e-learning during the COVID-19 pandemic in Mutah university: Advantages, disadvantages, and perspective of medical Students

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ABSTRACT

Objective: This study aims to investigate the reality of distance e-learning among undergraduate medical students, and to identify their opinions toward this new approach to learning. In addition, the study summarises the advantages and disadvantages of online education in the College of Medicine from the students' perspective.

Method: A cross-sectional study was conducted, and data was collected by sending a questionnaire link to undergraduate medical students. The questionnaire assessed students' attitudes towards different variables: the academic content, students' stress level, effectiveness of the e-learning method, devices and platforms used by students, advantages & disadvantages, and the best subjects taught using this method as judged by students during the period of the COVID-19 pandemic.

Results: 1,170 students have completed the questionnaire. Regarding the evaluation of the academic content and its quality, it was notable that students with excellent grades had a positive attitude. While assessing the students' stress levels, male students expressed higher levels of stress and depression. The online teaching is good in basic and theoretical part of the subjects and could not be substitutive to the practical part.

Conclusion: E-learning gave students the opportunity to listen to the lecturer and see PowerPoint slides, as if it is a one-on-one lecture. it saves time, but the absence of individual interactions is a disadvantage. This study emphasises that the triad of successful remote e-learning consists of an

adequate amount of training for both tutors and students, accessibility to the teaching materials, and maintaining an interactive platform.

Keywords: Questionnaire, Education method, medical students, e-learning, COVID-19.

Introduction

COVID-19 or Novel Coronavirus disease can be defined as "an infectious disease caused by a newly discovered coronavirus."(Coronavirus Disease (COVID-19), 2021) COVID-19 has occupied headlines and news since December 2019. Almost all countries have been negatively impacted by the virus in all sectors. Around 892,000 papers can be found in Google Scholar discussing the impact of COVID-19 (Coronavirus Disease (COVID-19), 2021).

On March 11th, 2020, the world health organization (WHO) declared the novel Corona virus COVID-19 a global pandemic(Coronavirus Disease (COVID-19), 2021.). From before this date to the present date, WHO has been constantly updating information and guidelines for countries to manage this pandemic. In Jordan, the first confirmed case of COVID-19 was announced on March 2nd, 2020 ('Coronavirus Disease, Ministry of health', 2020). Shortly after that, on March 14th, 2020, and in light of the accelerated international growth of this new pandemic, the government adopted strict measures to deal with the pandemic. These measures included, to mention a few: Comprehensive curfews, halting all air travel to and from the Kingdom, and suspending the activities of all educational institutions starting on the morning of March 15th and for the duration of two weeks. Of course, these measures were extended over two academic semesters due to the escalating numbers of positive cases through the following weeks. Education in Jordanian schools and universities, private and public, commenced with Distant/Remote Learning ('Coronavirus Disease, Ministry of health', 2020).

After the national lockdown, with little to no time to prepare for this disruption, students suddenly had to figure out how to help themselves into distance learning at home. Both tutors and students found themselves faced with a set of unprecedented circumstances, forced to quickly develop their skills in order to continue the education process. In the College of Medicine, our main priority in these exceptional circumstances was to provide medical students with the highest possible level of education and training to help them make new plans and cope with the new lifestyle.

The College of Medicine is one of traditional schools and relies almost exclusively on classroom lectures and practical laboratories. That said, it is fair to mention that The College of Medicine offered a few courses taught exclusively through e-learning platforms before the pandemic, such as History of Medicine. Exams and evaluations are completed digitally, except for clinical assessments. And in some labs, the latest technology methods are employed, such as the Anatomage table in the anatomy lab.

The Medical education program in Mutah university is a six-year program. The program consists of two main levels: three years of basic education, and the remaining 3 years of clinical curriculum. During basic education, students receive both onsite theoretical lectures and labs. While in the clinical years, they attend theoretical lectures and undergo additional hospital training. The faculty of Medicine at Mutah University currently enrols approximately 2,064 students. The online e-learning platform Moodle had been utilised to deliver exams for years prior to the pandemic. Many platforms

were used at the beginning of the e-learning period, such as: Video recordings, Zoom, Teams, even WhatsApp and Facebook. Eventually, all e-learning lectures were delivered by MS Teams.

