Opportunities and Challenges of E-learning for Nursing Students at the Beginning of the COVID-19 Pandemic in Iran: A Qualitative Content Analysis

Abstract

Background: Given the limited presence of students in universities and the closure of educational centers, including nursing schools, during the COVID-19 outbreak, there has been a significant shift toward e-learning. However, there is a lack of research in this area. Therefore, this study aimed to explore the experiences of undergraduate nursing students with e-learning during the COVID-19 outbreak in 2020. **Materials and Methods:** This qualitative-descriptive study focused on 12 undergraduate nursing students from the School of Nursing and Midwifery at Isfahan University of Medical Sciences. The participants were selected using purposive sampling. In-depth and semi-structured interviews were conducted to collect the data. The collected data were analyzed using MAXQDA10 and conventional content analysis. The study was conducted between May and September 2020. **Results:** Analysis of the findings led to the emergence of 11 subcategories and two main categories: E-Learning opportunities and Challenges of E-Learning, providing a comprehensive description of the experiences reported by the participants. **Conclusions:** Unforeseen crises, such as the current COVID-19 pandemic, can significantly affect the quality of education by disrupting face-to-face learning. To mitigate such disruptions, it is crucial to plan and establish infrastructure that supports alternative modes of education, such as e-learning. Additionally, providing training to students and educators on effectively utilizing digital platforms and producing electronic content can help ensure a smoother transition during crises.

Keywords: *COVID-19, nursing students, online learning, qualitative research*

Fatemeh Ghaedi-Heidari[1], Sima Ghezelbash[1], Nastaran Heydarikhayat[2], Zahra Shafiei[3]

[1]Department of Psychiatric Nursing, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran, [2]Department of Nursing, School of Nursing and Midwifery, Iranshahr University of Medical Sciences, Iranshahr, Iran, [3]Department of Operating Room, Nursing and Midwifery Care Research Center, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran

Introduction

The ongoing outbreak of 2019-nCOV pneumonia was first identified in Wuhan, China, on December 19, 2019.[1,2] Subsequently, on January 30, 2020, the World Health Organization (WHO) declared the novel coronavirus outbreak a Public Health Emergency of International Concern.[3] The disease caused by coronavirus infection was named COVID-19.[4] In Iran, COVID-19 was officially confirmed on February 20, 2017 in the city of Qom. Approximately two weeks later, the Iranian Ministry of Health announced that the virus had spread to all provinces of Iran.[5] Global statistics indicate that as of October 31, 2021, over 24,715,975 people worldwide and 137,724 people in Iran have been infected with COVID-19. The virus has claimed the lives of 5,010,881 individuals globally and 126,000 individuals in Iran.[6,7] To combat and control the spread of this virus, it is crucial to implement appropriate preventive measures, such as discouraging large gatherings.[7] As a result, educational institutions and crowded centers, including universities, dormitories, and face-to-face classes, have been closed in many countries.[8] E-learning has emerged as a vital alternative due to limited physical presence in the community and universities in accordance with social distancing measures and the need to continue teaching and learning during this period.[9] Since the spring of 2020, millions of university instructors and professors worldwide have transitioned to e-learning, with students attending online classes from their homes.[8] Information and communication technology has played a significant role in overcoming distance barriers and enabling learning to take place anytime and anywhere, catering to the diverse needs of learners.[9] In nursing education, e-learning has been considered an optional strategy for delivering information and teaching skills.[10]

Address for correspondence:
Mrs. Sima Ghezelbash,
Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: ghezelbash@nm.mui.ac.ir

