

Short Communication



Medical and anesthesia students' attitude toward e-learning physiology courses during the COVID-19 pandemic days

Reza Yahyavi Sahzabi¹ , Fatemeh Maghsoudi², Elahe Akjavan¹, Sara Mobarak³, Esmat Radmanesh^{4*} 

¹Student Research Committee, Abadan University of Medical Sciences, Abadan, Iran

²Department of Public Health, School of Health, Abadan University of Medical Sciences, Abadan, Iran

³Department of Infectious Disease, School of Medicine, Abadan University of Medical Sciences, Abadan, Iran

⁴Department of Physiology, School of Medicine, Abadan University of Medical Sciences, Abadan, Iran

Article info

Article History:

Received: September 18, 2022

Accepted: November 30 2022

published: December 31, 2022

Keywords:

E-learning, Medical student,
Physiology, COVID-19

Abstract

Background: The alarming outbreak of the COVID-19 virus significantly disrupted all aspects of human life, including education. As a result, e-learning has become a vital tool for education. This study aimed to investigate the attitudes of medical and anesthesia students toward e-learning in physiology during the pandemic of COVID-19.

Methods: This descriptive study was conducted among 67 medical and anesthesiology students at Abadan University of Medical Sciences who studied physiology in the second semester of 2020-2021 in the form of e-learning due to the COVID-19 pandemic. A researcher-created questionnaire was used, rating items on a five-point Likert scale. Data were entered into SPSS 21 for statistical analysis and analyzed using descriptive statistics.

Results: A total of 73.1% of the participants in this study were women. The favorable opinions of students by percentage were as follows: satisfactory access to the Internet, 71.0%; the possibility of downloading educational content from the educational system, 88.2%; effective communication between teacher and student through e-learning, 20.6%; e-learning by combining online and offline education, 69.1%; the suitability of offline educational content due to accessibility convenient to learn at any time and place where the student wants to learn, 75%; face-to-face education is more suitable than e-learning, 60.3%.

Conclusion: Effective communication between teacher and student is weak in virtual/online education. Students were generally positive about a combination of online and offline virtual education together and liked offline educational content due to ease of access at any time and place. In general, students preferred face-to-face teaching to virtual education.

Introduction

The COVID-19 pandemic started in the late fall of 2019 in Wuhan, China, and rapidly spread worldwide within months.¹ Depending on the prevalence and severity of conditions caused by the COVID-19 pandemic, countries with different challenges such as educating people about health, social distancing, quarantine, restrictions on domestic and foreign travel, closing places with large communities, including universities and educational institutions, conducting screening tests, and tracking suspected cases.² Education was one of the most heavily negatively-affected sectors due to the negative consequences of the worldwide pandemic.³ Due to the consequences of the closure of educational centers and the cessation of educational processes, learners and teachers had to quickly adapt to using virtual education

in various forms.²

Most universities around the world adopted virtual “online” teaching during the COVID-19 outbreak.⁴ However, learning online is often challenging for students because of limited non-verbal communication and other aspects, such as student-faculty interactions, access to content, and time management; these can influence participants’ perceptions of online education.⁵

Online learning in medical education can lead to effective and easy access to more information, especially in uncertain global situations such as epidemics. There is no doubt that COVID-19 has increased the focus on online learning in education, and it is predicted that this change will be a permanent trend in medical education.¹ In some countries, such as the United States, the epidemic coincided with educational transition.⁶ A steep rise in

*Corresponding author: Esmat Radmanesh, Emails: e.radmanesh@abadanums.ac.ir, esmatradmanesh33@gmail.com

© 2022 The Author(s). This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, as long as the original authors and source are cited. No permission is required from the authors or the publishers.