As a part of our faculty's vision to deliver a high standard of education through effective teaching methods to our students, the circumstances provided a unique opportunity to explore a new and innovative method of teaching and learning.

Many Educational and governmental studies claimed that e-learning is as efficient as the traditional method(Al-Hassan, 1998; Algahtani, 2011; Rotimi, Orah, Shaaban, Daramola, & Abdulkareem, 2017) Other studies stated that students were found to be more active when a variety of methods, such as electronic books and on-line articles, were employed in the teaching process(Aikawa, Moreira Zornoff, & Matsubara Bojikian, 2004; Letterie, 2003).

A very recent study from Saudi Arabia(Khalil et al., 2020) on the role of online learning in medical education, concluded that online learning is more effective, especially in uncertain international situations such as pandemics. They predict that this experience will not be transient or just a response to the pandemic, but it will be "a permanent trend in medical education.(Khalil et al., 2020)"

Online education, a popular term during the current pandemic, is not a "up-to-the-minute" concept. Online education in universities dates back to the mid-1900s (Al-Hassan, 1998). Though it is challenging to define online learning, the best definition is computer-based learning delivered by software utilising internet services(Siemens & Latour, 2013) Online education nowadays may utilise any electronic device such as computers, laptops and even mobile devices (smartphones, tablets... etc) and hence, the term "mobile learning" emerged in literature (Walsh, 2015)

Online learning has several categories, mainly: synchronous type or asynchronous type. The synchronous type permits direct communication between the instructor and the students (e.g., Microsoft Teams lectures). While the asynchronous type comprises of sending lectures and study material with instructions and/or assignments to students, who can read it at their own pace (e.g., e-mail, audio/ video recordings)

(Sistek & Cynthia Mary, 2020).

Online education has many advantages, mainly it is an effective tool of teaching especially during a pandemic(Bączek, Zagańczyk-Bączek, Szpringer, Jaroszyński, & Wożakowska-Kapłon, 2021), it also offers easy access and flexibility (Xie, Siau, & Nah, 2020)

It also has its disadvantages, mainly the lack of direct contact with instructors and colleagues (Kolar, Turčinović, & Bojanjac, 2020).

This study aims to investigate the reality of distance e-learning among undergraduate medical students in Mutah University, and to identify their attitudes toward this new approach to learning.

METHOD

Design

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A cross section study was conducted, data was collected through a questionnaire. A link sent to students' university email addresses in the College of Medicine at Mutah University with the objective of answering the main research questions that related to:

- The medical student's attitude toward e-learning at Mutah University during the COVID-19 pandemic.

- The effectiveness of the e-learning method, as it relates to the student experience.

- Devices and programmes/platforms used by students.

- Online education advantages & disadvantages.

- The best subjects taught using this method.

The e-learning courses assessed in this questionnaire are all courses delivered to medical students in Mutah university utilising different electronic software including Zoom, Ms Teams, Ms PowerPoint, and sometimes WhatsApp and Facebook groups with the novel aim to continue delivering education during the lockdown period in Jordan.

Questionnaire

The questionnaire used to collect data consisted of three sections. Section one included questions aimed at assessing the demographic characteristics of the respondents. Therefore, Section one included descriptive questions but maintained anonymity: Academic year, gender, academic level, place of residence.

Section two probed the general attitudes of the students through focusing on three axes: Internet and technical support, the academic content, in addition to evaluating the psychological status of the students. Section two utilised a 5- points Likert scale; where is 5: strongly agree, 4: agree, 3: neutral, 2: disagree, 1: strongly disagree. Questions are summarised in table (1)

AXES of interest	Questions
Internet and the technical support	Internet speed is appropriate, and I can attend the lecture without any interruption
	There is appropriate technical assistance from the university that facilitates the use of technological aids in the educational subject
	Enough information has been provided to use the website of the educational material
	Sending and receiving educational materials was without hindrance
	I can access the meeting easily and conveniently
	Do you feel that e-learning can be applied successfully in medical school
	Do you feel more organized for your time?