In some Iranian universities of medical sciences,[6] including Isfahan University of Medical Sciences, nursing courses have been conducted through the Navid system, which is a Learning Management System (LMS). Most classes have transitioned to online platforms, with various educational content being uploaded in the form of voice recordings, text, slides, and PDFs. However, the sudden shift to e-learning without prior preparation has presented challenges for nurse instructors and nursing students. These challenges include an improper attitude toward e-learning, a lack of national and academic infrastructure to support e-learning (such as access to equipment and high-speed internet), and a lack of skills required for virtual teaching and learning, such as computer literacy.[11,12] A study revealed that 77% of nursing students had a negative attitude toward e-learning.[13] Another study identified the most common barriers to e-learning as a lack of infrastructure and technology, limited technical and managerial support, and the characteristics of nurse instructors.[14] A literature review revealed that most studies examining nursing students' attitudes toward e-learning used quantitative methodologies. Furthermore, as virtual learning is a relatively recent development in Iran, both teachers and nursing students are still in the process of familiarizing themselves with this instructional method. Therefore, it is crucial to explore nursing students' perspectives on e-learning, as their attitudes toward this approach significantly affect its effectiveness.[14] The present study aimed to investigate the experiences of undergraduate nursing students with e-learning during the COVID-19 outbreak. Specifically, the study focused on nursing students enrolled in the School of Nursing and Midwifery at Isfahan University of Medical Sciences in 2020.

Materials and Methods

This qualitative-descriptive study aimed to explore the experiences of nursing students with e-learning during the COVID-19 outbreak. The descriptive method was employed, which involves producing a meaningful summary of the data using a naturalistic approach.[15] The study was conducted four months after the COVID-19 outbreak in Iran and three months after the implementation of e-learning at Isfahan University of Medical Sciences, a prominent institution in Iran. A total of 12 undergraduate nursing students, including four men and eight women, who had experienced e-learning for at least three months, were selected for interviews to gather rich and in-depth information.[16] The collected data were then analyzed using qualitative content analysis, allowing for an inductive approach to identify themes and patterns.[17] It is important to note that the students did not physically attend the university during the e-learning period. The inclusion criteria for participants in this study were a first- to third-year nursing student with no history of mental disorders. Exclusion criteria included being infected with the COVID-19 virus, hospitalization due to COVID-19,

or any COVID-19-related deaths. Additionally, students who did not participate in e-learning courses or expressed unwillingness to participate in the study were excluded.

The study was conducted between May and September 2020. Participants were undergraduate nursing students studying from the second to sixth semesters. Purposive sampling was used to ensure maximum diversity in terms of sex, age, marital status, semester, and residence in urban or rural areas. Data collection was carried out through semi-structured individual interviews. The interviews took place in a convenient space at a time suggested by the participants, usually during final training hours or break hours. In one case, a telephone interview was conducted to complete data collection. The interviews were conducted in the hospital department where students were interning. Before the interviews, participants were informed about the purpose of the study and given time to reflect on the interview topic. A pilot interview was conducted before the main interviews to refine the interview questions.

The interview guide began with an open-ended general question: "Could you please describe your experience with the virtual classes that are currently taking place?" This was followed by other questions such as "Can you describe the best and worst experiences you have had with e-learning?" and "What challenges did you face when trying to learn the content presented in e-learning?" Based on the participants' responses, the interview process continued, and additional probing questions were asked, such as "Please explain further" and "Can you provide an example?" The interviews were digitally recorded, and the data collection process continued until data saturation was reached and categories were reproduced.[18] The interviews had a duration of 25-50 minutes, with an average of 34.91 (8.20) minutes.

After the interviews, the recordings were transcribed verbatim. The researchers listened to the recordings multiple times to ensure accurate transcription. Following this stage, conventional content analysis based on the method proposed by Graneheim and Lundman (2004) was employed for data analysis. The researchers read the transcripts several times to immerse themselves in the data and gain a general understanding of the text. Units of analysis were then identified, and the text was condensed while preserving the original concepts. Codes were derived from the participants' own words, and a comparative method was used to form subcategories. Finally, the extracted subcategories were compared and merged to obtain the main categories.[17] MAXQDA10 was utilized to facilitate the data analysis process.

