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Students' Perceptions of the Positive Aspects of Electronic Teaching on Face-to-Face Learning in Post-COVID-19 Pandemic: A Phenomenological Study

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ABSTRACT

Background: The purpose of the present study was to investigate the perceptions of Yazd University of Medical Sciences students about the positive aspects of electronic teaching on face-to-face teaching in the post-COVID-19 pandemic.

Methods: This was a qualitative research with a phenomenological approach. Participants in the research included 10 students of Shahid Sadoughi University of Medical Sciences, Yazd, in the academic year 2022-2023 who were selected through purposive sampling. The research data collection tool included a semi-structured interview. Method of data analysis adapted from Smith was used, and the criteria of rigor and trustworthiness were considered.

Results: Eexperienced perceptions of medical students regarding the positive effects of electronic teaching were investigated and four main themes, including improving the hardware and software of virtual education, understanding the value of medical staff and health laws, increasing knowledge sharing and the role of virtual education, facilitating access to national and international education, and 12 sub-themes were achieved.

Conclusion: Based on the results of the current research, the positive experiences gained from e-learning during the COVID-19 pandemic can be used when distance learning is necessary, such as air pollution or unexpected events. Therefore, policy makers and planners of medical education can improve the quality of education by taking advantage of these experiences.

Keywords: Medical Students, Teaching, Education, Distanc Learning.

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Introduction

Electronic teaching (E-teaching) has been used increasingly due to the spread of the COVID-19 virus worldwide. This disease has a special complexity and multiple consequences that imposed significant costs on individuals, communities, and health services groups in health, social, education and economic areas (Organization, 2020). One of the areas seriously affected by this pandemic is the educational system. Many decisions were made, mostly based on the use of E-teaching, to continue learning in various countries. The same approach was adopted in Iran (Rezaei, 2020). There were many challenges facing the use of E-teaching under emergency conditions, and there were no preparations for its large-scale implementations. In this regard, (Niazi and Sanatkar,2022), in a review study of 17 articles, showed that the challenges of E- teaching are more than its opportunities. (Goli et al. ,2022; Moosavi et al. ,2022; Mosayebi et al. ,2021;Rahimiyan et al.,2022; Qorbanpour Lafamajan,2021; Jafari et al.,2020 ; Saleh and Meccawy ,2022; Aqdas et al.,2023; Joaquim et al. ,2023 and Al-Quran et al.,2023) refer to technological concerns, teaching process and poor interactive platform, low productivity, lack of motivation, comfort-seeking, stress, time concerns, alienation, confusion and uncertainty in class organization, class control, and management, insufficient preparation and training for instructors and students, and emotional and cultural issues as the challenges of E-teaching. Although there have been some challenges, many of them have been eliminated or lessened with increasing experience over time, making such teaching more effective and beneficial, which need to be analyzed and put into practice by policymakers for the post-COVID-19 Pandemic. In this regard, (Khan and Viswanathan ,2023) concluded that E-teaching can be used not only during crises such as pandemics but also in normal times to make teaching and learning more affordable, innovative and effective. (Sadjadi,2023) showed that educational systems can take measures to provide appropriate courses by the current movement towards digitalization in the post-crisis era. The results of the research by (Eltahir et al.,2023) showed the positive attitude of students towards the use of E-teaching. It was also reported in a research in china that electronic teaching in medical field provided useful tools and methods in China that were successfully used during the COVID-19 pandemic (Su et al., 2021). The quality of E-teaching is very good considering the combined use of synchronous E-teaching tools by teachers to achieve educational goals and encourages learners to learn and participate actively (Soleimani & Asghari, 2021). The benefits of an online class include creating a digital community, improving digital skills. Learners believe that a hybrid model that combines both classroom and online classroom modes is necessary for the post-COVID-19 pandemic (Li, 2022; Al- Alami et al. ,2022) conducted research on E-teaching in anatomy and histology fields regarding pharmacy students during the COVID-19 quarantine ,which led to a different understanding of social media platforms used in such teaching and online courses. According to a study by (Mortagy et al. ,2022), students consider the post-quarantine situation to be more positive than the quarantine era except for their engagement with learning and educational materials. According to the research by (Muflih et al. ,2020), students of health professional education had a moderate preparation and attitude towards E-teaching and most of them agreed that online courses help to allocate reading time and assignments better than on-campus approach. The fear of contracting COVID-19 has a positive effect on the prediction of academic motivation during E-teaching (Çevik & Bakioğlu, 2022; Song et al.,2021) stated that although medical students thought that learning task was overdone during the COVID-19 pandemic, the majority of faculty members and students advocated E-teaching, had positive opinions about it, and were satisfied with it. A student survey shows that E-teaching and learning during the COVID-19 pandemic has improved

