Original Article

Opportunities and challenges in virtual education of theoretical courses: Perspectives of medical students at Shahroud university of medical sciences

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Abstract

Background & Objective: Virtual education is considered a considerable transformation in educational systems, which depends on cultural creation, human sources, technological, educational, administrative, social, cultural, managerial, and economic infrastructures. This study investigated the opportunities and challenges in the virtual teaching of theoretical courses based on medical students' perspectives at Shahroud University of Medical Sciences, Shahroud, Iran.

Materials & Methods: This descriptive cross-sectional study was conducted on 505 students at Shahroud University of Medical Sciences using simple random sampling. Two demographic questionnaires and e-learning challenges and opportunities were used to collect information. The data were entered into SPSS software (version 18) and analyzed using descriptive and analytical statistics.

Results: According to the results, most of the students were female (n=274; 54.3%). The mean±SD age of the participants was 21.78±0.13 years. Most of the students participating in the general medicine study were studying at a medical school, were non-native, and lived in dormitories. Moreover, virtual education challenges and opportunities showed a significant relationship with gender (P=0.001), age (P=0.001), place of residence (P=0.001), satisfaction with the field of study (P=0.001), history of Coronavirus disease (P=0.001), history of vaccination (P=0.001), the Internet problems (P=0.001), and access to virtual learning tools (P=0.001). Among the variables, the highest mean±SD score was cost and effectiveness (37.26±5). The overall mean±SD of the questionnaire was obtained at 101.60±11.78.

Conclusion: Considering the relationship between opportunities and challenges of e-learning with several variables, we call for proper planning to improve the situation.

Keywords: Education, Students, Theory, Virtual

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Introduction

The advent of extensive communication networks, such as the Internet, along with advanced educational tools and facilities, has led to changes in educational methods. Such worldwide advanced methods implement scientific and specialized training and use various technologies, such as Internet networks, databases, and knowledge management. This method covers a wide range of science seekers in different places without the need to participate in face-to-face classes. In this type of training, educational content is provided through virtual services (1). In general, there can be certain problems in replacing traditional methods with new ones in an educational system. Thus, this change requires culture building, human sources, technological, educational, administrative, social, cultural, managerial, and economic infrastructures. Cultural, economic, legal, educational, strategic, and technical barriers, misconceptions, content problems, insufficient budget allocation, lack of internet access, inadequate information and electronic literacy skills, as well as information search and retrieval, are the challenges and obstacles associated with e-learning in Iran (2). According to studies, 93% of students have access to the Internet, with young people being the main users. About 73% of students use the Internet to do homework, and about 28% constantly texts their classmates (3-5).

The benefits and opportunities associated with e-learning have led to the rapid growth of virtual universities and education. E-learning is the most important solution to accompany the accelerating caravan of the information revolution in universities. Due to the increasing growth of virtual education in Iran and the number of universities that intend to provide virtual education services, most universities are likely to offer virtual education services shortly. Nevertheless, it should be noted that the virtual education system in Iran is gradually progressing and being tested. At the same time, virtual universities are involved in basic issues and problems in planning (strategic, operational), designing e-learning courses, developing content, applying teaching-learning strategies in virtual environments, and evaluating such programs (6). Challenges and disadvantages of e-learning include lack of face-to-face interaction, slow access to information, intensification of the digital divide, constant use of computers, individuals' isolation, lack of competition, and copyright problems (7, 8).

Zohri et al. (2011) investigated the attitudinal challenges of university faculty members in virtual education. The results showed that reduced teacher-student interaction was a dominant teaching method. While there is limited interaction in the traditional method, the multiple methods encompass high levels of interaction (9). In a study by Esfijani et al. (2018), educational content was the most important challenge in developing virtual education in Iran (10). Ismail et al. (2012) and Rawashdeh et al. (2021) showed that most faculty members and students considered virtual education possible in universities. Therefore, essential facilities, such as sufficient software and hardware, digital libraries, appropriate human and cultural resources, leadership and management, and economically enriched telecommunication networks, should be available (11, 12). Furthermore, some study showed that e-learning informed information technology and internet use for learning activities. Applying internet learning in medical education is supported by an adult learning theory. Learners control the content, sequence, speed, time, media, and learning styles (13-15).