In the present study, trustworthiness was ensured by employing Guba and Lincoln's criteria, which include credibility, conformability, dependability, authenticity, and transferability.[19] To enhance the credibility and conformability of the data, maximum variation sampling was employed. Additionally, an audit trail was utilized to

establish dependability. Three PhD nurses, who were not part of the study, independently analyzed and reviewed the extracted codes, subcategories, and categories. The codes and categories were compared to ensure consistency.

To achieve transferability, a detailed description of the context, participants, and data collection and analysis processes was provided. Member check was conducted by sharing the extracted codes and categories with the participants, who confirmed the final structures of the statements. Based on their feedback, some adjustments were proposed and implemented in the codes and categories.

Ethical considerations

The Ethics Committee of Isfahan University of Medical Sciences (IR.MUI.RESEARCH.REC.1399.666) approved the present study. Before the data collection, all participants were provided with an informed consent form, which outlined the purpose of the study, the voluntary nature of participation, the assurance of data confidentiality, and the right to withdraw from the study at any time. To ensure confidentiality, each participant was assigned a numerical code, and the data were reported in a manner that maintained anonymity, thereby protecting the individuals' identities.

Results

A total of 12 nursing students participated in this study, with ages ranging from 18 to 23 years old and a mean age of 20(1.85). Among the participants, eight were female and four were male. The majority of the participants were studying in the fifth academic semester. Further details of the demographic data can be found in Table 1.

During the qualitative data analysis process, a total of 426 codes were extracted. Through the merging of similar and related codes, 11 subcategories were identified. Further merging of related subcategories resulted in the formation of two main categories: "E-learning opportunities" and "Challenges of e-learning" [Table 2].

E-learning opportunities

The category of e-learning opportunities encompasses five subcategories: timeless learning, learning bridge over the COVID-19 bed, a flexible individualized method of learning, keeping up with the education process, and forced mastery of new skills.

Timeless learning

Participants in the study recognized the significance of the virtual nature of e-learning in facilitating sustainable learning. They highlighted that downloadable e-learning content allowed learners to have permanent access to the material without time limitations. This accessibility enabled them to repeat and reinforce learned lessons. *"In traditional classroom-based education, it is necessary for students to attend university punctually. However, there may be instances where a student is not feeling well due to a lack*

of sleep the previous night. Consequently, they may feel disinterested and unengaged during the class, resulting in a lack of attentiveness toward the lecturer. On the other hand, in e-learning, students have the freedom to access the course website at their convenience. They can study the lesson material at their own pace and repeat it as many times as necessary until they grasp the content effectively" (I1p1).

Learning bridge over the COVID-19 bed

Participants in the study described their experiences with e-learning as a valuable alternative that allowed them to continue their education without the need for physical presence at educational centers. *"E-learning during the COVID-19 pandemic has significantly reduced the risk of disease transmission. By eliminating the need to physically attend classes, students no longer have to go out and risk getting sick. This method has played a crucial role in preventing the spread of the coronavirus. Moreover, e-learning has provided us with the opportunity to continue learning without the fear of disruptions"* (I11p11).

A flexible individualized method of learning

E-learning offers a flexible learning method that caters

Table 1: Demographic characteristics of participants

Participant	Age	Gender	Marital status	Academic term	Living place
1	18	Female	Married	2	Urban
2	20	Male	Single	4	Rural
3	22	Female	Single	5	Urban
4	21	Male	Single	4	Urban
5	20	Female	Single	3	Rural
6	21	Female	Single	5	Urban
7	21	Female	Single	5	Urban
8	21	Male	Single	6	Rural
9	23	Female	Single	6	Urban
10	20	Female	Single	5	Urban
11	19	Male	Married	2	Urban
12	20	Female	Single	3	Urban

Table 2: Opportunities and challenges of e-learning for nursing students during COVID-19 pandemic in Iran, 2020

