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COVID-19 and Online Education in Iran's Universities of Medical Sciences: A Narrative Review

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Abstract

Context: With the outbreak of COVID-19 pandemic and the rapid growth of online education, Iranian universities of medical sciences began to hold online classes for students. Accordingly, the present study aimed to examine different aspects of online education in medical universities during the COVID-19 pandemic.

Methods: This narrative review study was to review studies on online education during the COVID-19 pandemic in Iran's universities of medical sciences. To this end, the PubMed and Sciencedirect databases as well as the Google Scholar scientific search engine were searched on April 20, 2021 using the following keywords: 'online education,' 'virtual education,' 'virtual learning,' 'e-learning,' 'COVID-19,' and 'Iran'.

Results: The present findings revealed Navid, Adobe Connect, and SkyRoom platforms as the most popular online teaching tools in Iran's universities of medical sciences during the COVID-19 pandemic. The main challenges in online education in Iranian universities of medical sciences was students' non-equal accessibility to appropriate hardware, software, and communication tools, students and professors' insufficient knowledge and unfamiliarity with information technology tools and e-learning, lack of proper interactions between professors and students, and the lack of a suitable platform for practical clinical training and internships.

Conclusions: Educational simulation systems and online education support systems are useful in teaching clinical, practical, and internship courses to students and promoting interactions between teachers and students.

Keywords: Online Education, E-Learning, COVID-19, Iran

1. Context

COVID-19 disease was first detected in China in December 2019 and has since spread worldwide; as such the World Health Organization (WHO) declared it a pandemic on March 11, 2020 (1). Accordingly, strict laws have been enforced worldwide on social distancing and home quarantine (2). The COVID-19 pandemic has posed fundamental challenges to all aspects of human beings' personal and social lives as such its consequences may persist throughout the world for a long time (3). Higher education is among the aspects affected by the pandemic (4). Due to the contagious nature and high prevalence of COVID-19, most schools and universities worldwide have been made to terminate in-person and physical activities and have shifted from in-person to online education and e-learning (5, 6). IN other words, the education in universities and medical schools has also been remarkably affected by this pandemic as such the educational and clinical activities have been disrupted (7, 8). This is because students are likely to be infected during their studies, resulting in the transmission and spread of this disease (8). New guidelines on medical education have also emphasized the absence of students in the field of education and clinics (9). Accordingly, medical schools have sought to change traditional education and introduce some alternatives (10) as such, it has been made possible for students to take the semester remotely using online techniques and have online courses instead of real classes (11). This is while, before the COVID-19 pandemic, online classes were of less significance in education, especially medical education (12).

The first COVID-19 case in Iran was reported on February 19, 2020 (13), and the government decided to close all universities and schools and encouraged individuals to stay home to hinder the COVID-19 prevalence. Iran's universities of medical sciences also canceled their in-person classes in hospitals and universities and replaced them with online education and e-learning, which can be the best options to deal with such a critical condition (4, 14, 15). Online or technology-based distance learning develops multimedia communication between teachers and stu-

dents (16); however, this type of education also has some disadvantages such as software and hardware infrastructure problems, lack of student participation, and cultural problems (17). On the other hand, saving time and money, facilitating and accelerating educational process, and providing the possibility of frequent reviews of the presented materials are among the advantages of e-learning (18, 19).

The current educational conditions during the COVID-19 pandemic have also posed some opportunities (20) and challenges to students and universities (21). Accordingly, different aspects of online education in Iranian universities of medical sciences were reviewed in the present study to detect tools applied in virtual education during the COVID-19 crisis and investigate the resulting opportunities and challenges.

2. Methods

The present study was a narrative review in terms of the topic and objectives. On April 20, 2021, the PubMed and Sciencedirect databases as well as the Google Scholar scientific search engine were searched on April 20, 2021, using the following keywords: 'online education,' 'virtual education,' 'virtual learning,' 'e-learning,' 'COVID-19,' and 'Iran'. It is noteworthy that no time limit was set in searching databases, and all the published studies were included in this study.

After completing the search process, the findings were reviewed by direct observation. The inclusion criteria were as follows: (1) studies addressing virtual education during the COVID-19 crisis; and (2) studies with Iran's medical universities as their statistical populations. Finally, four original papers and 11 letters to the editor and notes were reviewed in this study.

