Original Article

# Knowledge Assessment of Medical Students' College regarding the Suitability of E-Learning Application in Medical Education

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## Abstract

**Background:** E-learning (electronic-learning) usually means the introduction of electronic media and other useful communicative technologies in the undergraduate and postgraduate education. E-learning is a wide term including all forms of modern educational technology in learning process and teaching, which is more appropriate for both distance and flexible learning. **Objective:** This study aimed to determine the students' knowledge regarding the suitability of e-learning application in the medical education. **Materials and Methods:** A study was done on the students of the second and fifth medical stage at Tikrit Medical College during the period from April 1, 2021, to the end of June 2021, and 520 medical students were included in the study (260 students from both stages). The data were collected through a special questionnaire sheet that contains four main items about the e-learning, and the electronic distribution of the form was conducted after receiving their verbal consent before participation in the study after full, detailed information about the study was given. The statistical test, Chi-square test, was used to estimate the relation between the current variables, and $P < 0.05$ was regarded significant. **Results:** The current study shows that 53.1% of the studied students were female, 65.4% within the age group 23–24 years, and 85.3% living in the rural area. There is a statistically significant among 39.7% of male study students from the second stage that the main difficulty is the disagreement of medical staff in comparison to 54.6% of students from the fifth stage that the main difficulty is the financial problems. On the other hand, 37.2% of study students from the second stage disagree that e-learning is affected by good trainer skills compared with 15.1% of study students from the fifth stage. **Conclusion:** For female students of both stages, the main problem affecting e-learning is the current administrative instruction. The study recommended that e-learning introduction into the graduate and undergraduate education will promote a direct shift toward future adult learning in all branches and aspects of educational cycle.

**Keywords:** Assessment, e-learning, medical education, quality improvement, suitability

## Introduction

Medical education can be defined as an education related to the practice of being a medical practitioner or healthcare-related providers, either the initial training to become a physician (i.e., medical school) or across the various disciplines of health professionals (dental schools, pharmacy school, therapy schools, etc.) and internship, additional training thereafter (e.g., residency and fellowship), or physician assistant education.[1]

Medical education is a long, time-consuming process. The reality is that it never ends. Even after an individual graduates from the medical school, there is a constant need to learn new and updated information.[2]

Electronic learning (e-learning) can be defined as a system based on formalized teaching but with the help of electronic resources. While teaching can be based in or out of the classrooms, the use of internet and computers forms the main important component of e-learning. E-learning can also be mentioned as a network-enabled transfer of knowledge and skills, and the delivery of education is based on a large number of recipients at the same or different times. Later, it was not accepted all over the world

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because it was assumed that this type of learning deficient the human element, which is required in learning.[3,4]

E-learning, usually mentioned as online learning or e-learning, is the acquisition of knowledge that takes place through electronic media and technologies. Typically, e-learning is conducted on the internet, where students can access their learning materials online at any time and place.[4,5]

E-learning has many benefits including the following:

1 Increased accessibility to information and communication process
2 Easy in updating content and distribution
3 Personalized instruction
4 Standardization of content and accountability.[6,7]

E-learning consists of many types of media that deliver images, text, audio, streaming video, and animation, and contains technology process and applications such as video-tape, audio, CD-ROM, satellite TV, and web-based learning in addition to computer-based learning.[8,9]

E-learning may occur out or in the classroom. It can be instructor-led or self-paced, asynchronous learning. It is mainly concentrated that new technologies lead to a big gap in education.[10] Many numerous parts of e-learning agree that everyone should be maintained with a basic knowledge of technology and also to its usage as a main way for reaching educational aims and goals.[10,11]

The aim of the study was to assess the medical students' knowledge regarding the suitability of e-learning application in medical education.

## Materials and Methods

### Study setting

This study was done at Tikrit Medical College among the students of the second and fifth stage.

### Sampling techniques

A cross-sectional study was carried out among students of both stages (second and fifth) and randomly selected 260 students as samples from each stage. A special questionnaire form was prepared for this purpose and distributed after obtaining the verbal agreement from them, and the data were collected by electronic distribution, and full, detailed information about the study was given about the study aim.

### Study period

The study period was from April 1, 2021, to the end of June 2021.

### Data collection tool

A specific questionnaire form has been prepared by a researcher maintaining all the updated references and included four essential components.

Part 1: socio-demographic parameters such as gender, age, study stage, and residence
Part 2: students' knowledge regarding the main difficulties and problems subjected through the e-learning application
Part 3: students' knowledge regarding the factors affecting the e-learning application in the current situation
Part 4: students' knowledge regarding the suitability of e-learning application in the medical curriculum improvement.

