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Education Challenges of Medical Students in Virtual Sitting: Students' Perspectives about Quality and Satisfaction of E-learning Service during COVID-19 Pandemic

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Abstract

Introduction: Because the COVID-19 pandemic necessitated the use of e-learning, this study aims to investigate medical students' perspectives about quality and Satisfaction of the e-learning services provided by the Learning Management System (LMS) during COVID-19 Pandemic in Iran.

Methods: This descriptive cross-sectional research study conducted in 2022 in Iran. The statistical population consisted of 455 medical students. For this purpose, the convenience sampling method was used. Required data were collected using a demographic survey and SERVQUAL questionnaire in two parts importance and performance of learning services. Data were analyzed by using descriptive and non-parametric statistical tests in SPSS version 18 with a 5% confidence level.

Results: The results showed a negative gap in all dimensions of e-learning service quality. The highest and lowest mean quality gaps were related to responsiveness (-8.22 ± 1.8) and tangibility (-5.86 ± 0.7), respectively. Among the demographic variables, a significant relationship was observed only between education level and assurance dimension of e-learning service quality importance-performance ($P<0.05$).

Conclusions: Based on the findings of the present study, the LMS system has major challenges for the education of medical students. Therefore, to be used in the medical group, fundamental reforms are needed to improve the quality or to be used together with other appropriate methods and technologies in order to gain more satisfaction.

INTRODUCTION

Coronavirus disease (COVID-19) is recognized as one of the most serious health threats to humanity worldwide [1]. On March 11, 2020, the Director-General of the World Health Organization (WHO) publicly declared COVID-19 a pandemic [2]. To prevent the spread of the epidemic, many governments, including Iran [3], have ordered the prohibition of public gatherings, as well as the closure of businesses and educational institutions [4, 5]. According to UNESCO, educational institutions were closed in 186 countries by the end of April 2020, affecting approximately 74% of all students worldwide [6]. Also, the importance of education for development assurance at both individual and national levels has been proven to everyone [7].

Accordingly, higher education institutions were forced to evaluate and revise traditional teaching methods. Similarly, to adapt to these abrupt changes, universities and students turned to e-learning, but they ran into several issues and challenges. [5].

The term "e-learning" refers to the process by which learners use digital media to learn [8]. E-learning provides all the necessities to replace the traditional classroom environment beyond borders, time, and place[9] and has been introduced to almost all specialties and educational levels, including higher education. It is estimated that e-learning will experience a 15-fold increase over the next few years, accounting for 30% of all education provided worldwide [2, 10]. In the midst of the COVID-19 pandemic, e-learning has become a compulsory educational process [11].

Despite state-of-the-art technologies, students face challenges that differ from in-person learning [5, 12], including the diverse quality of training manuals, students' unequal access to essential technologies for e-learning [13], social isolation, communication problems [14], lack of technological equipment, stable internet connection, and socio-economic problems, also addressed in distance learning studies [15]. Despite the above challenges, the unexpected changes caused by the COVID-19 pandemic have provided academic institutions with the opportunity to leverage innovative learning methods [2, 13], including easy access to information, updating, content distribution and standardization at any time and place [2], and reducing student transportation and accommodation costs [16]. The Learning Management System (LMS) is a widely-used powerful learning-boosting software system, reflecting the technology significantly developed in higher education [17, 18]. It has been one of the technologies adopted during the COVID-19 pandemic [19]. Instructors manage and upload learning content and report on student performance.

It is now more vital than ever to study the quality of e-learning services after several months to ensure that e-learning is goal-oriented and that the implementation of any online learning system meets students' learning needs [20-23]. Due to the differences between conventional learning and e-learning, the need for efficient and constructive transition of traditional and e-learning programs, and the continuous increase in global demand for e-learning, this study was conducted to examine the perspectives of Medical Science disciplines students (including medicine, pharmacy, dentistry, nursing, public health, etc.) regarding the quality of e-learning services provided by LMS. It is expected that the results of this study can be applied in designing, planning, and taking the necessary measures to increase students' satisfaction with the quality of e-learning services and provide the means to improve the quality of e-learning services.

METHOD

Research Type

This is a cross-sectional research study that analyzes the relationship between variables, conducted from January 23, 2022, to October 31, 2022. This study was carried out in the faculties of Shahid Beheshti University of medical science Tehran, Iran. University of Medical Sciences.