3. Results

3.1. Instruments

Since the beginning of the epidemic in Iran coincided with the beginning of a new academic semester, there was no time for proper planning; hence, most medical universities focused their planning, policies, and activities on finding appropriate educational platforms and making proper infrastructure (22). Furthermore, the universities of medical sciences also focused on using learning management systems (LMS) (23). In the field of medical education, with the prevalence of COVID-19, education was initially provided via social network platforms irregularly (4), and some medical universities also had their exclusive platforms (24). However, medical universities were then asked to use the Navid system (university offline learning software for medical universities) as a centralized educational system (4, 12, 25) as such, the university professors and students would benefit from its capabilities after registration. This system has been pre-designed and employed in some universities; however, it has not been used globally in all medical universities as the system became prevalent due to the prevalence of COVID-19 (4).

The course content, user management, courses, instructors, facilities, reports, course calendar, learning path, and discussion are the main features of the Navid system. Using this system, the members can submit their exercises on time and reflect immediate feedback to their instructors on exercises and other materials (8, 26). The educational products in the Navid system are in the form of multimedia (i.e., video, audio, text, and image or a combination of these formats), which are uploaded on this system by the professors of each course and are only available to authorized students and individuals having their own usernames and passwords (27). One of the main contents uploaded by the professors was slides with sound effects (28). Moreover, since the Navid system only supports asynchronous online education, universities have also applied online and synchronous education systems such as Adobe Connect software (24), which possess many features, including file and desktop sharing capabilities. This software supports mobile and desktop systems and also records online classes (29). Skyroom is also another popular software among the online education platforms, which deals with desktop sharing, audio-video communication, slideshow, dashboard, and audio-video file sharing. One of the remarkable advantages of this software is that it supports Persian (29).

There are several other free tools (e.g., WhatsApp, Skype, Zoom, and Google Hangouts Meet) allowing instructors and professors to have video calls, video and audio conferences, chats, and webinars (8, 26, 30). Such online communication tools support collaboration and expertise sharing among universities and service providers.

Depending on their conditions, different countries have also used different software and applications such as Adobe Connect, Skype, Google Classroom, Google Drive, PowerPoint, Zoom, Model, Microsoft Class Note, WhatsApp, Webinar, and Microsoft team to advance their educational goals (30).

3.2. Opportunities and Challenges

Although the COVID-19 pandemic imposed many challenges to different sectors of society, including public health, it has led flourished some capabilities and opportunities across the country, including the high prevalence of online education, especially in Iranian universities of medical sciences (4, 14). Many universities have also rapidly up-

graded their electronic and Internet infrastructure to provide appropriate online education during the COVID-19 crisis (31). In this regard, Iran's online education seems to have entered a new phase, and more attention has been paid to virtual education. On the other hand, the authorities have become further aware of the significance of distance education and e-learning. Mosalanezhad et al. also detected the advantages of online education in the COVID-19 pandemic from the users' viewpoint and reported the advantages as relative satisfaction with education, frequent use and practice, repetition of content, and enjoyable teaching and learning (32).

Due to the sudden shift from in-person education to online education in many universities, especially Iran's universities of medical sciences, the professors and students have faced several challenges. The COVID-19 pandemic has widened the distance between individuals who have access to online learning opportunities and those who do not. In other words, many students do not have equal access to educational content due to improper internet connections (11). Moreover, given that online education was not common among the universities of medical sciences in Iran before the COVID-19 pandemic, it has taken time for students and professors to adapt to this type of education (28). Accordingly, medical science faculties need more time to be adapted to different online education tools (22).

The challenges of online education during the COVID-19 pandemic in Iran's universities of medical sciences were as follows: (1) the lack of skilled and trained human resources; (2) inadequate internet speed and bandwidth; (3) software problems; (4) students and professors' unfamiliarity with online education software; (5) insufficient digital literacy; (6) low-quality interactions; (7) lack of proper interaction between professors and students in online classes; (8) students' unequal access to synchronous online classes due to their geographical location; (9) use of different hardware in online classes; (10) improper delivery of to-be-submitted content; (11) poor support and management in e-learning systems (4, 12, 15, 28, 29, 33); (12) inadequate system display design for a variety of cellphones, multiple system outages, especially online education systems (15); (13) high diversity of software used by professors; (14) lack of standards to assess professors and their uploaded content; (15) imperfect software and applications especially networks and free virtual messengers such as Zoom and WhatsApp; and (16) impossibility of training professors on online education and software (29). Mosalanezhad et al. also claimed that online education infrastructure is the main challenge to online education during COVID-19. According to their report, the other challenges encompass sending bulk content in inappropriate time, lack of qualitative and interactive content in some courses, inconsistent content, lack of educational content simulation compared to in-person classes, and the integration of educational content in the run-up to exams (32).

