The Professional Medical Journal
www.theprofesional.com

DOI: 10.29309/TPMJ/2019.26.04.3367

ORIGINAL PROF-0-3367

E-LEARNING:
ARE WE THERE YET?

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Article received on:
08/06/2018
Accepted for publication:
15/11/2018
Received after proof reading:
26/03/2019

ABSTRACT… Objectives: To assess the readiness for eLearning in dental institutes of Khyber Pakhtunkhwa. **Study Design:** Cross-sectional survey. **Setting:** Three dental institutes affiliated with three different universities in Khyber Pakhtunkhwa (KP) province. **Period:** October 2016 to January 2017. **Methods:** Participants were all the dental students (n=789), postgraduate trainees (n=167) and faculty members (n=103) of these institutes. Data were collected using pre-validated 'Students' E-Learning Readiness Scale' and interpreted through descriptive and non-parametric statistics. **Results:** The response rate was 54% (568/1059). The respondents were predominantly female (62.3%), however, most of the faculty members were male. The mean scores for the undergraduates, postgraduates and the faculty across all the subscales (technology access, online skills and relationship, motivation, online audio/video preferences, readiness for online discussions and the importance of e-learning to participants' success) were above 3, indicating good readiness. The agreement was relatively lower in the subscales on motivation and online discussions. The mean scores of the faculty were higher than the undergraduate and postgraduate students. A comparison among genders also showed significantly higher readiness for eLearning among males than the female. Both the public and private institutes have access to technology and internet facilities. **Conclusion:** The undergraduate, postgraduate students and faculty from the public and private-sector institutes of Khyber Pakhtunkhwa province have good readiness for eLearning. The female students need further training in effective use of computer and internet for educational purpose. Course designers should focus on improving learners' motivation and online interaction. Future research should compare our findings with institutions in other provinces of Pakistan.

Key words: Continuing Medical Education, Dentistry, eLearning, Instructional Design, Postgraduate Education, Undergraduate Education.

Article Citation: Sethi A, Wajid A, Khan A. E-Learning: are we there yet? Professional Med J 2019; 26(4):632-638. **DOI:** 10.29309/TPMJ/2019.26.04.3367

INTRODUCTION

The trends in medical education are rapidly evolving with more student-centred learning approaches.[1] Students are encouraged to take on the driving seat with active construction of knowledge.[2] The adults learners are self-directed and they resist information being imposed.[3] They want to be respected and encouraged towards expression of ideas. Responding to these growing changes in higher education and other global economic constraints, e-learning is increasingly being used for a broad range of professional training and educational initiatives in healthcare around the world.[4] Globally, various undergraduate and postgraduate professional training programs run via eLearning[5] and virtual medical schools have also been established.[6]

eLearning involves the use of electronic communication technologies to deliver text, audio, image, animation, and video in education.[7] The curriculum organizers encourage online learning and discussion through several resources such as learning management systems (LMS), virtual classrooms, email, Web 2.0 (mainly Wikipedia, Skype, WhatsApp, YouTube, Twitter and Facebook). eLearning is known to reduce the long-term costs associated with delivering educational content, facilitate the development and scalability of educational interventions and improve access to education.[4] In medical education, e-learning provides a solution for continuously updating and expanding curriculum. It overcomes the shortage of faculty and enables them to deliver content and reach students anywhere at any time inside

and outside classroom.

For rapidly developing countries, the use of e-learning resources across the medical education continuum for students and faculty seems a possibility.[8] However, the demographics and resources vary and even though eLearning is a success for other countries it may not be the same for Pakistan. According to our literature review, no studies have assessed the needs, abilities and resources required for implementation of eLearning in Khyber Pakhtunkhwa province, Pakistan. Such a study is important to uncover the factors that are critical to successful implementation of well-organized eLearning structure and tools.[9] The Pakistan Medical and Dental Council (PMDC) is also in the process of revamping policies for undergraduate, postgraduate and continuing medical education. Therefore, this study is timely and particularly useful to inform policy and practice for universities and colleges. We assessed the readiness for e-learning among dental students, trainees and faculty members of dental institutes from Khyber Pakhtunkhwa province as a part of learner analysis in instructional design.

METHODS

This descriptive cross-sectional survey was carried out in three dental institutes of Khyber Pakhtunkhwa (KP) province from October 2016 to January 2017. Each of these dental institutes are affiliated with three different universities of KP i.e. Khyber Medical University (public), Gandhara University (private) and RIPHAH International University (private) respectively. The institutes have been approved by Pakistan Medical and Dental Council (PMDC) and College of Physician and Surgeons (CPSP), Pakistan for undergraduate and postgraduate trainings.