Sample Size

Since no similar study was found, the sample size was estimated to be 384 based on the Krejcie and Morgan Table. With a dropout rate of approximately 20% (18.5%), 455 students who met the inclusion criteria were selected to be included in the study using the convenience sampling method.

Sampling Method

Due to the conditions of the COVID-19 pandemic and the inability of students to attend university, sampling was not possible and the samples were selected as convenience samples from 12 faculties (including School of Medicine, School of Pharmacy, School of Dentistry, School of Nursing and Midwifery, School of Public Health and Safety, School of Paramedical Sciences, School of Nutrition Sciences and Food Technology, School of Rehabilitation Science, School of Traditional Medicine, School of School of Advanced Technologies in Medicine, Varamin Health Higher Education Complex, and Virtual School of Medical Education and Management), a questionnaire was designed in Google Chrome and electronic questionnaire creation service in Iran (Porsline) whose link was introduced to the representatives of the student classes. Then, it was sent to the email address registered in the Education Unit at the university. Before completing the questionnaire, a written consent form included a question was submitted to be approved by the students. Question was given to respondents if they signed and approved the questionnaire. Students participated in the study with informed consent while being aware of the research objectives. The purpose of the study was explained at the beginning of the questionnaire. Answering the questionnaire items was mandatory; accordingly, the next-stage questions were activated only if the questions about the dimensions of the questionnaire model used in the research were answered.

Inclusion Criteria

These included studying at University of Medical Sciences, spending at least one semester as a virtual educator, being interested in participating in the study.

Exclusion Criteria

These included the reluctance to participate in the study, posed as a question at the beginning of the questionnaire. Questions were given to respondents if

they signed and approved the questionnaire. Also, incomplete questionnaires or questionnaires whose data could not be retrieved were not included in the analysis were excluded from the study.

Ethical Considerations

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (SBMU.REC.1399.961). The purpose of the study was to inform the respondents at the beginning of the questionnaire and assure them that their information is kept confidential and only used for research purposes and that the results are published in general.

Research Tools

This study employed a demographic survey and a questionnaire to evaluate the quality of e-learning services based on the Servqual model (The Servqual model of online teaching quality).

It worth to mention that, the Servqual method, derived from the words "service" and "quality," is utilized for evaluating the quality of services provided using standardized evaluation criteria. This approach is founded on five gaps that stem from differences in expected and actual service quality.

Demographic Survey

This questionnaire consists of 6 items, including gender, age, education level, total Grade Point Average (GPA), number of semesters spent in the LMS, and the need to train professors before using the LMS from the students' point of view.

SERVQUAL Questionnaire

This study utilized the standard SERVQUAL questionnaire to evaluate the quality of e-learning services. The standard SERVQUAL questionnaire, developed by Parasuraman et al. (1985), is one of the most comprehensive instruments for measuring service quality, rated on a 7-point Likert scale (1: strongly disagree to 7: strongly agree). This questionnaire is widely used to measure the quality of services in various service sectors. This model seeks to measure service quality in environments where high service quality is considered a necessity for understanding service recipients. Quality is defined as the difference between the expectations of service recipients (service importance) of desirable status and their perception (service performance) of the services provided. This model is also called the gap analysis model because it examines the gap between current and desirable states. It consists of five components and 22 items: 1) Tangibility: the appearance of the equipment, facilities, and physical equipment in the workplace and the appearance of employees (4 items), 2) Reliability: service providers' ability to keep their promises accurately and continuously (5 items), 3) Responsiveness: service providers' willingness and desire to help users and provide timely services (4 items), 4) Assurance: employees' knowledge and skills in instilling a sense of trust and confidence in the user (4 items), and 5 Empathy: closeness and empathy with students and special and individual attention to them and efforts to understand them (5 items). Also, service quality can be checked by using this tool to analyze gaps. For each dimension of service quality, SERVQUAL measures customer expectations and perceptions (service importance and performance) with 22 questions in two steps. Then, the importance of each of the above five dimensions is determined based on the customer score. The score gap is calculated based on the difference in score in the two stages of completed questions about customer expectations and perceptions (importance and performance of services). Negative scores indicate that real-world services (service performance) are less than expected (service importance). The score gap is considered a reliable indicator for all five service quality dimensions. Service providers can provide an indicator to determine the level of quality of their services using SERVQUAL and identify areas in need of improvement [24].