Since medical education in Iran is provided by faculty members and clinicians who are in the first line of treatment of diseases, the professors fail to properly be involved in this new style of medical education (34).

One of the main challenges in medical and clinical education is difficulty in holding practical classes and internship courses requiring more physical interactions (15, 26, 31). The findings are summarized in Table 1.

4. Discussion

One of the main factors influencing the success of education is the use of an appropriate educational method as such, at any time and under any condition, the proper educational method should fit all individuals and still be useful and effective. Due to the prevailing conditions in the society raised by the COVID-19 pandemic, all universities and higher education centers in Iran are providing distance and online education for their students. Moreover, students, professors, and university authorities have welcomed this type of education regarding the existing conditions. Despite their concerns about this type of education, the students also agree to continue this type of education (35). Accordingly, e-learning and distance learning methods have eliminated and decreased the relevant problems and backwardness for students, teachers, and all those involved in the field of education.

To promote the effectiveness of education, different aspects of this type of education should be considered, and appropriate measures should be adopted to solve the existing problems and challenges. The findings of the present study revealed different aspects of virtual education in Iran's universities of medical sciences. Many studies have confirmed that, given the benefits of e-learning, some limitations make the effectiveness of this type of training a serious challenge (36) (32). The educational effectiveness is achieved if its challenges are removed and appropriate infrastructures are provided (36). One of the remarkable issues to be considered in promoting virtual education is to pay attention to the students' educational needs.

Since the students' educational needs are less regarded in the current virtual education systems (22), appropriate support systems should be applied to increase the interactions between students and faculty, and proper training should be provided for them in this regard (33). Furthermore, in medical education, developing online simulators in the field of medicine, promoting telemedicine and virtual hospitals, providing virtual cases,

Table 1. Challenges and Opportunities in Medical and Clinical Education

Values	Variables
Tools	Social networks, Navid System, Skyroom, Adobe Connect
Opportunities	Pervasion and improvement of virtual education, enhancement of electronic infrastructures, promoted student satisfaction, enhanced possibility of reviewing and repeating exercises and courses, authorities' further attention to virtual education.
Challenges	Students' unequal access to software and hardware platforms and educational content; students and professors' unfamiliarity with e-learning systems at the beginning of the COVID-19 crisis; lack of skilled and trained human resources, poor quality of interaction; lack of proper interaction between professors and students in online classes; poor support and management in e-learning systems; inappropriate system display design for different systems; availability of numerous software used by professors; lack of standards to assess professors and their uploaded content; lack of comprehensive software and applications, including free virtual networks and messengers; lack of quality and interactive content in some courses; content inconsistency; non-simulation of educational content with in-person classes; and accumulation of content during a period close to the exam time; and insufficient time for professors, especially clinical professors to produce virtual education.

and holding online exams may contribute to promoting virtual education in the field of medical sciences (26).

The COVID-19 pandemic has posed a severe challenge to medical education worldwide. Although the opportunity to apply information technology has to some extent been an alternative for traditional and in-person training, it has not been well-realized yet.

Since the COVID-19 pandemic still exists, and the initiation time of in-person classes as in the past cannot be predicted, it is urgent to solve the problems and challenges posed to professors and students in online education and e-learning. If the current condition is properly understood, timely and effective steps can be taken to provide evidence-based interventions for electronic learning and evaluation. Furthermore, university authorities and professors should exploit the gained experiences and consider weaknesses and strengths in holding effective and successful online classes to pursue online education.

Finally, future studies are suggested to examine different aspects of e-learning in the medical sciences, and researchers should detect the role of professors in communicating and interacting with students and supporting virtual education systems. As mentioned in the present study, despite all the challenges, many benefits of virtual and distance education methods can pave the way for enhancing the mixed education encompassing both in-person training and virtual education.