### Statistical analysis

Number and percent were used for all the statements with yes and no answer.

The statistical test used was Chi-square test to estimate the correlation between the current variables, and $P$ value $< 0.05$ was regarded significant.

### Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with students verbal and analytical approval before the sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document no. 1 on 1/04/2021.

## Results

Table 1 shows that 53.1% of the studied students were female, 65.4% were within the age group 23–24 years, and 85.3% were living in the rural area.

Table 2 shows that there is a statistical significance among 39.7% of male study students from the second stage that the main difficulty is the disagreement of medical staff in comparison to 54.6% of students from the fifth stage that the main difficulty is the financial problems with $P$ value = 0.006.

On the other hand, for female students of both stages (second and fifth), the main problem is the current administrative instruction (19.2%, 45.4%, respectively), with $P$ value = 0.181.

Table 3 presents that there is a significant statistically agreement among 64.2% of the second stage students that e-learning is affected by low adoption rate in comparison to 38.9% of students from the fifth stage who agree that a lack of e-learning quality content is the main factor, with $P$ value = 0.000.

On the other hand, 37.2% of study students from the second stage disagree that e-learning is affected by good trainer skills compared with 15.1% of study students from the fifth stage, with $P$ value = 0.000.

**Table 1: Frequency distribution of medical students college according to social characteristics**

| Social character | | Second stage, N = 260 | Fifth stage, N = 260 | Total, N = 520 | |
|---|---|---|---|---|---|
| | | No. | No. | No. | % |
| Gender | Male | 156 | 88 | 244 | 46.9 |
| | Female | 104 | 172 | 276 | **53.1** |
| Age group (years) | 20–22 | 86 | 68 | 154 | 29.6 |
| | 23–24 | 158 | 182 | 340 | **65.4** |
| | >24 | 16 | 10 | 26 | 5 |
| Residence | Rural | 226 | 218 | 444 | **85.3** |
| | Urban | 34 | 42 | 76 | 14.7 |

Bold values refer to most frequent comment value present in the study

**Table 2: Study of medical students' knowledge regarding the main difficulties in e-learning**

| Students' knowledge about the expected difficulties in e-learning application | Study students, N = 520 | | | | *P* value* |
|---|---|---|---|---|---|
| | Second stage, N = 260 | | Fifth stage, N = 260 | | |
| | M | F | M | F | |
| | No. (%) | No. (%) | No. (%) | No. (%) | |
| The current administrative instructions | 30 (19.2%) | **42 (40.4%)** | 12 (13.6%) | **78 (45.4%)** | 0.181 |
| Disagreement of medical staff | **62 (39.7%)** | 22 (21.2%) | 14 (15.9%) | 46 (26.7%) | 0.006 |
| Financial problems | 46 (29.4%) | 10 **(9.6%)** | **48 (54.6%)** | 26 (15.2%) | 0.006 |
| More technical resources are needed | 18 (11.5%) | 30 (28.8%) | 14 (15.9%) | 22 (12.7%) | 0.274 |
| Total | 156 | 104 | 88 | 172 | |

*$\chi^2$ test was used

Bold values refer to most frequent comment value present in the study

**Table 3: Students' distribution about the factors affecting e-learning application in the current situation**

| Factors affecting e-learning application in medical education | Students' opinions | | | | | | | | *P* value* |
|---|---|---|---|---|---|---|---|---|---|
| | Second stage, N = 260 | | | | Fifth stage, N = 260 | | | | |
| | Agree | | Disagree | | Agree | | Disagree | | |
| | No. | % | No. | % | No. | % | No | % | |
| Good trainer skills | 16 | 8.4 | **26** | **37.2** | 54 | 35.1 | **16** | **15.1** | **0.000** |
| Lack of computer interest | 46 | 24.2 | 22 | 31.4 | 32 | 20.8 | 24 | 22.6 | **0.593** |
| Low adoption rate | **122** | **64.2** | 14 | 20.0 | 8 | 5.2 | 54 | **50.9** | **0.000** |
| Lack of quality of e-learning content | 6 | 3.2 | 8 | 11.4 | **60** | **38.9** | 12 | 11.4 | **0.000** |

