Students' Perceptions of e-Learning in Medical Faculties in Jordan during the COVID-19 Pandemic

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ABSTRACT:

Objective: The purpose of this study is to evaluate the e-learning of medical specialties in Jordan at different grade levels and to investigate students' satisfaction and opinions about this teaching method.

Design: retrospective cross-sectional questionnaire-based study

Methods: The opinions of 415 students from various medical specialties were collected using a web-based questionnaire delivered via google forms to evaluate the quality of the education system from various aspects.

Results: More than half of the students felt that e-learning was easy to use. The majority of students believe that the instructor did not cover the material completely. Most students actively emphasized the need for clinical reinforcement of what they learned, and they still highly value face-to-face traditional learning as irreplaceable. Analysis of the responses by grade level revealed statistically significant differences in responses to different questions among students.

Conclusion: Even though e-learning is an effective and well-managed learning method, it cannot completely replace traditional face-to-face teaching, especially in the clinical grades of medical undergraduates, but it can be considered as a supplementary method in situations such as the previous COVID 19-related lockdown.

KEY WORDS

medical, e-learning, COVID19, Jordan, healthcare

INTRODUCTION

In December of 2019, the novel Coronavirus disease 2019 (COVID-19) emerged from Wuhan city in china and rapidly has become a public health emergency of international concern[1]. While an increasing number of medical students are in the process of acquiring knowledge and developing skills that require clinical exposure, the effects of COVID-19 on health care education could therefore be considerable. The response of the various medical faculties has been very different. Some have decided to take a business-as-usual approach, while others have restricted students' attendance to ward rounds, clinics, and operating rooms. Because isolation has made traditional face-to-face teaching almost impossible, there is a new need to use distance learning as the primary and only method of teaching, rather than as an adjunct.

Online delivery or e-learning is a form of distance education using the Internet that has been adopted in the field of education since the early 1990s. It goes beyond traditional computer-based learning by using the Internet and other digital technologies to provide easy access to educational materials without the constraints of time and space[3]. in the wake of the COVID-19 pandemic, medical education in most countries of the world has rapid adoption of online delivery of webinars and other materials using various platforms such as Zoom and Microsoft teams, and this technologically facilitated approach has already proven to be of high interest to students[4].

In an e-Learning environment, multiple factors influence user satisfaction and, consequently, the quality of educational outcomes. Those factors can be categorized into six major domains: students, teachers, content, technology, design, and environmental dimensions[5]. The purpose of this paper was to assess the opinions and satisfaction of Jordanian health care professionals towards electronic learning and its teaching methods in order to guide policy makers and relevant authorities in implementing a student friendly educational environment.

MATERIALS AND METHODS

Study design:

This cross-sectional study was conducted between April 2021 and June 2021. The target population was university students of different grades belonging to medical faculties in the Hashemite Kingdom of Jordan. The participants were recruited through social media services such as Facebook, WhatsApp, and Telegram groups dedicated to medical students. Before starting the questionnaire, the purpose of this study was explained to the participants and they were asked if they would like to participate in the study, knowing that the data collected would be analyzed and used for research purposes.

Instrument

We conducted an extensive literature review and constructed an

Table 1: Characteristics of included sample

		Count	Column N %
Academic year	First	144	34.7%
	Second	67	16.1%
	Third	42	10.1%
	Fourth	75	18.1%
	Fifth	41	9.9%
	Sixth	46	11.1%
Faculty	Medicine	358	86.3%
	Dentistry	23	5.5%
	Pharmacy	14	3.4%
	Nursing	18	4.3%
	Rehab	2	0.5%
University	JU	246	59.3%
	JUST	36	8.7%
	HU	38	9.2%
	Mut'ah	42	10.1%
	Yarmouk	20	4.8%
	Balqa	21	5.1%
	Al Albeit	11	2.7%
	ASU	1	0.2%
First	Yes	267	64.3%
Experience	No	148	35.7%
Method	Video	148	35.7%
	Chat	65	15.7%
	Records	192	46.3%
	YouTube	3	0.7%
	All	7	1.7%

JU: university of Jordan, JUST: Jordan university of science and technology, HU:

