Original article

ELECTRONIC LEARNING IN MEDICAL EDUCATION IN THE ERA OF COVID-19: ACADEMIC STAFF PERSPECTIVES

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A R T I C L E   I N F O

A B S T R A C T

Electronic learning was used as a substitute method for learning during the COVID-19 pandemic to conduct scientific materials and perform student assessment; this study aimed to investigate academic staff opinions toward electronic education. A cross-sectional study with a web-based questionnaire distributed to academic staff in different medical colleges in Iraq. After de-identification, data were collected and analyzed with statistical software to determine the significance between variables. A total of 256 participants were enrolled in the study: 83% were not satisfied or neutral to online learning, 80% showed a poor benefit from delivery of the practical electronic knowledge and 25% for theoretical sessions with a significant difference. After the era of COVID-19, 75% of participants don't recommend electronic learning for delivering practical knowledge, while only 45% don't recommend it for delivering theoretical knowledge. Participants acknowledged the low genuine attendance, virtual lectures, and little student interest in scientific materials with a percent of 56% and 61% of participants respectively. They agreed that efficacy of daily student assessment and electronic exams were poor with 60.1% and 80% of participants' opinions, respectively. 56% agreed the electronic assessment could not discover students cheating on the exam. The unplanned and rapid transition to electronic learning presented challenges at all academic levels. Not much information on the best practices was available to guide such transitions. The lack of social interaction, requirement for self-motivation, time management skills, the inaccessibility to others and the unavoidability of cheating and focusing on theory may all negatively impact the educational process.

1. Introduction

COVID-19, a worldwide public health crisis was declared by the World Health Organization as a pandemic in March 2020. (1)

Several medical schools have discontinued face-to-face education as social distancing is important at this stage. Educational institutions are attempting to devise alternative approaches to dealing with this difficult situation. (2)

The electronic learning indicate "Anything that is given, enabled, or mediated by electronic technology for the express goal of learning" (3)

Many faculties have been involved in determining the best way to provide online course materials, electronic learning, engage students, and conduct evaluations. (4) Dealing with this current situation due to lockdown caused by the pandemic was difficult for the educational sectors; professional education and, particularly, medical education. (5)

During the COVID-19 pandemic, many universities worldwide used e-learning for medical education. (6-9). The advancement of information and communication technologies and the internet have contributed to the advancement of teaching and learning by shifting from traditional methods of instruction to new methods in which technology is integrated throughout the teaching and learning process. (10)

Most students nowadays use the internet, and many have smartphones and laptop computers, indicating a strong technological foundation for implementing e-learning. (11-13)

Like the rest of the globe, Iraq has been shut down in every aspect of life during the pandemic. This lockdown affected schools and universities, forcing them to use electronic learning as a last resort. Some colleges have digital learning platforms, but they aren't fully functional. To deal with the obstacles and meet students' expectations, Iraqi universities have used electronic learning and blended learning to varying degrees. (14, 15)

There is little study on the impact of the rapid shift from traditional to electronic learning in medical education, and the issues that come with it are not well understood. (16)

Teachers who are not sufficiently trained may have difficulty using the applications. Furthermore, lecturers at higher education institutions must embrace, apply, and utilize technical improvements made possible by electronic learning for successful outcomes. Such innovative instructional techniques are required to maintain course quality. (3)

As a result, understanding the technological, institutional, budgetary, faculty and student challenges to successfully deploying e-learning in medical education is critical. (16)

The aim of this study is to investigate the perspectives of academic staff toward electronic education including teaching and assessment methods in different Iraqi medical colleges in the pandemic and post pandemic periods.

2. Material and methods

The study was a cross-sectional - web-based questionnaire survey. The participants were academic staff from medical colleges in different Iraqi governmental universities. The study was conducted during the period from June 2021 to November 2021. Participants were contacted through different official college groups on email, WhatsApp, Viber, and Messenger as these are the most common communication methods used by medical schools. The Ethics Committee at University of Baghdad Al-Kindy College of Medicine approved the study. Participants received an electronic link, accompanied by a letter stating the study title, the objectives, and the length of the survey, confidentiality, and the investigator's name. They also acknowledged that the collected data would not be shared and kept anonymous. All collected data were de-identified and exported to a Microsoft Excel file for analysis.

