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# Explaining medical students' perceptions of asynchronous virtual education in the COVID-19 pandemic: A qualitative study

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## Abstract:

**INTRODUCTION:** With the unintended closure of classrooms following the outbreak of COVID-19, the virtual education method is used as an alternative to face-to-face education. Virtual education is one of the important factors in promoting the learning of medical students and has many benefits such as increasing the ability of critical thinking, problem-solving skills, and self-directed learning. However, critically examining students' perceptions of e-learning can help improve quality and better planning.

**MATERIALS AND METHODS:** This research was a qualitative study. Twelve students were enrolled in the study based on purposive sampling. Data were collected using in-depth semi-structured interviews in 2020. All interviews were recorded and then transcribed and analyzed using a continuous comparison and conventional content analysis approach.

**RESULTS:** Data analysis revealed four main themes and ten subthemes. The main themes included "student concern," "teacher barriers," "technology weakness," and "asynchronous virtual learning flexibility."

**CONCLUSION:** Asynchronous e-learning in the COVID-19 outbreak had its advantages and disadvantages. By analyzing students' perceptions in this field, some better designs and planning can be done to increase the quality of education.

## Keywords:

Education virtual education, medical, perception, students

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## Introduction

At one point in the COVID-19 outbreak, many laws changed. The announcement of a COVID-19 pandemic by the World Health Organization prompted many countries to start quarantining to control the outbreak by isolating and tracking cases. Since the beginning of the COVID-19 pandemic, 2 billion people worldwide have been affected by university closures. The COVID-19 affected all matters, including economics, education, entertainment, and government policy. In the case of education, the priority was to ensure the safety of

students and the progress of the education process. In this situation, the use of distance learning could be useful.<sup>[1,2]</sup>

In fact, COVID-19 has disrupted face-to-face training in medical schools around the world. The use of distance learning as an emergency has affected students, faculty, support staff, and administrators. The effects of the current epidemic are steadily evolving in medical education and are likely to have long-term effects on student learning. COVID-19 put university management under a lot of pressure to offer, access, and evaluate courses while at the same time maintaining the principles of honesty, ethics, justice, and fairness in education.<sup>[3]</sup>

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Virtual learning (distance and e-learning) can be used to mean the use of electronic technology and media to provide, support, and enhance learning and teaching, and includes communication between learners and teachers using electronic content.<sup>[4]</sup>

Types of e-learning include the use of interactive CD-ROMs, multimedia software or video and audio materials, multimedia presentations, simultaneous and asynchronous meetings through the web-based system, and visual presentations to increase participation and interaction. E-learning can be used both as an independent tool and in combination.<sup>[5]</sup>

Numerous studies have been reported on the advantages and disadvantages of e-learning. Virtual education helps save 60% of time compared to traditional learning, reduces millions of dollars in costs, and removes geographical barriers. It also reduces commuting and saves time, money, and better and easier learning.<sup>[6]</sup> A cross-sectional study of medical students at 13 medical schools in Libya found that e-learning is feasible in that country. There was an acceptable level of attitude and practice toward e-learning, however, students experienced financial and technical difficulties.<sup>[7]</sup>

In another study by Warnecke and Pearson (2011) to assess medical students' perceptions of the usefulness and effectiveness of e-learning packages to enhance the learning of counseling skills, most participants described it as enjoyable, useful, and effective in increasing knowledge. The researchers concluded that e-learning should be used as a combination training and as a support for face-to-face training.<sup>[5]</sup> Vitoria *et al.* conducted a study in Indonesia to understand students' use of e-learning. The results showed that web-based e-learning is useful and effective for improving students' understanding of the curriculum, time order, and interactions with each other and the teacher. Therefore, the inclusion of technology in education and university was mentioned as useful.<sup>[8]</sup>

