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Are Medical Undergraduates Ready for Online Learning? A Cross-Sectional Study in a Tertiary Health Care Institution in Coastal South India

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ABSTRACT

Purpose: COVID-19 pandemic has caused a shift from offline to online teaching and learning in all educational institutions. One of the important factors which impact the effectiveness of online learning is the online learning readiness of the students. This study was undertaken to measure the readiness of undergraduates of a medical college in India.

Methods: A cross-sectional study was carried out among medical undergraduates of second, third and fourth academic years. An online learning readiness scale covering five dimensions, i.e., self-directed learning, learner control, motivation for learning, computer/internet self-efficacy and online communication self-efficacy, was administered. Independent samples t-test and one-way multivariate analysis of variance were used to analyse the association between age, gender, grade of study and previous use of e-learning with online learning.

Results: The mean scores of study participants ranged from 2.90 to 3.22 on the five-point Likert scale. The mean score for motivation for learning was the highest followed by that for self-directed learning. The least score was in the domain of learner control which is one of the important predictors of online learning. The mean scores in all the five dimensions were similar among males and females. The difference in mean scores were statistically significant for the previous experience of online learning. Technical issues and network problems are major barrier for online learning.

Conclusion: Medical undergraduates are ready for online learning to a certain extent, with good motivation for learning in the online context. However, they need to have self-discipline to focus on work and avoid distractions while learning online.

Keywords

Students, Medical; COVID-19; Education, Distance Learning

Introduction

With the advancement in information and technology, its integration in medical education was inevitable. E-learning or online learning has been defined as the use of information technology to impart or assist in learning (Pei & Wu, 2019). Over the past few years, many institutions in developed countries have adopted online learning in training medical undergraduates. In developing countries, online learning adaptation in medical education has been slow nevertheless, filled with challenges.

Before COVID-19 pandemic, very few medical institutions in India were using e-learning or online learning platforms (Dhir et al, 2017).These medical institutions are usually in urban areas and the students can access internet and computers in the college campus itself.

Once COVID-19 spread across the globe and it was declared a pandemic, one of the measures suggested to control its transmission has been social distancing and closure of educational institutions. This has had a huge impact on the training of medical undergraduates who are not only learners but clinicians-in-training. With the cancellation of in-person classes, all medical institutions have transitioned to online learning as soon as possible. Many institutions have started using synchronous teaching methods and platforms like Google classroom and Zoom. Students now have to attend online classes sitting in their homes which may be in rural areas with poor internet connections. Studies exploring the barriers for online learning have suggested

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that behavioural, economic, geographic and other factors like previous experience in using online learning can hinder learning (Muflih et al 2020). Various studies that evaluated the use of online learning using a specific platform like learning management systems and social medias have proved that online learning provides students an access to vast and updated resources, a flexibility to study anywhere, better acquisition of knowledge and an improvement in the level of competence (Shrivastava & Prateek, 2020). Since students are considered to have prior digital knowledge, they are generally assumed to be ready for online learning, so much so that their readiness is hardly taken into account and considered. Readiness for e-learning or online learning is defined as the ability to benefit from the use of information and communication technologies in education(Dada, 2006). Studies on readiness have shown that individuals with low level of readiness impacts the level of engagement and active participation of students (Hong & Gardner 2018). Low level of readiness also affects critical thinking skills of students resulting in poor planning, not being able to clearly state their ideas and lower engagement with other students(Parkes et al., 2015). On literature review, the components to be considered for measuring online learning readiness includes self-efficacy, internet self-efficacy, self-directed learning, learner control and motivation towards e-learning (Hung et al., 2010; Rovai, 2003). It goes beyond the self-directed learning. Many studies in medical education have explored the self-directed learning readiness which is a requirement of a lifelong learner and an important aspect of the development of medical students. However, in future, as online learning gains prominence, students should have not only self-directed learning skills but computer efficacy too, apart from online communication skills. These skills are important in having an overall benefit from the online learning (Kırmızı, 2015). As online learning readiness is one of the predictors of student engagement thereby affecting the success of online learning, it becomes imperative that online learning readiness should be taken into account by the facilitators and educators (Esin & Kurnaz Adıbatmaz, 2020). Hence this study was carried out to estimate the online learning readiness of medical undergraduates and to assess the factors, such as age, gender, and grade of study, and how they correspond to the online learning readiness.

Methodology

Study Design: This is a cross-sectional descriptive study.