Survey questions were based on literature review, interviews with academic staff, and discussion with experts in medical education who broadly discussed and reviewed the topic for appropriateness and consistency.

Data were analyzed using SPSS V26 statistical software. Descriptive statistics were presented using tables and graphs. While the Chi-square test was used to determine the significance of association between related categorical variables, a p-value less than 0.05 was considered a cutoff point for significance.

3. Results

Of the total 1200 invitations sent, respondents were only 278 from 26 medical schools from all 18 Iraqi governorates.

Twenty-two were excluded because of incomplete data, leaving 256 participants for analysis, 1:1 male to female. In addition, 139 of the participants were from the basic sciences department of medical colleges; others were from clinical departments. Finally, 41 of the participants were professor-titled, and nine held post-doctorate degrees.

In general, the majority of academic staff was not satisfied with electronic learning. Most respondents (83%) reported not satisfied or neutral opinion toward electronic education as a substitute for traditional medical learning and indicated a preference for face-to-face medical education. 44% were not satisfied. 39% neutral and only 17% were satisfied. There was no significant association between medical staff in the basic sciences or clinical departments and satisfaction with electronic learning maneuvers as a substitute for classroom and bed learning (P>0.05) (Table 1).

Branch		Not satisfied		Neutral		Satisfied		P value
		N	%	N	%	N	%	
Branch	Basic Sciences	60	43.2%	60	43.2%	19	13.7%	0.172
	Clinical	52	44.4%	40	34.2%	25	21.4%	

Table 1. Satisfaction with electronic (online) medical education

The main point of dissatisfaction of electronic learning efficacy during the pandemic for medical education was the practical session delivery and beneficence. 80% of the medical staff showed unconvinced of the benefit of the practical electronic session in teaching medical skills, versus 7% who were satisfied. But, the percentage of inconvenience dropped 25% with theoretical sessions and delivering factual knowledge with a significant p. value less than 0.001. Likewise, according to X2-test, there was no significant relationship between satisfaction with electronic learning and the staff's affiliation, whether from the basic or clinical department (Table 2). Furthermore, 75% of academic Staff doesn't recommend online methods for delivering practical or clinical knowledge after the era of COVID-19. However, this percent dropped to 45% regarding theoretical knowledge delivery with a significant P value less than 0.001. Again, there was no significant relationship between satisfaction to recommend electronic knowledge after the pandemic and the staff's affiliation (whether from the basic or clinical department). (Table 3).

		poor			Fair			Good			P value	
		N		%	N		%	N		%		
Delivering Theoretical Knowledge	Basic Sciences	31	64	22.3%	45	77	32.4%	63	115	45.3%	0.489	
	Clinical	33		28.2%	32		27.4%	52		44.4%		0.001*
Delivering Practical or Clinical Knowledge	Basic Sciences	111	206	79.9%	18	31	12.9%	10	19	7.2%	0.899	
	Clinical	95		81.2%	13		11.1%	9		7.7%		

Table 2. Efficacy of electronic learning to deliver theoretical and practical knowledge during the pandemic

		Not recommended			Neutral			Recommended			P value	
		N		%	N		%	N		%		
Delivering Theoretical Knowledge	Basic Sciences	64	114	46.0%	35	59	25.2%	40	83	28.8%	0.367	
	Clinical	50		42.7%	24		20.5%	43		36.8%		0.001*
Delivering Practical or Clinical Knowledge	Basic Sciences	101	191	72.7%	25	38	18.0%	13	27	9.4%	0.274	
	Clinical	90		76.9%	13		11.1%	14		12.0%		

Table 3. Academic Staff recommendations for electronic learning after the era of COVID-19

With COVID-19 reported in almost all countries, electronic learning provides a substitute solution for medical education to protect the health of students and teachers. However, only 29% of the participants were in agreement about this substitution. 42% disagreed with replacing face-to-face teaching with an electronic one.