infection rates forced students to remove themselves from clinical rotations and to stop all summaries completely. Several schools in Canada, the United Kingdom, and Australia took similar immediate action. If the epidemic continues for an unpredictable time, an extension of medical training periods may be warranted. In this situation, medical students will suffer.⁶ It is essential to examine the effects of COVID-19 on higher education in general and medical students in particular.¹ Al-Azzam et al found that 67% of students preferred face-to-face education to virtual education.⁴ A recent study among medical and dental students at Liaquat College reported that 77% of students negatively perceived e-learning and did not prefer virtual learning to face-to-face during the COVID-19 lockdown, and 84% of these students reported limited student-teacher interaction.⁷ However, Khalil et al found in their study that online sessions saved time and predicted that many clinical students would prefer online learning in years to come.¹

In this study, the opinions of medical and anesthesia students of Abadan University of Medical Sciences regarding the e-learning course of physiology in the conditions of the COVID-19 pandemic were investigated. Considering that there are very few such studies among physiology courses, and the results of the research regarding the effectiveness of e-learning are different, this study was conducted to investigate knowledge of the factors that are effective in improving the quality of distance education and solving some existing problems. It is hoped that the results and suggestions of this study will be effective in improving e-learning.

Materials and Methods

This descriptive study was conducted among a population and statistical sample of medical and anesthesia students who studied physiology electronically in the second semester of 2020-2021. The sample size in this study included 29 anesthesia students and 50 medical students who were enrolled in a physiology course virtually for a total of 79 potential participants; 67 students participated by answering the questionnaire. A questionnaire was designed in three parts. The first part of the questionnaire included information and objectives of the project; the second part included demographic information of the participants; and the third part included 14 questions about e-learning on a five-point Likert rating scale (5 = strongly agree, agree, neutral, disagree, 1 = strongly disagree). The questionnaire was provided online to the two groups of students in the physiology course by sending an electronic link, and a total of 67 students completed the questionnaire. The questionnaire was designed using DigiSurvey software (<https://www.digisurvey.net/>), valid software in Iran for creating different virtual exams and questionnaires. The validity of the questionnaire was determined by giving the questionnaire to 20 professors with experience in medical

education research to apply their corrective opinion regarding the following issues: quality of questions, grammar, phrasing, and appropriateness of the position of phrases. The questionnaire was given to 33 students, with a Cronbach's alpha of 0.7, to measure reliability on two occasions with an interval of 2 weeks.

Statistical information analysis was performed using SPSS 21 and reported as descriptive statistics.

Results

The students ranged in age from 18 to 44 years (21.07 ± 3.48); 73.13% of the participants were women. The favorable opinions of students based on percentages from high to low were as follows: the ability to download educational content from the educational system, 88.2%; a requirement to have a pdf file of teaching resources along with other educational content, 79.1%; convenience to learn at any time and place where the student wants to learn, 75.0%; e-learning through combining online and offline education, 69.1%; satisfactory access to the Internet, 71%; face-to-face education is seen as more effective of the teacher's educational content, 50.7%; reducing stress in e-learning, 51.4%; education online alone, 26.7%; effective communication between teacher and student through e-learning, 20.6%; e-learning through books or pdf textbooks alone, 11.7%; and only 19% agreed that e-learning was more effective than face-to-face (Table 1).

Discussion

The current study's results showed that most participants preferred face-to-face learning to e-learning. Mulyanti et al, in their study of Indonesian high school students, found face-to-face learning more useful than distance learning.⁸ The majority of studies reviewed acknowledged that e-learning has many shortcomings and cannot effectively meet the various needs of learners as well as in-person and in-class education.⁹ The results of our study, in line with previous studies, found that most participants prefer face-to-face learning to e-learning.

