Research Paper

Quality and Effectiveness of Virtual Education From the Viewpoint of Rehabilitation Professors and Students of Ahvaz Jundishapur University of Medical Sciences During the COVID-19 Pandemic

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ABSTRACT

Objectives: The emergence of COVID-19 and its prevalence in the global community had various economic, social, emotional, psychological, and educational impacts. The closure of schools and universities in the country because of the outbreak of COVID-19 has led to the emergence of e-Learning in education at all levels. Given the importance of virtual education during the pandemic and the need to improve its quality at schools and universities, this study aims to explore the quality, efficacy, and understanding of the strengths and drawbacks of virtual education from the perspectives of professors and students at Ahvaz Jondishapur University of Medical Sciences.

Methods: In the domains of physiotherapy, occupational therapy, speech therapy, and audiology, the current descriptive-analytical study was done with 17 professors and 210 undergraduate and postgraduate (master's degree) students. The data was collected using the Persian version of the Watkins e-learning standard questionnaire and was analyzed via the SPSS software, v. 26.

Results: From the professors' perspective, the quality and effectiveness of virtual education based on different components of the questionnaire did not differ significantly and all dimensions were considered effective. However, the students considered the dimensions of technology access and online skills and relationships as strengths and faced challenges in the importance of success.

Discussion: Considering the identified strengths and challenges, it seems that policymakers in the field of education should pay special attention to providing the necessary conditions and facilities to improve the quality of learners' virtual education.

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Highlights

• The overall quality of virtual education of professors in the Rehabilitation School of Ahvaz Jundishapur University was at a good level, and the overall quality of virtual education of most students was at a moderate level.

• From the viewpoint of the professors in the Rehabilitation School of Ahvaz Jundishapur University, the quality and effectiveness of e-Learning based on different components of the questionnaire did not differ significantly; the quality of all dimensions was good.

• The dimensions of technological access, online skills, and relationships had the greatest quality from the students' perspective at Ahvaz Jundishapur University's Rehabilitation School, whereas in the dimension of importance to success had the lowest quality.

Plain Language Summary

COVID-19 has affected various dimensions of life around the globe, including education, and led the education system to e-Learning. Given the importance of virtual education during the COVID-19 pandemic and the need to assess its quality and effectiveness from the perspectives of professors and students in various fields and universities, this study examines the quality, strengths, and weaknesses of virtual education from the perspectives of professors and students at Ahvaz Jondishapur University of Medical Sciences's Rehabilitation School. The overall quality of virtual education of professors was good and the overall quality of virtual education was moderate for most students. Professors evaluated the quality and effectiveness of virtual education in all dimensions of the questionnaire. Technology access, online skills, and relationships had the best quality in the eyes of the students, while the dimension of "Importance to success" had the lowest quality.

1. Introduction

The emergence of COVID-19 in Wuhan, China, in December 2019, and its worldwide spread caused widespread quarantines [1]. The virus affected the world in different aspects, including economic, social, emotional, and educational. With the closure of schools and universities to reduce the spread of the disease, extensive changes occurred in the education system and led to the introduction of virtual education at various levels [2-4]. Virtual education or e-learning refers to any type of course and training that offers the curriculum and the content to learners outside the classroom and is different from traditional methods. Course contents can be provided to learners via the internet in the context of video conferences and webinars and software and educational videos [5, 6].

The advantages and opportunities of this education method include reducing the prevalence of COVID-19, learning more than traditional education, reducing the cost of education and accelerating the educational process, educational justice, being student-centered, lack of time and place limits and availability [6, 7], and creating participation opportunities for employed people who do not have enough time to attend face-to-face classes [5].Therefore, the advantages of this education method are emphasized in strengthening its reliability in the global educational systems during the post-COVID-19 era [8-10].

While virtual education has brought opportunities to the field of medical sciences, it has also faced disadvantages and challenges, such as problems associated with facilities and equipment, classroom control and administration, challenges related to preparation, and insufficient training for learners and professors to use virtual education and emotional and cultural issues [11-13]. Therefore, it seems that managers and authorities in the educational system should respond to the educational needs and challenges facing students and identify the weaknesses with appropriate evaluations and plans to solve them [14, 15].

Other disadvantages, especially in the fields of medical sciences and rehabilitation are related to practical training and clinical courses. Rehabilitation sciences include various fields, such as physiotherapy, occupational therapy, speech therapy, audiology, and optometry. Similar to other fields related to medical sciences, such as medicine, nursing, and so on, it consists of several special sections, including theory, practical training, and clinical courses. It seems that transferring theoretical training via e-learning is easy. However, substituting this learning method with the old

educational system is not easy when teaching clinical skills [16-18]. To teach these skills clinically, equipment and software should be designed that is less time-consuming and cheaper. On the other hand, it seems that the lack of necessary infrastructure for the virtual evaluation of clinical and practical courses has made this a challenge [19]. Therefore, for teaching practical and clinical courses, blended education (traditional and virtual education) is suggested [6]. It is necessary to take serious measures to identify and solve these challenges professionally [12, 13].