Validity and Reliability of SERVQUAL Questionnaire

The validity and reliability of the SERVQUAL questionnaire have been approved in other countries [25, 26]. Also, the validity and reliability of the standard SERVQUAL questionnaire for evaluating the quality of learning services have been reported with a coefficient of 0.85 in Iran [27]. The validity of the questionnaires has been determined in this study using content validity, calculated based on the opinions of 10 professors of educational technology and virtual learning. Finally, all questionnaire questions were approved. Also, the reliability of the questionnaire was determined using internal consistency and Cronbach's alpha (0.85), indicating the optimal reliability of the questionnaire.

Data Analysis Method

Data were analyzed in SPSS software version 18. For this purpose, the data distribution was first determined using the Kolmogorov–Smirnov test. The results showed non-normal data distribution. Therefore, descriptive statistical tests (mean, Standard Deviation (SD), frequency, and percentage) were used as well as several non-parametric tests, including the Wilcoxon signed-rank test, Spearman correlation, Mann–Whitney U test, and Kruskal–Wallis H test.

RESULTS

The results showed that 53.6% of the participants were women, and 75.2% had a bachelor's degree. Also, the mean age and GPA of the research participants were 22.01 ± 3.3 and 17.73 ± 7.5, respectively. Other demographic information is listed in Table 1.

The Wilcoxon signed-rank test was used to compare the performance and importance of the quality dimensions of e-learning services. According to Table 2, the mean and standard deviation of importance (expectations) and performance (perceptions) are 107.03 ± 12.5 and 71.55 ± 17.77, respectively. There is a negative gap between the level of importance and the mean performance in each dimension of the quality of learning services.

Since the dimensions of quality of learning services provided by the university are prioritized based on the gap, these dimensions are ultimately prioritized as responsiveness (-8.22 ± 1.8), empathy (-7.54 ± 1.3), reliability (-7.45 ± 1.3), assurance (-5.98 ± 1.1), and tangibility (-5.86 ± 0.7), based on students' perspectives. In general, there was a significant difference between e-learning service importance and performance in all dimensions of e-learning quality (P<0.001). (Table 2)

Examining the relationship between demographic variables and the importance of e-learning service quality dimensions showed a significant inverse relationship (P<0.05) between age and the importance of reliability, responsiveness, assurance, empathy, and overall e-learning quality. ANOVA also indicated a significant relationship (P<0.05) between the need for training of professors before using the LMS from the students' perspectives and the overall quality of e-learning. In contrast, no relationship was observed (P>0.05) between the need for training of professors before using LMS from students' perspectives and dimensions of e-learning service quality. (Table 3).

According to Table 4, there is a significant relationship (P<0.05) between the need for training of professors before using the LMS from the students' perspectives and the performance of tangibility, reliability, responsiveness, assurance, and overall quality of e-learning services, as well as between education level and the assurance performance of e-learning service quality.

Table 1. Distribution of demographic characteristics of participation

	Number	Frequency
Gender		
Female	244	53.6
Man	211	46.4
Education		
Association	2	0.4
BS	342	75.2
Master	35	7.7
Ph.D.	76	16.7
the need for training of professors before using the LMS from the students' perspectives		
Yes	422	92.7
No	33	7.3
The number of semesters that students used e-learning		
1	33	7.2
2	161	35.4
3	230	50.5
4	29	6.4
5,6	2	0.4

Table 2. Wilcoxon signed-rank test results related to the difference between the importance and performance of e-learning services from the perspective of students participating in the study

	M ±SD	t	P-value
Tangibility		-17.309	<0.001
Importance	21.88±2.8		
Function	16.02±3.5		
Assurance		-17.210	<0.001
Importance	22.57±2.9		
Function	15.12±4.2		
Responsiveness		-17.344	<0.001
Importance	22.54±2.9		
Function	14.32±4.7		
Reliability		-17.210	<0.001
Importance	18.14±2.4		
Function	12.16±3.5		
Empathy		-17.254	<0.001
Importance	21.82±3.1		
Function	14.28±4.4		
Overall e-learning quality		-17.934	<0.001
Importance	107.03±12.5		
Function	71.55±17.77		

Table 3. The relationship between the importance's the dimensions of the quality of e-learning services with the demographic variables of students participating in the study