Hashemite university, ASU: Applied science university

English-language questionnaire that can assess all aspects that affect the quality of e-learning among medical students of different academic levels, and thus provide a valid assessment of digital learning. The questionnaire is web-based and self-administered, completed using Google forms® (Google LLC, Mountain View, CA), and includes general characteristics (4 questions), educational content (6 questions), communication and interaction (4 questions), multimedia and technical support (6 questions), and instructor innovation (3 questions). The quality of the educational system is assessed in terms of dimensions that are known to significantly affect the e-learning process, such as innovativeness of the instructor (3 questions) and the role of the student (5 questions)[6,7]. The form takes about 10 minutes to complete. Responses were rated on a 5-point scale: strongly agree, agree, neutral, disagree, and strongly disagree for each question. Familiarity and past experience with e-learning were also considered important variables for student comfort and satisfaction8) and were also assessed in the questionnaire.

Full instrument analysis

For the 28-item scale used, the mean score was 81.86 (± 19.95), with a variance of 398.03. We found a high validity for the used instrument with Cronbach's alpha of 0.931. The interclass correlation for a single measure was 0.326 (95% confidence interval 0.295 to 0.361), and for the average measures was 0.931 (95% confidence interval 0.921 to 0.940).

Sub-scale analysis

General characteristic scale: four items scale with Cronbach's alpha reliability score of 0.764, Educational content: six items scale with Cronbach's alpha reliability score of 0.722, Communications and interaction: four items scale with Cronbach's alpha reliability score of 0.870,

Multimedia: six items scale with Cronbach's alpha reliability score of 0.845, Instructor innovation and interaction three items scale with Cronbach's alpha reliability score of 0.722, Students' role five items scale with Cronbach's alpha reliability score of 0.395

We included students of different ages, both genders, of all academic years, from health care faculties in the governmental universities in Jordan

Statistical analysis

SPSS version 21.0 (Chicago, USA) was used for the analysis. Continuous variables (e.g., age) were described using mean values (± standard deviation). For other nominal variables (e.g., gender), count (frequency) was used. Chi-square tests were used to analyze differences between "first time" and "not first time" in other questions, followed by Bonferroni correction. Correlations between grade level and each question were examined using Pearson correlation tests. Unless otherwise noted, all assumptions were met. A p-value of 0.05 was adopted as the significance threshold.

RESULTS

A total of 415 students (mean age 20.62 (± 2.65) years) from the Faculties of Medicine, Dentistry, Pharmacy, Nursing, and Rehabilitation were included in the study. The sample consisted of 175 (42.2%) males and 240 (57.8%) females. Table 1 shows the characteristics of the sample. Analyzing the students' responses to the questionnaire on the general characteristics of e-learning, 51.1% of the students said that the course was not well scheduled, 54.9% said that it was easy to use, and 61.3% said that they did not enjoy e-learning. In terms of educational content, 57.2% of students said that there are too many materials, 46.8% said that they do not feel confident about what they have learned, and 48% said that they agree with the use of case studies and scenarios. 2% of the students indicated that internal chat was available and 58.6% of the students indicated that discussion was available during class.

Regarding multimedia and technical support, we found that although 46.8% of the students reported that the quality of the text and fonts was good, most (53.3%) of the students reported that their Internet access was not stable. Responses regarding visual design and audio quality were mixed. Regarding instructor innovation and interaction, 44.6% of the students thought that the instructor could not cover the material completely, and 42.2% thought that the instructor did not seem to enjoy using this teaching method, but the instructor's familiarity with e-learning was not a limiting factor However, the instructor's familiarity with e-learning was not a limiting factor.

When examining the role of students in the e-learning process, we found that 50.4% of the students said that they had no role in deciding how to spend their time in online lectures, 56.4% believed that this method of learning had a negative impact on interpersonal relationships, 58.8% positively emphasized the need for clinical reinforcement of the material learned It was found that 58.6% of the students still highly valued the face-to-face traditional learning method as irreplaceable. Analysis of the survey responses by grade level (Table 2) shows that as grade level increases, students are more likely to think that the course schedule is well organized, easy to use, fun, appropriately placed at the right time, with clear instructions, and with proper navigation. Students believe that case studies and instructional scenarios are helpful in deepening their understanding.