The academic content for students and their attitudes	Do you feel more comfortable sharing your thoughts on the e-learning platform than the classroom?
	Content is displayed electronically in a way that is interesting and not boring
	The online content of the subject is comprehensive
	The information obtained by e-learning is equal to that obtained by the traditional method
	I think exams can be held remotely
	I can ask any questions and inquiries during distance learning, and I will be answered
	There is constant coordination between me and the course teacher about the online content
Evaluation of the psychological status of the students.	I feel greater academic burden when using e-learning
	In general: Do you feel less anxious?
	Did the Psychological situation because of the Corona virus affect my studies?
	Did the psychological state caused by the Corona virus affect my acceptance of e-learning?

Table 1: summary of questions/ statements examined in section two of the distributed questionnaire.

Section three included two questions. The two questions probed the advantages and the disadvantages of online education from the students' perspectives.

The questionnaire was structured by the authors and reviewed mainly by the second author. The questionnaire was initially structured in Arabic, as it is the first language of all the target population, thereafter content was validated by the second and third author. The questionnaire was then translated into English for publication purposes. the language proficiency was detected by third and fifth authors. Before distribution, the Arabic version was further reviewed by all authors and being validated.

After being validated, the questionnaire was formatted into the Google forms, as it is highly accessible software, and it is commonly used for the college to collect data from staff and students.

In order to troubleshoot the questionnaire on the ground of quality, it was piloted on a total number of 100 participants sampled from the same target population and subsequently approved by authors. The questionnaire was then distributed to students by sending them a link to their university email addresses as above mentioned.

Participant

To check if the sample was representative, a sample size was calculated by using OpenEpi, Version using Kish formula15 for sample size estimation at a 95% significance level and a 5% error margin, the representative sample size is 1,000 and to overcome a non-response rate, a 10% sample was added which is 1,100. Therefore, the sample of 1,170 is statistically representative.

1,312 undergraduate medical students (from a total number of roughly 2,064), and about 1,170 students duly responded and completed the questionnaire. Therefore, the sample that was used for statistical analysis was N= 1,170 students.

Inclusion and exclusion criteria

Inclusion criteria

1. Medical students [undergraduate] in Mutah University's College of Medicine.

2. Current students.

3. Any gender and any nationality.

Exclusion criteria

1. Students NOT registered in the faculty of medicine.

2. Medical students from other universities.

3. University staff, whether from the College of Medicine or others.

4. Public Health Master students (postgraduate) at Mutah University.

Objectives and aims were explained at the beginning of the questionnaire to all participating students, and their participating in this study was after they consent without any obligation to contribute to the survey.

Aims and objectives:

This study generally aims to explore the students' evaluation of online education during the lockdown period due to the COVID-19 pandemic.

This can be broken down into the following objectives:

1. Evaluate the satisfaction of medical students in different academic years with online learning.

2. Assess the advantages and disadvantages of online courses.

Statistical analysis

Categorical data is expressed in frequency and percentages. Scale data is expressed in mean and standard deviation.

Due to the nature of questions assessed in section one and three, only descriptive and frequencies tests were used employing the IBM SPSS STATISTICS V25 for data analysis.

MANOVA TEST used to detect mean differences of attitudes, variables based on demographic data. IBM SPSS STATISTICS V25 was used to analyse data.

RESULTS

Section one analyses.

This part includes the demographic characteristics of the study sample namely, academic year of education, gender, academic level, and place of residence. A descriptive statistical method (frequencies and percentages) was used to describe these characteristics.

