The views of medical students about e-learning during pandemic of COVID-19 in Iran

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Abstract

Background: Iran affected by coronavirus since early March 2020 and all schools and universities were closed. Medical universities of Iran introduced e-learning system in late March 2020. The aim of this study was to evaluate the views of universities' students about e-learning.

Method: This was a cross-sectional study in which 600 medical students in medical universities of Iran were recruited. A questionnaire included 54 questions was used to collect data. The views of medical students on five subscales including quality of content, effective interactions, the supporting system, virtual class management, and motivation management were measured. Data analyzed using Mann-Whitney U test, Kruskal–Wallis test and the Spearman correlation coefficient.

Results: The scores of quality of content, effective interaction, supporting systems, the management of virtual classes and management of the motivations were 20.42 ± 7.12 , 22.55 ± 8.16 , 7.47 ± 2.89 , 12.66 ± 4.43 , and 17.26 ± 5.70 respectively. These scores show that the mean of five subscales was in the medium range. Participants with moderate computer skill, high-speed internet and very good access got more score in all five subscales of e-learning ($p < 0.0001$). Time had a reverse correlation with quality of content, and positive correlation with management of virtual system and management of motivation. The costs only showed a reverse correlation with effective interaction ($P < 0.05$).

Conclusion: The results of this study showed that Iranian medical students had some challenges with e-learning such as high volume of content presented by professors, lack of interaction with professors, weak supporting system, weak management of e-learning system and low motivation. It seems that Iranian e-learning system for the optimal use, should be upgraded and professors and students should receive adequate training in this regard.

Introduction

In December 2019 a novel virus that causes severe acute respiratory syndrome was emerged in Wuhan, China and soon after spread around the world [1]. First case of COVID-19 was recognized in mid-February 2020 in Qom city of Iran. In late March, this disease was announced as pandemic because more than 100 countries were affected by the coronavirus [2]. A few weeks after recognizing first case in Iran, the government closed all schools and universities [3]. There are 15 million school students and 4 million university students and around 930, 000 teachers and faculty members in Iran. A month after closing of universities, officials announced an e-learning services which teachers should upload educational materials for students [4]. Officials of education in schools, introduced a virtual system that called SHAD, and in universities, virtual learning systems such as NAVID, VESTA, and MOODLE were introduced [5].

University students rarely used to e-learn before the pandemic of COVID-19 in Iran. A study in Tehran university showed that 40% of e-learning users had a problem to access technology and only 26.4% of students were prepared to use e-learning [6].

Iran is currently facing a second wave of coronavirus, with more than eight provinces are red, and the number of daily confirmed cases has been rising above the previous peak of this disease in March 2020 [7]. Some of the universities that re-opened in early June 2020, were closed because of second wave of coronavirus and some universities in red areas were not re-opened. It is unclear how long Iranian universities will be closed, so e-learning is a necessity not just a choice.

Medical schools in Iran started to use e-learning in early March 2020, when Iran encountered epidemic of COVID-19. This study, then designed to evaluate the medical students' views about e-learning in Iran.

Methods

This was a cross-sectional study in which 600 medical students in medical universities of Iran were recruited non-randomly. We used a researcher made a questionnaire to collect data. This questionnaire included 54 questions that 21 questions were about demographic characteristics and general information of e-learning and 33 questions was about five specific areas of e-learning that each question in this area scored from 1 (strongly disagree) to 5 (strongly agree) using 5-item Likert scale. Five subscales were used to evaluate the different areas of e-learning. These subscales included quality of content and effective interactions (each had nine questions with maximum scores 45), the supportive system (three questions, with maximum scores 15), score of virtual class management (five questions with maximum scores of 25) and score of motivation management area (7 questions with maximum score 35).

The questionnaire was sent for medical students around the country through WhatsApp or Telegram groups and they were asked to complete the questionnaire and return it. The data collection was started in 5th May and completed in 20th June 2020.