	M ±SD	f	P value
Tangibility			
Gender**		0.51	0.822
Female	21.91±2.8		
Male	21.85±2.8		
Education***		0.961	0.411
Association	22.00±4.2		
BS	21.78±2.9		
Master	21.77±2.9		
Ph.D.	22.39±2.5		
the need for training of professors before using the LMS from the students' perspectives **		2.062	0.152
Yes	22.57±2.8		
No	21.83±2.8		
Age*	22.01±3.3	-.088	.060
Grade point average*	17.73±7.5	.050	.287
Assurance			
Gender**		1.134	0.287
Female	22.72±2.9		
Male	22.42±2.9		
Education***		3.700	0.12
Association	17.00±2.8		
BS	22.50±2.9		
Master	22.40±3.4		
Ph.D.	23.19±2.2		
the need for training of professors before using the LMS from the students' perspectives **		.881	.348
Yes	22.12±3.7		
No	22.62±2.8		
Age*	22.01±3.3	-.122	.009
GPA *	17.73±7.5	.050	.289
Responsiveness			
Gender**		2.344	0.126
Female	22.74±2.9		
Male	22.31±2.9		
Education***		2.440	0.064
Association	21.00±2.1		
BS	22.40±4.1		
Master	22.22±4.2		
Ph.D.	23.35±4.6		
the need for training of professors before using the LMS from the students' perspectives **		.094	.759
Yes	22.39±3.4		
No	22.55±2.9		
Age*	22.01±3.3	-.163	.000
GPA *	17.73±7.5	.053	.256
Reliability			
Gender**		2.450	0.118
Female	18.30±2.4		
Male	17.95±2.4		
Education***		2.706	0.045
Association	16.50±3.5		
BS	18.00±2.4		
Master	18.17±2.4		
Ph.D.	18.81±1.9		
the need for training of professors before using the LMS from the students' perspectives **		.528	.468
Yes	17.84±2.8		
No	18.16±2.3		
Age*	22.01±3.3	-.140	.003
GPA *	17.73±7.5	.054	.253
Empathy			
Gender**		1.954	0.163
Female	22.02±3.09		
Male	21.60±3.21		
Education***		1.043	0.373
Association	20.00±7.0		
BS	21.77±3.1		
Master	21.40±3.3		
Ph.D.	22.30±2.7		
the need for training of professors before using the LMS from the students' perspectives **		.286	.593
Yes	21.54±3.6		
No	21.85±3.1		
Age*	22.01±3.3	-.106	.024
GPA *	17.73±7.5	.057	.224
Overall e-learning quality			
Gender**		1.755	0.186
Female	107.70±12.40		
Male	106.15±12.54		
Education***		2.305	0.076
Association	96.50±23.3		
BS	106.47±12.8		
Master	105.97±13.8		
Ph.D.	110.06±9.4		
the need for training of professors before using the LMS from the students' perspectives **		6.320	.012
Yes	106.48±14.99		
No	107.02±12.28		
Age*	22.01±3.3	-.142	.002
GPA *	17.73±7.5	.061	.196

* Spearman's Correlation

**Mann Whitney

***Kruskal-Wallis

Table 4. The relationship between the performance dimension of the quality of e-learning services and the demographic variables of students participating in the study