However, the development and expansion of information and communication technologies have improved e-learning. Some universities in Iran have used this system for over a decade and have taken advantage of this opportunity by designing e-learning courses. In addition, they have developed a new approach to teaching methods in virtual environments. The new approach is warranted to study issues and benefits to improve processes and redesign courses. Based on the literature on this issue in Iran, views, experiences, and opinions of e-learning audiences in universities, namely students and instructors, are highly neglected and require attention. Therefore, this study investigated the opportunities and challenges in virtual education of theory courses drawing on the perspective of students at Shahroud University of Medical Sciences, Shahroud, Iran, in 2021-22.

Materials and Methods

Design and setting(s)

This descriptive, cross-sectional study was conducted at Shahroud University of Medical Sciences, Shahroud, Iran, in the academic year of 2021-2022.

Participants and sampling

Five hundred-five students were invited from five faculties (Medicine, Paramedicine, Nursing, Midwifery,

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and Health) of Shahroud University of Medical Sciences using social networks. Our criteria for inclusion in the study were at least one study semester for students. On the other hand, resident students were excluded from the study.

Instrumentation

The required information was collected using two questionnaires. The first questionnaire included demographic data (e.g., gender; age; interest in the field of study; study field; satisfaction with the study field; history of Coronavirus disease; vaccination history; students' problems; access to a tablet, smartphone, or laptop; school of study; economic status; parents' occupational status and education level; nativeness; place of residency; and admission year to university). The second questionnaire was the virtual education challenges and opportunities scale prepared by Khoshrang et al. (1) with 0.81 reliability estimated by Cronbach's alpha. The latter questionnaire is composed of 28 items pertaining to challenges and opportunities in three areas of cost and effectiveness (10 items), mental-emotional factors and teacher-student communication (10 items), and factors related to teaching and learning (8 items) arranged on a five-point Likert scale assessed on a scale of completely agree (5), agree (4), no opinion (3), disagree (2), and completely disagree (1). The minimum and maximum scores in cost and effectiveness are 10 and 50, respectively. Regarding mental-emotional and teacher-centered communication factors, 10 and 50 are the lowest and highest scores, respectively. 8 and 40 are considered the minimum and maximum scores in teaching-learning areas. The overall score in the questionnaire ranges between 28 and 140, and the cutoff point is 100. For scores below 100, certain actions should be taken to improve the process. There is no particular problem with scores above 100.

Data collection methods

The required data were collected in the academic year of 2021-2022, implementing a simple and online random mode. The participants completed the questionnaire in 12 min and had to answer all questions once. Five hundred-five students participated in the study.

Data analysis

The collected data were fed to SPSS software (version 18) to account for descriptive statistics (frequency and percentage) and inferential statistics (chi-square test, independent and paired t-tests, and correlation).

Results

According to the results, most of the students were female (n=274; 54.3%). The mean±SD age of the participants was 21.78±0.13 years. Most participants were 21-24 years old, and their study field and school were mainly general medicine and medical school, respectively. Mostly, they were non-native students and lived in the dormitory (Table 1).

Table 1. Demographic characteristics of the participants (part 1)

Variable	Subgroups	Frequency	Percent
Gender	Male	231	45.7
	Female	274	54.3
Age	18-20	183	36.2
	21-24	268	53.1
	24 and up	54	10.7
Field of Study	Surgery room	24	4.8
	Occupational health	9	1.8
	General hygiene	9	1.8
	Environmental Health	22	4.4
	Nursing	50	9.9
	Radiology	41	8.1
	General medicine	214	42.4
	Laboratory sciences	50	9.9
	Health information technology	15	3
	Medical urgency	22	4.4
	Midwifery	20	4
	Anesthesia	25	5
	Other disciplines	4	0.8
College of study	Health	42	8.3
	Midwifery and Nursing	86	17
	Medical	220	43.6
	Paramedical	157	31.1
Location	Native	201	39.8
	Non-native	304	60.2
Residency status	Dorm	322	63.8
	Living with family	126	25
	Private home (Rent)	57	11.3