The proposal of the study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref No: IR.AJUMS.REC.1399.004), and all participants provided consent for participation.

Statistical analyses

All data were entered to SPSS version 22. For descriptive statistics, mean (SD), frequency and percentages were calculated. The Mann-Whitney U test and Kruskal Wallis test were used to evaluate the relationship between demographic characteristics and five subscales of e-learning. The Spearman correlation coefficient was used to test the relationship between e-learning subscales and some demographic factors. $P < 0.05$ was considered significant.

Results

Demographic characteristics of participants are shown in Table 1. The mean age of participants was 24.26 ± 5.66 years. Most participants (66%) were female and single (76.8%). Most participants were from medicine faculty followed by rehabilitation and health faculties, and most of them (41.2%) were bachelor

students. Table 2 shows some general information about e-learning. Each participant spent around two hours per day for e-learning. Most of participants used their smart phone to connect to the virtual system. Most of participants (58.8%) did not have online class. The speed of internet was very low, low and moderate for most of participants.

Table 3 shows the mean score of five subscales of the views of students about e-learning. The scores of quality of content and effective interaction were 20.42 ± 7.12 , and 22.55 ± 8.16 respectively. The scores of supporting systems, the management of virtual classes and management of the motivations were 7.47 ± 2.89 , 12.66 ± 4.43 , 17.26 ± 5.70 respectively. These scores show that the mean of five subscales was in the medium range.

Table 4 shows the relationship between mean scores of the subscales of students' view about e-learning and some demographic and general characteristics of participants. The reported scores of supporting systems were significantly more in female in comparison to male participants ($p=0.015$). Also, the management of e-learning system scored significantly more by female participants in comparison to male participants ($p=0.03$).

The scores of five subscales of e-learning were significantly reported more by married participants in comparison to single participants ($p=0.001$). The scores of quality of content, effective interaction, and management of virtual classes were significantly higher in the participants from medicine school in comparison to other faculties ($p<0.0001$, 0.001 , 0.013 respectively), while in the supportive systems and management of motivation the scores of Health faculty were more than other faculties ($p<0.0001$ and 0.003 respectively). Also, MD students scored significantly more in all five subscales of e-learning in comparison to the PhD, master and bachelor degree ($p<0.05$). Those participants who had laptop got more score in all five subscales of e-learning in comparison to the other types of connection such as PC and smart phone ($p<0.0001$).

Participants with moderate computer skill got more score in all five scales of e-learning in comparison to the low and high computer skills ($p<0.0001$). Participants with high-speed internet and very good access got significantly higher scores from all five sub-scales of e-learning ($p<0.0001$).

Table 5 shows the correlation of five subscales of e-learning with some educational characteristics. As evident from this table, age had a reverse and significant relationship with effective interaction. The grade of last semester had a positive correlation with quality of content, the number of subjects had a reverse significant correlation with effective interaction, supportive systems and management of e-learning system. Time had a reverse correlation with quality of content, and positive correlation with management of virtual system and management of motivation. The costs only showed a reverse correlation with effective interaction (P for all correlations was less than 0.05).

Table 6 is prepared to show the relationship of areas of the educational system with subscales of e-learning. As this table shows there was no relationship between 10 national regions for medical universities and the subscales of e-learning.

Discussion

This study designed to evaluate the views of medical students about e-learning during the coronavirus pandemic in Iran. The results of this study showed that the mean of five subscales of effective e-learning, including quality of content, effective interaction, supporting systems, the management of virtual classes and management of the motivations was in the medium range. Although many universities in the world started to use platforms such as Zoom for online education, that made the interaction between students and teacher easier [8], the majority of medical universities in Iran relied on virtual education using a website called NAVID that was not feasible for mutual interaction. In NAVID system teachers were able to record their voice on slides and put those slides on the website. Teachers could put some assignments in the system and were able to respond the questions of students in the specified place. Because before the pandemic of coronavirus, e-learning was not popular in medical universities in Iran, students and educational system needed time to coping with e-learning.