Other studies have identified the disadvantages and disadvantages of e-learning. Barriers to e-learning in low-income countries can be divided into three categories: barriers to technology and infrastructure, barriers to institutions and teachers, and barriers to students. These barriers can affect both learners and faculty members.<sup>[9]</sup> Abbasi *et al.* conducted a descriptive cross-sectional study in Pakistan at a private medical college on virtual education during the COVID-19. 77% of students had a negative perception of e-learning. Students preferred face-to-face learning to e-learning and knew less about the impact of e-learning on learning.<sup>[10]</sup> In another study, there was a decrease in motivation and

concern for future of education and concern for academic results in these approaches.<sup>[11]</sup>

Considering that during the COVID-19, there was an urgency to use e-learning, and since faculty and students had no previous experience in this field, and on the other hand, given that the understanding of the phenomenon of e-learning is influenced by various contextual factors, it is necessary for administrators and faculty to make the necessary plans with the knowledge of students' perceptions.

With prevalence of the pandemic of the COVID-19 and the restriction of students from attending in-person classes in Khoy University of Medical Sciences (Iran), asynchronous virtual training was used Navid system (platform) which included items for presenting the content of courses, assignments, self-test, and conversation forum. This study was conducted with the aim of students' understanding of asynchronous virtual education, to record approaches to improve the performance of teachers and administrators in future by recording students' experiences and analyzing them.

## Materials and Methods

### Study design and setting

This qualitative research study with content analysis approach was carried out in 2020. According to the purpose of this study, which was to explain students' perceptions of e-learning, qualitative research method was a good method to obtain rich data from participants and analyze. In a qualitative study, researchers try to create meaning for phenomena and interpret them according to the meanings provided by people. Content analysis is the process of systematically classifying data through which codes and themes are displayed.<sup>[12]</sup>

### Study participant and sampling

Purposeful sampling was performed in Khoy University of Medical Sciences. Inclusion criteria were employment, having at least one semester of virtual education experience, and willingness to express experiences. In this study, 12 students were included in the study with maximum diversity by the first author of the article.

### Data collection and tools

Unstructured face-to-face interviews were used to collect data. The time and place of the interview were determined by agreement. Of course, most of the interviews were conducted in a suitable space inside the classroom in accordance with health protocols. Data collection took place from early April to August 2020. The duration of the interviews was between 30 and 60 min. At the beginning of the interview, a short conversation was held to make the researcher more familiar with the

participants and also to create an intimate atmosphere. Then, more specific, semi-structured, and in-depth questions were asked with the aim of discovering their experiences regarding asynchronous virtual education. Open-ended questions were designed as interview guides, and followed by probing questions. Interviews were recorded with the written permission of the participants. The main question that students were asked in the interviews was: What is your experience of presenting lessons in a virtual way? How did you understand e-learning based on your own experiences? What problems did you have during the virtual course presentation period? No new code was obtained after the tenth interview. However, two other interviews were conducted to ensure data saturation.

### Data analysis

The data analysis was performed by using the conventional qualitative content analysis method that was proposed by Graneheim *et al.* Recorded interviews were transcribed. Due to the fact that qualitative research requires total immersion in data and in order to get a general understanding of the data. The interviews were listened to and the text of the manuscript was read several times. Meaning units were then extracted from the participants' statements in the form of initial codes. The codes were classified based on semantic and conceptual similarity and were as small and concise as possible. The declining trend in data reduction took place in all units of analysis and the main and subthemes. Finally, the data were placed in the main categories, which were more general and conceptual, based on explicit and implicit text, and finally, the themes were abstracted.<sup>[13]</sup> All coding and classification steps were performed with MAXQdata software version 2007.

### Troth worthiness

Lincoln and Guba criteria including credibility, confirmability, dependability, and transferability were used to achieve the accuracy and reliability of the data. In this regard, the researcher tried to meet these criteria by reviewing the transcripts of participants and using their complementary opinions, as well as the researcher's long-term involvement with the data, allocating sufficient time for interviews and continuous review and comparison of data.<sup>[14]</sup>

### Ethical consideration

All ethical considerations in this study, including obtaining permission from the Faculty Ethics Committee (IR.KHOY.REC.1399.013), obtaining the informed consent of the participants to enter the study, and maintaining the anonymity of the participants in the study, were done. The informed consent form was completed by them, and permission to record and use the information was obtained without mentioning the

name. The right to withdraw from participation was taken into account during the study.