To assess the suitable application for medical teachers to achieve the mission of electronic learning, Google Meet and Zoom application ranked first and second and constituted the majority of choices (90%). The medical staff also recommended the same two applications as most effective in the learning process (Figure 1-2).
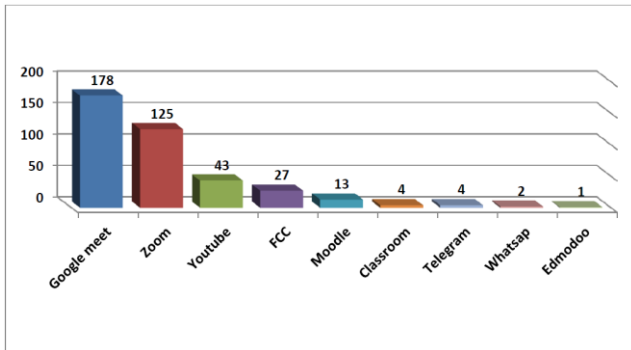
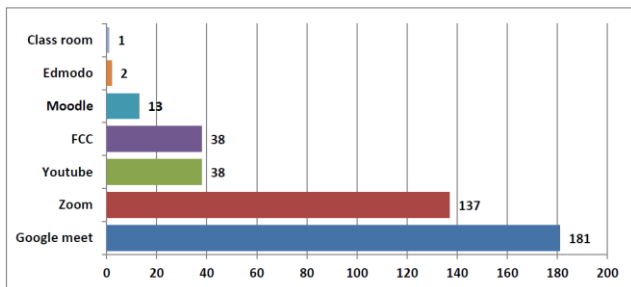

Figure 1. More frequently used applications

Figure 2. Most recommended applications

56% of medical staff agreed that students had poor attendance and stuck to virtual lectures, and only 16 % declared a good student interaction. 61% also agreed that the students would have poor attention to the lecture and scientific material in electronic learning versus 14% who acknowledge good attention (Table 4).

Assessment of the student is the other face of medical education; most of the teachers agreed that electronic learning is associated with poor student assessment. The online platforms for daily student assessment were not accepted as an alternative to the traditional exam, and only 13.3% of the respondents showed a good response. Furthermore, only 5.8% showed a good response regarding the efficacy of the electronic exams as a tool for the final student assessment (Table 5). The major concern of staff about the assessment, which brings more challenges, is the fear that students could cheat more than in on-site or face-to-face conditions. Most of the staff agreed that a good chance for cheating would present in the electronic exam, of them; 56% suggest that electronic learning tools cannot discover students cheating on the exam (Figure 3).

	Good		Fair		Poor	
	N	%	N	%	N	%
Real attendance and sticking to virtual lecture	41	16%	71	28%	144	56%
Level of student attention to lecturer and scientific materials	36	14%	63	14%	157	61%

Table 4. Opinion regarding real attendance and level attention to online materials

	Poor		Fair		Good	
	N	%	N	%	N	%
Efficacy of daily student assessment	154	60.1%	68	26.6%	34	13.3 %
Efficacy of electronic exams	207	80.0%	34	13.2%	15	5.8%

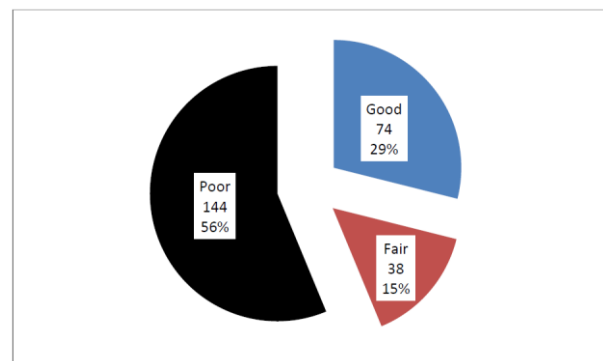**Table 5. Efficacy of daily assessment and electronic versus traditional exams.**

Figure 3. Ability of electronic learning to discover student cheating in the exam

4. Discussion

During the COVID-19 pandemic era, medical education witnesses a vital transition from the traditional education to online education as well as all educational institutions. However, for medical colleges the requirements for knowledge and skills are very important and were a true challenge for the faculty and the students.