Our results indicated that the support system and management were significantly rated more by female students in comparison to male students. Also, the scores of five subscales of e-learning were significantly reported more by married participants in comparison to single participants.

The scores of quality of content, effective interaction, and management of virtual classes were significantly higher in the participants from medical school in comparison to other faculties.

Also, MD students scored all five subscales of e-learning significantly more in comparison to the PhD, master and bachelor degree's students.

Our results indicated that, participants with moderate computer skill got more score in all five subscales of e-learning in comparison to the low and high computer skills. A study by Link et al on medical students of Vienna showed that only small percentages of medical students had low computer skill, and 12% of medical students did not use e-learning materials [9]. The results of Link et al's study revealed that most universities in developing countries started e-learning before pandemic of coronavirus. O'Doherty et al in their study found that one of the barriers of e-learning is the lack of sufficient technical skill [10], that is similar to our study.

Our results indicated that participants with high-speed internet and very good access got significantly higher scores from all five sub-scales of e-learning. A qualitative study by Shafiei Sarvestani et al showed that low speed of internet, lack of interaction with professors and classmates, and lack of time were important challenges in using e-learning in Iranian medical students [11]. Although high cost of internet was not a challenge for e-learning from the prospective of Iranian medical students, Demuyakor found that participating in online learning need high cost and this may not affordable for some students [12].

The results of the current study showed that age had a reverse significant relationship with effective interaction. Also, the grade of last semester had a positive correlation with quality of content. A study by Corell et al showed that using competitive tool, could enhance the e-learning of medical students [13].

Our results showed that the number of subjects had a reverse significant correlation with effective interaction, supporting systems and management of an e-learning system. Time had a reverse correlation with quality of content, and positive correlation with management of virtual system and management of motivation. Lack of time was mentioned as an obstacle for e-learning in previous study [11].

Limitations of the study

We relied on responses of participants and it may affect by recall bias. The number of participants from different national regions was not equal and it may affect the generalizability of the results.

Conclusion

The results of this study showed that Iranian medical students had some challenges with e-learning such as high volume of content presented by professors, lack of interaction with professors, weak supporting system, weak management of e-learning system and low management of motivation. It seems that Iranian e-learning system for the optimal use, should be upgraded and professors and students should receive adequate training in this regard.

Abbreviations

MD: Medical Doctor

PhD: Doctor of Philosophy

PC: Personal computer

Declarations

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Authors' contribution: PA, Parvin Abedi, KE, DR, EM and MB contributed to the design of the study. MB collected data. EM analyzed data. EM and Parvin Abedi interpreted data. Parvin Abedi prepared manuscript in English. All authors read and approved the content of the manuscript.

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Availability of data: Dataset used in this study will be available upon the request from corresponding author.

Ethics approval and consent to participate: The proposal of the study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref No: IR.AJUMS.REC.1399.004), and all participants provided consent for participation.

Competing interest: None of the researchers had any conflict of interest.

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Tables

Table 1: Socio-demographic characteristics of participants

Variables	N (600)
	Mean (SD)
Age (y)	24.26 ±5.66
Grade point average (last semester)	16.47 ±1.56
	N(%)
Gender	
Female	396(66)
Male	204(34)
Marital status	
Single	461 (76.8)
Married	139 (23.2)
Relevant faculty	
Medicine	160(26.7)
Rehabilitation	88(14.7)
Health	107 (17.8)
Nursing & Midwifery	126 (21)
Paramedics	119(19.8)
Grade	
Bachelor	247 (41.2)
Master	131(21.8)
PhD	46(7.7)
MD	176(29.3)
Computer Skill	
Low	224(37.3)
Moderate	261(43.5)
Good	115(19.2)