Categories	Subcategories
E-learning opportunities	Timeless learning
	Learning bridge over the COVID-19 bed
	A flexible individualized method of learning
	Keeping up with the education process
	Forced mastery in the new skills
Challenges of e-learning	Abrupt transition to a new learning system
	Financial burden of e-learning
	Disruption of interactions
	Shortcomings on the part of educators
	Conflict with educational rules
	A threat to student' rights

to the specific life conditions of students. This flexibility is particularly beneficial for students facing various challenges, such as being a female student with a small child, having a part-time job, or having a sick family member. By providing the option to learn remotely, e-learning alleviates the anxiety and stress associated with physical presence in traditional classes. It ensures uninterrupted learning opportunities for students, allowing them to continue their education without any disruptions. *"E-learning proved to be highly beneficial for individuals who were employed and faced time constraints. It provided them with the flexibility to pass courses without the need for physical presence. Unlike traditional classes, where they may have felt tired and unable to fully engage, e-learning allowed them to study at their own pace and access course materials whenever they desired"* (I4p4).

During the COVID-19 outbreak, e-learning presented a unique opportunity for married students with young children to balance their studies and childcare responsibilities effectively. *"E-learning during the COVID-19 pandemic provided a valuable opportunity for me to take care of my child without added stress. The flexibility of e-learning allowed me to listen to uploaded files and engage in my coursework while my child was sleeping"* (P1).

In addition, some participants also believed that e-learning allowed students to utilize the uploaded educational files according to their individual learning styles. *"In summary, e-learning provides the flexibility for individuals to adapt the learning process according to their capabilities and preferences. Students who prefer self-study can download the instructor's PowerPoint files, pause the instructor's voice, and study the material at their own pace. On the other hand, those who prefer to listen to the lesson can utilize the hands-free option, where audio files and slides are loaded separately, allowing students to download and access them based on their specific needs"* (I1p7).

Keeping up with the education process

Participants in the study recognized that e-learning offered an opportunity for improved curricular development. With e-learning, students were required to engage in continuous learning throughout the semester through mid-term assignments and evaluations. This approach helped prevent the accumulation of a large amount of content to be studied only on the night before the exam. *"During the previous semesters, I had a habit of not studying regularly as I would attend classes and only realize the full scope of the lesson right before the exams. However, this semester was different due to the shift to virtual education. I had to study my lessons consistently throughout the semester as there were various mid-term assignments and tests. Consequently, unlike the previous semesters where I would stay up all night cramming, e-learning did not pose a challenge for me"* (I2P2).

Forced mastery in a new learning system

The COVID-19 pandemic necessitated the development of certain skills that were crucial for successful e-learning. Participants in the study highlighted the need to acquire and improve skills such as typing, working with educational platforms, managing time, and preparing for the final exam. *"Engaging in e-learning and typing the required assignments had a noticeable impact on my typing speed, leading to significant improvement. Moreover, I made a conscious effort to enhance my concentration skills by using hands-free devices and blocking out surrounding noise"* (P9).

Challenges of e-learning

This category comprises six subcategories: abrupt transition to a new learning system, financial burden of e-learning, disruption of interpersonal interactions, shortcomings on the part of educators, threats to students' rights, and Conflicts with educational regulations.

Abrupt transition to a new learning system

The anxiety caused by the outbreak of an unknown disease, which lacked a definitive treatment, was compounded by the challenges of implementing measures to prevent its spread. Additionally, the widespread adoption of e-learning across all levels of education further complicated the situation. The lack of necessary infrastructure, the stress induced by technology, and the unfamiliarity with e-learning systems all contributed to frustrations for both students and instructors. Moreover, the time-consuming process of content production at the beginning of the training for instructors, coupled with the delayed sharing of materials, added to the difficulties. Furthermore, the act of mocking teachers and students for their mistakes in using e-learning had a detrimental effect on self-confidence and mutual respect. *"I live in a rural area where accessing the internet is a challenge. Every day, I have to walk a considerable distance to find a spot with an internet connection in order to download content"* (P6).