Research conducted in this field has investigated the quality and effectiveness of virtual education from the viewpoints of professors and students of some academic fields. Some universities and institutions have used this education method. However, due to the unique characteristics and requirements in other fields and universities, the results obtained in previous research cannot be generalized to all fields, especially the field of medical sciences. Therefore, it seems necessary to investigate the quality of virtual education from the viewpoints of professors and students in different fields. Given the importance of e-learning during the COVID-19 pandemic and the necessity to determine the quality and efficacy of this educational approach, the main goal of this research is to answer the following questions:

- From the perspective of professors and students of the Faculty of Rehabilitation of Ahvaz Jondishapur University of Medical Sciences, which dimensions have the highest and lowest quality?

- What is the overall quality of virtual education for professors and students of the Faculty of Rehabilitation of Ahvaz Jondishapur University of Medical Sciences?

2. Materials and Methods

The procedure for selecting the participants

The statistical population for this study was chosen by a census, and it was done using a descriptive-analytical technique. Electronic informed consent forms and questionnaires were distributed among professors and students of the Rehabilitation School of Ahvaz Jondishapur University of Medical Sciences with at least one semester of virtual and face-to-face education experience. The informed consent form and questionnaire were completed by 17 professors and 210 male and female undergraduate and postgraduate (masters) students in the departments of physiotherapy, occupational therapy, speech therapy, and audiology.

Study instruments

In this study, we used the Persian version of the Watkins e-learning standard questionnaire, in addition to the participants' demographic information questionnaire (consisting of academic rank, gender, field of study, and level of study). The questionnaire was developed in 2004 and has been used in various foreign and domestic studies. Its reliability has been reported to be around 0.90 using the Cronbach α coefficient [20, 21]. The Cronbach α coefficient of 0.91 was used to establish its reliability in this study. The questionnaire has 27 questions across 6 dimensions: 1) access to technology, 2) online skills and relationships, 3) motivation, 4) online audio/video, 5) internet discussions, and 6) importance to success. The questionnaire was graded on a 5-point Likert scale.

Statistical analysis

All data were entered into the SPSS software, version 26, and descriptive statistics were used to evaluate the data (Mean±SD), frequency.

To answer the first question of the research, the normality of the data was evaluated using the Kolmogorov-Smirnov test. Subsequently, each participant's average score for each dimension was calculated separately. To compare the dimensional scores and determine the maximum and minimum scores, the average of the total scores of the participants in each dimension was calculated and the highest and lowest dimensions of the quality were determined, respectively.

To determine the overall quality of the participants' virtual education and to answer the second question of research, the total score of all dimensions was calculated for each participant. A total score less than 65 was considered poor overall quality, a total score between 65.01 and 97 was considered average overall quality, and a total score higher than 97.01 was considered good overall quality [21]. Then, according to the demographic characteristics of the participants, the frequency of overall quality was determined. The Ethics Committee of the Student Research Committee of the Ahvaz Jondishapur University of Medical Sciences approved the current study with license number 00S7 and the code IR.AJUMS.REC.1400.089. All research participants provided their written consent and agreed to participate in the trials.

3. Results

The statistical population of this study included 17 professors and 210 male and female students in un-

Table 1. Frequency distribution of demographic information of the research participants

Variables		No. (%)
Academic rank	Professor	17(7.5)
	Student	210(92.5)
Gender of students	Male	76(36.2)
	Female	134(63.8)
Students' field of study	Physiotherapy	61(29.0)
	Occupational therapy	46(21.9)
	Speech therapy	73(34.8)
	Audiology	30(14.3)
Students' level of study	Undergraduate	182(86.7)
	Masters	28(13.3)

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dergraduate and postgraduate (master's degree) courses in physiotherapy, occupational therapy, speech therapy, and audiology at the Rehabilitation School of Ahvaz Jondishapur University of Medical Sciences who had experience in at least one semester of virtual and face-to-face education (Table 1). Comparing the mean scores of the Persian version of the Watkins e-learning standard questionnaire showed that from the professors' perspective of the Rehabilitation School of Ahvaz Jondishapur University of Medical Sciences, the quality and effectiveness of e-learning based on different components of the questionnaire were not significantly different and they evaluated the quality of all dimensions as good. However, from the perspective of male and female students of this school, the dimension of technology access was of the highest quality and the dimensions of motivation and importance to success were of the lowest quality. The results also demonstrated that in the dimension of technology access, students have easier access to electronic equipment than the required software. Despite the relative engagement of students in e-learning, "technically and managerially" is not instantly supported in the dimension of "important to success". According to the students, the four professions of physiotherapy, occupational therapy, speech therapy, and audiology have access to high-quality technology. However, the dimensions of "motivation" and "importance to success" faced challenges (Table 2). The average total quality score of e-learning students was 86.32±13.49 and 79.9% of them had moderate overall quality. Also, 94.1% of professors had good overall quality in e-learning (Table 3).