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their digital citizenship behaviors (Akcil & Bastas, 2020). Research shows that medical sciences students are satisfied with E-teaching (Aziz Ansari et al., 2021) and applied E-teaching which is useful during the COVID-19 pandemic (Karaca & Ilkım, 2021). E-teaching is still in its infancy although traditional classrooms seem necessary; there are many positive attitudes and desires towards E-teaching, and there are many potential futures for these E-teaching platforms in universities and higher education institutions (Ismaili, 2021; Shahrvini et al.,2021) showed in research that E-teaching of medical students has become more flexible, and there are defects such as digital fatigue, reduced participation rate, lack of clinical skills, laboratory and hands-on learning. Despite the many challenges during E-teaching, its positive effects has been shown in medical field during the COVID-19 pandemic, and there is confidence and support of such teaching among students (Rafi et al., 2020; Rajab et al., 2020).

The important issue is that the nature of face-to-face teaching during the post-COVID-19 pandemic is different from face-to-face teaching in pre-pandemic period, due to the experiences gained from E-teaching during the COVID-19 pandemic; accordingly, the capacity of the phenomenology method, which can deeply explore the students' lived experiences of this phenomenon, has been used. Therefore, the current research's main purpose was to " investigate the perceptions of Yazd University of Medical Sciences students about the positive effects of E-teaching on face-to-face teaching in post-COVID-19 period."

Methods

This was qualitative research with Husserl's transcendental phenomenological approach. From Husserl's point of view, phenomenology is basically the study of lived experience or the world of life. Phenomenology looks at the world, as it is through a person is lived, not a world or a reality that is something separate from man. The study sample included medical students of Shahid Sadougi University of Yazd who have studied both in pre-and post-pandemic face-to-face teaching. In qualitative methods, researchers are instructed to interview 5 to 25 people who have experience with the phenomenon under study (Polkinghorne, 1989). Participants were invited to the interview through a call placed in virtual student groups, and they expressed their willingness. Gradual and purposive sampling continued until reaching data saturation. Therefore, 10 students of Yazd University of Medical Sciences were enrolled in the present study (Table 1).

Table 1. Demographic information related to the students participating in the research at Yazd University of Medical Sciences

Row	Interview code	Field of study	Semester	Row	Interview code	Field of study	Semester
1	A	General medicine	8	6	F	Bachelor's degree in operating room	8
2	B	General medicine	8	7	G	Bachelor's degree in nursing	7
3	C	Bachelor's degree in nursing	7	8	H	General medicine	11
4	D	General medicine	10	9	I	General medicine	7
5	E	Bachelor's degree in nursing	8	10	J	Pharmacology	11

It should be noted that data reached saturation after 9 interviews; but 10 interviews were conducted to ensure data accuracy. Interviews were conducted over a three-month period from mid-April to mid-July 2023, and each interview lasted between 60-100 minutes. The data collection tool included a semi-structured interview.In this regard, after studying and consulting with several