Materials and/or Subjects: Participants of this study were 300 students studying MBBS from second to fourth year of a medical college in Puducherry, India. Students of first year were not included since their admission was not complete at the time of the study.

Data Collection instrument: The questionnaire was divided into two parts. The first part included the sociodemographic characteristics like age, gender and information regarding previous use of online learning. The second part included the scale of online learning readiness as developed by Hung et al, which covers five dimensions, i.e., self-directed learning, learner control, motivation for learning, computer/internet self-efficacy and online communication self-efficacy(Hung et al., 2010). It contains 18 items that measure the online learning readiness on a five-point Likert type scale (1= Strongly disagree, 2= Disagree, 3= Undecided, 4= Agree, 5= Strongly agree). Higher scores indicate higher degree of online learning readiness.

Internal reliability coefficients (Cronbach's Alpha) for all dimensions range from .64 to .88 and the total internal reliability coefficient is .88, which indicates a high level of reliability.

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After obtaining a clearance from the ethical committee, students from second to fourth year were invited to participate in the study using email and WhatsApp. The students who consented to participate were provided the link of Google form for the purpose of data collection.

Analysis

Data was analysed using the SPSS version 21. Characteristics of the participants were analysed using descriptive statistics. Unpaired t test and one-way analysis of variance (ANOVA) were used to analyse the association between age, gender, grade of study and previous use of e-learning with online learning. All statistical analyses were tested at 0.05 significance level

Results

Of the 300 students contacted, two refused to participate and two forms had to be discarded on account of being incomplete. Hence the total number of participants in the study was 296. The mean age of these participants was 20.9±1.3 years. Of the total participants, 53% were females and 47% were males. Among the study participants 33.4% were in second year, 33.8% in third year and 32.8% in fourth year of the MBBS course. Only 27.4% of the total number of participants in this study had previous experience of online learning. (Table 1)

Table 1: Sociodemographic Characteristics of Study Participants

Characteristics	Frequency	Percentage
Gender		
Male	139	47
Female	157	53
Grade of Study		
Second Year	99	33.4
Third Year	100	33.8
Fourth Year	97	32.8
Previous Experience in Online Learning		
Yes	81	27.4
No	215	72.6

Mean scores of the domains of online learning are shown in the Table 2. The mean score of factors for the motivation of learning (3.32±0.60) was highest followed by that for self-directed learning (3.12±0.52). Least mean score was for the learner control domain (2.75±0.73). The total mean score for all domains was 3 ± 0.32.

Table 2: Online Learning Readiness Scores of Study Participants

Domains of Online Learning	N	Mean	Std. Deviation
Computer Self-Efficacy	296	2.94	0.57
Learner Control	296	2.75	0.73
Motivation for Learning	296	3.32	0.60
Self-Directed Learning	296	3.12	0.52
Online Communication Self-Efficacy	296	2.87	0.63

In our study, the total mean score of online learning readiness for males was similar to that for females with almost similar scores in the domain of computer self-efficacy, learner control and motivation for learning. However, the difference of mean score among males and females was not statistically significant. (t test value = 0.22 p value=0.83) Table 3

Table 3: Association between gender and online learning readiness score among medical undergraduates

Domains of online learning readiness	Males (n=139) Mean (SD)	Females (n= 157) Mean (SD)	T test (p value)
Computer Self-Efficacy	2.94(0.57)	2.94(0.58)	0.22(0.83) Not Significant
Learner Control	2.76(0.75)	2.75(0.72)	
Motivation for Learning	3.31(0.6)	3.33(0.6)	
Self-Directed Learning	3.09(0.52)	3.15(0.51)	
Online Communication Self-Efficacy	2.93(0.71)	2.82(0.56)	
Total Score	3.00(0.32)	2.99(0.33)	

In this study, the mean score of study participants having previous experience with online learning platforms was higher than those with no previous experience with higher scores in all the domains of online learning except motivation for learning domain. The difference between the mean scores was statistically significant (t test value = 3.51 p value=0.01) Table 4

Table 4: Association between previous online learning experience and online learning readiness score among medical undergraduates

Domains of online learning readiness	Previous online learning experience (n=81) Mean (SD)	No previous online learning experience (n= 215) Mean (SD)	T test (p value)
Computer Self-Efficacy	3.04(0.60)	2.90(0.56)	3.51(0.01) Significant
Learner Control	2.94(0.75)	2.68(0.71)	
Motivation for Learning	3.28(0.51)	3.33(0.63)	
Self-Directed Learning	3.09(0.48)	3.13(0.53)	
Online Communication Self-Efficacy	3.21(0.79)	2.74(0.52)	
Total Score	3.11(0.34)	2.96(0.31)	