* $\chi^2$ test was used

Bold values refer to most frequent comment value present in the study

**Table 4: Medical students' distribution according to the suitability of e-learning application in medical curriculum improvement**

| Students' knowledge about the suitability of e-learning in medical curriculum | Study students, N = 520 | | | | | | *P* value* |
|---|---|---|---|---|---|---|---|
| | Second stage, N = 260 | | Fifth stage, N = 260 | | Total, N = 520 | | |
| | Agree | Disagree | Agree | Disagree | Agree | Disagree | |
| Clinical science only | **66 (55.9%)** | 46 (32.3%) | **68 (70.8%)** | 24 (14.6%) | 82 (38.3%) | 70 (22.9%) | 0.113 |
| Basic sciences only | 22 (18.6%) | 20 (14.2%) | 16 (16.7%) | 42 (25.7%) | 90 (42.1%) | 62 (20.2%) | 0.790 |
| Both of them | 30 (25.8%) | **76 (53.5%)** | 12 (12.5%) | **98 (59.7%)** | 42 (19.6%) | 174 (56.9%) | 0.094 |
| Total | 118 | 142 | 96 | 164 | 214 | 306 | |

*$\chi^2$ test was used

Bold values refer to most frequent comment value present in the study

Table 4 shows that a majority of students from both stages (second and fifth) agreed that e-learning application is suitable for clinical sciences only (55.9% and 70.8%, respectively), with *P* value = 0.113, whereas both students from two stages disagree that e-learning is suitable for both clinical and basic sciences (53.5% and 59.7%, respectively) with *P* value = 0.094.

## Discussion

Concerning Table 2 about the main difficulties affecting e-learning application, the current study shows that there is a statistical significance among male students from the second stage that the main difficulty is the disagreement of medical staff in comparison to students from the fifth stage that the main difficulty is the financial problems.

Albarrak[12] done a similar study in Saudi Medical College, Riyadh, Saudi Arabia, and found the affectivity of e-learning in addressing the most important medical education opportunities and challenges. He reported that e-learning provides a more flexible learning and teaching while encouraging and promoting the possibilities for more self-directed and individualized learning. E-learning mediated that education modes have been used in order to restrict geographic distribution and facilitated the capacity for learning process and interactive teaching.

Choules[13] at University of Warwick reveled that computers are more increased nowadays especially in the medical education because it is moving from textbooks in electronic format (that are increasingly enhanced by the use of multimedia adjuncts) to a truly interactive medium that can be delivered to maintain the educational needs of students.

He also reported that the use of computer technology presents a reliable, reusable content in a format that is suitable to the learner and can be used to transcend geographical boundaries and time zones. It is an important tool to add to the medical teacher's toolkit, but like all tools, it must be used in a good manner and the teacher must play an effective role in students' monitoring and continuous assessment through the study year.

Regarding Table 3 about the factors affecting e-learning, the present study revealed that there is a statistically significant agreement among the second stage students that e-learning is affected by low adoption rate and a lack of e-learning quality content.

Baris[14] explained in his study for assessing the faculty of medical school attitudes and their opinions toward e-learning as an example of a distance type of learning method in Hacettepe University that e-learning has been differentiated from other teaching methods over the last decade because of the assistance of modern new technology. They also mentioned in their study results that students' attitude toward e-learning was neutral, and they expressed that distance learning is very important in terms of time and limits for communication skills.

Masic *et al.*[15] reveled in their study, which was done at University of Sarajevo in 2005, about the suitability of e-learning in medical education that distance learning does not compensate with the needs of the learning processes, but in spite of that, it is necessary in combination with professional training procedures, impersonal practices, or/and classroom. They furthermore discussed that online learning is very useful for services, tests, self-education, and medical examination purposes, i.e., in terms of individual examination services and self-education.

Regarding Table 4 about the suitability of e-learning in the medical curriculum improvement, the present study shows that a majority of students from both stages (second and fifth) agreed that e-learning application is suitable for clinical sciences only, whereas students from both stages disagree that e-learning is suitable for both clinical and basic sciences.

Isleyen *et al.*[16] mentioned in their study among medical school students their opinions about the internet uses in e-learning that it is useful for both the learners and instructors because of easily updating the information and time consuming for the providing a standard educational guidelines. They further mentioned that e-learning system is prepared to help and get rid of other medical educational opportunities and can improve students involvement in medical procedures with the assessment of the patient safety while paying more care handling the privacy and safety of the patient data.

Seble *et al.*[17] suggested in their study about e-learning in the medical educational application in resource-constrained low- and middle-income countries (LMICs) including countries such as India, Brazil, Egypt, and South Africa that this type of education is a means to an end, rather than the end in itself through the adaptation of e-learning, which can lead to better educational challenges and opportunities for students while simultaneously promoting faculty efficiency power and effectiveness. In spite of potential effect of e-learning may be a specific level of institutional readiness in infrastructural resources and human that is not every time present in LMICs. Institutional readiness for e-learning utilization makes the alignment of new guidelines and tools to the educational and economic context.