Questionnaire

Several instruments have been developed for assessing learners' capabilities, attitudes, accessibility and social contexts towards eLearning.[10,11,12,13] In this study, we used 'Students' E-Learning Readiness Scale' developed by Watkins et al as its validity and reliability has been established.[10] Also, this instrument explores the ease of access, necessary technical skills, issue related to learners' attitudes and beliefs in great detail, which is important to the successful implementation of eLearning.[14,15] The instrument was revalidated in the local context by four experts. It was then piloted (n=12) to ensure understanding by the participants, identifying ambiguities and difficult questions. No changes were suggested. The questionnaire includes 27 items that assess participants on six subscales: technology access, online skills and relationship, motivation, online audio/video preferences, readiness for online discussions and the importance of e-learning to participants' success.[10] A five-point scale (1: strongly disagree through to 5: strongly agree) was used to ask participants to rate their readiness for e-learning. Demographic questions were added to the questionnaire and it was kept anonymous.

Data Collection

Ethical approval was obtained from one of the institutes, which was accepted by the other two institutes. Participants were all the dental students (n=789), postgraduate trainees (n=167) and faculty members (n=103) of these institutes in 2016. They were informed about the purpose of this research and its implication towards introduction of online dental education resources in KP. Participation was voluntary, and participants expressed their consent by completing and returning the questionnaire.

Data Analysis

Each completed questionnaire was given a unique ID. All the data from the questionnaire were coded and entered into SPSS.v.24. Descriptive statistics (frequencies and averages) were calculated. The average of each subscale was calculated by dividing the sum of averages of all the items by the number of items in each subscale. Averages more than 3 indicate good readiness, and scores equal or less than 3 shows inappropriate readiness of the participants in that subscale. Several factors including: gender, academic achievement, brain processing and culture can influence learners readiness for eLearning,[16] therefore, we also compared respondent subgroups. The data distribution was not normal (Shapiro Wilk test

p=0.000) therefore non-parametric tests such as Mann–Whitney U, Wilcoxon Signed Rank Test and Kruskal–Wallis were used. P value less than 0.05 was considered as significant.

RESULTS

The response rate was 54% (568/1059). The respondents were predominantly female (62.3%), however, most of the faculty members were male. The respondents had a good amalgamation of X, Y and Z generation. The undergraduates were mainly from Generation Z, who grew up in a highly sophisticated media and computer environment. The postgraduate trainees belonged to Generation Y, while the faculty members had a good mix of both Generation X and Y. One fourth of the students and trainees were hostelites. Among our respondents, the public-sector institute had more postgraduate trainees and faculty members than the two private institutes combined. (Table-I)

The mean score and the differences among respondents with different levels of training, genders, residences and institutions are provided in Table-II. The respondents had significantly different (p=0.000) perceptions on all sub-scales, except for their online audio/video preferences and importance of eLearning sub-scales (p=0.166), which showed a similar perception. In general, the respondents rated their access to technology and online skills higher than their levels of motivation and readiness for online discussions, which were less than all other subscales. The mean scores for the undergraduates, postgraduates and the faculty were above 3 across all the subscales. However, these scores were comparatively lower in the subscales on motivation and readiness for online discussions. The mean scores of the faculty were higher than the undergraduate and postgraduate students. However, these differences were only significant for the subscales on online skills and importance of e-learning. A comparison among genders showed significantly higher readiness for eLearning on all the subscales such as in having online skills and motivation among males than the female respondents, except in having access to technology (computer, internet and softwares). The mean scores of hostelites on most of the subscales were higher than the day scholars, however, these differences were non-significant. Readiness for online discussions was significantly higher among respondents from private institutes than the government funded (public) institute. The differences in mean score on all other sub-scales among public and private institutions were non-significant.

Characteristics		Undergraduate Students (n=386)	Postgraduate Trainees (n=114)	Faculty Members (n=68)
Gender	Male	110 (28.5%)	48 (42.1%)	56 (82.4%)
	Female	276 (71.5%)	66 (57.9%)	12 (17.6%)
Age	18-23 Years	377 (97.7%)	0 (0.0%)	0 (0.0%)
	24-29 Years	9 (2.3%)	96 (84.2%)	2 (2.9%)
	30-35 Years	0 (0.0%)	8 (7.0%)	38 (55.9%)
	36-41 Years	0 (0.0%)	10 (8.8%)	8 (11.8%)
	41+ Years	0 (0.0%)	0 (0.0%)	20 (29.4%)
Residence	Home	298 (77.2%)	82 (71.9%)	68 (100%)
	Hostel	88 (22.8%)	32 (28.1%)	0 (0.0%)
Institution	Public	168 (43.5%)	60 (52.6%)	36 (52.9%)
	Private	218 (56.5%)	54 (47.4%)	32 (47.1%)