	M ±SD	f	P value
Tangibility			
Gender**		2.162	0.142
Female	15.79±3.5		
Male	16.28±3.4		
Education***		0.766	0.513
Association	14.00±1.4		
BS	16.15±3.3		
Master	15.57±3.5		
Ph.D.	15.71±4.0		
the need for training of professors before using the LMS from the students' perspectives **		7.594	.006
Yes	17.63±3.7		
No	15.89±3.4		
Age*		.034	.468
GPA *		.048	.304
Assurance			
Gender**		0.782	0.377
Female	14.95±4.2		
Male	15.31±4.2		
Education***		0.988	0.398
Association	12.50±2.1		
BS	15.08±4.1		
Master	16.11±4.2		
Ph.D.	14.89±4.6		
the need for training of professors before using the LMS from the students' perspectives **		10.632	.001
Yes	17.43±3.5		
No	14.94±4.2		
Age*		.076	.108
GPA *		.013	.789
Responsiveness			
Gender**		2.261	0.133
Female	14.02±4.8		
Male	14.68±4.6		
Education***		2.282	0.078
Association	8.50±3.5		
BS	14.56±4.4		
Master	14.37±4.6		
Ph.D.	13.40±5.5		
the need for training of professors before using the LMS from the students' perspectives **		7.302	.007
Yes	16.45±5.1		
No	14.16±4.6		
Age*		.020	.677
GPA *		-.007	.876
Reliability			
Gender**		1.781	0.183
Female	11.96±3.6		
Male	12.40±3.44		
Education***		2.768	0.041
Association	5.50±2.2		
BS	12.29±3.4		
Master	11.91±3.5		
Ph.D.	11.88±3.7		
the need for training of professors before using the LMS from the students' perspectives **		3.276	.071
Yes	13.24±3.5		
No	12.08±3.5		
Age*		.029	.537
GPA *		-.021	.653
Empathy			
Gender**		0.262	0.609
Female	22.02±3.0		
Male	21.0±3.2		
Education***		1.308	0.271
Association	10.00±7.0		
BS	14.47±4.2		
Master	13.71±4.6		
Ph.D.	13.81±4.9		
the need for training of professors before using the LMS from the students' perspectives **		1.971	.161
Yes	15.33±4.9		
No	14.20±4.3		
Age*		.011	.812
GPA *		.015	.742
Overall e-learning quality			
Gender**		2.086	0.149
Female	70.42±17.8		
Male	72.85±17.8		
Education***		1.482	0.219
Association	50.50±13.4		
BS	72.16±16.6		
Master	71.68±18.2		
Ph.D.	69.27±21.2		
the need for training of professors before using the LMS from the students' perspectives **		6.320	.012
Yes	79.12±18.51		
No	70.97±17.61		
Age*		.016	.737
GPA *		.012	.797

* Spearman's Correlation

**Mann whitney

***Kruskal-Wallis

DISCUSSION

This study aimed to evaluate the quality of e-learning services and student satisfaction during COVID-19 pandemic in Shahid Beheshti University of Medical Sciences according to SERVQUAL model and explore the difference between the importance and performance of e-learning services provided by LMS based on students' perspectives. Herein, the largest gap was observed in responsiveness, indicating the ability of service providers to provide the best learning services immediately and the willingness to help students [28]. The professors failed to obtain the full satisfaction of the students from the learning services. Education officials also failed to establish strong relationships with students as a major factor in problematic e-learning during the COVID-19 pandemic. These results are consistent with those of Um et al. [29] but inconsistent with those of Sumi and Kabir [23] because their findings showed a small effect of responsiveness on service quality due to students' awareness of the inability of institutions and educators to provide prompt responses as a result of quarantine.

Empathy came in second after responsiveness in terms of the gap. Nursing students enjoyed of spiritual intelligence [30]. Empathy is defined as paying special attention to students and showing sensitivity to their needs and grievances [28]. The negative gap in this dimension indicates that the professors were uninterested in listening to the students' opinions. This is consistent with the results of studies [21, 23] stating that empathy significantly affects the quality and students' perceived satisfaction with e-learning services but inconsistent with those of other studies [29, 31] stating that empathy does not affect students' satisfaction. A study by Sohail and Hasan [31] in Saudi Arabia showed that members of society recognize individual differences in the power hierarchy. Therefore, students do not expect empathy from professors because they believe that they are officials who are rarely questioned and should be followed.

Reliability ranked third has a gap between importance and performance. It refers to the ability of service providers to provide services in accordance with what has been promised [28]. This gap indicates that students' expectations have not been fully met to meet university officials' obligations. This is consistent with the results of the Sumi and Kabir study [23] but inconsistent with those of the study by Um et al. [29], stating that reliability has no significant effect on students' satisfaction with the quality of learning services during the COVID-19 pandemic.

Assurance was ranked fourth. It is described as the ability and skill of service providers to build trust [28]. The low average gap in assurance indicates that it is mainly addressed and considered one of the strengths of ..X.. University of Medical Sciences. However, the gap in assurance indicates that the promises made have failed to fully meet students' expectations of e-learning programs. This is inconsistent with the results of the study of Sohail and Hasan[31] because assurance, as the most important dimension of the quality of learning services, has a significant impact on student satisfaction.

Tangibility ranks last with the smallest gap between students' perceptions and expectations of the quality of e-learning services, indicating that the University of Medical Sciences has succeeded in meeting students' expectations about tangibility more than other dimensions. It refers to the physical facilities, human resources, and apparent charm used by teachers in teaching [28]. This is inconsistent with the results of studies [31, 32] stating that tangibility is the second factor affecting student satisfaction. These contradictory results suggest that differences in socio-cultural characteristics, universities, courses, facilities and equipment, professors, and LMS in universities have led to students' different levels of satisfaction and views on the quality of e-learning services during the COVID-19 pandemic. Also, insufficient resources, maintaining problematic academic integrity, students' indiscipline, sleep and concentration disorders, fewer social interactions, computer anxiety, internet access, and technical skills are among the main challenges in implementation [8, 33, 34].