Another reason for students' dissatisfaction with online education was technical problems such as power outages during exams, lack of internet access, and technological ineptitude.¹⁰

Another factor was positive relationships with the teacher. In addition to academic achievement,¹¹ high-class participation¹² leads to more classroom attendance.¹³ Evidence suggests that participation in online learning depends on strong educational relationships between educators and students.¹⁴ In Chile, Sepulveda-Escobar and Morrison conducted a study among teachers to examine challenges experienced in e-learning and found that e-learning reduced their learning due to teachers' lack of interaction with learners. However, e-learning was considered a positive experience.¹⁵ Coaching provides both instructional guidance for student teachers and supports emotional and professional socialization.¹⁵

Table 1. Satisfaction of students towards virtual education Physiology course^a

Opinion	A	B	C	D	E
Internet access is convenient in place of residence.	13 (18.84)	36 (52.17)	7 (10.14)	11 (15.94)	2 (2.89)
It is possible to download the electronic educational materials of physiology.	22 (32.35)	38 (55.88)	3 (4.41)	3 (4.41)	2 (2.94)
Communication with the teacher is effective in increasing the learning of physiology lessons.	13 (19.11)	32 (47.05)	17 (25)	4 (5.88)	2 (2.94)
Learning physiology online alone is effective in increasing the learning of physiology lessons.	6 (8.45)	13 (18.31)	22 (30.98)	22 (30.98)	8 (11.26)
Teaching and learning physiology offline and by studying pre-prepared files by the teacher, has an effect on increasing physiology learning.	22 (31.88)	13 (18.31)	13 (18.31)	16 (23.88)	5 (7.24)
There is more effective scientific communication between professor and student in electronic classes than in face-to-face classes.	4 (5.88)	10 (14.7)	14 (20.58)	25 (36.76)	15 (22.05)
In online classes, there is less stress when asking questions to the professor than in face-to-face classes.	8 (11.43)	28 (40)	19 (27.14)	10 (14.28)	5 (7.14)
A combination of online and offline education is effective in increasing the learning of physiology lessons.	13 (9.11)	34 (50)	16 (23.53)	2 (2.94)	3 (4.41)
Learning physiology by studying the course content offline is very pleasant because it is available anytime and anywhere.	22 (32.35)	29 (42.65)	11 (16.17)	3 (4.41)	3 (4.41)
The efficiency and quality of electronic physiology training is better than face-to-face training.	4 (5.9)	9 (13.23)	19 (27.94)	25 (36.76)	11(16.17)
If, along with the video containing educational content (including slides with the teacher's voice), the reference pdf file is also desired, it will be effective in increasing the learning of physiology.	20 (29.85)	33 (49.25)	12 (17.91)	0 (0.0)	2 (2.98)
Educational content in the form of educational videos (including slides with the teacher's voice) alone effects on learning physiology.	11 (15.94)	9 (13.04)	26 (37.68)	18 (26.09)	5 (7.24)
If the e-learning content is just a book and a pdf file, it is enough to learn physiology.	1 (1.47)	7 (10.3)	11(16.17)	31 (45.59)	18 (26.47)
If e-education of physiology is offline, it is more effective in increasing the learning of physiology courses than online education.	13 (19.4)	22 (32.83)	23 (34.32)	8 (11.94)	1 (1.5)

^a Values are expressed as No. (%).

A: Strongly agree, B: Agree, C: Neutral, D: Disagree, E: Strongly disagree.

Student-teacher interactions are essential to creating the flexibility to respond to problems they may encounter in future teaching contexts.¹⁶ In our study, the roles of teacher and student in virtual education were both considered weak according to the participants, and only 21% agreed that communication is effective between teacher and student in distance education.

Online education enables learning and teaching for teachers and learners at any place and time.¹⁴ Because virtual tutorials are web-based, no additional tools are required, and content is available to users anytime after loading.¹⁷ Our results, in line with other studies, showed that 75% of participants appreciated the convenience of offline educational content for easy access at any time and place to learn.

Examine learners' perception of online learning amid COVID-19 and found that online learning was beneficial in the middle of the epidemic. Emphasizing the problems related to Internet access and students' financial issues, he also noted that professors should use facilities such as a free messaging program within an online education system.¹⁸ Lassoued et al concluded that learners' performance improved in the classroom teaching method.¹⁹

Increasing access to online tools for all students leads to equality, and a fair environment ensures students have access to their classrooms.⁴ Lack of easy access to online tools makes virtual learning difficult.^{1,20} Universities and

educational institutions should facilitate users' access to online tools and use new technologies to improve the quality of education. Our study found that 71% of participants had easy access to the Internet, and for the majority, it was possible to download educational content from the content upload system; Internet access and educational content were suitable for about seven in ten students.