Variable	Subcategory	N	(%)
Academic Year	First year	552	47.2
	Second year	111	9.5
	Third year	100	8.5
	Fourth year	124	10.6
	Fifth year	128	10.9
	Sixth year	155	13.2
Gender	Male	686	58.6
	Female	484	41.4
Academic Level	Excellent	363	31.0
	Good	723	61.8
	Acceptable	68	5.8
	Fair	16	1.4
Place of Residence	Inside the governorate	431	36.8
	Outside the governorate	720	64.5
	Other	19	1.6

Table (2) Demographic characteristics of the study sample (N=1170)

Table (2) showed that the majority of respondents were in the first year of education 555(47.2%). Male gender respondents made up the majority in the sample 686(58.6%) compared to female respondents 484(41.4%). Regarding academic level, the vast majority of participants were of an acceptable grade 723(61.8%), while only 16 (1.4%) belonged in the excellent grade subcategory. 720 (64.5%) medical students resided outside the governorate, while 19 (1.6%) belonged to the other category, i.e., outside the country.

Statistical analyses of section two:

To answer the main research question: Does the medical students' attitude at Mutah University toward e-learning differ significantly at (α≤0.05) based on academic year, gender, academic level, place of residence, the mean and standard deviation were extracted for attitude total score and dimensions score based on demographic data as shown in table (3).

Variable	Category	Internet &Technical Support	Academic Content	Psychological impact	Attitude total score

		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Academic Year	First	3.35	0.88	3.51	0.78	2.49	0.90	3.24	0.67
	Second	2.83	0.90	3.11	0.91	2.45	0.79	2.89	0.71
	Third	2.54	0.92	2.78	0.95	2.56	0.84	2.67	0.76
	Fourth	3.07	0.89	3.18	0.87	2.47	0.80	2.99	0.65
	Fifth	2.93	0.82	2.99	0.81	2.37	0.63	2.83	0.60
	Sixth	3.36	0.83	3.38	0.78	2.44	0.71	3.16	0.60
Gender	Male	3.10	0.90	3.27	0.85	2.56	0.85	3.06	0.70
	Female	3.20	0.93	3.32	0.86	2.41	0.81	3.08	0.69
Academic Level	Fair	3.17	0.98	3.37	0.93	2.50	0.91	3.12	0.79
	Acceptable	3.12	0.93	3.26	0.82	2.46	0.79	3.04	0.64
	Good	3.35	0.88	3.27	0.81	2.36	0.70	3.09	0.65
	Excellent	3.80	0.76	3.77	0.77	2.61	0.98	3.52	0.66
Place of Residence	Inside the governorate	3.19	0.96	3.35	0.85	2.48	0.90	3.11	0.72
	Outside the governorate	3.13	0.90	3.27	0.86	2.47	0.78	3.05	0.67
	Other	3.35	0.92	3.35	0.99	2.24	0.83	3.10	0.76

Table (3) Mean and SD of respondents on attitude total score and dimensions score.

The results in table (3) show that there is an apparent difference in the mean score of the study sample on the total score for each dimension and the total score of the attitude scale based on demographic variables. To verify if these differences are statistically significant, at the level of significance ($\alpha \leq 0.05$), the MANOVA test was used, as shown in Table No (4).

Source	Dimension	Sum of square	Df	Mean square	F statistic	Sig
Academic Year Wilks' lambda (0.890) F=9.192 p≤0.001**	Internet &Technical Support	85.396	5	17.079	21.959	0.000**
	Academic Content	70.447	5	14.089	20.885	0.000**
	Psychological Status	2.506	5	0.501	0.732	0.600
	Attitude total score	45.106	5	9.021	20.374	0.000**
Gender Wilks' lambda (0.988) F=4.550 P=0.004*	Internet &Technical Support	2.687	1	2.687	3.176	0.075
	Academic Content	0.823	1	0.823	1.125	0.289
	Psychological Status	6.371	1	6.371	9.379	0.002*