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experts in the field of education, the research questions were set by the researchers, and after each interview and analysis of its findings, the questions were revised and completed. Some of the questions raised in the interview were: In your opinion, comparing face-to-face education before and after the COVID-19 pandemic, what positive differences have occurred in post-COVID-19 face-to-face education? What positive aspects were there in the teaching methods of professors in face-to-face education after COVID-19 compared to before COVID-19 period? What positive aspects can you tell us about the learning methods of students in face-to-face education after COVID-19, compared to before COVID-19? In addition to these questions, an attempt was made to encourage interviewees to provide more experiences by using probing questions. All interview sessions were recorded by a voice recorder after obtaining the consent of the participants. Each interview was implemented verbatim, and key points were noted at the same time. Also, after each interview, the implementation process, weaknesses and strengths, and follow-up items were also determined so that they could be taken into consideration in the next interviews. The interviews were conducted in the dormitory and university environment. Data analysis was carried out using the interpretative approach proposed by (Smith et al. ,2021). Smith has proposed three stages of data generation, data analysis, and case integration for data analysis in the phenomenological method (Smith et al., 2021). In the present study, interviews were first conducted and analyzed. Then, suthemes were determined and coded. Afterward, themes were organized and clustered, which means that more general themes were extracted by continuously comparing and considering the differences and similarities of the themes. To enhance trustworthiness in this research, prolonged and continuous engagements, avoiding quick and unproven judgments, discussing findings with neutral people, documenting the process of change throughout the study, member check, and the researcher self-review were used during the data collection and analysis process. Coding was carried out and compared by two experts in qualitative research. To enhance trustworthiness in this research, prolonged and continuous engagements, avoiding quick and unproven judgments, discussing findings with neutral people, and documenting the process of change throughout the study were done during the data collection and analysis process. In addition, the validity of the findings can be improved by using "different sources, different methods, and sometimes multiple reviews"; which is known as the triangulation method. In the current research, the method of triangulation of the quadrants presented by Deniz Cited in (Johnson ,1997) has been used.

To ensure the rigor and trustworthiness of the findings from the perspective of the researcher, participants, or readers of the research report, the following measures were taken:

- Member checking: Some of the participants reviewed the final report of the first stage, the analysis process or the obtained themes, and expressed their opinions about them.
- Peer examination: several professors of educational sciences and master's students familiar with qualitative research and the subject of the research reviewed the findings and commented on them.
- Collaborativeness of the research: the participants were simultaneously helped in analyzing and interpreting the data.
- Researcher reflexivity: as much as possible, it was tried to control the researcher's bias and prejudice.

Results

Each theme is explained separately below.

Theme 1- Improving the hardware and software of virtual education: With the spread of the COVID-19 virus, extensive collaborations were made between governments, publishers, educational system professionals, and telecommunication network operators. They attempted to create appropriate conditions for creating a digital infrastructure aimed at dealing with the education disruption. Experiencing this

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outbreak as a rare opportunity helped to explore the best strategies for providing effective and workable E-teaching and learning, considering all associated threats and opportunities.

Evolution of teaching methods in the post-COVID-19 pandemic: Today, technology has become an integral part of the educational system. Professors and students have learned the new style of teaching and learning well by gaining experience in the virtual environment.

"Faculty members used new and updated methods of teaching and E- teaching in the face-to-face post-COVID-19 pandemic, and COVID-19 caused them to distance themselves from these traditional methods." (Interview.6)

Improving educational hardware: Over time, virtual education infrastructures were provided in universities. With the passage of time, high-speed Internet, modern computers, and other tools and devices such as microphones and webcams were provided, and online education was done in a better way.

"Over time, they used more suitable E-teaching programs, which had an easier connection and fewer disconnections." (Interview.4)

Use of technology in Post-COVID-19 pandemic: During the coronavirus pandemic, virtual education became very important all over the world. Due to the opportunities created by virtual education, in the post-COVID era, the educational system cannot go back to the traditional model.

"COVID-19 and E-teaching have caused students to make significant progress in terms of working with computers and software, and it may save them several years." (Interview.2)

Theme 2- Understanding the value of medical staff and health laws: In the pre-COVID-19 pandemic, a few people appreciated the efforts of nurses, but the COVID-19 disease made all people appreciate the efforts and sacrifices of the medical staff, and attach more value to them. Moreover, hygiene practices and healthy habits became more important as the world faced more struggles with the COVID-19 crisis.

Improving the position of the medical staff in society: Before the pandemic, few people appreciated the efforts of nurses, but the pandemic made all the people appreciate the efforts and sacrifices of the medical staff and value them more.

"The COVID-19 had caused them to place a high value on the hospital staff." (Interview.7)

Improving hygiene in the post-COVID-19 pandemic: With the epidemic of COVOD-19, the observance of health tips increased significantly, and these cases continued during post-COVID face-to-face education; today, students in face-to-face classrooms observe health tips as an institutionalized culture, more than ever before.

