

Para medicine Students' Experiences of Virtual Education: A Qualitative Study

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Abstract

Background: The emergence of the Internet and its development led to the expansion of virtual education. The development of virtual education in recent years has had a tremendous impact on the improvement of education and the establishment of educational justice in different parts of the world. Despite its advantages, virtual education is also associated with some challenges. The present study aimed to investigate para medicine students' experiences of virtual education.

Methods: This qualitative study was conducted using conventional content analysis. The participants were 25 students in various fields of para medicine who were selected using purposive sampling. The study took place at universities in the north of Iran. The data were collected using semi-structured in-depth interviews and focus groups from January to April 2022. The collected data were analyzed using Graneheim and Lundman's qualitative content analysis method.

Results: The core category identified in this study was from helplessness to interaction which was divided into three main categories (challenges and desperation, deprivation of mutual interaction and learning, and resilience and adaptation) and fourteen subcategories.

Conclusion: The main theme extracted from the interviews with the participants was from helplessness to interaction. When a person has numerous failures, cannot control environmental conditions, and feels the ineffectiveness of their activity and response, they will experience a sense of vulnerability. Thus, the person has to accept the conditions and interact with them. In other words, interaction is a skill that improves the ability to quickly learn new skills and behaviors in response to the conditions. Thus, identifying challenges and realizing the weaknesses, strengths, opportunities, and threats governing the existing virtual education environment can help to turn many threats into opportunities, promote virtual education, and support teachers and students to improve the quality and quantity of the teaching-learning process in the COVID-19 and post-COVID-19 era.

Keywords: Para medicine students, Virtual education, Virtual learning, Qualitative research

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Introduction

The development of virtual education in recent years has had a tremendous impact on the growth and improvement of education and the establishment of educational justice in different parts of the world (1-3). In recent years, the changes made in information technology (IT) have forced all people everywhere in the world to use this technology to transfer information (4,5). Besides,

the emergence of the Internet and its development led to virtual education. Virtual education in Iran is also one of the main requirements for the establishment of educational centers and is considered a complement to conventional modes of education (6). In Iran, virtual and online universities have been established for years, and offices for virtual education study and development at universities encourage professors to produce content for



virtual education (7).

However, like other technologies, the introduction of this new technology also requires a suitable platform, training, and creating an acceptable environment to use its numerous facilities and capabilities. Moreover, various factors such as faculty members' support, the existence of a support system, organizational commitment, management system, trainer competencies, the quality of service delivery, and the infrastructures affect the success of education (8). Virtual education refers to all forms of teaching and learning that are implemented and supported electronically. This mode of education aims to build knowledge related to individual experience. The three main characteristics of virtual education include flexibility, distribution in all places, and openness (6). Information and communication technologies (ICTs), whether networked or non-networked, are considered the main media for facilitating virtual education. The move towards this new technology in higher education has caused a large number of universities in the world to increasingly use it for offering courses (9). Virtual education can create skills and facilitate learning anywhere and anytime. Students also have a great desire for technology and new technology products because there is a great potential for integrating new technologies into education and providing flexible and suitable methods for teaching students at any time. Furthermore, before the COVID-19 pandemic, virtual education was used as a supplementary method and mostly informally (10). However, virtual education in universities has led to a transformation in education and has created some new concerns in educating students in cyberspace (9). For example, the COVID-19 pandemic has affected all modes of education in medical sciences, including nursing education, and led to the closure of educational centers all over the world (11). Pushing all medical sciences education toward virtual education has caused problems such as insufficient learning, especially in clinical skills (12). However, medical sciences are dynamic and nursing requires theoretical training, practical skills, creativity, and experience, as well as motivation and abstract thinking. Paying attention to the education of students who join the medical staff immediately after graduation is very vital to maintain the health of citizens throughout the country (7). Although researchers have found many benefits of learning through virtual education, such as reducing anxiety, getting involved with the content, self-regulated learning, monitoring the learning process by the students themselves, creating an attractive and interactive environment (10), low cost, user-friendliness, constant access to the content, creating the opportunity to achieve deeper understanding and knowledge through sharing resources and expressing and exchanging opinions (12), virtual education has some disadvantages such as addiction to technology, concerns about data

security and fraud, inadequate infrastructure, neglect of intellectual property rights and ignoring ethical issues (8), insufficient feedback, insufficient access to computers and the Internet for some students (7), ineffectiveness for all contents, insufficient teaching by professors, the lack of financial facilities and physical space, cultural barriers, teachers' and students' inability to use technologies, public perceptions of this type of education, disruption in the socialization process, evaluation problems (11), and lack of role models from professors (9). For example, Mortazavi et al showed the negative impacts of learning with virtual education among students of medical sciences, which indicated students' dissatisfaction with the teaching-learning process in virtual education (7).