Across various grades of study, the mean scores for online readiness were similar. The overall mean score was higher in Second Year students as compared to other years. Those studying in second year also had higher scores in almost all the domains except computer self-efficacy and online communication self-efficacy. However, the differences in mean scores of online learning readiness across various year of study were not statistically significant. (Table 5)

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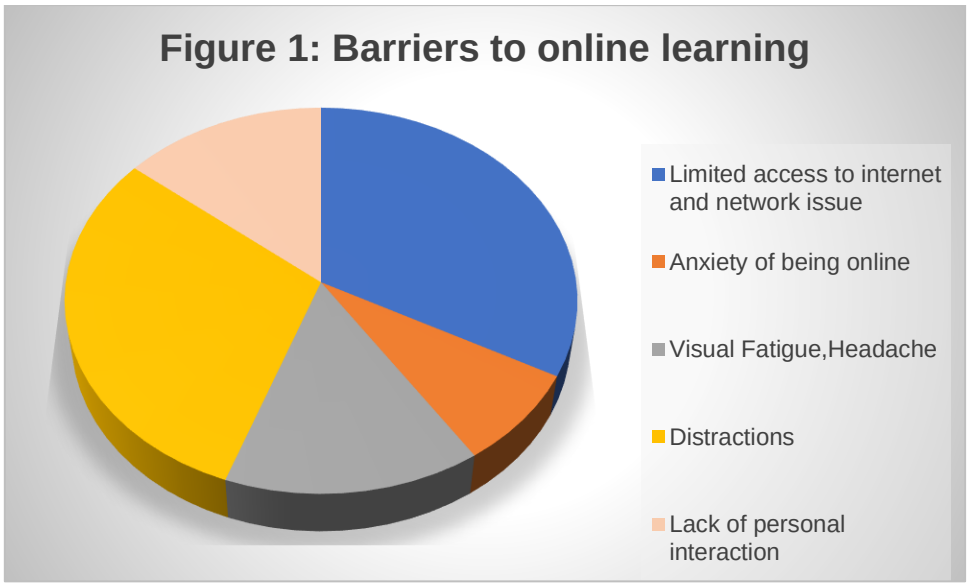
Table 5: Association between year of study and online learning readiness score among medical undergraduates

Domains of online learning readiness	Second Year(n=99) Mean (SD)	Third Year (n= 100) Mean (SD)	Fourth Year (n= 97) Mean (SD)	ANOVA test (p value)
Computer Self-Efficacy	2.93(0.61)	2.87(0.54)	3.02(0.56)	0.525 (0.59) Not Significant
Learner Control	2.81(0.75)	2.76(0.68)	2.69(0.76)	
Motivation for Learning	3.39(0.71)	3.28(0.71)	3.29(0.58)	
Self-Directed Learning	3.21(0.67)	3.08(0.39)	3.07(0.44)	
Online Communication Self-Efficacy	2.80(0.7)	2.93(0.56)	2.89(0.64)	
Total Score	3.03(0.38)	2.98(0.27)	2.99(0.32)	

Barriers to online learning

In this study, network issue and internet related problems (33%) were the major barrier for learning. Around thirty percent of participants also mentioned distractions and disturbances at home being a barrier to online learning. Headache and visual fatigue were recognised as barriers by 15% of the study participants while others mentioned lack of interaction and feeling of isolation (14%) as the barriers to online learning. (Figure 1)



Discussion

The study was conducted to estimate the online learning readiness of the students studying MBBS. Among the study participants, female participants were greater in number compared to male. Only a third of the study participants had previous experience of using online learning. Before being admitted to undergraduate course, in India, students are barely exposed to online

learning. According to a study done by Vivek Bharadwaj among school students in India, the use of information and technology tools in education is very limited (Bharadwaj, 2007). Even when computers are available in schools, they are used to teach computers as a subject, with little integration in teaching other subjects. However, the current pandemic has forced a drastic change in the scenario. The use of online platforms for learning has increased significantly not only in bachelor degree courses but also in school education.

Online learning readiness scores

The mean scores of study participants ranged from 2.90 to 3.22 on the five-point Likert scale. The mean score for motivation for learning was the highest followed by that for self directed learning. In India, MBBS course is opted for by the students with high grades and ranks. These students qualify highly competitive examinations to enter the MBBS course. The motivation for learning is therefore higher in these students as reflected in the study.