	Attitude total score	0.121	1	0.121	0.252	0.615
Academic Level Wilks' lambda (0.979) F=2.787 P=0.003*	Internet &Technical Support	10.226	3	3.409	4.053	0.007*
	Academic Content	6.373	3	2.124	2.916	0.033*
	Psychological Status	1.497	3	0.499	0.729	0.535
	Attitude total score	4.623	3	1.541	3.232	0.022*
Place of Residence Wilks' lambda (0.966) F=0.0.852 P=0.530	Internet &Technical Support	1.585	2	0.792	0.935	0.393
	Academic Content	1.614	2	0.807	1.102	0.332
	Psychological Status	1.123	2	0.562	0.821	0.440
	Attitude total score	0.919	2	0.459	0.958	0.384

* Statistically significant at ($\alpha \leq 0.05$)   ** statistically significant at (≤ 0.001)

Table (4) MANOVA test results

Table (4) revealed that:

1. With regard to academic year, the results showed a statistically significant difference in attitude variables combined. (Wilk's Λ=0.890, *F*=9.192, p≤ 0.001)   A separate ANOVA analysis was conducted for each dependent variable and The Univariate between subjects' effects show statistically significant differences in the Internet &Technical Support dimension. F (5,1164) = 21.959, p≤ 0.001, Academic Content dimension F (5.1164) = 20.885, p≤ 0.001 and Attitude total score (5,1164) = 20.374, p≤ 0.001. But not for Psychological Status dimension. F (5.1164) = 0.732, p=0.600 based on Years of Education.

To show in favour of which academic year the statistical significance existed, a pairwise comparison (Bonferroni post hoc) test was performed for each dependent variable and suggests that medical students in the first and sixth year have an attitude mean score toward Internet &Technical Support more than medical students in second, third, fourth and fifth years with statistically significant differences (p≤ 0.001) for all. But they did not significantly differ from each other (p=0.895).

Also, a statistically significant mean difference was noted between medical students in second and third year in favour of second year medical students having a higher mean (p=0.016), and at the same time, the students in the first and sixth year have a higher attitude mean score toward academic content dimension than medical students in second, third, fourth and fifth years with a statistically

significant difference (p≤ 0.001) for all. But they did not significantly differ from each other (p=0.074).

Amazingly, similar results were found on total attitude score implying that students in the first and sixth year have a higher total attitude mean score than medical students in the second, third, fourth and fifth years with a statistically significant difference (p≤ 0.001) for all. But they did not significantly differ from each other (p=0.216).

2. Regarding to medical students' genders, the results showed there was a statistically significant difference in attitude variables combined. (Wilk's Λ =0.988, F=4.550, p= 0.004) a separate ANOVA analysis was conducted for each dependent variable and the univariate between subjects' effects show, the statistically significant differences were only noted in Psychological Status dimension F (1,1168) = 9.379, p=0.002. Not for Internet &Technical Support dimension. F (1,1168) =3.176, p=0.075. Academic Content dimension. F (1,1168) =1.125, p=0.289 and Attitude total score. F (1,1168) =0.252, p=0.615.

Consequently, the mean score of psychological impact for male medical students was statistically significantly higher than the female mean score (M=2.56, M=2.41) respectively (p=0.002).

3.With regard to medical students' academic levels, the results showed a statistically significant difference in attitude variables combined. (Wilk's Λ =0.979, F=2.787, p=0.003) a separate ANOVA analysis was conducted for each dependent variable and the Univariate between subjects' effects show statistically significant differences in Internet &Technical Support dimension. F (3,1166) =4.053, p = 0.007, Academic Content dimension F (3.1166) =2.916, p= 0.033 and Attitude total score. F (3,1166) = 3.232, p =0. 022.But not for Psychological Status dimension. F (3.1166) = 0.729, p=0.535 based on years of education.

To show in favour of which academic level the statistical significance existed, a pairwise comparison (Bonferroni post hoc) test was performed for each dependent variable and suggests that medical students at an excellent academic level have an attitude mean score toward Internet &Technical Support more than medical students of fair and acceptable academic grades, with statistically significant differences (p=0.007, p=0.003) respectively. While no statistically significant mean differences were detected between the remaining academic levels (p>0.05) for all.