All aspects of medical education were affected and went through many difficulties in this pandemic era and adjustment in teaching methods and curriculum was done using multiple online approaches. Many literatures said that the e-learning was an excellent substitute to improve the teaching methods and was the only solution available (17).

This study shed a light on the quality, facilities and difficulties from medical teachers' point of view.

The results of this study showed that 44% of the Iraqi medical faculty teachers were totally unsatisfied with the outcome of the distant e-learning. As previously assessed, the Iraqi colleges were rarely using e-learning pre-covid-19 era (distance teaching has become a global trend since 1990), and provide their curriculum depending mostly on face-to-face education. So, it was a real challenge when the authorities and conditions enforced the total change to distance learning.

Nevertheless, 58% of the total participants agreed or were neutral with the use of e-learning during the quarantine, while 42% didn't agree with the substitution.

This result may agree with many related literatures (16).

It is well viewed that information and communication skills (ICT) are currently used in education to assist students in learning more efficiently and helping the tutors/teachers to be more efficient in undertaking their tasks; but, the poor net service and the opposition of many teachers to renew their mode of teaching and learning new technology could explain these results.

Using online platforms and social media for educational purposes helps the teachers to share knowledge and information with students to enhance their academic performance, especially when the teacher uses an interactive technique. But for many teachers the problem with teaching skills and practical sessions in distance learning was immense (75% were not satisfied), while this percent dropped to 45% in theoretical teaching.

It is well understood that online learning couldn't replace the formal or traditional learning in providing patient contact and clinical experience and the practical session is still a challenge (18), but under the circumstances it was either virtual classrooms or no education at all and this will cause a big threat to the education institutions form primary schools to post-graduate level. Alternative and innovative methods should be used in practical and clinical sessions, as students can be invited into the simulated class to participate in history taking, observe virtual physical examination, be a part of decision-making, patient and family counseling, and planning of implementations of treatment plan.

The completion of telehealth interactions that are supplemented by e-learning would help to create a new blended learning model that still promotes patient involvement and would make the learning experience real, unlike sometimes the very impersonal and almost inauthentic e-learning experiences that exist in place of clinical rotations. (19) As for the programs used in online teaching, as many resources were available, Google classroom meeting was the most preferable because of the easy way to excess to it for teachers as well as the students, then came Zoom and You-Tube. As for other programs, they were less preferable and this result was in accordance with many other results (18).

The real challenge for distance education is performing an effective online exam. E-exams are particularly helpful as it includes marking and reporting the examination, later on storing, performing statistical analysis and prompt feedback. They are more useful when the class sizes are considerable. Even though this study stated that 81% of the examiners didn't account the exam as a good index for assessment, only 6% agree with the online exam. This result might explain the effectiveness of e-exam for assessing student knowledge, but not skills, which are ultimately required in medical education. Besides, there is a wider opportunity for cheating on such exams.

These results disagree with many literatures as other countries have a more sophisticated monitoring programs (like blackboard), PBL-type of exams and collaborative learning/exams (19-20). Standard and well monitored exams are in urgent demand for Iraqi educational institutions of medicine. And a well-constructed online exam containing verities of problem-based question approaches is also needed instead of traditional multiple-choice questions which facilitated the cheating as a large number of students enforce the easily conducted and marked questions (19-21).

The main limitation to our study was the small number of participants related to invitations sent, however, there was a good diversity of participants from different Iraqi governorates and regions.

5. Conclusions

The unplanned and rapid transition to electronic learning presented challenges at all academic levels. Not much information on the best practices was available to guide such transitions .The lacks of social interaction, requirement for self-motivation, time management skills, inaccessibility to others and the unavoidability of cheating and focus on theory may all negatively impact the educational process.

6. Conclusions

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