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According to the results, most students were interested in their study field (n=207; 41%), favored their study field (n=447; 88.5%), and had suffered from the Coronavirus disease (n=353; 69.9%). Moreover, 328 (65%) cases had internet problems, and 499 (98.8%) had received the vaccination. It should be mentioned that 444 (87.9%) participants had access to e-learning tools, most of the participating students had been admitted to the university in 2020 (n=188; 35.8%), and they had an average economic status (n=345; 68%). Notably, interest in the field of study (P=0.001), history of Coronavirus disease (P=0.001), vaccination history (P=0.001), Internet problems (P=0.001), and access to virtual training tools (P=0.001) showed significant relationships with the challenges and opportunities of e-learning (Table 2).

Table 2. Demographic characteristics of participants (part 2)

Variable	Subgroups	Frequency	Percent	P-Value
Interest in the field of study	Very much	104	20.6	0.486
	A lot	207	41	
	Medium	175	34.7	
	Low	11	2.2	
	Very low	8	1.6	
Satisfaction with the field of study	Yes	447	88.5	0.001
	No	58	11.5	
History of the Coronavirus disease	Yes	353	69.9	0.001
	No	152	30.1	
Vaccination history	Yes	499	98.8	0.001
	No	6	1.2	
Internet problems	Yes	328	65	0.001
	No	177	35	
Access to virtual learning tools	Yes	444	87.9	0.001
	No	61	12.1	
Entering year	Lower than 2017	29	5.7	0.563
	2018	93	18.4	
	2019	89	17.6	
	2020	181	35.8	
	2021	113	22.4	
Economic status	Bad	55	10.9	0.546
	Good	105	20.8	
	Medium	345	68.3	

Regarding the parents' occupational status, they were housewives (n=334; 66.1%), and 200 (39.6%) parents were included in the other category. Most parents' education was undergraduate and above in both genders. Parents' educational level and occupational status showed no significant relationship with the challenges and opportunities of virtual education (Table 3). Furthermore, the highest mean±SD among the desired variables belonged to the cost and effectiveness subgroup (37.26±5.41), and minimum and maximum scores were 18 and 50, respectively. In the sub-group of emotional and communication factors in professors and students, a score of 34.44±4.86 was obtained, and minimum and maximum scores were 15 and 50, respectively. Finally, in terms of teaching and learning, a score of 29.89±4.75 was obtained, followed by the minimum and maximum scores of 8 and 40, respectively. The overall mean score of the questionnaire was determined at 101.60±11.78 (Table 4).

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Table 3. Demographic characteristics of the participants (part 3)

Variable	Subgroups	Frequency	Percent	P-Value
Father's occupational status	Freelancer	156	30.9	0.644
	Unemployed	20	4	
	Manual worker	99	19.6	
	Employee	30	5.9	
	Other	200	39.6	
Mother's occupational status	Freelancer	22	4.4	0.588
	Housewife	334	66.1	
	Other	27	5.3	
	Employee	122	24.2	
Father's education level	Illiterate	13	2.6	0.616
	Elementary	40	7.9	
	Middle school degree	63	12.5	
	Diploma	133	26.3	
	Associate Degree	44	8.7	
	Bachelor's degree and higher	212	42	
Mother's education level	Illiterate	25	5	0.501
	Elementary	55	10.9	
	Middle School Degree	64	12.7	
	Diploma	146	28.9	
	Associate Degree	44	8.7	
	Bachelor's degree and higher	171	33.9	

Table 4. Challenges and opportunities of virtual education

Subgroups	Medium	Standard deviation	Variance	Minimum score	Maximum score
Cost and effectiveness	37.26	5.41	29.31	18	50
Emotional and communication factors of teacher and student	34.44	4.86	23.68	15	50
Factors related to teaching and learning	29.89	4.75	22.63	8	40
Total score	101.60	11.78	138.92	46	140

Discussion

This study investigated the opportunities and challenges of virtual education in theory courses based on the perspective of students at Shahroud University of Medical Sciences in 2020-2021. Poor attention to learners' problems in virtual education leads to inadequate training. These problems are less frequent in the face-to-face education system due to the physical presence of the students in class.