"During the face-to-face post-COVID-19 pandemic, all the students were required to wear masks, and they also had to sit next to each other while observing social distancing. Another point was disinfection and health recommendations that the university followed." (Interview.5)

Theme 3- Increasing knowledge sharing and the role of virtual education: Undoubtedly, COVID-19 pandemic has caused a great change in daily events. Increasing the importance of E-teaching and the use of online space has been one of the most important developments and achievements of this pandemic. The importance of using online space during the pandemic was completely noticeable in every family that has a student. Although the importance of using online space peaked during the COVID-19 pandemic, its importance will not diminish even after this pandemic.

Sharing experiences in Online Space after COVID-19: In the post-pandemic period, with the increase in the skill of working with virtual space, the exchange of information and experiences was formed in the context of virtual space, and students and the experienced treatment staff shared their experiences using virtual space.

"Being on the path of E-teaching and the lack of face-to-face exchange of courses and handouts has led to increased participation in online space and sharing of experiences. Therefore, most students turn to this method, that is, attending online

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networks, to share the results of their studies and knowledge in these networks." (Interview.10)

Virtualization of some activities: During the COVID-19 era and also after that, many class activities were carried out in the virtual space, and class groups were formed in the virtual space and provided the necessary information, as well as practical work, and its review was also done in this space.

"The faculty members had to create a group in online messengers for each course and send assignments and practical tasks there, and the students sent their completed assignments to them through email or sent them to the instructor in the desired messenger. Such things are also done in the post-COVID-19 period." (Interview.6)

Adding the strengths of E-teaching to face-to-face teaching in the post-COVID-19 pandemic: In relation to virtual education in the post-COVID period, it is necessary to make optimal use of the opportunities provided for virtual education and develop virtual education infrastructures and expand the interactive learning environment so that education can be developed by taking advantage of the strengths and opportunities created.

"If a student cannot participate in the class for any reason, he/she can use the educational content prepared during the COVID-19 pandemic, or if there is a problem for the instructor, he/she can offer compensatory courses, on the condition that they are theoretical, in the online platform, and in general, part of the flexibility advantage of the E-teaching has been added to face-to-face teaching in the post-COVID-19 pandemic." (Interview.7)

Preferring to teach theoretical courses online: The temporal and spatial flexibility of virtual education as one of its most important advantages has caused the demand for this type of education from students, especially for theoretical courses.

"In my opinion, many general courses can be taught online, and in this way, many of the student expenses will be reduced, and students can receive the necessary teaching at home. There are also practical and theoretical subjects for some specialized courses. For example, the anatomy course has both theoretical and practical subjects. Because the theoretical subject of the anatomy course is mostly a memorization subject, the instructor can hold it online, and the practical subject must be done in person at the university." (Interview.4)

Theme 4- Facilitating access to national and international education: Many students learned during the COVID-19 Pandemic that they can use online classes or content produced by distinguished faculty members. Also, online seminars provided a wider and easier opportunity for students and faculty members to participate in them, which they also used in the post-COVID-19 pandemic.

Using distinguished faculty members in virtual education: By using virtual education, the best professors of the country can be used to train students and also exchange information. By holding virtual seminars, a large number of students can use the best professors in the country.

"In face-to-face pre-COVID-19 pandemic, only one instructor could teach some students; but E-teaching made it possible for us, for example, to take a course from the best faculty members in the country, and when they hold E-teaching, we could listen to their courses to learn well, and in this way, we could benefit from the best faculty members in the country. In the post-COVID-19 period, there is access to the recorded classes of some of these faculty members." (Interview.3)

Participation in national and international virtual webinars: A webinar is an interactive meeting and webcast organized through the World Wide Web where there is no face-to-face meeting. This is a virtual conference that is transmitted with appropriate technology, audio, and video files. The platforms provided for virtual education have made participation in webinars continue even after COVID-19.

"If there is a link to a webinar or seminar and there is no limit on the number of students, they can participate in them and benefit from the contents of the classes. To increase the experience or additional points about courses, the distinguished national faculty members have been

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used in these webinars and seminars in many cases. In the case of international online classes, if the conditions are right, a number of students would participate in such online seminars and classes out of their curiosity." (Interview.5)

Access to the content provided by faculty members in virtual education: Some professors spent more time creating virtual content and produced very useful content that students can still use.

"The recorded online classes can be useful if the faculty members have spent enough energy and time and designed high-quality video files. They can also give those video files to the students and only solve the problems in face-to-face classes." (Interview.9)

The main themes and subthemes from the interviews are presented in Table 2.