They had reported that instructors seem to enjoy this way of teaching and they feel more involved in deciding how to spend the lecture time, more confident about the learned material and stress more on the need for clinical enhancement.

As the grade level increases, fewer students believe that the course is burdensome and fewer believe that it has a negative impact on their relationships. When students' opinions on the necessity of adding clinical encounters with actual patients to the online course materials were analyzed by grade level, as shown in Figures 1 and 2, the majority of students in the basic grades answered "undecided," while the majority of students in the clinical grades answered While the majority of students in the basic grades answered "undecided," the majority of students in the clinical grades answered "strengthening e-learning with the addition of clinical encounters is strongly needed.

Table 2: Correlation between academic year and questions:

Question		Academic year
Well -Scheduled	Pearson Correlation	.256**
	Sig. (2-tailed)	.000
	N	415
Clear Instructions	Pearson Correlation	.261**
	Sig. (2-tailed)	.000
	N	415
Easy to use	Pearson Correlation	.305**
	Sig. (2-tailed)	.000
	N	415
Enjoyable	Pearson Correlation	.151**
	Sig. (2-tailed)	.002
	N	415
Consistent with objectives	Pearson Correlation	.084
	Sig. (2-tailed)	.087
	N	415
Proper arrangement	Pearson Correlation	.209**
	Sig. (2-tailed)	.000
	N	415
Overloaded	Pearson Correlation	-.343**
	Sig. (2-tailed)	.000
	N	415
Appropriate timing	Pearson Correlation	.283**
	Sig. (2-tailed)	.000
	N	415
Case studies and scenarios help in learning	Pearson Correlation	.282**
	Sig. (2-tailed)	.000
	N	415
Confident about learnt material	Pearson Correlation	.182**
	Sig. (2-tailed)	.000
	N	415
Personal profile	Pearson Correlation	.192**
	Sig. (2-tailed)	.000
	N	415
Internet chat	Pearson Correlation	.325**
	Sig. (2-tailed)	.000
	N	415
Allowed discussions	Pearson Correlation	.347**
	Sig. (2-tailed)	.000
	N	415
Discussions easy to follow	Pearson Correlation	.307**
	Sig. (2-tailed)	.000
	N	415
Appropriate navigation	Pearson Correlation	.260**
	Sig. (2-tailed)	.000
	N	415
Good visual design	Pearson Correlation	.204**
	Sig. (2-tailed)	.000
	N	415
Clear text and fonts	Pearson Correlation	.179**
	Sig. (2-tailed)	.000
	N	415
Good quality audio	Pearson Correlation	.263**
	Sig. (2-tailed)	.000
	N	415
Electronic notes	Pearson Correlation	.172**
	Sig. (2-tailed)	.000
	N	415
Stable internet access	Pearson Correlation	.194**
	Sig. (2-tailed)	.000
	N	415
Complete coverage of the content	Pearson Correlation	.092
	Sig. (2-tailed)	.061
	N	415
Instructors enjoying teaching	Pearson Correlation	.165**
	Sig. (2-tailed)	.001
	N	415
Instructors being familiar with using e-learning	Pearson Correlation	.252**
	Sig. (2-tailed)	.000
	N	415
Students deciding how to spend class time	Pearson Correlation	.293**
	Sig. (2-tailed)	.000
	N	415
Clear assignments	Pearson Correlation	.174**
	Sig. (2-tailed)	.000
	N	415
Negative effect on students' relationships	Pearson Correlation	-.092
	Sig. (2-tailed)	.060
	N	415
Need clinical enhancement	Pearson Correlation	.372**
	Sig. (2-tailed)	.000
	N	415
Can replace traditional education	Pearson Correlation	.034
	Sig. (2-tailed)	.483
	N	415

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

e-Learning is a web-based system that uses online technologies to facilitate the dissemination of education and training, making knowledge available to users anywhere and anytime. In recent years, it has emerged as a model for modern education[9] e-Learning provides a wide range of solutions to improve knowledge and performance using the Internet, and goes beyond computer-based learning with the Internet as the primary driver[10]. The global pandemic of COVID-19 has caused unprecedented difficulties in the health care system, affecting not only patient care but also the delivery of medical education, resulting in the interruption of medical education programs in all countries and specialties[11].