## Results

Twelve students in the age range of 19–24 years (M = 20/5) participated in this study. Their average educational background was 9 [Table 1]. The analysis of the participants' interviews led to the extraction of four themes and ten subthemes, which are explained below [Table 2].

### Theme 1: Students' concerns

In all the interviews, the students tried to express the concept that emergency start of e-learning had caused them concern. They were worried because they were unfamiliar with e-learning and worried about their educational status.

#### *Not familiar with virtual education*

#### *Academic delay*

*I'm worried that this disease will last. Our study period will be longer. Well, we finally learn theories with virtual, but clinics, laboratories,*

### Theme 2: Obstacles to the training process

This theme included three subthemes of content problems, interaction, and evaluation. The students stated that some faculty provided low-quality content and uploaded the entire semester content at a time and near to the examination time, as well as complaining about poor interaction and the challenge of online examinations.

#### *Content Challenge*

The students stated that some faculty uploaded without schedule, nonstandard content at a time, which reduced their efficiency and learning.

*Some threshers sent us the entire semester textbooks a week before the exams, which were very large. Well, this way we do not learn anything.*

*Some threshers upload files without audio, or some courses require uploading videos. They upload a PDF file, which is not effective.*

#### *Weak interaction*

*Interaction is less than face-to-face training. If I did not understand something, I would write in the discussion section, thresher would take a day or two to answer.*

*Some threshers responded to our assignments late and we did not receive timely feedback.*

#### *Inappropriate online testing method*

Another challenge that students experienced was how to conduct online examinations. They stated

**Table 1: Demographic characteristics of the participants**

| Participant    | Sex    | Age | Grade              | Field of study       | Semester |
|----------------|--------|-----|--------------------|----------------------|----------|
| Participant 1  | Female | 20  | B.Sc               | Nurse                | 3        |
| Participant 2  | Male   | 22  | B.Sc               | Nurse                | 5        |
| Participant 3  | Female | 24  | B.Sc               | Operating room       | 6        |
| Participant 4  | Female | 19  | B.Sc               | Operating room       | 2        |
| Participant 5  | Female | 20  | B.Sc               | Public health        | 2        |
| Participant 6  | Female | 21  | Associate's degree | Medical emergencies  | 3        |
| Participant 7  | Female | 21  | B.Sc               | Environmental health | 5        |
| Participant 8  | Male   | 24  | B.Sc               | Public health        | 5        |
| Participant 9  | Male   | 21  | B.Sc               | Environmental health | 6        |
| Participant 10 | Female | 22  | B.Sc               | Nurse                | 4        |
| Participant 11 | Male   | 20  | Associate's degree | Medical emergencies  | 4        |
| Participant 12 | Female | 21  | B.Sc               | Operating room       | 3        |

**Table 2: Themes and subthemes obtained from the interview**

| Primary concepts   | Subthemes   | Themes  |
|--|---|---|
| Lack of planning for the presentation of course content by faculty | Not familiar with virtual education                   | Students' concerns                            |
| Nonstandard content  | Academic delay  |   |
| Low opportunity for questions and answers                          | Content challenge                                     | Obstacles to the training process             |
| Poor response  | Interaction defects                                   |   |
| Prolonged feedback time from faculty                               | Inappropriate online testing method                   | Weakness of technology                        |
| Impossibility to go back in questions                              | Lack of access to smart virtual communication devices |   |
| Difficulty of tests  | Insufficiency of the Internet platform                | Flexibility of asynchronous virtual education |
| Allocate low time to questions                                     | Elimination of time and place limitations of learning |   |
|  | Possibility to listen to audio file several times     |   |
|  | Independence in learning                              |   |

that allocating too little time to each question and not being able to go back in the examinations hindered good performance. The students' statements are as follows:

*In face-to-face tests, it was possible for us to devote appropriate time to each question according to our abilities, but not here.*

*In the pencil-and-paper tests, I kept the hard questions for last only to think that, this is not possible now, and that it has made things difficult for us.*

**Theme 3: Weakness of technology**

This theme also included two subthemes of Internet platform inadequacy and lack of access to smart virtual communication devices. Student statements include the following:

*Internet platform inadequacy*

*The Internet is disconnected and connected several times to download content. This gets worse when it happens during the exam.*

*Lack of access to smart virtual communication devices*

*Most of the phones are smart now, but in the early days they were poor students who did not have smart phones.*

**Theme 4: Flexibility of asynchronous virtual learning**

*Elimination of time and place restrictions on learning*

*In terms of the less time spent in class and the more hours spent studying, it was a good and beneficial experience.*

*This type of training was better, it took less energy from us and we wasted less time. Before we used to be in class until the evening, then you were tired in the dormitory and the dormitory problems, food and many other things that made you not have time to study.*

*Ability to listen audio files several times*

*One positive thing was that it took less time than face-to-face classes, and if we did not understand the discussion we could listen to the file several times.*

*Audio files had the advantage that you could listen back again.*

*I am one of the students who have to work to make ends meet. With offline training, I can work in the morning and listen to the contents of the files whenever I have time.*

*Independence in learning*

*Virtual education separated us from pure dependence on the teacher and we experienced independence in learning.*

## Discussion

This study, with a qualitative content analysis approach, determined the medical students' perception of offline virtual education during COVID-19 outbreak. The research findings showed four themes and ten subthemes. The extracted themes included students' concerns, barriers to the education process, technological weakness, and the flexibility of asynchronous education.

The first theme that emerged in the study was students' concerns. According to students' perceptions, the beginning of using virtual education was associated with their concerns. They were unfamiliar with how to learn in cyberspace and worried about their future education and the length of their graduation. In a study in Saudi Arabia, students experienced moderate-to-high levels of concern about distance learning. Psychological responses such as anxiety, depression, and stress occur due to a lack of interpersonal communication during social distancing. Sources of stress included repetition and performance tests, curriculum, parental pressure, loneliness, and anxiety about future.<sup>[15]</sup> Another review study found that students in e-learning may feel isolated and disconnected and affected by their learning. Dependence on society affects learners' sense of identity and learning.<sup>[16]</sup> Furthermore, in a study conducted in Nepal, nursing students were anxious and worried about their ability to effectively use e-learning and the pressure exerted by teachers to conduct educational and research activities.<sup>[17]</sup> It is recommended that psychological counseling centers in universities listen to and alleviate students' concerns by making telephone calls and different support forms. Furthermore, the role of parents and teachers can be crucial in reducing student anxiety. Parents can provide effective support with emotional support, and teachers as mentors can guide students.

The other theme was related to barriers to the education process. Students in the present study complained about the poor and unplanned educational content and weak interaction. This could be due to the sudden outbreak of the COVID-19 and the closure of universities and the lack of training on virtual education. As we know, the teaching and learning process underwent a great revolution during the COVID-19. The results of a study based on teachers' views showed that the transfer of face-to-face education to virtual education is challenged due to teachers' unpreparedness to use virtual platforms. Instructors believe that in virtual teaching, teachers should also prepare lesson plans and teaching materials and learning objectives, but the lack of training for teachers is one of the main obstacles to this. Other studies have suggested that a good teacher in the classroom may not necessarily be a good virtual teacher. Since not all students are suitable for distance learning and not all

content can be taught this way, it is recommended to provide them with rich content.<sup>[18]</sup> Another obstacle to the learning process was the poor interaction of teachers. In a study conducted in Jordan, poor interaction was one of the challenges.<sup>[9]</sup> To address this challenge, it is suggested that empowerment workshops be considered for faculty to produce rich e-learning content and be taught how to work with virtual platforms. Furthermore, to increase teacher-student interactions and the effectiveness of e-learning, providing electronic content is not enough. Interactions should be enhanced by creating assignments, conversations, and providing timely feedback on virtual platforms.