For the academic content dimension, the results show that students of excellent academic level have an attitude mean score toward the academic content dimension more than medical students of acceptable and good academic levels, with statistically significant differences (p=0.018, p=0.034) respectively. While no statistically significant mean differences were detected between the remaining academic levels (p>0.05) for all.

For Attitude total score, medical students in the excellent level had an attitude mean score more than medical students of fair, acceptable and good academic levels with statistically significant differences (p=0.023, p= 0.006, p=0.024) respectively. While no statistically significant mean differences were detected between the remaining academic levels on the total attitude score (p>0.05) for all.

4. Finally No statistically significant mean differences were noted in the attitude variables combined based on medical students' place of residence. (Wilk's Λ =0966., F=0.852, p=0.530).

Section three analyses

Advantages of Online Education

The main advantages of online learning, categorized broadly by students, arranged from the highest frequency to the lowest:

1. Time saving- 48.85%.

2. Flexibility- 35.46%.

3. Cost saving- 29.34%.

4. Other advantages- 9 responses.

Disadvantages of Online Education

A new experience without preparation, paired with the uncertainty and dangerous circumstances of a viral outbreak cannot pass without negativity. The main disadvantages of the online learning experience were found to be as follow:

1. Online learning could not match the knowledge obtained during hospital rounds and practical classes (90% of the responses). Students felt that online learning could never provide the practical aspects of medical education.

2. Disadvantages related to the lecturers such as the lack of direct communication with students, the lack of technical experience using online programmes and even a lack of commitment to the online mode of teaching.

3. Disadvantages related to the students such as cost and time efficiency, the difficulty of reading using electronic devices and feelings of uncertainty about online education as an efficient mode of learning.

4. Disadvantages related to the internet:

- 10% of students complained about the cost of internet usage.

- 30% complained about the quality/speed of the internet service which impacted the downloading of lectures and study material and the ability to attend live lectures and meetings.

Other: Generally bad and stressful experiences with no reasons specified (20%), Some students (less than 3%) complained of developing health problems after using their smartphones or PCs for E-learning such as problems with vision, headaches, and muscle spasms.

DISCUSSION

This study aimed to evaluate undergraduate medical students' experiences with the e-learning method of teaching, which is considered a "proper alternative" in the College of Medicine as well as

in all faculties of Mutah University, to provide high standard education during the COVID-19 pandemic.

In this study, we explored student's thoughts and attitudes toward their experiences learning through this new method, with the quality of electronic content and technical support and problems related to the internet as main factors. In addition, we evaluated their mental health during these critical times.

Recent studies(Al-Balas et al., 2020; Chandrasinghe et al., 2020; Pozo-Rico, Gilar-Corbí, Izquierdo, & Castejón, 2020; Tabatabai, 2020) summarised the main challenges or barriers, as they said, that had an impact on e-learning as a teaching method. These were related to infrastructure, institutional/educators, and or student barriers. They stated that the lack of infrastructure, technology, internet access, and poor quality of internet services are examples of barriers that impact both learners and faculty members(Al-Balas et al., 2020; Dutta et al., 2021). In this study, internet issues were not an obstacle especially for the first year and sixth year students. While this was a good finding, considering their sample size, and in case e-learning would become long-term rather than temporary, the internet problems and technical support should be taken in consideration. Therefore, based on the preliminary results of this questionnaire, the College of Medicine formed a committee from the faculty staff and IT experts to be in direct contact with students to solve any emerging problems immediately.

Regarding the evaluation of the academic content and its quality, it was notable that students with distinction (excellent grades) had a positive attitude. The staff in the College of Medicine utilised different platforms such as PowerPoint, Microsoft Teams, Zoom, and even WhatsApp groups to ensure quality academic content was delivered to students.

Assessing the students' stress levels, male students expressed higher levels of stress and depression with the situation during the COVID-19 pandemic and the consequent lockdowns. The authors were pleasantly surprised at the female students' resilience and ability to cope with stress.