Previously, many professors did not teach online; they were accustomed to teaching offline. The COVID-19 epidemic required educators to switch from offline to online learning.¹⁷

In a study among 94 undergraduate and graduate students in India aimed at understanding students' academic stress during online education, Chandra found that the epidemic of COVID-19 left both students and educators locked in their homes. A chaotic social life and isolated learning caused stress to students and educators.²¹ Fawaz and Samaha conducted a study among 520 students and found a significant relationship between student satisfaction with online learning and the prevalence of anxiety and stress, and 12.7% of participants were stressed.¹⁰ The results of our study also showed that students in e-learning suffered less stress in than in the classroom around asking questions of the teacher in class.

Limitations of the study

Among the limitations of this study was that due to the

conditions of the COVID-19 epidemic, there was no face-to-face access to the students, and not all eligible students completed the online questionnaire.

Suggestions

It is recommended that studies with a larger sample size across the whole country regarding solving the problems of e-learning and studies regarding ways to improve the relationship between professors and students in e-learning be conducted. Furthermore, there could be solutions to solve problems through the educational officials of the universities, such as holding more workshops about effective teaching methods in electronic education and workshops about improving communication between professors and students in electronic education.

Conclusion

This study aimed to investigate the attitudes of medical and anesthesia students toward virtual physiology education during the COVID-19 pandemic. The survey results showed that in virtual education, the role of effective communication between teacher and student was weak and that students accepted the combination of online and offline virtual education together if they were provided with a PDF file of the course. They liked the offline educational content because access was possible at any time and place. Internet access and the ability to download educational content were available to most students. However, in general, students preferred face-to-face teaching methods to virtual education.

Acknowledgments

Authors gratefully appreciate the Student Research Committee of Abadan University of Medical Sciences.

Author Contributions

Conceptualization: Esmat Radmanesh.

Data curation: Esmat Radmanesh, Reza Yahyavi Sahzabi, Elahe Akjavan.

Formal Analysis: Fatemeh Maghsoudi.

Investigation: Esmat Radmanesh, Reza Yahyavi Sahzabi.

Methodology: Esmat Radmanesh, Fatemeh Maghsoudi, Sara Mobarak.

Project administration: Esmat Radmanesh.

Validation: Fatemeh Maghsoudi, Sara Mobarak.

Writing – original draft: Esmat Radmanesh, Reza Yahyavi Sahzabi

Writing – review & editing: Esmat Radmanesh.

Funding

No specific grant was received from funding agencies for this research.

Ethical Approval

The Ethics Committee of AUMS approved this study (Ethical approval ID: IR.ABADANUMS.REC.1399.062) (Direct link: <http://ethics.research.ac.ir>).

Competing Interests

The authors declare no conflict of interests.