Additionally, there are several reasons for stress among students. These include the anxiety of adjusting to a new teaching method and feeling unfamiliar with it, adaptation to changes in teaching styles, the pressure of mastering the web-based learning environment, the stress of participating in online classes, and the challenge of dealing with environmental noise and the voices of family members while studying. *"Virtual training was initially very stressful for me. I constantly worried that environmental noises would disrupt the flow of the class. I felt immense pressure until I learned how to adapt to this new method and submit my assignments successfully."*

Financial burden of E-Learning

Since the advent of the Internet, the availability of a suitable mobile phone and/or computer has become a prerequisite

for students to access e-learning facilities. However, it is evident that some students have encountered difficulties in meeting these requirements, as reflected in their experiences. *"My difficulties began with e-learning. Unfortunately, my cellphone proved to be inadequate for this purpose, so I had no choice but to take out a loan and purchase a smartphone. This decision was particularly challenging given the current economic situation, where many individuals are facing financial hardship. I truly wish that e-learning would not come with such a high cost. Despite being enrolled in a public university, the combination of the coronavirus pandemic and the education system has forced me to bear a heavy financial burden. Additionally, the rapid depletion of data bundles has added further strain. It is disheartening to think about how much I have to pay for these data bundles. As a student, my financial resources have been depleted, leaving me with an empty pocket"* (I9P9).

Disruption of interpersonal interactions

Participants believed that, unlike in-person education, e-learning lacks the ability to facilitate nonverbal interaction, self-expression, and self-knowledge. *"In e-learning, students' mischiefs and self-expressions in the classroom are no longer present. I believe that students gain a deeper understanding of themselves through close relationships in the classroom, as they engage in conversations, display body language, and develop a clearer awareness of their strengths and weaknesses. This observation particularly applies to extroverted individuals like myself, who feel the absence of in-person classes more acutely. However, introverted students who are less inclined to speak up may find solace in the absence of these interpersonal dynamics in the online realm and may even experience enhanced learning opportunities"* (I10P10).

Shortcomings on the part of educators

Based on the participants' experiences, one of the barriers and challenges faced by educational systems in implementing e-learning was the sudden prevalence of this method in all universities due to the COVID-19 pandemic. As a result, professors struggled to adapt their content to the online format. Some instances of failures on the part of educators included low-quality recorded content in terms of audio and video, excessive amounts of content for a single class session, delayed or inadequate feedback on assignments, and a disregard for ensuring active student participation in online classes. *"Many of the professors presented the content in English without providing sufficient explanation, which posed a challenge for us as undergraduate students who were not proficient in English. They seemed unaware of the fact that we needed to comprehend and utilize the material in the future. While some professors shared slides and audio files in English, which proved unhelpful, others presented files in Persian without providing adequate explanations"* (I7P7).

The participants highlighted the lack of adequate feedback to students as a detrimental outcome of e-learning. In certain instances, students were confronted with only vague terms to assess their performance or assignments submitted through the learning system. *"Most of the professors failed to provide us with a clear explanation of the problem, merely labeling the assignments as good or bad without elaborating on the reasons behind their assessment. It appears that they are pressed for time and unable to delve into the specifics"* (I12P12).

Conflict with educational regulations

Based on the perspectives of the participants in the current study, it was found that e-learning's effectiveness was diminished due to its misalignment with existing educational regulations. Specifically, the absence of clear guidelines regarding attendance in online classes, the lack of consequences for frequent absences, insufficient monitoring of online exams, inadequate measures to prevent cheating, and the justification of non-attendance by attributing it to internet issues were all in contradiction with the current educational rules. *"One issue that made me anxious and nervous was the behavior of certain professors who seemed to blame me for internet disconnections. For instance, there was a time when I could not attend an online class due to internet issues. Later, I discovered in the WhatsApp group that the professor had given me a low grade as a result"* (I1P1).