It was interesting that there was no significant difference in attitude between students who resided inside the governorate and those who resided outside the governorate. One would expect those residing outside the governorate to have a more positive attitude due to the elimination of the necessity to travel to and from the university campus. These students no longer resided in dormitories, thus eliminating the need to cook their own meals and the many other burdens of a student living away from home.

In the students' opinions, advantages of online learning are as follows:

1. Students had more time to study and revise.

A. Time was saved in transportation to/from the university campus.

B. Students could attend lectures at a time that suited them. This flexibility was useful to students at times when they were not feeling well or could not wake up for early classes.

C. More time was available for family and other activities.

2. Flexible system.

A. No obligation to attend the lectures at a precise time because they were pre-recorded. This was true for lectures in basic medical sciences as there were no live meetings. However, starting from the beginning of the fall (first) semester 2020/2021, the College of Medicine adopted Microsoft Teams as its official online educational platform, making attendance of live streaming lectures mandatory. Therefore, we do not know whether this point is still valid or not.

B. Studying whenever and wherever the student pleases, with comfort and less barriers and with no unnecessary interruptions. As some students remarked that sitting in the lecture hall was uncomfortable.

C. Students were able to study at their own pace. Students were able to watch the lectures over and over at any time with clearer sound and images.

D. The ability to study and memorize information while the video of the lecture is playing. There was no need to listen to the lecture again to write down notes.

3. Easing the financial burden of student expenses:

A. For transportation to get to the university campus and back home.

B. For accommodation and other living costs necessary for students residing outside the governate.

C. Money for food, snacks.

D. Money spent on hard copies of lectures.

4. Other

A. By adopting online learning, students avoided dropping or postponing the semester.

B. Students developed their skills using a variety of programmes and became more proficient in research using the internet.

C. Feeling safer during the COVID-19 pandemic. Being home helped mitigate the spread of infections, which eased the students' fears.

Disadvantages: Students mentioned several disadvantages of online education. The main disadvantages are as follows:

1.Time wasting. while 48.85% said e-learning saved their time as explained earlier, other students (10 %) did not take online education seriously, thus wasting time and not benefiting from the experience.

2. Reasons related to teachers: lack of direct communication, lack of experience using online programmes and lack of commitment.

A- The lack of direct and instant connection/communication between the teacher and students, which reduced the quality of receiving information.

B- Insufficient experience of teachers dealing with e-learning tools. This led to the poor quality of lectures and consequently negatively impacted the experience.

C. Lecturers did not adhere to specific times for downloading their lectures.

3. Reasons related to students.

A. Time wasting

B. The preference of lectures and slides as printed out copies. These students faced difficulty studying electronically because they were not used to it and found it hard to adjust.

C. The lack of a clear plan regarding online education, due to the uncertainty of whether this mode of education would continue or would be temporary.

D. Problems faced at the very start of the implementation of online education. Due to the abrupt announcement of the lockdown in Jordan, some students admitted to leaving their belongings, books and notes in their accommodations. Consequently, they could not read or follow up as they thought that the suspension of educational institutions would be for only two weeks (as was announced by the government at the time).

3. Reason related to internet.

The cost of internet usage, problems with the quality/speed of the internet service which impacted downloading lectures and the quality of live lectures and meetings.

4, Generally negative experiences, both psychological and physical stress in some cases.

5. Other: some comments were not reported by a statistically significant percentage, however, they are worth mentioning:

A. Families having more than one university and/or school student complained that those students sometimes competed for the use of one device or struggled to find enough room to study with siblings. And if more devices were available, their use for e-learning proposes caused an overload on the internet service.

B. Students complained that some programmes such as Zoom®, were problematic despite having a high satisfaction rate. Some students claimed that they were not able to watch the lectures again.

C. Students claimed that the teachers exceeded the usual lecture duration. They also complained of long lectures full of minute details that had never been discussed before.

