Iranian medical students' E-learning continuance intention after end of COVID-19 pandemic

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Abstract:

BACKGROUND: Coronavirus disease (COVID-19) pandemic caused the closure of many face-to-face classes in Iran's universities of medical sciences, so e-learning was adopted as the alternative method. This study aims to examine the medical students' perspectives on e-learning continuance intention.

MATERIALS AND METHODS: In this quantitative study, the population included 1,453 students and the statistical sample size was determined to be 305 students using the Cochran formula. The participants were selected using stratified sampling method based on the field of study and the data were collected by e-learning evaluation questionnaire. The data were analyzed using SPSS 26.0 in addition to descriptive statistics.

RESULTS: The results showed the mean perceived autonomy, perceived competence, and communication in e-learning, intrinsic motivation, information quality, e-learning applicability and students' satisfaction with e-learning courses were 2.61, 2.81, 2.91, 3.03, 2.98, 2.92, and 3.31, respectively. There was no significant correlation between the competence and applicability, user satisfaction and e-learning continuance intention. Moreover, e-learning continuance intention had the highest correlation with students' satisfaction (0.787) and information applicability (0.784), respectively.

CONCLUSION: Medical students had a tendency to continue e-learning, even after controlling the COVID-19 outbreak, and health education policymakers can be of use in this opportunity to developing educational services.

Keywords:
Continuing education, COVID-19, intention, learning, pandemic

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Introduction

E-learning could be provided in various forms such as computer-based, online, virtual, network-based, and web-based learning.[1] E-learning complements conventional medical education methods and brings a more effective experience for learners.[2,3] Combined learning is an accepted approach, especially in the field of medical education, so that many basic trainings could be provided as e-learning.[2,4-6] The U.S., Canada, England, Australia, and China are pioneers in using e-learning in medical education.[7,8]

After the COVID-19 outbreak, a large number of Iran's medical universities had to stop a part of their face-to-face activities.[9-11] E-learning, which had received less attention in Iran's universities before the COVID-19 outbreak, was widely adopted.[9,12] It is expected that using e-learning will continue in medical education in Iran's universities of medical sciences to some extent even when the COVID-19 pandemic ends.[12]

Students' acceptance of e-learning is effective in its success.[2,13] Before the COVID-19 outbreak, different studies investigated Iranian medical students' attitudes regardless of their experience in e-learning.[4,14-16] The

COVID-19 pandemic enabled students to gain the experience of participating in electronic courses.[9,12,17] Therefore, reexamining students' attitudes toward e-learning could reveal the acceptance level of e-learning. It is expected that medical students' reluctance will decrease by increasing their knowledge and awareness of e-learning programs and the ground will be provided for more acceptance of e-learning, even after the end of the COVID-19 pandemic. For this reason, the present research investigated students' attitudes toward continuing e-learning at Abadan University of Medical Sciences (AbadanUMS). Attempts were made to examine the perceived autonomy, competence and communication, intrinsic motivation, information quality, applicability, satisfaction level, and e-learning continuance intention among students at AbadanUMS, and reveal whether there is a correlation between these variables during the COVID-19 outbreak.

Material and Methods

Study design and setting
The study has adopted a qualitative survey design. The study was conducted at Abadan University of Medical Sciences (AbadanUMS).

Study participants and sampling
In this study, the statistical population included 1,453 students at AbadanUMS in 2021. The sample size was determined using the Cochran formula considering P value = 0.51, α = 0.05, and d = 0.05. In total, 305 students were selected by using stratified sampling method. For this purpose, the ratio of the number of students in each field of study to the total number of students at AbadanUMS was calculated. Then, the number of students supposed to participate from each field of study was determined considering the sample size and total ratio in each field.

Data collection tool and technique
The data were collected using e-learning evaluation questionnaire. This questionnaire, consisting of eight sections of perceived autonomy, competence and communication, intrinsic motivation, information quality, applicability, satisfaction level, and e-learning continuance intention, was derived from the research by Betacherji and Mathieson.[18] The data were analyzed by calculating descriptive statistics including frequency, frequency percentage, and mean in SPSS 26.0. Moreover, to identify the relationship between variables affecting the willingness to continue e-learning, the correlation between the components was determined by obtaining Pearson's correlation coefficient.

Ethical consideration
This research was approved at AbadanUMS biomedical ethical committee by code IR.ABADANUMS.REC.1400.058.

Results

As indicated in Table 1, medicine students had the highest frequency of participation in the study (31.5%). The number of women participating in the study (51.1%) was more than that of men (48.9%). Moreover, most of the students aged 18–20 years old (46.6%) and 85.2% were under 23 years old.