Although all studies in the literature agree that no educational method can replace face-to-face education and communication with the teacher, critical situations such as the COVID-19 pandemic have changed education from face-to-face to virtual, from classroom to home, and from seminars to webinars (13). Accordingly, it can be concluded that although learning through virtual education is associated with some challenges, previous studies have highlighted the need of countries to prepare for virtual education, especially in epidemics (14). The truth is that turning to virtual education is a change that has occurred in the world and it is expected that it will receive growing attention in the post-COVID-19 era. To this end, it is essential to explore nursing students' experiences of virtual education as students are the main beneficiaries to this type of education.

Some studies have often examined this concept through presuppositions and using quantitative methods, and few qualitative studies have addressed para medicine students' experiences of virtual education (15-17). Quantitative approaches do not have the necessary flexibility and depth in understanding people's beliefs and values from phenomena that are somehow related to human interactions (18). Therefore, given the importance of virtual education for medical sciences students, the present study aims to investigate medical para medicine' experiences of virtual education.

Methods

The present study was conducted in 2022 using a qualitative research design with a conventional content analysis approach to examine Para medicine students' experiences of virtual education. This approach is a systematic and purposeful way to describe a phenomenon (19). This study was conducted on various fields of medical sciences (nursing, anesthesiology, operating room, midwifery, laboratory sciences) studying at universities in the north of Iran. The purposive sampling method was used to recruit the participants, and the sampling continued until data saturation. The inclusion criteria were taking virtual education courses, having the ability to provide rich

information about the phenomenon in question, having suitable mental and physical conditions for the interview, and willingness to participate in the study and answer the questions. The exclusion criteria were unwillingness to continue cooperation in the next sessions and having an unfavorable mental and physical state. The data in the present study were collected through semi-structured interviews and focus group discussions. The interviews were conducted face-to-face with the participants in a calm environment without the presence of others. The setting and time of the interview were determined by the agreement of the participants (at the participant's school or hospital). The average duration of the interviews was 35 to 40 minutes.

The second author (N.M.) arranged and conducted all the interviews. Participants were informed that they could withdraw from the study at any stage. A written informed consent was obtained from all participants. All interviews were recorded with the permission of the participants and then transcribed line by line on paper. A total of 25 interviews were conducted with students. Two focus group discussions were conducted with 6 students, none of whom were interviewed individually. The duration of the group discussions was 90 to 120 minutes. The focus groups were conducted via Skype.

The starting time of the group discussion sessions with the participants was determined in advance and it was tried to be at a time of the day when the internet speed was suitable. Then, the group link was provided to the participants a day in advance, and the meeting was held at the appointed time. All sessions were also recorded.

Examples of the interview questions are as follows:

- Would you please describe your experience of virtual education?
- Can you explain how you felt when you encountered virtual education?
- What factors affect virtual education?
- Would you please describe a good or bad experience you had with virtual education?

In addition, probing questions (Could you give an example? What do you mean?) were asked for further clarification. In this study, there was no limitation in terms of the number of participants, interviews, or data sources. Besides, different sources of data were used until the collected data were saturated. Efforts were made to enroll students with maximum variation in terms of age, gender, and educational background. The collected data were analyzed using the conventional content analysis approach proposed by Graneheim and Lundman (20,21). After conducting each interview, its content was transcribed word by word. In the next step, the transcript was read several times to come up with a general understanding of the content. Afterward, the meaning units were specified and the primary codes were extracted. In the next step, the codes were merged into a

set of clusters based on their similarities and differences. Finally, the themes underlying the data were extracted.

The criteria proposed by Guba and Lincoln were used for the trustworthiness of the study (21,22). The credibility of the data was enhanced by prolonged engagement with the phenomenon in question and allocating enough time to collect data and their continuous reviews. The researcher also established a good relationship with the participants. To ensure the reliability of the findings and their conformity with the transcripts, some transcribed interviews with the extracted codes and categories were reviewed through peer-debriefing by 3 professors with a Ph.D. degree in nursing who were experts in the field of qualitative research and nursing. The interviews and the extracted codes were assessed through peer checking by four participants in the study and they stated that the findings matched their understanding and interpretation. Furthermore, at the beginning of the study, the researcher carefully reviewed the transcribed interviews to reduce any possible bias in collecting, analyzing, and coding the participants' conversations and improve the validity of the data. To ensure the dependability of the data, all the steps taken to conduct this study were independently assessed by external observers (qualitative researchers), and then their findings were compared. Moreover, to enhance the confirmability of the findings, all data collection and analysis procedures were assessed through step-by-step reviews and auditing. Although the findings of qualitative research have low transferability, the researcher tried to provide a detailed description of the procedures used for the selection of participants, data collection, and data analysis to apply the findings in similar situations.