This study aimed to examine the quality of e-learning from the perspective of 415 students from various medical faculties in the Hashemite Kingdom of Jordan, and to provide a clear impression of students' attitudes, barriers and attitudes towards online delivery as a learning tool during the pandemic. To the best of the author's knowledge, this is the first study to evaluate e-learning among medical undergraduate students in Jordan during the last COVID19 pandemic.

A structured web-based questionnaire based on an in-depth literature review was used to evaluate various aspects of the quality of this new online education system from the students' own perspective.
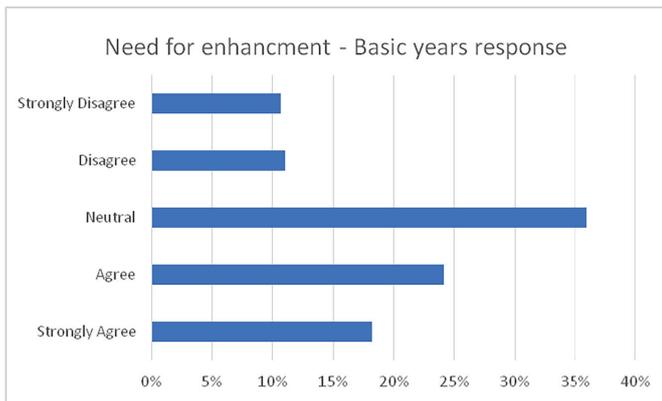
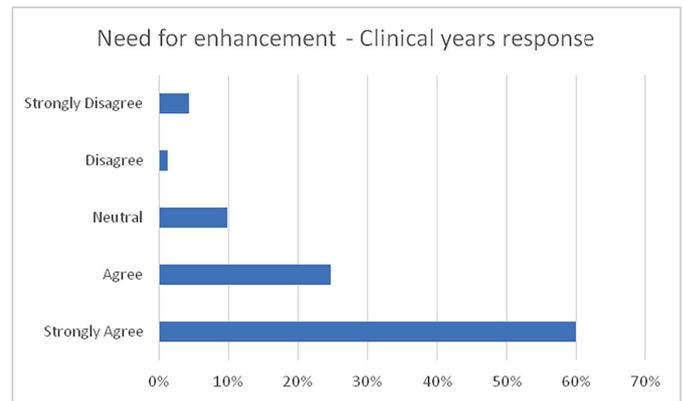Figure 1: basic years student response to the need for clinical enhancement question

Figure 2: clinical years student response to the need for clinical enhancement question

e-Learning courses are flexible in time, geographic location, and method, which has increased student engagement and satisfaction with this learning method[5]. has increased student engagement and satisfaction with this learning method[5]. Several interacting factors play a role in students' success in eLearning courses, including course scheduling, familiarity with online technology, and time management, not just course content[12]. When assessing the overall characteristics of e-learning in our study, most students found online courses easy to use, although they thought they were not well scheduled and not in a fun way. Despite the fact that many students (46.8%) were unsure of the content they learned and most (57.2%) reported that there was too much material, as the school year progressed, students felt less so and were generally satisfied with the course content. A study conducted by Aung and Khaing concluded that weak educational content is one of the main challenges in implementing e-learning systems in developing countries[13]. According to Moore, there are three areas of interaction in learning activities: student-teacher, student-learning materials, and student-student[14]. The virtual nature of e-learning also eliminates the shyness associated with face-to-face communication in traditional education and allows students to freely express their ideas in discussion groups[16]. Therefore, the availability of internal chat in online courses is essential for these forms of communication. 46.2% of students said they enjoy this feature, and 58.6% agreed that it allows for discussion during class. This enhances student learning and satisfaction as shown in many studies that showed that the more interaction between learners, the more likely they are to be satisfied with their learning experience, this kind of interaction helps learners solve problems and promote progress[17,18]. The quality of technology and the Internet has a very significant impact on learner satisfaction in e-learning[18]. In his own research, Finlay states that apart from the role of the instructor and the classroom environment, the technological aspects of e-learning have a statistically significant impact on student satisfaction and participation[6]. Having a user-friendly software design requires little effort from its users, allows them to adopt such a tool and promotes their satisfaction[19]. This also was demonstrated by Reeves who concluded that to have a satisfying user interface it should consider several factors such as ease of use, navigation and mapping, information presentation, and overall functionality[20].