References

1. Khalil R, Mansour AE, Fadda WA, Almisnid K, Aldamegh M, Al-Nafeesah A, et al. The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' perspectives. *BMC Med Educ.* 2020;20(1):285. doi: 10.1186/s12909-020-02208-z.
2. Fallahi-Khoshkenab M. Comparison of virtual education challenges in nursing before and after COVID-19; a systematic review. *Iran J Syst Rev Med Sci.* 2021;2(1):81-103.
3. Özer M. The contribution of the strengthened capacity of vocational education and training system in Turkey to the fight against COVID-19. *J Higher Educ.* 2020;10(2):134-40. doi: 10.2399/yod.20.726951.
4. Al-Azzam N, Elsalem L, Gombedza F. A cross-sectional study to determine factors affecting dental and medical students' preference for virtual learning during the COVID-19 outbreak. *Heliyon.* 2020;6(12):e05704. doi: 10.1016/j.heliyon.2020.e05704.
5. Middleton AJ. How effective is distance education? *Int J Instr Media.* 1997;24(2):133.
6. Sahi PK, Mishra D, Singh T. Medical education amid the COVID-19 pandemic. *Indian Pediatr.* 2020;57(7):652-7. doi: 10.1007/s13312-020-1894-7.
7. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding E-learning during COVID-19 at a private medical college. *Pak J Med Sci.* 2020;36(COVID19-S4):S57-S61. doi: 10.12669/pjms.36.COVID19-S4.2766.
8. Mulyanti B, Purnama W, Pawinanto RE. Distance learning in vocational high schools during the COVID-19 pandemic in West Java province, Indonesia. *Indones J Sci Technol.* 2020;5(2):271-82.
9. Ranjbar Kouchaksaraei S, Rohaninasab M, Nikjo P, Jannati Y. The education users' opinion about the E-learning in COVID-19 pandemic in the world: a review study. *Clinical Excellence.* 2021;10(4):41-50.
10. Fawaz M, Samaha A. E-learning: depression, anxiety, and stress symptomatology among Lebanese university students during COVID-19 quarantine. *Nurs Forum.* 2021;56(1):52-7. doi: 10.1111/nuf.12521.
11. Cornelius-White J. Learner-centered teacher-student relationships are effective: a meta-analysis. *Rev Educ Res.* 2007;77(1):113-43. doi: 10.3102/003465430298563.
12. Roorda DL, Koomen HMY, Spilt JL, Oort FJ. The influence of affective teacher-student relationships on students' school engagement and achievement: a meta-analytic approach. *Rev Educ Res.* 2011;81(4):493-529. doi: 10.3102/0034654311421793.
13. Rosenfeld LB, Richman JM, Bowen GL. Social support networks and school outcomes: the centrality of the teacher. *Child Adolesc Social Work J.* 2000;17(3):205-26. doi: 10.1023/a:1007535930286.
14. Scull J, Phillips M, Sharma U, Garnier K. Innovations in teacher education at the time of COVID19: an Australian perspective. *J Educ Teach.* 2020;46(4):497-506. doi: 10.1080/02607476.2020.1802701.
15. Sepulveda-Escobar P, Morrison A. Online teaching placement during the COVID-19 pandemic in Chile: challenges and opportunities. *Eur J Teach Educ.* 2020;43(4):587-607. doi: 10.1080/02619768.2020.1820981.
16. He Y. Strength-based mentoring in pre-service teacher education: a literature review. *Mentor Tutoring Partnersh Learn.* 2009;17(3):263-75. doi: 10.1080/13611260903050205.

17. Faizah U, Ambarwati R, Rahayu DA. From offline to online learning: various efforts to secure the learning process during COVID-19 outbreaks. *J Phys Conf Ser.* 2021;1747(1):012002. doi: [10.1088/1742-6596/1747/1/012002](https://doi.org/10.1088/1742-6596/1747/1/012002).
18. Girik Allo MD. Is the online learning good in the midst of COVID-19 pandemic? The case of EFL learners. *Jurnal Sinestesia.* 2020;10(1):1-10.
19. Lassoued Z, Alhendawi M, Bashitialshaaer R. An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic. *Educ Sci.* 2020;10(9):232. doi: [10.3390/educsci10090232](https://doi.org/10.3390/educsci10090232).
20. Al-Zahrani A. Toward digital citizenship: examining factors affecting participation and involvement in the Internet society among higher education students. *Int Educ Stud.* 2015;8(12):203-17.
21. Chandra Y. Online education during COVID-19: perception of academic stress and emotional intelligence coping strategies among college students. *Asian Educ Dev Stud.* 2021;10(2):229-38. doi: [10.1108/aeds-05-2020-0097](https://doi.org/10.1108/aeds-05-2020-0097).