Results

The participants in this study were 25 paramedical students. The majority of the participants were female and single. Most of the participants were nursing students. The participants' age ranged from 19 to 25 years. Table 1 shows the demographic characteristics of the participants.

The core category identified in this study was *from helplessness to interaction* which was divided into three main categories (*challenges and desperation*, *deprivation of mutual interaction and learning*, and *resilience and adaptation*) and fourteen subcategories as shown in Table 2.

The core theme extracted from the interviews with the participants was *from helplessness to interaction*. When a person has numerous failures, cannot control environmental conditions, and feels the ineffectiveness of their activity and response, they will experience a sense of vulnerability. Thus, the person has to accept the conditions and interact with them. In other words, interaction is a skill that improves the ability to quickly learn new skills and behaviors in response to the

Table 1. Demographic characteristics of the participants

Participant	Gender	Age	Field of study	Semester
1	Female	19	Nursing	4
2	Female	20	Nursing	5
3	Male	22	Nursing	7
4	Female	21	Nursing	3
5	Female	19	Laboratory sciences	4
6	Male	19	Surgery	3
7	Female	19	Nursing	4
8	Female	19	Anesthesiology	3
9	Male	20	Laboratory sciences	4
10	Female	22	Midwifery	7
11	Male	21	Surgery	4
12	Female	21	Nursing	7
13	Female	22	Midwifery	5
14	Female	19	Anesthesiology	4
15	Female	24	Midwifery	6
16	Female	23	Nursing	6
17	Male	19	Nursing	6
18	Female	20	Midwifery	4
19	Male	21	Surgery	4
20	Male	23	Anesthesiology	4
21	Male	25	Surgery	4
22	Male	19	Anesthesiology	3
23	Male	19	Nursing	5
24	Male	22	Nursing	5
25	Male	21	Nursing	5

conditions. *From helplessness to interaction* covered three subthemes including *challenges and desperation*, *deprivation of mutual interaction and learning*, and *resilience and adaptation*.

Challenges and desperation

The participants in this study stated that the most important experience with virtual education was related to challenges and desperation. Virtual education led to a new challenging situation. Thus, they could not do their current and educational activities normally and they needed special attention and energy to do them. These challenges included the unavailability of educational software and applications, unfamiliarity with virtual education, unfamiliarity with the software environment, inadequate internet infrastructure, and concerns about the lack of clinical training.

One of the participants stated, “Most of the software and applications needed for education were not available at the university and college and we practically had no access to many good educational software programs” (Participant 5). The participants also complained about inadequate internet infrastructures, “We had no internet connection.

Table 2. The main themes, categories, and subcategories extracted in this study

Core theme	Categories	Subcategories
From helplessness to interaction	Challenges and desperation	Unavailability of educational software
		Unfamiliarity with virtual education
		Unfamiliarity with the software environment
		Inadequate internet infrastructure
		Concerns about the lack of clinical training
	Deprivation of mutual interaction and learning	Having no communication with classmates
		The one-sidedness of the class
		Symbolic presence in the class
		The bad feeling of non-attendance
		The normalization of virtual education
Resilience and adaptation	The use of other interactive methods	
	More participation in the class	
	Learning media literacy	
	Attending clinical training	

Sometimes the internet speed was too low, and we could hardly download a file. We wasted a lot of time due to the internet disconnection, which was really annoying” (Participant 12). Virtual education does not allow students to attend clinical environments, and this is a challenging issue, especially for students of medical sciences. One of the nursing students stated, “*We were really worried about not being able to go to the hospital. Clinical training is an important part of nursing education, which does not get along at all with the virtual education system, and this is especially a big challenge for us”* (Participant 4).

Deprivation of mutual interaction and learning

Virtual education through applications and software systems does not allow students to attend the classroom and establish two-way communication and learning. This was one of the issues pointed out by the participants in the interviews. They complained about having no communication with classmates, the one-sidedness of the class, the symbolic presence in the class, and the bad feeling caused by non-attendance in the classroom. One of the participants stated, “*One of the disadvantages of virtual education is that you don’t have face-to-face contact with anyone, and even you don’t know many of your classmates at the end of the semester”* (Participant 13).