Table 2 presents the mean scores of variables. The Health Information Technology (HIT) and anesthesia students had the maximum (2.81) and minimum (2.34) perceived autonomy, respectively. The students' mean perceived autonomy was 2.61. The students' mean perceived competence at AbadanUMS for participating in e-learning during the COVID-19 outbreak was 2.81. The medicine and operation room students had the maximum (2.98) and minimum (2.56) perceived competence, respectively. Moreover, the mean score of students' attitudes about communication in e-learning was 2.91. The HIT and occupational health students obtained the maximum (3.12) and minimum (2.71) communication scores, respectively. The students' mean intrinsic motivation to participate in e-learning was 3.03. As reported by students at this university, the mean information quality provided in e-learning courses was 2.98. The HIT and operation room students obtained the highest (3.25) and lowest (2.65) information quality scores in e-learning courses, respectively. Moreover, the mean applicability of the provided electronic education was 2.92. Anesthesia and nursing students reported the maximum (3.73) and minimum (2.52) applicability for electronic courses during the COVID-19 outbreak, respectively. The students' satisfaction with the held electronic courses was 3.31 on average. The HIT and occupational health students had the maximum (4.42) and minimum (2.64) satisfaction with the use of e-learning during the COVID-19 outbreak. The students showed their tendency to continue e-learning with the mean score of 3.21. The HIT and occupational health students had the maximum (3.83) and minimum (2.58) e-learning continuance intention, respectively.

Table 3 shows a significant correlation between variables. There was no significant correlation between the perceived competence ande-learning continuance intention among students. E-learning continuance intention had the highest correlation with user satisfaction (0.787) and applicability of provided information (0.784). The correlation between user satisfaction and e-learning applicability was obtained as 0.784. The lowest correlation (0.163) was observed between intrinsic motivation and perceived competence during e-learning courses.

Table 1: Demographic information

	Frequency	Percentage	Cumulative Percent
Education			
Operation Room	19	6.2	6.2
Occupational Health	10	3.3	9.5
Public Health	14	4.6	14.1
Environmental Health	18	5.9	20.0
Nursing	60	19.7	39.7
Medicine	96	31.5	71.1
Laboratory Sciences	23	7.5	78.7
Health Information Technology	14	4.6	83.3
Medical Emergency	13	4.3	87.5
Medical Library and Information Science	16	5.2	92.8
Anesthesia	22	7.2	100.0
Gender			
Male	149	48.9	48.9
Female	156	51.1	100.0
Age			
18–20 year	142	46.6	46.6
21–23 year	118	38.7	85.2
24–26 year	33	10.8	96.1
27–29 year	11	3.6	99.7
>30	1	0.3	100.0

Table 2: Opinions of medical students about e-learning

	Autonomy	Competency	Communication	Motivation	Quality	Application	Satisfaction	Interest
Operation Room	2.47	2.56	3.01	2.93	2.65	2.84	2.74	3.32
Occupational Health	2.63	2.97	2.71	2.71	2.89	2.60	2.64	2.58
Public Health	2.70	2.83	2.81	3.02	3.05	2.89	3.33	3.37
Environmental Health	2.57	2.90	2.76	3.15	3.01	2.91	3.59	3.25
Nursing	2.64	2.72	2.78	2.86	2.87	2.52	3.02	2.78
Medicine	2.67	2.98	2.88	3.17	2.99	2.88	3.20	3.08
Laboratory Sciences	2.55	2.80	2.99	2.86	3.14	2.57	3.21	3.11
Health Information Technology	2.81	2.73	3.12	3.49	3.25	3.52	4.42	3.83
Medical Emergency	2.66	2.64	3.05	3.23	3.01	3.13	3.65	3.23
Medical Library and Information Science	2.67	2.84	2.91	2.85	2.90	2.55	3.03	3.18
Anesthesia	2.34	2.95	3.02	3.14	3.01	3.73	3.65	3.58
Mean	2.61	2.81	2.91	3.03	2.989	2.92	3.31	3.21

Discussion

The results showed students' autonomy for participating in e-learning courses during the COVID-19 outbreak had the maximum and minimum correlations with information quality and e-learning continuance intention, respectively. Previous studies conducted in situations other than the COVID-19 pandemic have emphasized that perceived autonomy has a lower mean than other factors affecting e-learning.[6,13,19-21] In the present study, there was no significant correlation between perceived competence and applicability, user satisfaction, and e-learning continuance intention. Previous studies have emphasized that perceived competence could indirectly affect e-learning.[3,11,22] It could be said that, although students' previous familiarity with different e-learning processes and models strengthen their perceived autonomy and competence, their autonomy and competence for continuing e-learning could be further reinforced during a specific situation like the COVID-19 outbreak, in which participating in e-learning courses is compulsory, by providing training and empowering students.