Table 2. The main themes and subthemes of the positive effects of E-teaching on face-to-face teaching in the post-COVID-19 period

Row	Main themes	Row	Subthemes
1	Improving the hardware and software of virtual education	1	Evolution of teaching methods
		2	Improving educational hardware
		3	Acquiring the technology skills in the post-COVID-19 pandemic
2	Understanding the value of medical staff and health laws	4	Improving the position of the medical staff in the society
		5	Improving hygiene in the post-COVID-19 pandemic
3	Increasing knowledge sharing and the role of virtual education	6	Sharing online experiences after COVID-19 outbreak
		7	Virtualization of some activities
		8	Adding the strengths of E-teaching to face-to-face teaching after COVID-19 outbreak
		9	Preferring teaching theoretical courses online
4	Facilitating access to national and international education	10	Using distinguished faculty members in virtual education
		11	Participation in national and international virtual webinars
		12	Access to the content provided by faculty members in virtual education

Discussion

The purpose of the present study was to investigate the aspects of E-teaching on face-to-face teaching in the post-COVID-19 Pandemic from the perspective of students at Yazd University of Medical Sciences. Four main themes and 12 subthemes have been obtained in this regard.

Concerning the theme of improving the hardware and software of virtual education, it should be stated that there was no infrastructure necessary for E-teaching in the pre-COVID-19 pandemic, nor was there enough experience for E-teaching and learning. Over time, these infrastructures and the experience required for teaching and learning have increased during the COVID-19 disease and the post-COVID-19 pandemic. The results of this research were consistent with the results of the studies by (Goli et al. ,2022 ; Moosavi et al. ,2022; Qorbanpour Lafamajan ,2021; Jafari et al. ,2020; Shahrvini et al. ,2021; Saleh and Meccawy ,2022; Sadjadi ,2023; Al-Quran et al.,2023; and Khan and Viswanathan ,2023). Considering the importance of E-teaching in the modern educational system, many Iranian universities have attempted to establish and plan principles to realize this important goal. Since the implementation of E-teaching projects requires access to comprehensive facilities and infrastructure in various fields of this type of educational system, its development is important, especially after the experiences gained during the COVID-19 pandemic. Accordingly, E-teaching has been considered as a medical curriculum education (Mirsaidi et al., 2016).

The second main theme is understanding the

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value of medical staff and health laws. People recognized the value of this segment of society more than before at the time of COVID-19 outbreak and later and the sacrifices made by the medical staff. Similar to other people, the medical staff also face problems such as being vulnerable to the disease itself, as well as rumors and false information. We should value and appreciate this group more frequently (Fathi et al., 2020). Regarding the theme of improving hygiene practices in the post-COVID-19 pandemic, it should be stated that the best solution to prevent infectious diseases is the implementation of personal protection measures such as frequent hand washing and the use of masks, which should be taken into consideration by the entire society (Ehsani, 2020). In the pre-COVID-19 period, hygiene compliance was very low and people did not follow the hygiene recommendations if they got an infectious disease. With the advent of the COVID-19 disease, the level of personal hygiene has increased and students have been following health recommendations both in universities, internships, and hospitals.

With regard to the third theme, i.e. increasing knowledge sharing and the role of virtual education, it should be stated that students mostly exchanged information in person in this period; but with the advent of COVID-19 and the development of online space, communication and information exchange are done mostly online, and this platform is used by students and faculty members to exchange information and communicate with each other more frequently. The results of this section are consistent with the results of studies by Qorbanpour Lafamajan ,2021; Jafari et al. ,2020; Muflih et al. ,2020 and Çevik and Bakioğlu ,2022). The findings from the studies showed that in the pre-COVID-19 period, students did not learn many courses in case of absence and fell behind in the desired courses; but with the advent of E-teaching and the preparation of its platforms and positively affecting face-to-face teaching in the post-COVID-19 pandemic, students planned their lessons and progressed accordingly. (Li, 2022 and Çevik and Bakioğlu, 2022). After the end of the COVID-19 pandemic, the contents prepared during the pandemic helped students benefit from them if they could not participate in the class for any reason. (Mortagy et al., 2022). The results of this section were consistent with the results of studies by (Niazi and Sanatkar, 2022; Soleimani and Asghari ,2021; Li ,2022; Song et al. ,2021; Aziz Ansari et al. ,2021 and Mortagy et al. ,2022).