A more detailed study was reported by Valjevac *et al.*[18] in Bosnia and Herzegovina to determine the medical students' perspective toward the teleeducation development in biomedicine, and they concluded that the application of teleeducation as an important standard of education is a decision that has to be made by the faculty management. It is the end result of faculty's well-prepared plan according to the present and future possibilities. In spite of this problem, some universities have established to encourage the uses of online learning as a stand-alone solution to expanding and updating their curricula, and it is very useful to establish with an *blended strategy* that is regarded as the most useful and suitable burdens of blended learning before revising the curriculum.

## Conclusion

E-learning is suitable for both clinical and basic sciences. It is affected by low adoption rate and a lack of e-learning

quality content. For female students from both stages (second and fifth), the main problem is the current administrative instruction. The study recommends that e-learning integration into both undergraduate and graduate education will promote and facilitate a rapid shift toward adult learning in the educational process and recommends more advanced specific training programs and courses about the advantages of e-learning in educational process and further expanded studies and researches on a large scale of population to assess the effectiveness of e-learning in the educational aspect.

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## Conflicts of interest
There are no conflicts of interest.

## References
1. Zubair A. Basics in Medical Education, World Scientific Publishing Company. BME 2009;7:42-7.
2. ACGME institutional requirements. Accreditation Council for Graduated Medical Education; 2021.
3. Mars M. Introduction: E-health in Africa. Telemed J E Health 2012;18:3-4.
4. Kaliyadan FF, Manoj JJ, Dharmaratnam AD, Sreekanth GG. Self-learning digital modules in dermatology: A pilot study. J Eur Acad Dermatol Venereol 2010;24:655-60.
5. Adanu R, Adu-Sarkodie Y, Opare-Sem O, Nkyekyer K, Donkor P, Lawson A, *et al*. Electronic learning and open educational resources in the health sciences in Ghana. Ghana Med J 2010;44: 159-62.
6. Aristovnik A. The impact of ICT on educational performance and its efficiency in selected EU and OECD countries: A non-parametric analysis. MPRA Paper No. 39805, Aydin, Turkey; July 3, 2012.
7. Seluakumaran K, Jusof FF, Ismail R, Husain R. Integrating an open-source course management system (Moodle) into the teaching of a first-year medical physiology course: A case study. Adv Physiol Educ 2011;35:369-77.
8. Clark AW, Li HM. Teaching medical information retrieval and application courses in Chinese universities: A case study. Health Info Libr J 2010;27:316-22.
9. Vyas RR, Albright SS, Walker DD, Zachariah AA, Lee MY. Clinical training at remote sites using mobile technology: An India-USA partnership. Distance Edu 2010;31:211-26.
10. Chang AY, Ghose S, Littman-Quinn R, Anolik RB, Kyer A, Mazhani L, *et al*. Use of mobile learning by resident physicians in Botswana. Telemed J E Health 2012;18:11-3.
11. Obura T, Brant WE, Miller F, Parboosingh IJ. Participating in a community of learners enhances resident perceptions of learning in an e-mentoring program: Proof of concept. BMC Med Educ 2011;11:3.
12. Albarrak AI. Designing e-learning systems in medical education: A case study. Int J Excellence Healthc Manag 2010;3:1-8.
13. Choules AP. The use of e-learning in medical education: A review of the current situation. Postgrad Med J 2007;83:212-6.
14. Baris S. Faculty of medicine students' attitudes towards electronic learning and their opinion for an example of distance learning application. Comput Hum Behav 2016;55:932-9.
15. Masic I, Novo A, Kudumovic M, Masic Z. E-learning at medical faculty of University of Sarajevo. Acta Inform Med 2005;13:132-5.
16. Isleyen F, Bozkurt S, Zayim N. Medical students' educational internet usage and opinions towards e-learning. Turkish Online Journal of Distance Learning 2011;15:17.
17. Seble F, Yianna V, Zohray T, Nadia M, Heather R. E-learning in medical education in resource constrained low- and middle-income countries. Hum Resour Health 2013;11:4.
18. Valjevac A, Masic I, Nakas-Icindic E, Kudumovic M. Perspective of teleeducation development in biomedicine in Bosnia and Herzegovina. Acta Inform Med 2007;15:31-5.