The results revealed the students' mean communication score in e-learning courses was 2.91 and had a significant correlation with all other factors. Previous studies have reported that various interactions could be formed in e-learning, so that each is of particular importance.[23] There is a significant and direct correlation between interaction types and the quality of collaborative learning in e-learning courses, while no significant correlation is observed between content–content interaction and the quality of collaborative learning.

Table 3: Correlation between different dimensions of e-learning among medical students

	Perceived Autonomy	Perceived competence	Perceived communication	Intrinsic Motivation	Information Quality	Applicability	User satisfaction	Continuance Interest
Perceived Autonomy								
Pearson Correlation	1							
Sig. (two-tailed)	-							
Perceived competence								
Pearson Correlation	0.297**	1						
Sig. (two-tailed)	0.000	-						
Perceived communication								
Pearson Correlation	0.352**	0.238**	1					
Sig. (two-tailed)	0.000	0.000	-					
Intrinsic Motivation								
Pearson Correlation	0.330**	0.163**	0.259**	1				
Sig. (two-tailed)	0.000	0.004	0.000	-				
Information Quality								
Pearson Correlation	0.455**	0.262**	0.459**	0.590**	1			
Sig. (two-tailed)	0.000	0.000	0.000	0.000	-			
Applicability								
Pearson Correlation	0.259**	-0.046	0.350**	0.628**	0.602**	1		
Sig. (two-tailed)	0.000	0.425	0.000	0.000	0.000	-		
User Satisfaction								
Pearson Correlation	0.316**	-0.019	0.337**	0.706**	0.681**	0.784**	1	
Sig. (two-tailed)	0.000	0.737	0.000	0.000	0.000	0.000	-	
Continuance Interest								
Pearson Correlation	0.238**	-0.012	0.362**	0.667**	0.588**	0.771**	0.787**	1
Sig. (two-tailed)	0.000	0.837	0.000	0.000	0.000	0.000	0.000	-

**Correlation is significant at the 0.01 level (two-tailed)

The student–student interaction has the paramount importance in the quality of cooperative learning, and teacher–teacher and content-content interactions have the minimum importance among interaction types. Therefore, it seems that the interaction between students could guarantee the quality of collaborative learning in e-learning.[10,16] E-learning could be used as a tool to strengthen communication skills.[11,21,22]

The results showed the students' intrinsic motivation to participate in e-learning courses with a mean score of 3.03 was significantly correlated with all other variables. The maximum and minimum correlations were obtained between the perceived information quality in e-learning and user satisfaction and competence, respectively. Results of previous research demonstrated applicability, user satisfaction, and perceived autonomy had a significant effect on efficient e-learning. However, the effect of information quality on e-learning was in decline.[13,17]

The determined Pearson's correlation coefficient in this study revealed students' satisfaction had the highest significant correlation with e-learning applicability and an insignificant correlation with intrinsic motivation. Previous studies have indicated interactional justice, distributive justice, and satisfaction with the use of e-learning systems could directly affect the tendency to

continue using e-learning systems, so that satisfaction with the use of e-learning systems had the greatest effect on the tendency to continue using them and the other factors indirectly affected the tendency to continue using e-learning systems.[6,15] Furthermore, technical, support, managerial, strategic, educational, and content factors had a greater impact on learning success than other factors.[13]

Our findings showed students at AbadanUMS were interested in using e-learning even after controlling the COVID-19 outbreak (3.21 on average). There was no significant correlation between students' e-learning continuance interest and perceived competence. The students' satisfaction and applicability of the provided educational content had the maximum significant correlations with e-learning continuance interest (0.787 and 0.771, respectively). Results of previous studies have shown students' preparation, performance, and satisfaction with e-learning had a positive effect on their desire to continue e-learning and provided new insights into e-learning by presenting empirical evidence on the factors supporting students' tendency to continue e-learning during the COVID-19 pandemic,[24,25] e.g., e-learning continuance interest and information quality directly and indirectly affected e-learning through variables of applicability and user satisfaction.[19,20]

Limitation and recommendation

Only one university in Iran was considered for studying the medical students' e-learning continuance intention. The applicability and pertinence of this study would have been enhanced if more institutes and universities had been taken into consideration. This recommendations are provided for future research: 1) Observing e-learning continuance after the end of the COVID-19 outbreak and comparing the results with those of the present study, 2) Collecting the experiences of students and professors participating in e-learning, and 3) Analyzing educational regulations at different universities for using e-learning approach, especially in times of emergency such as natural disasters or diseases.

Conclusion

The results showed the students' attitudes towards all the investigated factors, including perceived autonomy, perceived competence, perceived communication, intrinsic motivation, information quality, applicability, satisfaction level, and e-learning continuance intention were higher than the average (2.5). The students were interested in continuing e-learning even after controlling the COVID-19 outbreak. The students' e-learning continuance intention was significantly correlated with other factors, except for perceived competence.

Conflicts of interest

There are no conflicts of interest.

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