Footnotes

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References

1. Alsoufi A, Alsuyihili A, Msherghi A, Elhadi A, Atiyah H, Ashini A, et al. Impact of the COVID-19 pandemic on medical education: Medical students' knowledge, attitudes, and practices regarding electronic learning. *PLoS One*. 2020;**15**(11). e0242905. doi: 10.1371/journal.pone.0242905. [PubMed: 33237962]. [PubMed Central: PMC7688124].
2. Eva KW, Anderson MB. Medical education adaptations: Really good stuff for educational transition during a pandemic. *Med Educ*. 2020;**54**(6):494. doi: 10.1111/medu.14172. [PubMed: 32233098].
3. Aristovnik A, Keržič D, Ravšelj D, Tomaževič N, Umek L. Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability*. 2020;**12**(20):8438. doi: 10.3390/su12208438.
4. Ghafourifard M. [The promotion of virtual education in Iran: The potential which turned into reality by Coronavirus]. *Iran J Med Sci*. 2020;**20**:33–4. Persian.
5. Rezaei AM. Student learning evaluation during the Corona: Challenges and strategies. *Educ Psychol*. 2020;**16**(55):179–214.
6. Onyema EM, Eucheria NC, Obafemi FA, Sen S, Atonye FG, Sharma A, et al. Impact of Coronavirus pandemic on education. *Journal of Education and Practice*. 2020;**11**(13):108–21.
7. Li L, Lin M, Wang X, Bao P, Li Y. Preparing and responding to 2019 novel coronavirus with simulation and technology-enhanced learning for healthcare professionals: Challenges and opportunities in China. *BMJ Simul Technol Enhanc Learn*. 2020;**6**(4):196–8. doi: 10.1136/bmjstel-2020-000609. [PubMed: 32832099]. [PubMed Central: PMC7410111].
8. Rose S. Medical student education in the time of COVID-19. *JAMA*. 2020;**323**(21):2131–2. doi: 10.1001/jama.2020.5227. [PubMed: 32232420].
9. Hofmann H, Harding C, Youm J, Wiechmann W. Virtual bedside teaching rounds with patients with COVID-19. *Med Educ*. 2020;**54**(10):959–60. doi: 10.1111/medu.14223. [PubMed: 32403185]. [PubMed Central: PMC7273015].
10. De Ponti R, Marazzato J, Maresca AM, Rovera F, Carcano G, Ferrario MM. Pre-graduation medical training including virtual reality during COVID-19 pandemic: A report on students' perception. *BMC Med Educ*. 2020;**20**(1):332. doi: 10.1186/s12909-020-02245-8. [PubMed: 32977781]. [PubMed Central: PMC7517753].
11. Tabatabai S. COVID-19 impact and virtual medical education. *J Adv Med Educ Prof*. 2020;**8**(3):140–3. doi: 10.30476/jamp.2020.86070.1213. [PubMed: 32802908]. [PubMed Central: PMC7395196].
12. Khojasteh L, Karimian Z, Sharifzadeh S, Nasiri E. Medical students' views of e-learning-based medical education during COVID-19 pandemic. *Research Square*. 2020;**Preprint**. doi: 10.21203/rs.3.rs-117994/v1.
13. Shalbafan M, Khademoreza N. What we can learn from COVID-19 outbreak in Iran about the importance of alcohol use education. *Am J Drug Alcohol Abuse*. 2020;**46**(3):385–6. doi: 10.1080/00952990.2020.1753759. [PubMed: 32310677].
14. Dastani M. [COVID 19: A new beginning in virtual education at the medical universities of Iran]. *Horizons of Medical Education Development*. 2020;**11**(1):1–4. Persian.