Concerning the theme of using the strengths of E-teaching in post-COVID-19 period, it should be stated that the spread of COVID-19 showed the necessity of E-teaching in many countries. This type of teaching does not have many limitations of traditional teaching suggested by (Khan and Viswanathan ,2023; Li ,2022; Su et al.,2021) and has its own advantages and characteristics (Almaiah et al., 2020; Ismaili, 2021). E-teaching not only imposes no time and place constraints, saves time and money, creates the same educational conditions and facilities, and allows people to use them practically, it also affects effective learning. Despite the advantages and disadvantages of E-teaching, its strengths should be used in face-to-face teaching to greatly contribute to the development of face-to-face teaching (Soleimani & Asghari, 2021). The results of this section are consistent with the results of studies by(Mosayebi et al. ,2021; Li ,2022; Su et al.,2021;Ismaili ,2021; Almaiah et al. ,2020 and Khan & Viswanathan ,2023). When E-teaching is used, subsequent costs are reduced, and also users in remote and deprived areas can use them, and educational justice is established. Moreover, to use E-teaching content, there is no need to be in a particular place, and it is possible to be present in the classroom from anywhere using a computer and Internet connection. This event makes it possible to teach people who are constantly traveling (Shahbeigi & Nazari, 2012). Accordingly, many medical students prefer to conduct their general and theoretical courses online in order to benefit from its advantages.

The fourth main theme is facilitating access to national and international education, classes and

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webinars. With the advent of the COVID-19 pandemic, almost all face-to-face events were canceled in an effort to break the chain of infection, and many events were converted to an online model through webinars using technologies related to offline meetings. In face-to-face teaching, the instructor must be present in the classroom, and for this reason, he can cover a small and fixed number of students;for this reason, many students miss the advantage of using strong, experienced, and educated faculty members, and have to have poorer faculty members. However, with the advent of E-teaching and the use of seminars and webinars, it is possible to use the best faculty members in each field. The results of this section are consistent with the findings of (Li ,2022; Su et al.,2021; and Ismaili ,2021).

With regard to the theme of access to content produced during the COVID-19 pandemic, it should be stated that the content and learning materials in E-learning must have features that are suitable and efficient in situations where learning requires a high degree of self-centeredness and independence. Faculty members can use these contents for further teaching and in face-to-face classes to save time by producing useful content. The results of this section are consistent with the findings of (Qorbanpour Lafamajan ,2021; Rahimiyan et al. ,2022;Jafari et al.,2020; and Mortagy et al.,2022 and Saleh and Meccawy ,2022).

This research had some limitations. For example, only the data of interviews with medical students were obtained, and the findings of this study can not be generalized to a broader population, and the experience of faculty members, managers, and educational policymakers can also be investigated. Besides, the only data collection tool used was a semi-structured interview, and collective interviews such as focus groups can be used in future studies. It is suggested to use the infrastructure provided for E-teaching during COVID-19 for the development of a hybrid mode of teaching and to design interactive and more comprehensive software for hybrid teaching. Necessary measures for the development of hybrid teaching such as in-service teaching for university faculty members and students should be considered. Necessary arrangements should be made for the access of faculty members and students to authentic national and international webinars, seminars, and online classes.

Conclusions

Based on the research findings, policymakers and planners can take advantage of the positive capacities of distance electronic education and its development in times of bad weather conditions and unforeseen epidemics, which require providing non-attendance training, improving the quality of education and providing more capable graduates to society.

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Conflict of interest

The authors declared no conflict of interests.

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Ethical Considerations**:** Necessary explanations were given to the students about the objectives of the research, and interviews were conducted after obtaining permission and consent from Yazd University and Shahid Sadougi University of Medical Sciences, Yazd. The students were assured of the confidentiality of their information, and no additional costs were imposed on the research participants. The participants were free to answer the interview questions.

Code of ethics

Research ethics code: IR.YAZD.REC.1402.008.

Authors' Contributions

Conceptualization was done by M.K.K.SH; methodology was devised by M.SH. and H.H;. M.SH. and M.K.K.SH conducted the investigation; formal analysis was conducted by M.SH and H.H; K.B.B reviewed and edited the manuscript; H.H. made the original draft; and M.SH. supervised the study.

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