This study also indicated a significant relationship between education level and the importance and performance of assurance dimension of the quality of learning services. These results are consistent with those of studies[33, 35] in terms of gender and those of Noori [33] in terms of the relationship between age and the importance of dimensions of quality of educational services but inconsistent with those of Shahroudi et al. [35]. The opposite is true of the relationship between age and performance in the dimensions of the quality of educational services [33, 35]. These results are also consistent with those of Mohammadi et al. [22] regarding the relationship between education level and performance dimensions of the quality of educational services.

Several factors, including users' digital competence, especially faculty, are considered to ensure the quality of e-learning services. Therefore, the last demographic question is whether professors should be trained to use LMS. Some professors may have little training in e-learning. Inconsistency in any of the above factors can call into question the whole teaching process. In addition to extensive knowledge of how to implement e-learning successfully, educators must also be equipped with technological knowledge about the use of electronic systems [9, 17, 20]. Therefore, the key factors

affecting online learning should be identified to maintain sustainable development after the COVID-19 pandemic [36]. To satisfy students, universities need to develop a set of specific tools, which is possible by improving the quality of services provided. This study aimed to evaluate the effect of e-learning quality dimensions on student satisfaction during the COVID-19 pandemic. Understanding student satisfaction is an urgent need that must be met. Therefore, universities try to implement student-centered quality assessment criteria to predict student satisfaction as a service level indicator.

One of the strengths of this study is the study of students' perceptions on e-learning services provided by LMS. The results are consistent and reliable due to cultural adaptation and compatibility with the conditions of Iran and Tehran. One of the weaknesses of this study is students' self-reports, which may disrupt the realistic nature of the data. For example, students who had difficulty accessing the questionnaire link and e-learning, in general, may not have been able to complete the questionnaire. Also, among the limitations of this study was the convenience sampling method of the participants and also the study of the research subject from the perspective of medical students. The E-learning has a several challenges. The key solution to addressing the challenges of E-learning teaching is to focus on learner engagement and interaction. Developments in e-learning and technology are revolutionizing education by individualizing learning through adaptive learning, enhancing interaction among learners through collaborative learning, and transforming the role of teachers from disseminators to facilitators. Adaptive learning assesses learners' knowledge and delivers personalized educational materials, while collaborative learning breaks isolation through synchronous distance education and collaborative technologies. In the changing paradigm of medical education, educators are evolving into facilitators of learning and assessors of competency, utilizing e-learning resources to support the learning process.

CONCLUSIONS

The results showed that the overall mean of the performance of the dimensions of quality of e-learning services was lower than the overall mean of the importance of the dimensions of quality of e-learning services. This means that students' expectations of the e-learning services provided by the LMS during the COVID-19 pandemic were not fully met. The results indicate a negative gap in all aspects of the quality of e-learning services, which can be used as a guide for planning educational facilities in the future. Based on the results of the present study, the LMS system has major challenges for the education of medical students. It may be suitable for non-medical groups, but it was not satisfactory for the medical group. Therefore, to be used in the medical group, fundamental reforms are needed to improve the quality or to be used together with other appropriate methods and technologies to gain more satisfaction. Therefore, it is suggested to take a series of measures to increase the technical and digital literacy skills of professors, faculty and students to improve and enhance the quality and satisfaction of e-learning services. It is recommended that the skills and opinions of experts in educational design and educational technology be used in the design of clinical training content, so that clinical content can be prepared and designed in the form of educational videos and online and mobile applications with offline access.

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ETHICAL CONSIDERATION

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1399.961). The purpose of the study was to inform the respondents at the beginning of the questionnaire and assure them that their information is kept confidential and only used for research purposes and that the results are published in general.

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AUTHOR'S CONTRIBUTIONS

Marjan Moradi Fath: Researcher, data gatherer, data analyser. Fatemeh Estebsari: Supervisor, result reviser. Marzieh Latifi: Wrote and revised the manuscript. Elnaz Goodarzi: Critically revised the manuscript and provided important intellectual content.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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