15. Yazdaninejad H, Eslami K, Arjmand R, Shakerian N, Tork Shirazi N, Abuali R, et al. Evaluation of e-learning in the Covid 19 epidemic crisis and the prospect of its complementary use in the post-crisis period from the perspective of medical students. *Educational Development of Judishapur*. 2020;**11**(3):554–71.
16. Garrison DR. *E-learning in the 21st century: A framework for research and practice*. New York, UK: Routledge; 2011.
17. Jafari H, Keshmiri F, Shiri SD, Abghari K, Baghian N. [Explaining the views and experiences of e-teacher and e-learners about virtual education in Yazd Shahid Sadoughi University of Medical Sciences]. *Med Educ Dev*. 2020;**15**(2). Persian.
18. Khazaei S, Rashedi E, Barati E. Blended learning approaches in medical science: A review article. *Pajouhan Scientific Journal*. 2013;**11**(1):6–11.
19. Lee BC, Yoon JO, Lee I. Learners' acceptance of e-learning in South Korea: Theories and results. *Comput Educ*. 2009;**53**(4):1320–9. doi: 10.1016/j.compedu.2009.06.014.
20. Chandratre S. Medical students and COVID-19: Challenges and supportive strategies. *J Med Educ Curric Dev*. 2020;**7**:2382120520935060. doi: 10.1177/2382120520935059. [PubMed: 32637642]. [PubMed Central: PMC7315659].
21. Gaur U, Majumder MAA, Sa B, Sarkar S, Williams A, Singh K. Challenges and opportunities of preclinical medical education: COVID-19 crisis and beyond. *SN Compr Clin Med*. 2020:1–6. doi: 10.1007/s42399-020-00528-1. [PubMed: 32984766]. [PubMed Central: PMC7508422].
22. Ahmadipour H. Student: A neglected element in facing the challenges of medical education during the COVID-19 era. *Stride Dev Med Educ*. 2020;**17**(Supplement). e194951.
23. Alizadeh M, Khabaz Mafinejad M. The shadow of COVID-19 on medical education at Tehran University of Medical Sciences in 2020. *Stride Dev Med Educ*. 2020;**17**(Supplement).
24. Iranmanesh F, Ostadebrahimi H, Mirzazadeh A, Azin M. Performance report of distance learning at Rafsanjan University of Medical Sciences during the COVID-19 pandemic. *J Rafsanjan Univ Med Sci*. 2020;**19**(4):423–8.
25. Ahmady S, Shahbazi S, Heidari M. Transition to virtual learning during the Coronavirus disease-2019 crisis in Iran: Opportunity or challenge? *Disaster Med Public Health Prep*. 2020;**14**(3):e11–2. doi: 10.1017/dmp.2020.142. [PubMed: 32375914]. [PubMed Central: PMC7264447].
26. Tabatabai S. Simulations and virtual learning supporting clinical education during the COVID 19 pandemic. *Adv Med Educ Pract*. 2020;**11**:513–6. doi: 10.2147/AMEP.S257750. [PubMed: 32821192]. [PubMed Central: PMC7424224].
27. Dastani M. Virtual education contents of medical universities during the COVID-19 outbreak An opportunity to promote universities on the web. *Med Educ Dev*. 2020;**13**(38):1–2.
28. Afshari P, Abedi P, Eslami K, Rokhafrooz D, Maraghi E, Beheshtinasab M. The views of medical students about e-learning during pandemic of COVID-19 in Iran. *Research Square*. 2020;**Preprint**. doi: 10.21203/rs.3.rs-47582/v1.
29. Haghighi M, Salehi S, Ghasemian M, Nouraei M. Online education strategies used in Imam Hossein Hospital in Tehran during the COVID-19 outbreak. *Stride Dev Med Educ*. 2020;**17**(Supplement).
30. Crawford J, Butler-Henderson K, Rudolph J, Malkawi B, Glowatz M, Burton R, et al. COVID-19: 20 countries' higher education intra-period digital pedagogy responses. *J Appl Learn Teach*. 2020;**3**(1). doi: 10.37074/jalt.2020.3.1.7.
31. Ebadi A, Heidaranlu E. Virtual learning: A new experience in the shadow of Coronavirus disease. *Shiraz E-Med J*. 2020;**21**(12). e106712. doi: 10.5812/semj.106712.
32. Mosalanezhad L, Atashpoor S, Kalani N. What do medical students want to learn in the Corona crisis curriculum? Expressing students' expectations and strategies. *Education and Ethics in Nursing*. 2021;**10**(1):5–11.
33. Mohammadimehr M. eLearning as an educational response to COVID-19 epidemic in Iran: The role of the learners support system. *Future Med Educ J*. 2020;**10**(3):64–5.
34. Aghakhani K, Shalbafan M. What COVID-19 outbreak in Iran teaches us about virtual medical education. *Med Educ Online*. 2020;**25**(1):1770567. doi: 10.1080/10872981.2020.1770567. [PubMed: 32449487]. [PubMed Central: PMC7655059].
35. 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. doi: 10.17509/ijost.v5i2.24640.
36. 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.