Another theme that emerged from the study was technological weakness. Lack of access to smart virtual communication devices and inadequacy of the Internet platform were other weaknesses of technology. Furthermore, in another study in Iran, low bandwidth, hardware and software problems, and lack of expertise have been some of the challenges mentioned in e-learning, which leads to the closure of classes and incomplete meetings.<sup>[19]</sup> Keshavarzi *et al.*, from the analysis of interviews with faculty members, mentioned the main challenge of e-learning as organizational barriers and inadequate structures.<sup>[20]</sup> The challenge of evaluating the tests was another area that was experienced by students in this study. Studies also show that the transition from face-to-face education to online education has a serious impact on student evaluation. Faculty members should change the types of evaluation according to the online mode. It is difficult to monitor online usage and ensure that students do not cheat during the examination. It is also not possible in the laboratory and practical courses, and students with Internet problems face more problems when participating in the evaluation process.<sup>[21]</sup> In a study in Saudi Arabia, 57% of students had difficulty in evaluation.<sup>[22]</sup> The results of a study in India showed that although online education is a very powerful and effective tool for teaching in this epidemic, online classes are not welcomed by students due to book unavailability, technical problems, and network connection issues.<sup>[23]</sup> Indeed, a large number of published studies have shown that technical problems are the main disadvantages of virtual education. Lack of access to digital tools, issues related to virtual learning platforms, and speed and quality of the Internet cause student dissatisfaction. Therefore, it is necessary to strengthen the technological infrastructure in each university.<sup>[24]</sup>

Another theme derived from the research was the flexibility of e-learning. Students in various literatures have also confirmed this. The limitation of time and place of learning was removed, the possibility of going backward, the possibility of listening to audio files several times, self-learning, and the possibility of

students working independently in learning were some of the positive experiences that students expressed. In fact, the philosophy of e-learning is based on the participatory and constructive learning approach and causes students to get out of the passive state.<sup>[25]</sup> Studies also point out that in virtual education, students have access to educational resources and information 24 h a day.<sup>[23]</sup> Half of the students believed that virtual education is useful and has a complementary role in education, and users control their content, learning order, time, and experience according to their personal learning styles and goals.<sup>[2,26]</sup> Students in the present study had a positive perception of asynchronous education and stated that in this type of education, they had more control over the time and type of learning. Asynchronous learning, which is increasingly used in undergraduate medical students, has the advantages of flexibility, cost-effectiveness, and efficient use of resources.<sup>[27]</sup> Having independence in learning was another benefit that was mentioned. In traditional methods, students are passive participants who only take notes.<sup>[28]</sup> Involving students in the design and implementation of educational programs is one of the vital components in medical education. By involving students in educational design, they feel ownership over their education and, as a result, gain more trust and respect for faculty and administrative members.<sup>[29]</sup> However, there is no evidence that online education is better than offline. Therefore, combination training is recommended.<sup>[30]</sup> A similar study of virtual learning during the Corona pandemic found that WhatsApp-based learning promotes collaborative learning, motivation, and self-directed learning in students. Using social media reduces anxiety and creates a sense of socialization (such as using a WhatsApp group for students).<sup>[31]</sup> The innovation of the research was that since most of the researches in this field were done with a quantitative research approach, the researchers tried to discover and offer suggestions for the challenges of virtual education with a qualitative approach.

### Limitation and recommendation

Given that other pandemics are likely to occur in future, more attention should be paid to virtual education. Therefore, it is suggested that the challenges identified in this research be addressed. Development of technical and technological infrastructure, training of university professors on increasing ways of interaction with students, use of standard content and evaluations appropriate to virtual education, empowering of students and professors to use computer skills can reduce students' anxiety and increase the effectiveness of e-learning. The challenges of e-learning in other fields can be different, and this is one of the limitations of this research. Furthermore, caution in generalizability is one of the limitations of the results of all qualitative studies.

The results of the present study may be applied in a setting similar to our context.

### Conclusion

The results of the study showed that students' perceptions of virtual education have positive and negative aspects. In fact, it can be concluded that at university's students, there are more possibilities of using virtual education, but this is a new method, and there are many unknowns in this field, and on the other hand, there are some problems such as unprepared some of the structures and facilities in our country have led to negative perception in students. Therefore, it is suggested that other researches such as the achievement of educational goals in virtual education and comparison of different methods of virtual education be considered.

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### Conflicts of interest

There are no conflicts of interest.

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