotation used was Varimax. The value of Kaiser-Meyer-Olkin measure for sampling adequacy (MSA) was 0.880. The criteria used for identifying factors were the latent root criteria. A total of six factors were identified. The overall variance explained by these factors was 61.9%. Initial Eigen values greater than 01 were taken significant as shown in Table-1.

Table 1: Factors Identified Based on Eigen Values

Component	Initial Eigen Values		
	Total	% of Variance	Cumulative %
Barriers Pertaining to Instructor Problems and Personal Problems	9.748	32.494	32.494
Barriers Pertaining to Motivational Problems and Time Interruptions	2.646	8.821	41.315
Barriers Pertaining to Lack of Support Services	2.015	6.715	48.030
Barriers Pertaining to Lack of Pre-requisite Skills for Online Learning	1.709	5.695	53.726
Barriers Pertaining to Technical Problems	1.124	4.524	58.249
Barriers Pertaining to Social Interactions	1.357	3.745	61.995

The only items considered were those with factor loadings of 0.5 and above. There was specific loading of every item on one factor. Five of the 35 barrier items were dropped. The following factors were identified 01) Barriers pertaining to instructor issues and personal issues, 02) Barriers pertaining to learner`s motivational problems and time, 03) Barriers pertaining to support service problems, 04) Barriers pertaining to prerequisite skills, 05) Barriers pertaining to technical problems, 06) Barriers pertaining to social interactions, as shown in Table-2.

Table 2: Principal Component Factor Analysis using Varimax Rotation with Kaiser Normalization

Rotated Component Matrix[a]						
	Component					
	1	2	3	4	5	6
Instructors knowledge during online teaching	0.565					
Minimum advisors for online teaching	0.545					
Delay in delivery of course material	0.603					
Incongruous size of class	0.600					
Lack of social support	0.691					
create disruption in family life	0.648					
intrude into my personal time	0.745					
Lack motivation to learn online		0.762				
Procrastination		0.683				
Choose the easier assignments		0.549				
Unsupportive e-learning environment		0.742				
Lack of adequate time to learn		0.572				
Interruptions during studying		0.670				
unclear instructions from instructor			0.585			
Insufficient training of teachers			0.679			
Deficient provision of services			0.608			
Communication Gap			0.574			
Deficient writing skills				0.700		
Deficient typing skills				0.773		
Deficient reading skills				0.652		
Inadequate academic confidence				0.569		
Deficient communication skills				0.587		
Unavailability of internet/issues					0.743	
High cost of repairing service provider/software					0.647	
Deficient skills for using systems					0.693	
lack of consistency in system usage					0.603	
Deficient skills for using software					0.581	
Limited interaction among students						0.772
lack of social context cues						0.829
Lack of collaboration						0.800

It was observed that the students ranked barriers pertaining to motivational problems and time interruptions the highest, while the instructor and personal problems were ranked the lowest barriers they experienced in the acquisition of online education as shown in Table-3.

Table 3: Ranking of Barriers to Online Learning

Barriers to Online Learning	Mean	Std. Deviation
Barriers Pertaining to Motivational Problems and Time Interruptions	2.8667	.88524
Barriers Pertaining to Social Problems	2.7617	.95904
Barriers Pertaining to Lack of Support Services	2.4871	.76464
Barriers Pertaining to Technical Problems	2.4323	.77524
Barriers Pertaining to Lack of Pre-requisite Skills for Online Learning	2.4204	.83990
Barriers Pertaining to Instructor Problems and Personal Problems	2.3894	.81059

DISCUSSION:

A descriptive cross-sectional study was conducted on dental students to determine the various barriers faced by them while acquiring online education. Literature supports that there are many barriers to online learning faced by the students. Some of these include skill deficit for online education, time limitation, lack of proper infrastructure, lack of institutional support, and lack of instructor support[1]. Some studies have reported a lack of instructor feedback, social isolation, and confusion in comprehending the format of online classes as problems[18]. According to one study, the barrier factors extracted were similar to that of our study and included social barriers, technical problems, motivational problems, and academic/pre-requisite skills.

According to our study, motivational problems were rated as the strongest barriers to e-learning (2.8667±0.88524). These results are very different from another study where this barrier was ranked the fourth-highest (1.91±0.93)[14]. It was seen in one study that students rated procrastination as a barrier to participating in online classes (3.02±1.34). It was reported that (57.63%) of students considered it a barrier[18]. In our study, procrastination was also reported to be a considerable barrier in online learning (2.77±1.222) and was seen as a moderate barrier (30.1%), strong barrier (17.6%), and very strong barrier (9.8%) by students. It was also reported in our study under motivational barriers that submission of assignments and the level of their difficulty were also moderate (34.9%), strong (19.8%), and very strong (5.2%) barrier that hinders online learning. These results were very different from another study where only (6.78%) of students reported it to be a barrier in online learning[18].

Students rated the barriers related to social interaction as the strongest barrier (2.36±1.07)[14]. These results are comparable to our study where it was seen that social barriers were ranked the second strongest barrier to online learning (2.7617±0.95904). Among social barriers, our study reported that lack of collaboration among students was considered a significant barrier to online learning and it was considered a moderate barrier by (37.8%), strong barrier by 14%, and very strong barrier by (6.7%) of students. Another one of the social barriers reported was lack of interaction and communication with other students, which was reported as a moderate (41.5%), strong (16.6%), and very strong (9.3%) barrier by the students. Similar social barriers were identified in another study where (38.98%) reported a lack of collaboration with peers as a barrier while 25.42% identified lack of interaction as an important barrier[18.]

In the study above[14], technical problems were ranked the fifth-strongest barrier (1.70±0.73) which is quite similar to our study, where technical problems were ranked fourth-strongest barriers (2.4323±0.77524). According to our study, the lack of pre-requisite or academic skills was the fifth strongest barrier to online learning (2.4204±0.83990). These results

are contrary to another study where lack of academic skills was rated the least strong barrier to online learning (1.22±0.50)[14]. Another significant issue reported pertaining to instructors was that (37.29%) of students found communicating with the instructor a big hindrance in online learning[18]. This barrier was identified in our study as well and it was found that (42%) of students considered it a moderate barrier, (9.5%) strong, and (4.2%) a very strong barrier to online learning.

CONCLUSION:

The biggest barrier was found to be motivational problems in attending online classes. The second-highest ranked barrier was social problems, which included a lack of collaboration and interaction among students. The third barrier included a lack of support services. Technical barriers were ranked the fourth and included problems of Internet connectivity, costly hardware and software repairs, and lack of consistency in online teaching platforms. The barrier that was ranked fifth was lack of pre-requisite skills, which included academic, writing, typing, language, and communication skills. The barriers that were reported to be the least were problems pertaining to the instructor and personal problems.

LIMITATIONS:

This study was conducted on dental students of one dental college. The results of the study can be more generalized if students from other dental colleges are also included.

CONFLICT OF INTEREST: None

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