D. Some students did not take the e-learning experience seriously and claimed that lecturers, in turn, did not show any seriousness and lacked in support and cooperation.

Strengths and limitations

To the best of our knowledge, this is the first paper from Mutah University discussing Medical Distance e-learning in Jordan, and it is added to the two other Jordanian studies(Al-Balas et al., 2020; Sindiani et al., n.d.). However, further studies are required to assess the students' attitudes in other universities and to compare the results in order to assess the limitations of this new educational mode, in an effort to overcome obstacles/difficulties and to optimize preparation for any possible future scenarios.

CONCLUSION AND RECOMMENDATION

During the lockdown period, most of us thought it would be a transient period and we could use the time to revise previously discussed materials on face-to-face mode. The suspension period was extended, and the two-week period initially announced by the government stretched to two semesters. The e-learning mode has become the only possible educational tool in educational institutions all over the world due to the pandemic. Teaching in medical school is quite traditional, therefore, introducing any change is usually faced with much resistance. Mutah University already offered many courses that were taught online, and the University utilised online platforms long before the pandemic and lockdown period. Despite this, in the College of Medicine, the experience was quite challenging for both student and lecturers.

E-learning has various advantages, such as: flexibility (time and place), cost effectiveness as it diminishes the use of facilities and labs, allows self-pacing (Holmes and Gardner 2006). Dowling et al. (2003) stressed that e-learning yielded better outcomes in specific courses. On the other hand, the most obvious downside of e-Learning is the absence of individual interactions, not only between students and instructors, but also among colleague students themselves (Jorge et al 2006).

Some challenges/obstacles noted are summarized in the following points:

1. Infrastructure and lack of readiness problems. Represented in the lack of an educational platform that adequately encompasses educational content and media formats.

Particularly with videos and audio recordings, and the inability of those outside the university's electronic server to access these platforms. For the aforementioned reasons, this may explain the answers of many who faced difficulty using different new educational software and platforms.

2. Difficulty in accepting change and problems adapting to modern means of learning by students in light of the speed of transition in addition to the circumstances nationally and internationally.

The difficult psychological state of students and their fear of evaluation methods or how the final exams are going to be sit during e-learning must be considered. This uncertainty, especially for the graduates, may have significantly influenced their opinions and their acceptance of the e-learning materials.

3. Facing technical problems: E-learning allows students to access educational content whenever they want, as well as allowing learning in a more flexible manner than traditional education, where the student can choose the speed and method of their progress. Despite this, a large percentage of students faced great difficulty accessing content due to the lack of adequate internet speed and/or internet packages that might be above a student's budget.

4. Dullness and lack of the necessary motivation for students to learn from a distance. This may be due to several reasons, including the presentation of scientific content in a dry, unstimulating way (especially for theoretical subjects) and there was no direct interaction between the scientific content provider (the teacher) and the student, or even between the students themselves.

From our point of view, e-learning solved many problems which our students usually complained about. E-learning gave students the opportunity to listen to the lecturer and see PowerPoint slides, as

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if it is a one-on-one lecture, as students always complained that the lecture hall or theatre did not provide fair opportunities to all of them. E-learning saved the time wasted in travelling to and from the university campus and minimized time wasted waiting for the next lecture or lab. E-learning offered a platform for students to pose their questions directly to the lecturer instead of waiting for office hours. On the other hand, e-learning deprived students from direct involvement and hands on experience in the labs. In addition, methods and programmes used to evaluate students online may not be fair or accurate in assessing academic levels.

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CONFLICT OF INTEREST

We have no conflict of interest to declare.

ETHICAL APPROVAL STATEMENT

The Ethics Committee Approval Number: 10022021

AUTHORS CONTRIBUTION

AAA and IMA think up and designed the questionnaire. IMA did the statistical analysis and wrote the first draft of the discussion section. AAA and GHA wrote the initial draft of the introduction and the conclusion sections. AAA assembled the sections together and HMA critically reviewed all the paper's drafts and provided logistic support. MST proofread and edited the final draft. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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