Table-I. Demographics

Subscale		Undergraduate (n=386) Mean (SD)	Postgraduate (n=114) Mean (SD)	Faculty (n=68) Mean (SD)	P-Value
Technology access		4.13 (1.04)	4.34 (0.89)	4.17 (0.92)	0.259
	Male	4.18 (0.93)	4.42 (0.83)	4.14 (0.99)	0.755
	Female	4.11 (1.08)	4.28 (0.92)	4.33 (0.40)	
	Home	4.18 (1.03)	4.26 (0.99)	4.17 (0.92)	0.181
	Hostel	3.96 (1.05)	4.54 (0.49)	0.00 (0.00)	
	Public	4.25 (0.81)	4.31 (1.10)	4.24 (0.79)	0.311
	Private	4.04 (1.19)	4.37 (0.57)	4.10 (1.05)	
Online skills and relationships		4.00 (0.77)	4.18 (0.54)	4.27 (0.75)	0.006*
	Male	4.12 (0.57)	4.28 (0.37)	4.31 (0.80)	0.001*
	Female	3.95 (0.83)	4.12 (0.62)	4.09 (0.43)	
	Home	4.03 (0.78)	4.12 (0.58)	4.27 (0.75)	0.426
	Hostel	3.90 (0.76)	4.35 (0.37)	0.00 (0.00)	
	Public	4.05 (0.67)	4.14 (0.67)	4.33 (0.56)	0.596
	Private	3.96 (0.84)	4.23 (0.33)	4.21 (0.93)	
Motivation		3.47 (0.82)	3.36 (0.79)	3.61 (0.74)	0.159
	Male	3.74 (0.74)	3.53 (0.79)	3.66 (0.75)	0.000*
	Female	3.36 (0.82)	3.25 (0.78)	3.39 (0.67)	
	Home	3.45 (0.85)	3.25 (0.70)	3.61 (0.74)	0.093
	Hostel	3.52 (0.70)	3.64 (0.95)	0.00 (0.00)	
	Public	3.39 (0.82)	3.42 (0.58)	3.74 (0.79)	0.555
	Private	3.53 (0.81)	3.31 (0.98)	3.46 (0.66)	
Online audio/video preferences		3.86 (0.78)	3.80 (0.74)	3.86 (0.77)	0.671
	Male	3.95 (0.74)	3.99 (0.66)	3.89 (0.78)	0.038*
	Female	3.82 (0.78)	3.66 (0.76)	3.72 (0.71)	
	Home	3.85 (0.78)	3.80 (0.69)	3.86 (0.77)	0.427
	Hostel	3.91 (0.75)	3.77 (0.85)	0.00 (0.00)	
	Public	3.98 (0.67)	3.79 (0.74)	3.81 (0.81)	0.136
	Private	3.77 (0.83)	3.80 (0.75)	3.92 (0.74)	
Readiness for online discussions		3.65 (0.79)	3.55 (0.63)	3.74 (0.68)	0.293
	Male	3.78 (0.71)	3.66 (0.69)	3.77 (0.72)	0.026*
	Female	3.59 (0.81)	3.46 (0.58)	3.59 (0.35)	
	Home	3.66 (0.79)	3.51 (0.58)	3.74 (0.67)	0.537
	Hostel	3.62 (0.77)	3.63 (0.77)	0.00 (0.00)	
	Public	3.59 (0.67)	3.42 (0.61)	3.73 (0.72)	0.005*
	Private	3.69 (0.87)	3.69 (0.64)	3.75 (0.63)	
Importance of e-learning to participants' success		3.80 (0.71)	4.14 (0.55)	4.16 (0.68)	0.000*
	Male	3.80 (0.63)	4.21 (0.55)	4.18 (0.73)	0.041*
	Female	3.80 (0.74)	4.08 (0.55)	4.04 (0.21)	
	Home	3.79 (0.74)	4.12 (0.58)	4.16 (0.68)	0.697
	Hostel	3.84 (0.61)	4.19 (0.48)	0.00 (0.00)	
	Public	3.89 (0.64)	4.11 (0.62)	4.19 (0.49)	0.085
	Private	3.73 (0.75)	4.17 (0.46)	4.12 (0.84)	