Analysis of subjects responses about the multimedia and technical support of e-learning showed variable responses regarding the quality of visual design and audio but 46.8% of students agreed about text and fonts being of good quality, these technical factors were found to be of great importance by Kisanga and Ireson who suggested that poor interface design and insufficient technical support are the primary barriers for successful e-learning projects[21]. However, most (53.3%) students reported that internet access is not stable and this can be considered a limiting factor for e-learning. Having a flexible technology that meets all user needs will increase its overall educational value and is an ultimate factor for learning satisfaction and success[22,23].

Teaching styles have a significant impact on the entire educational process. Adopting an interactive teaching style between teacher and students plays a fundamental role in learning activities[24]. Without a pronounced interaction between the teacher and students, students will lose focus and become easily distracted during lectures[25]. Although students indicated that instructors allow class discussions and interact positively with students, 44.6% of students believe that instructors do not fully cover the material, and 42.2% believe that instructors do not seem to

enjoy using these teaching methods. Student responses to whether instructors are comfortable with e-learning vary and are generally not considered a limiting factor. This is important because students often face technical problems in distance education using the Internet. This has been clearly shown in another study which stated that it is essential to have an instructor who can solve the technical problems faced by the students and help them with this educational tool[3].

The success of an e-learning system depends largely on students willingness and acceptance to use this system[26]. Well-structured software design with smart use of technology improves students' perspectives towards this way of teaching[27]. In addition, several factors should be assessed in order to have an actively participating student importantly: student autonomy, their understanding of what is required from them to succeed, and effective student-teacher interaction[6]. However, in this study, most (50.4%) of students deny having many roles in deciding how to spend online lecture time.

With regard to the influence of e-learning on student's interpersonal relationships, most (56.4%) consider this method negatively affecting it, however, this point changed with increasing academic year with students in their final years less likely to consider e-learning negatively affecting their interrelationships.

Comparing medical education with other educational disciplines, it can be seen that the development of clinical sense and skills is characterized by the consideration of this type of knowledge because it requires direct patient encounters and student participation in the clinical environment McIntyre states that actively engaging students in problem-based learning also allows for engagement. McIntyre states that engaging students in problem-based learning also allows for engagement[28]. Engaged students are highly motivated students[29], so the need to reinforce the material learned online in clinical practice is an important point to consider. Since most of the students (58.8%) positively emphasized the need to clinically reinforce the learned material, this aspect was thoroughly investigated in this study. The results showed that students in the clinical grades significantly agreed on the need for clinical rounds to develop their skills as compared to students in the basic science grades. Although the use of e-learning in medical education started a long time ago, its use still varies widely among medical schools and seems to be used more in basic grades than in clinical clerkships[30,31]. This is consistent with our findings that most students are satisfied with e-learning in the quarantine setting, but still greatly value the face-to-face traditional learning methods as irreplaceable, and this is agreed upon by most students regardless of grade. Ultimately, studying the factors that influence the adoption of e-learning in an educational system can help us better understand the needs of students and ultimately make the e-learning system successful[32].

There are several limitations to this study. Individual differences among students were not taken into account in this study, and students' grade point averages (GPA) may affect their responses, which should be taken into account in future studies to enhance the online education process[33]. Furthermore, our assessment of e-learning quality was based solely on students' opinions and perspectives, but future research should include teachers' attitudes and ideas about e-learning in order to get a more complete picture.

CONCLUSION

It was emphasized that although e-learning is an effective and well-managed learning method, it cannot completely replace traditional face-to-face teaching, especially in the clinical year of medical school. However, it can be considered as a complementary and effective method in unpredictable situations such as the previous COVID19 related lockdown.

CONFLICT OF INTEREST

The authors declare they have no conflict of interest to disclose, no funding was needed for this research.

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