Table 2: General information about connection to the system

Variables	Mean $\pm$ SD
Mean of virtual subjects	7.17 $\pm$ 3.21
Time that spend on education system (h/d)	2.01 $\pm$ 1.37
Homework on a daily basis (h)	1.8 $\pm$ 1.46
How long does it take you to upload in the system? (min/day)	13.78 $\pm$ 17.41
How long does it take to download from the system? (min/day)	17.23 $\pm$ 18.45
N (%)	
How to check the virtual education system	
Personal computer	138 (23)
Laptop	146(24.3)
Phone	310 (51.7)
My friends' computer	6(1)
Do you have any online class?	
Yes	247 (41.2)
no	353 (58.8)
Speed of internet	
Very low	91(15.2)
Weak	127(21.2)
Moderate	176(29.3)
Good	156(26)
Very good	50(8.3)
Monthly cost of the internet to use the system (Tuman)	48033.33 $\pm$ 42495.04
Is backup was introduced to fix possible bugs?	
Yes	281(46.8)
No	319(53.2)
How did the backup work?	
There is no backup	206(34.3)
I did not need it	236(39.3)
Very effective	42(7)
Was effective	42(7)
It was not useful	74(12.3)
How was it possible to access the system at day and night?	
Weak	110(18.3)
Moderate	302(50.3)
Good	119(19.8)
Very good	69(11.5)
Was there a survey to evaluate the website?	
Yes	80(13.3)
No	520(86.7)

Table 3: Educational issues related to the system

Variables	Mean $\pm$ SD
Score of content quality	20.42 $\pm$ 7.12
Score of effective interaction	22.55 $\pm$ 8.16
Score of supporting service	7.47 $\pm$ 2.89
Score of virtual class management	12.66 $\pm$ 4.43
Score of motivation management	17.26 $\pm$ 5.7

Table 4: The relationship of demographic characteristics and educational issues among medical students (N=600)

Variables	Content quality	Effective interaction	Supportive services	Management of e-learning	Motivation management
Gender					
Female	20.68±6.5	22.79±7.94	7.65±2.79	12.9±4.27	17.18±5.5
Male	19.9±8.18	22.1±8.55	7.12±3.06	12.2±4.7	17.4±5.9
P value	0.140	0.495	0.015	0.030	0.915
Marital status					
Single	19.8±7.08	21.9±7.98	7.28±2.87	12.34±4.30	16.73±5.49
Married	22.36±6.93	24.6±8.4	8.11±2.8	13.73±4.7	18.98±6.04
P value	<0.001	0.001	0.001	<0.001	<0.001
Relevant faculty					
Medicine	22.23±7.57	24.2±8.13	8.17±2.86	13.46±4.55	18.24±6.43
Rehabilitation	18.68±6.35	20.16±8.14	6.48±2.78	11.43±4.20	16.84±4.79
Health	21.88±7.24	23.5±8.75	8.32±2.8	13.01±4.88	18.63±5.88
Nursing & Midwifery	18.9±6.79	20.83±7.52	6.45±2.8	11.9±4.14	15.9±5.18
Paramedics	19.55±6.53	22.79±7.6	7.59±2.69	12.94±4.06	16.36±5.2
P value	<0.0001	0.0001	<0.001	<0.008	0.010
Grade					
Bachelor	19±6.23	21.8±6.9	7.27±2.59	12.43±3.91	16.57±4.9
Master	20.76±7.58	20.47±9.89	6.82±3.21	11.68±5.07	17.72±5.36
PhD	19.19±6.83	24.35±7.97	7.09±2.75	13.26±4.12	16±7.20
MD	22.48±7.52	24.64±7.85	8.33±2.91	13.54±4.54	18.20±6.35
P value	<0.0001	<0.0001	<0.001	0.008	0.01
Access to e-learning					
PC	18.20±6.76	20.78±7.54	2.97±6.54	10.72±4.24	15.24±4.69
Laptop	22.72±8.52	25.94±8.7	8.46±2.89	14.71±4.57	19.14±7.57
Smart phone	20.31±6.23	21.77±7.71	7.42±2.72	12.56±4	17.31±4.73
Friend's computer	21.33±5.32	21.5±8.60	8±2.76	12.50±6.25	15.17±4.62
P value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Computer skill					
Low	19.19±5.76	20.5±6.73	7.18±2.68	12.12±3.59	16.40±4.40
Moderate	22.02±8.08	24.8±9.10	8.08±2.93	13.59±5.08	18.77±6.46
Good	19.19±6.48	21.45±7.15	6.66±2.95	11.59±3.93	15.49±5.26
P value	0.001	<0.0001	<0.0001	<0.0001	<0.0001
The speed of internet					
Very weak	14.27±4.99	17.41±6.25	6.12±2.42	9.81±3.62	13.75±4.38
Weak	20.99±5.52	20.20±7.61	6.69±2.59	11.48±4.24	16.90±4.63
Moderate	20.13±5.38	23.28±6.11	7.76±2.34	13.43±3.08	16.86±4.78
Good	21.92±7.91	24.56±9.03	8.31±3.17	13.69±5.06	18.99±5.30
Very good	26.52±8.80	29.08±8.90	8.28±3.84	14.90±5.07	20.54±9.57
P value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Access					
Weak	17.85±5.68	17.96±7.63	5.73±2.64	9.99±3.89	14.48±4.19
Moderate	19.35±5.80	22.29±6.21	7.46±2.40	12.72±3.58	16.81±4.65
Good	20.64±7.35	23.29±8.38	7.81±3.06	12.72±4.35	7.31±5.18
Very good	28.83±8.03	29.77±10.58	9.74±3.24	16.54±5.68	23.54±7.90
P value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