The students also reported that they had unpleasant feelings as they could not attend a real classroom. For example, one of the participants said, “*It’s a very bad feeling because you can’t really be in the class, you feel lonely. You think that online education is of no use and the impossibility of attending the class creates a bad feeling and you think that this type of education is not real”* (Participant 24).

Resilience and adaptation

The participants in this study stated that they gradually learned how to adapt to new conditions and benefit from online courses. They became interested in virtual education and tried to communicate with each other in other ways. Gradually, they attended online classes more frequently. They could use the applications effectively and they learned more about educational technologies. The students could attend clinical educational environments gradually and students could benefit from clinical training.

The students in this study stated that virtual education became a normal issue for them. One of the participants reported, *“After a few months, we slowly got used to this model of training and learning, it was not as strange as it was before”* (Participant 25).

The participants acknowledged that the use of other interactive ways played an important role in their adaptation to the new education system. A student said, *“Little by little, we learned how to communicate with each other. For example, we used to chat and talk to each other, or if we had a question in class, we could ask each other more intimately”* (Participant 4).

The students reported that over time, they got more interested in attending online classes, *“We learned that in these classes we should also talk, express our opinions, give suggestions, and ask questions, and it even happened that we had group discussions in these online classes”* (Participant 17).

The participants stated that virtual education helped them learn media literacy. A participant stated, *“I got to know how to work with different software programs and applications, even I could buy and install some applications for myself. I didn’t even know their names before”* (Participant 19). Finally, the participants reported that they could attend clinical training. A student said, *“They divided us into small groups and we could go to the hospital and receive the necessary training there, which was very good”* (Participant 16).

Discussion

The present study aimed to investigate para medicine students’ experiences of virtual education. The findings showed a model of helplessness to interact with virtual education. This model had three components of challenges and desperation, deprivation of mutual interaction and learning, and resilience and adaptation. The results of the study showed when a person has numerous failures, cannot control environmental conditions, and feels the ineffectiveness of their activity and response, they will experience a sense of vulnerability. Thus, the person has to accept the conditions and interact with them. In other words, interaction is a skill that improves the ability to quickly learn new skills and behaviors in response to the conditions

The participants in the study stated that they faced many challenges including the unavailability of educational software and applications, unfamiliarity with virtual education, unfamiliarity with the software environment, inadequate internet infrastructure, and concerns about the lack of clinical training.

Communication and internet infrastructure, human resources infrastructure, and experienced experts play a vital role in virtual education (23). The lack of any of these components will cause a serious problem in the launch and establishment of this new system. Following the findings of the present study, Coman et al reported that the platforms provided by the universities were facing many technical problems and 14.8% of the students complained about poor internet connection and the lack of laptops or computers (24) while a study in China showed that during the COVID-19 pandemic, students were satisfied and had the least challenges with virtual education (25). Shafiei Sarvestani et al reported that technical challenges such as low internet speed, lack of physical spaces in e-learning, and support challenges like lack of facilities were some problems faced by medical students in e-learning courses (6).

Longhurst et al also reported similar problems, including the lack of expert IT personnel for technical support, cyber-attacks on online platforms, time constraints, poor technical skills of faculty members and students, insufficient information, and financial resources as challenges of virtual education in low-income and developing countries (26).

Following the findings of the present study, empowering learners before holding online courses is essential which is among the weaknesses mentioned in this study. Personal skills, study and computer skills, and internet skills are among other important requirements that should be considered (27). The lack of experienced and expert human resources in the field of e-learning, the low motivation of students and professors to use e-learning, and the low personal experience of students and professors in using computers were introduced as challenges to the development of e-learning in universities (23).

It is obvious that to solve this problem and achieve the improvement of virtual education, the relevant officials should be scientifically familiar with the up-to-date learning environment and in terms of technical equipment and infrastructure with the latest methods that meet the educational needs of students.

Since clinical education has an important contribution to the learning of medical students, staying away from the clinical setting was one of the challenges reported by the students in this study. Similarly, a study in the Netherlands showed that fourth- to sixth-year medical students mentioned the lack of interaction with the patient as one of the most important disadvantages of

virtual education (17).

Babazadeh et al also reported that disruption of practical courses during COVID-19 such as laboratory and clinical courses is the main drawback of virtual education. Since clinical education is the cornerstone of medical education, its absence is considered a fundamental problem in e-learning courses (28).