Threats to students' rights

Participants identified several instances that posed a threat to students' rights in the context of e-learning. One such instance was cheating on online tests, which was considered a disadvantage. Additionally, the lack of educational justice, exemplified by inadequate infrastructure and internet access in rural areas, the proximity of students' scores due to cheating in assignments and exams, and the infringement on the rights of hardworking students through copy-pasting assignments and cheating were all seen as cases of neglecting students' rights. Other examples included low-quality educational content and changes in student learning assessment, both of which undermined students' rights. Furthermore, the increased workload on students and the lack of compatibility between e-learning and certain subjects, particularly practical lessons, had a detrimental impact on learning and the rights of students as recipients of educational services. *"We were present at the beginning and at the end of the online classes. We resorted to cheating on the tests, even though we had no knowledge of the subject matter. It is possible that there were individuals who chose not to cheat on the tests, even though they had the opportunity to do so. To be frank, I used to consistently receive low grades and averages during my time at university, so I am surprised by the sudden improvement to a score of 20 in the online tests!"* (I2P2).

Discussion

This qualitative study aimed to explore the nursing students' experiences with e-learning during the COVID-19 pandemic in Iran. Due to concerns about learner safety and the potential transmission of the virus to the community, all universities in

Iran decided to offer e-learning courses to students instead of continuing with the traditional clinical courses.[20] The sudden shift from traditional to electronic education posed significant challenges for both teachers and students.[21,22] However, the nursing students in this study described their experience with e-learning as a mix of challenges and opportunities. They viewed e-learning as a bridge that kept them safe from the dangers of COVID-19. Despite the desire to graduate on time, the students prioritized their safety in the face of the global risk of infection and death, as well as the limited understanding of COVID-19. In Spain, the interruption of education during the pandemic was a concern for students. Their perception of e-learning varied depending on their academic level. Students who were only taking clinical courses did not see online education as a substitute for the practical experience gained in the clinical setting. Some students were willing to delay their graduation, while others believed that replacing the clinical course with an online alternative would result in a loss of job opportunities.[21] These differences among students may be attributed to their values, which are a set of principles or standards that individuals consider important in their personal and professional lives.[23]

In this study, nursing students expressed their positive views on e-learning as a flexible and suitable training method. They believed that educational content was readily available and that learners had the freedom to determine their study time. The findings indicate that e-learning is a convenient and flexible approach to distance education,[24] enabling effective knowledge transfer and allowing learners to participate at their own convenience, regardless of time or location. Students in the study had 24-hour access to educational materials.[19]

Furthermore, the students acknowledged the need to adapt gradually to the online class and emphasized the importance of not postponing their studies until the end of the course. The assignments provided by the teachers had specific schedules and had to be submitted on time. Despite the increased workload, students found it easier to keep up with the class and training, which facilitated their learning process. However, in a global study, students reported experiencing stress and a heavy workload associated with e-learning. Their stress was attributed to factors such as an unsuitable learning environment and difficulties in self-discipline.[22]

To ensure the quality of e-learning, it is important to assess students based on clear assignment explanations, appropriate grading criteria, reasonable time frames, and manageable assignment sizes. Additionally, student-specific factors can influence the quality of e-learning.[24] Students' life circumstances and challenges may affect their acceptance or rejection of e-learning. For students who were employed, had children, or were responsible for caregiving at home, e-learning proved to be an excellent method that prevented them from feeling frustrated.