4. Discussion

This study aimed to assess the quality and efficacy of virtual education from the perspective of professors and students at Ahvaz Jundishapur University's Rehabilitation School. Furthermore, analyzing students' expectations and perspectives by area and degree of study resulted in a more accurate understanding of their expectations and perspectives. Studies show that restrictions

Table 2. The mean dimension score of the Persian version of the Watkins e-Learning Standard Questionnaire by variables

Variables		Dimensions					
		1	2	3	4	5	6
Academic rank	Professor	4.7794	4.6078	4.8235	4.8431	4.9020	4.8088
	Student	3.8601	3.1254	3.9127	3.5889	3.7571	3.0726
Gender of students	Male	3.8224	3.0789	3.8158	3.4298	3.6053	2.9671
	Female	3.8815	3.1517	3.9677	3.6791	3.8433	3.1325
Students' field of study	Physiotherapy	3.9098	3.2131	3.9617	3.6885	3.6011	2.9754
	Occupational therapy	3.8207	3.0290	3.7536	3.3623	3.7101	3.2717
	Speech therapy	3.8682	3.1826	3.9087	3.5799	3.8356	3.0856
	Audiology	3.8000	2.9556	4.0667	3.7556	3.9556	2.9333
Students' level of study	Undergraduate	3.8022	3.0403	3.9011	3.5275	3.7253	3.0220
	Master	4.2366	3.6786	3.9881	3.9881	3.9643	3.4018

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1. Online skills and relationships; 2. Motivation; 3. Technology access; 4. Audio/video on the internet; 5. Internet discussions; 6. Importance to your success.

Table 3. Frequency of the overall quality of the Persian version of the Watkins e-Learning Standard Questionnaire by variables

Variables		No. (%)		
		Poor Quality	Moderate Quality	Good Quality
Academic rank	Professor	0(0)	1(5.9)	16(94.1)
	Student	16(7.6)	157(74.8)	37(17.6)
Gender of students	Male	12(15.8)	50(65.8)	14(18.4)
	Female	4(3.0)	107(79.9)	23(17.2)
Students' field of study	Physiotherapy	6(9.8)	48(78.7)	7(11.5)
	Occupational therapy	4(8.7)	36(78.3)	6(13.0)
	Speech therapy	6(8.2)	51(69.9)	16(21.9)
	Audiology	0(0)	22(73.3)	8(26.7)
Students' level of study	Undergraduate	16(8.8)	138(75.8)	28(15.4)
	Masters	0(0)	19(67.9)	9(32.1)

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on access to electronic communication technology and equipment pose challenges to the quality of e-learning [20] and providing the necessary infrastructure for quick and easy access to electronic equipment will increase the motivation of learners to participate in e-learning [12].

The findings of this study show that simple access to technology and online skills and relationships were the strengths and essential factors in increasing the quality of virtual education from the perspective of professors and students, which contradicted the findings of Jafari et al. As they pointed out, at Shahid Sadoughi University of Yazd, Iran, problems related to the equipment were the main weaknesses of the participants [13]. However, according to the findings of Saberi et al., from the perspective of Guilan University of Medical Sciences professors and students, the conditions for establishing a virtual education system, including the ability to install the necessary software and electronic systems were above moderate and desirable, which is consistent with the findings of this study. However, because there are restricting constraints in the university's equipment, such as hardware and software, reducing these barriers, according to the authors, might make the development and deployment of this type of instruction easier [21]. In Abbasi et al.'s research, despite the higher level of satisfaction of medical students in developed countries than in developing countries, 41% of e-learning challenges were related to technology access problems [17].

Virtual education learners should be supported in different domains and organizers of e-learning courses should interact and cooperate with students and professors to meet their needs and solve them [12, 13]. However, the findings of this study revealed that, from the perspective of students, the dimension of relevance to the performance was not favorable, indicating that continued engagement from learners and assistance from organizers are problematic.