Table-II. Readiness for eLearning
*** The differences are significant (p<0.05)**

DISCUSSION

The current study assessed the readiness for eLearning among dental students, trainees and faculty from three dental institutes of Khyber Pakhtunkhwa province. The scores for the undergraduates, postgraduates and the faculty indicated good readiness (mean score above 3) of the participants on all the subscales. The respondents had high agreement on having access to technology, internet and possession of necessary computer skills. These findings are in line with those reported by Asiry (Saudi Arabia),[9] Suri and Sharma (India)[17], Goodwin et al (Kuwait)[18] and Eslaminejad et al (Iran).[19] The agreement on 'motivation' and 'readiness for online discussion' subscales were less than other subscales, as also reported by similar study on postgraduate students from Iran.[5] As the instructor is not present at all times in online courses, the learners' motivation and catching up on different discussion boards simultaneously is an issue. Motivation of the learners and interactive discussions are important for efficient online learning resulting in high retention and better outcomes.[20,21] To improve motivation and maintain it during an online course, the course designers should relate course objectives with the learners' practice as processing relevant information allows for deeper learning[14] and encourage active participatory learning. On the other hand, lack of readiness for online discussions may be related to inexperience and novelty of virtual learning environment (VLE). Therefore, adding preparatory activities to the course, including techniques for establishing and managing VLE and online discussions is recommended.[14]

We found that faculty is more motivated towards e-learning than the undergraduate and postgraduate students, this may be because currently faculty have more usage of technology and internet on day-to-day basis for lecturing and research purposes. It may also be related to their thirst for learning new instructional designs that can help them match the evolving requirements of teaching. Such an optimistic stance of faculty members towards e-learning is encouraging, as it will not only be important for their own learning but also for the provision of online learning content, facilitation of learning process and building fruitful interaction with their students.[19]

Gender related differences have been found in many other studies from Pakistan.[22,23] The underlying reason may be related to region specific socio-cultural traditions and deep-rooted gender inequalities.[24] In this study, male respondents showed significantly higher readiness than the female respondents on other subscales including motivation, online audio/video preferences and online skills and relationship. Arenas-Gaitán et al[25], Lu and Chiou,[26] Wei and Johnes[27] and Ong and Lai[28] also found that males prefer and value using e-learning platforms more than females. We recommend proactive measures for capacity building, skill development and training to neutralize these gender differences.

Online discussion forum provides a platform for open exchange of views, keeps an evidence of thoughts and communications, and also offers observation for everyone[29]. Readiness for online discussion was found significantly less in government funded (public) institute as compared to private. Although, this might be perceived that it is due to lack of access to technology and internet facilities in public-sector institutions, however, this was not the case in this study. Hence, this needs further exploration using qualitative methods.

In the current study, an overriding percentage of respondents indicated strong willingness and acceptance towards all the potential benefits of eLearning. Therefore, eLearning seems a possibility in future professional development and education of dental students and faculty. Jawaid and Ashraf in their study exposed first year medical students to an e-learning module for six months at Dow University of Health Sciences, Karachi.[30] They reported good experience of students, who wanted more topics to be covered with this modality. Similar response was observed in the students from Lahore Medical and Dental College.[31] We recommend integration of e-learning into undergraduate, graduate, and continuing medical education. As eLearning is relatively new in Pakistan, therefore, initially it

may be used in combination with traditional face-to-face teaching (blended learning).

Our findings are not generalizable but relevant only to the institutes of KP, yet its potential value is that it helped in identifying readiness in the most developed institutes affiliated with three different universities of the country. The self-reported nature of findings is another concern. Despite these limitations, the findings help understand the potential challenges towards implementation of online learning for undergraduate, graduate, and continuing medical education in Pakistan.

CONCLUSION

The undergraduate, postgraduate students and faculty from the public and private-sector institutes of Khyber Pakhtunkhwa province have good readiness for eLearning. eLearning across the medical education continuum for students and the faculty seems a possibility. The female students need some motivation and training. Both the public and private institutes have access to technology and internet facilities. The female students need further training in effective use of computer and internet for educational purpose. Course designers should ensure adequate measures for improving learners' motivation and interaction. Future research should compare our findings with institutions in other provinces of Pakistan.

Conflict of Interest

The authors declare no conflict of interest

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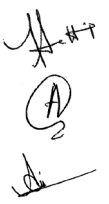
AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Ahsan Sethi	AS conceived the idea and designed the study. AW and AK secured the ethics approval and collected the data. All authors (AS, AW and AK) contributed towards writing and editing the manuscript.	
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