Many studies that have been conducted to explore the self-directed learning among medical undergraduates have shown high levels of self-directed learning readiness among medical undergraduates (Naik Bijaya N, Rangasamy S, Kanungo S, 2019). Self-directed learning is a pre requisite for modern medical education where health care professionals have to be abreast with newer information regarding disease diagnosis, prognosis and treatment. This study, similar to other studies, has too shown that self-directed learning in medical undergraduates is high.(Akmal et al., 2020)

As today's generation are digitally advanced, they have basic knowledge of doing internet searches, sending emails etc. Hence, these undergraduates not only have motivation for learning but also have computer /internet self-efficacy. Both motivation for learning and computer efficacy are prerequisites for online learning. However, these findings are in contrast to those of the study conducted by Özlem Coşkun et al., in Turkey, among the fourth-year medical undergraduates which stated lowest scores in the factor of motivation for learning for online learning readiness(Coşkun et al., 2018). Online learning environment is however complex. Hence, does the computer efficacy translates into effective learning has to be investigated.

Apart from these components, online learning readiness is also determined by learner control and online communication efficacy. The least score was in the domain of learner control which is one of the important predictors of online learning (Özkan, 2015). Learner control implies to paying attention to learning material and objects. This finding was similar to the study conducted among the university students in Malaysia by Chung et al., where the least scores were in the domain of learner control (Chung et al., 2020).

Majority of study participants were reported to be distracted by instant messaging apps and internet surfing. Online learning is carried out using a phone or a computer which contains other apps as well. Although online learning is said to be convenient and flexible, students have to develop self-discipline as the learning environment is different from traditional class room settings.

Association of selected factors with online learning readiness

In this study, gender didn't play any role in the online learning readiness. The mean scores in all the five dimensions were similar among males and females. Various studies conducted among university students and medical postgraduates have also stated that gender has role to play in the online learning readiness. However, a study conducted by Özlem Coskun et al., among the medical undergraduates has revealed that male students have significantly higher online learning readiness score in contrast to their female counterparts, which may be because

the female students might have underestimated their computer technical skills (Coşkun et al., 2018). In the present study, although the overall scores for the online learning readiness was higher for males than that in females, the difference wasn't statistically significant.

In this study, only one-third of the study participants had used online learning methods in the past. This is similar to a study conducted by Milic et al., which stated that only 19% of entry-level medical undergraduates had experience of online learning in their pre-medical education (Milic et al., 2018). There was significant difference in the online learning readiness among the students with or without previous online learning experience. Those with previous exposure to online learning maybe familiar with the format and have better confidence giving them an edge over the students who haven't been exposed to online learning.

At the outset, the score of fourth year students in online learning readiness seems to be lower than that of third- and second-year students. However, participants from different academic grades showed no statistically significant difference in their score in online learning readiness. Study conducted by Obi et al., among the medical undergraduates in Nigeria reported lower scores in the online learning readiness among the students of higher grade of study, due to the fact that students in higher levels were more focused on passing the examination with the known format of classroom teaching (Obi et al., 2018).

Barriers to online learning

In our study technical issues related to network and internet connection were the major barriers to online learning. Reliable internet connection is crucial for online learning. This is a major issue causing hinderance in not only India but in other countries as well where more than half of the medical students indicated technical issues such as poor network to be a barrier for online learning (Baçzek M,et al 2021). Apart from that, in our study, distractions at home were a major barrier. This was similar to the finding of national survey among medical students in Philippines (Baticulon et al., 2021). Long hours of exposure to screens due to online classes has also led to visual fatigues and headaches among medical undergraduates.

Conclusion

Due to COVID-19, it has become imperative to incorporate online learning systems in MBBS teaching and learning methods. And therefore, it is important to understand all aspects of online learning readiness of the medical students. Medical undergraduates are slightly to moderately ready for online learning with good motivation for learning in online context. However, they need to have self-discipline to focus on work and avoid distractions while learning online.

Limitations and Future Studies

As the questionnaire was self-administered, there could have been a misunderstanding about the items among the study participants. Keeping that in mind and in view of the time constraint of medical undergraduates, lengthy questionnaire was avoided. Hence, other factors were not studied, which might be related to online learning readiness. As the study was conducted in a medical college, there is a limit to which the results could be generalized.

In future, studies can be carried out to understand other factors influencing online learning effectiveness in relation to environment as well as those concerning teaching faculty in medical colleges.

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