According to Jafari et al., Saberi et al., and Olum et al., empowering professors and students with individual skills and working with electronic equipment before virtual training courses is essential. The use of experts to educate learners can increase the efficiency and adequacy of this method of education [13, 21, 22]. Considering the weakness of specialized human resources in the domain of e-learning and the low motivation of professors and students to use electronic equipment, this was considered a weakness in Shahid Sadoughi University of Yazd [13]. However, the findings of the study by Alsoufi et al. showed that despite the impact of the COVID-19 pandemic on medical education in Libya, students had an acceptable level of knowledge, attitude, and e-learning skills [1]. Contrary to the results of Puljak et al., the results of our study showed that students' motivation to use e-learning is low. This can be due to the challenges in the technical and managerial support of learners [23].

5. Conclusion

According to academics from Ahvaz Jundishapur University's Rehabilitation School, the quality and efficacy of e-learning based on different components of the questionnaire were not substantially different, and they rated the quality of all aspects as good. The student's ability at the Rehabilitation School to use technology and develop online skills and relationships is also a strong asset. We can witness an improvement in the quality of e-learning in learners if it is maintained and enhanced.

However, difficulties in the dimension of "importance to success" may compromise this teaching style. Planning for development and success in this area appears to be critical. Universities and e-learning centers can look at the benefits and drawbacks of e-learning as well. Due to the small number of professors participating in this study, it was not possible to separate the professors into separate variables. This study did not examine the quality of virtual education of practical and clinical training. The main focus and purpose were to evaluate the quality and effectiveness of theoretical training of rehabilitation students. It is expected that further research could focus on the quality and effectiveness of virtual education of clinical and practical training.

Ethical Considerations

Compliance with ethical guidelines

The current study was authorized by the Ethics Committee of the Ahvaz Jondishapur University of Medical Sciences's Student Research Committee (No: 00S7 and Code: IR.AJUMS. REC.1400.089). The experiments were undertaken with the understanding and written consent of all study participants.

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Authors' contributions

Conceptualization: Golnoosh Abaeian, Masoume Hoseini-Beidokhti; Methodology: Golnoosh Abaeian, Seyed Mahmoud Latifi; Investigation: Golnoosh Abaeian, Sara Abedini-Baghbadorani; Data Analysis: Golnoosh Abaeian, Seyed Mahmoud Latifi; Writing–original draft: Golnoosh Abaeian, Sara Abedini-Baghbadorani; Writing--review and editing: Golnoosh Abaeian, Masoume Hoseini-Beidokhti, Sara Abedini-Baghbadorani; Supervision: Golnoosh Abaeian, Masoume Hoseini-Beidokhti.

Conflict of interest

The authors declared no conflicts of interest.

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Watkins e-Learning Standard Questionnaire (Watkins,2004, pp.78-79)

	Row	Dimensions of Questionnaire
Technology access	1	I have access to a computer with an Internet connection.
	2	I have access to a fairly new computer.
	3	I have access to a computer with adequate software.
Online skills and relationships	4	I have the basic skills to operate a computer.
	5	I have the basic skills for finding my way around the Internet (e.g. using search engines).
	6	I can send messages with a file attached.
	7	I think that I would be comfortable using a computer several times a week to participate in a course.
	8	I think that I would be able to communicate effectively with others using online technologies (e.g. email, chat).
	9	I think that I would be able to express myself clearly through my writing (e.g. mood, emotions, and humor).
	10	I think that I would be able to use online tools (e.g. email, chat) to work on assignments with students who are in different time zones.
	11	I think that I would be able to schedule a time to provide timely responses to other students and/or the instructor.
	12	I think that I would be able to ask questions and make comments in clear writing.
Motivation	13	I think that I would be able to remain motivated even though the instructor is not online at all times.
	14	I think that I would be able to complete my work even when there are online distractions.
	15	I think that I would be able to complete my work even when there are distractions in my home (e.g. television, children, and such).
Online audio/video	16	I think that I would be able to relate the content of short video clips (1-3 minutes typically) to the information I have read online or in books.
	17	I think that I would be able to take notes while watching a video on the computer.
	18	I think that I would be able to understand course-related information when it's presented in video formats.
Internet discussions	19	I think that I would be able to carry on a conversation with others using the Internet.
	20	I think that I would be comfortable having several discussions taking place in the same online chat even though I may not be participating in all of them.
	21	I think that I would be able to follow along with an online conversation (e.g. Internet chat, instant messenger) while typing.
	22	I sometimes prefer to have more time to prepare responses to a question.
Importance to success	23	Regular contact with the instructor is important to my success in online coursework.
	24	Quick technical and administrative support is important to my success in online coursework.
	25	Frequent participation throughout the learning process is important to my success in online coursework.
	26	I feel that prior experiences with online technologies (e.g. email, Internet chat, online readings) are important to my success with an online course.
	27	The ability to immediately apply course materials is important to my success with online courses.