In this study, the results showed that satisfaction with the field of study, history of Coronavirus disease, history of vaccination, Internet problems, and access to virtual learning tools (as well as housing) significantly correlated with the challenges and opportunities of virtual learning. In a study by Yazdi et al., the results showed inappropriate educational space for learners, which led to communication obstacles for most students (16). In addition, virtual education has a negative effect on student learning, and professors need to be more successful in virtual education. Naderifar et al. found that most professors do not have expertise in the field of virtual education, and sufficient resources are not available for training. Therefore, it is necessary to provide the necessary infrastructure (17). In a study conducted by Zaman et al., most challenges related to evaluation in electronic courses were related to technical issues (71.3), pedagogical issues (20.3), and

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psychological issues (3), as students reported (18). Students had different views on the evaluation of challenges. Polina et al. examined the challenges and opportunities of online education during the COVID-19 epidemic in Chile and interviewed 27 people. In line with our study, their results show that the challenges of e-learning are more than their opportunities. These challenges include a lack of direct interaction with learners, a sudden change from real training to virtual training, inequality in teachers' teaching power in virtual education, a lack of proper planning and support for virtual education, as well as lack of proper preparation of materials and adequate guidance for people in virtual education (19).

Svetlana et al. showed that all students had problems in a virtual environment, such as isolation, fewer opportunities to expand work, and the need for technical knowledge. Such issues require regular training of students and professors (20). In addition, they found that the highest score among the variables of challenge and e-learning opportunities belonged to cost and effectiveness, including cost-effectiveness variables, no need for a special physical location, opportunity to continue education for employees, internet line disruptions, and lack of facilities in the dormitory. Such findings are consistent with similar studies (21-23). Moreover, the overall mean score of e-learning opportunities and challenges obtained by students was lower than the cut line of the questionnaire (1). Thus, authorities need to address these challenges and put more emphasis on strengths.

This study is a pioneering attempt at the provincial and university level, which targets important issues, such as virtual education, as well as respective challenges and opportunities. However, regarding the limitations, one can refer to inappropriate student cooperation, no focus on consensus by the students, and not including other universities and medical universities for comparison purposes. Accordingly, future researchers may seek university professors' and officials' perspectives and develop consensus among universities and authorities on the issues mentioned above.

To make improvements in this respect, the conditions for specialized groups should be built. Moreover, the required budget should be provided, and the culture and necessary training should be improved. In addition, researchers and authorities need to avoid trial and error in this field. Using prosperous countries' experiences and rebuilding and modifying previous experiences are helpful suggestions. Reviewing e-learning programs in universities and strengthening the basic elements of educational programs are basic necessities. Such actions can involve professors in research and activities, leading to strong educational content.

On the other hand, technological infrastructure, such as internet speed and bandwidth in universities, should be empowered. Furthermore, there should focus on e-learning by improving the quality and quantity of databases. Valid scientific and indigenous and non-indigenous databases (abroad) should be promoted. Finally, practical models of teacher-learner interactions in the teaching process must be developed in virtual education systems across universities.

Conclusion

Due to the proximity of the overall mean with the cut line of the questionnaire, it is necessary to take appropriate actions to increase the quality of virtual education. The first step is to improve these issues to increase the quality of virtual education. On the other hand, there should be changes in educational designs for employing new educational technologies, especially virtual education.

Ethical consideration

This study was extracted from a research project (project code: 140060) approved by the Ethics Committee of Shahroud University of Medical Sciences, Shahroud, Iran (IR.SHMU.REC.1400.223). To observe the principles of research ethics, the participants were assured of the confidentiality of information. Meanwhile, the participants were provided with the research objectives, and approval was obtained from the faculties and vice-chancellors.

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Authors' Contribution

Sahar Paryab (first author) was the leading researcher (20%). Alireza Masoudi (second author) conducted methodology (20%). Kimia Zarouj Hosseini (third

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author) wrote the article (15%). Sepehr Zamani (fourth author) and Robabeh Zrouj Hosseini (fifth author) did the methodology (30%), and Omid Garkaz (sixth author) wrote the discussion section (15%).

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