PC: Personal Computer

Table 5: The relationship of some demographic characteristics and Five domains of e-learning (N=600)

Variables	The quality of content	Effective interaction	Supportive system	Management of virtual classes	Management of motivation
Age (y)	-0.050	-0.091	-0.118	-0.076	-0.063
Grade point average (last semester)	0.086	0.034	-0.008	0.035	0.042
The number of subjects	-0.073	-0.109	-0.169	-0.133	0.066
Time	-0.115	0.075	0.071	0.082	0.096
Expenses	-0.060	-0.091	0.001	-0.043	-0.018

Spearman correlation coefficients was used for assessing relationship

Bold numbers had p value <0.05

Table 6: Comparison of students' point of view about problems with the virtual system in different national areas

National Area	Quality of content	Effective interaction	Supportive services	Management of virtual classes	Management of motivation
1(n=100)	20.45±7.39	22.67±8.18	7.72±2.86	12.86±4.43	17.53±6.06
2(n=77)	19.86±7.17	23.19±7.46	7.66±2.75	13.24±4.19	17.06±5.28
3(n=56)	19.80±7.40	22.59±8.89	7.25±2.94	12.50±4.68	17.50±5.55
4(n=60)	22.58±6.78	24.30±8.19	7.93±2.81	13.47±4.54	18.77±5.96
5(n=66)	21±5.82	22.41±7.06	7.56±2.72	12.62±3.88	17.24±4.61
6(n=44)	19.86±7.02	21±8.41	6.91±3.14	11.52±4.71	16.27±5.66
7(n=66)	19.24±8.36	21.23±9.27	7.18±3.35	11.97±5.25	16.89±6.66
8(n=34)	19.53±5.46	22.53±7.16	7.38±2.12	12.70±3.41	16.65±4.70
9(n=53)	20.70±8.25	22.70±9.04	7.34±3.27	12.81±4.82	17.11±6.61
10(n=44)	21.02±5.78	22.36±7.50	7.34±2.65	12.27±3.67	16.79±4.91
P value	0.137	0.595	0.643	0.442	0.670

Supplementary Files

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