When education is provided online and through software systems, students are deprived of the opportunity to attend the classroom and establish two-way communication and learning, as was reported by the students in this study. The students also complained about the impossibility of communicating with classmates, the one-sidedness of the class, the symbolic presence in the class, and the bad feeling caused by non-attendance in the classroom. The lack of effective interaction and the inappropriate psychological atmosphere are major problems in conducting online courses mainly due to the Internet bandwidth and hardware facilities that may not be available to all learners. Furthermore, the lack of face-to-face communication between the instructor and the students leads to the instructor's and the learner's isolation (29). In addition, the lack of deep online conversations, not understanding others and not being understood by others (16), audio and video problems, boring classes without encouragement and face-to-face communication, the need for two-way interaction, and communication problems (15) are some disadvantages of e-learning and online courses. Providing facilities for two-way communication through synchronous and asynchronous communication technologies, as well as the use of mixed (non-virtual and virtual) educational modalities can contribute to enhancing students' interaction in online courses (24). Applying other solutions such as shortening the online teaching time, assigning homework, and asking the learner to search for material can increase the efficiency of online courses, which of course also requires teacher and learner planning and self-management of learning motivation, varying in teachers and learners (30). The participants in the present study complained about the symbolic presence in the class and unpleasant feelings due to the impossibility of attending the class. Similarly, Sadati et al reported that the students complained about not having a sense of being a student and confusion about roles (31).

Regarding the role of student interaction in virtual education and the role of face-to-face education, for more learning and participation, it is better to use a combination of different learning tools such as combining traditional methods with new audio and video tools with more and better sharing capabilities. Holding classes in the form of video conferences and expanding the use of video conferences and collective training and web-based group training methods should be increased so that students can communicate visually and simultaneously with

professors and other students. Besides, taking help from various tools such as chat rooms, discussion groups can be useful in increasing interactions in virtual education.

The participants in this study stated they gradually learned how to adapt to new conditions and benefit from online courses. They became interested in virtual education and tried to communicate with each other in other ways. Gradually, they attended online courses more frequently. They could use educational applications effectively and they learned more about educational technologies. The students could attend clinical educational environments gradually and students could benefit from clinical training.

Mohammadi et al showed that online education can revolutionize the educational system by expanding educational opportunities, developing creative opportunities, incorporating virtual education into the field of education and training, creating a new experience, improving the media literacy of learners and parents, and encouraging the development of new educational methods (32). Doddaiah et al examined virtual education during the COVID-19 pandemic and showed that WhatsApp-based learning promotes participation in learning, motivation, and self-directed learning in learners. The use of social networks creates a feeling of socialization in learners (33).

Other studies have shown that over time, as learners get used to this educational method, they can use this technology to access vast learning resources and increase their creative learning motivation. Creative learning develops the necessary motivation for activity and effort in the learner to think of creative solutions even for future problems that cannot be predicted (34).

Tehrani et al reported that one of the advantages of virtual education is the creation of a suitable platform for teaching and learning. The flexibility of virtual education programs and the creation of learning opportunities for learners who tend to think more about the educational content have been mentioned as an advantage of virtual education (35).

In addition to the disadvantages and problems of virtual education, the advantages of virtual education include accountability, participation, creativity, increasing skills in information technology, students' knowledge of today's technologies, and finally adapting to this educational method. Adapting to virtual education technology requires a transformation in teaching and learning plans. It seems that developing concept-based curricula, problem-solving, fostering creativity, welcoming innovative and new ideas, and using integrated student evaluations in the educational system and combining it with virtual education are some of the ways out of the current problems of virtual education in universities of medical sciences.

Among the limitations of this study were the use of a

purely qualitative approach and the limited number of participants. Thus, to generalize the results, it is necessary to carry out similar studies in other universities and use mixed research methods (qualitative and quantitative). In addition, due to the COVID-19 pandemic, it was not possible to conduct the focus group sessions in person.

Conclusion

Better implementation of virtual education requires managers to pay attention to the challenges and try to solve them. Moreover, due to the advantages of this type of education, some courses can be designed in the future using blended learning methods. Thus, identifying challenges, weaknesses, strengths, opportunities, and threats governing the existing virtual education platforms can contribute to turning many threats into opportunities. Besides, promoting virtual education platforms and providing necessary training for teachers and students can be a step towards improving the quality and quantity of the teaching-learning process in the COVID-19 and post-COVID-19 era.

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Competing Interests

The authors declared no conflict of interest.

Ethical Approval

This study was approved by the ethics committee of Guilan University of Medical Sciences (IR. GUMS. REC.1401.407). The objectives and protocol of the study were explained to all participants. Verbal and written informed consent was obtained from the participants.

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