In addition to the advantages of this approach, there are also drawbacks. The participants in the current study expressed concerns about the loss of face-to-face communication as a negative outcome of e-learning. Furthermore, some nursing students in Spain preferred traditional face-to-face learning over e-learning. It was evident that the participants strongly favored face-to-face education.[21] Additionally, the interaction between teachers and students plays a significant role in the effectiveness of education.[22] The interactions among learners should also be taken into account in e-learning.[24] To address the challenges of communication limitations in e-learning, learners can benefit from blended learning or a hybrid approach that combines face-to-face and online training.[25] Synchronous, asynchronous, and hybrid or blended learning environments are different divisions of e-learning. Synchronous learning requires both the instructor and the student to be present simultaneously, but it requires infrastructure and incurs higher costs. Asynchronous environments are not bound by time and space,[24] and in terms of satisfaction with e-learning methods, real-time video conferences were found to be the most desirable approach. Additional pleasant methods included video recording, presentations, written communication, and audio recording.[22] Nursing students believed that unrecorded training content, such as PDF or PowerPoint, was of substandard quality due to its non-interactional nature.[21,24] Interaction among students and instructors is crucial for satisfaction with education and the improvement of e-learning quality. Factors that significantly influenced students' satisfaction included evaluation techniques, disciplinary rules, and the quality of educational content. In this study, participants expressed dissatisfaction with the evaluation process, cheating, and the lack of disciplinary rules in e-learning and virtual classes. Similar experiences were reported by nursing students in Spain, where participants did not find evaluation through submitted work appealing.[23] Evaluating learners' progress toward educational goals is an essential aspect of e-learning. It is important to align the evaluation methods with the content and educational objectives and provide feedback to students.[24] The quality of e-learning was affected by the rapid transition from traditional teaching methods to new ones. This transition was particularly evident in universities that were using e-learning for the first time, and it had an impact on the quality of teaching and learning.[22] Despite e-learning being integrated into university education for approximately 20 years, there has been a slow trend toward widespread adoption of this approach.[26] Therefore, this study identified the inadequacies of e-learning infrastructure as a barrier to its effectiveness. Successful implementation of e-learning requires teachers with adequate knowledge and skills, motivated instructors, well-designed lesson plans, information and communication technology, as well as comprehensive training programs and financial support. However, in some countries, these facilities did not exist before the COVID-19 epidemic.[22,24] Students face numerous difficulties in e-learning, such as a lack of equipment, limited internet access in rural areas, poor internet connectivity, and even a lack of electricity.[21,22]

One of the strengths of this study is that it was conducted at the beginning of the COVID-19 epidemic, providing valuable insights into the barriers and challenges of e-learning. However, a limitation of this study is that it only considered the experiences of students and did not include the perspectives of professors.

Conclusion

The findings of this study indicate the importance of incorporating new learning approaches at various educational levels in addition to traditional classroom settings. Unforeseen crises can significantly affect the quality of education by disrupting face-to-face learning. Therefore, it is crucial to develop plans that focus on building infrastructure, training students, and producing electronic content to mitigate any disruptions in learning. Furthermore, it is essential to prioritize students' rights in the context of electronic learning, as this should be an integral part of modern educational approaches.

Conflicts of interest

Nothing to declare.

References

1. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: A modelling study. Lancet 2020;395:689-97.
2. Alipour A, Ghadami A, Farsham A, Dorri N. A new self-reported assessment measure for COVID-19 Anxiety Scale (CDAS) in Iran: A web-based study. Iran J Public Health 2020;49:1316-23.
3. Tavakoli A, Vahdat K, Keshavarz M. Novel coronavirus disease 2019 (COVID-19): An emerging infectious disease in the 21st century. Iran South Med J 2020;22:432-50.
4. Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. Psychiatry Clin Neurosci 2020;74:281-2.
5. Ministry of Health & Medical Education (MOHME). coronavirus epidemic in Iran. Available from: https://behdasht.gov.ir/. [Last accessed on 2021 Mar 10].
6. Dastani M. COVID 19: A new beginning in virtual education at the medical universities of Iran. Horizon of Medical Education Development 2020;11:1-4.
7. Alimohamadi Y, Sepandi M. Basic reproduction number: An important indicator for the future of the COVID-19 epidemic in Iran. J Mil Med 2020;22:96-7.
8. Bao W. COVID-19 and online teaching in higher education: A case study of Peking University. Hum Behav Emerg Technol 2020;2:113-5.
9. Naderifar M, Ghaljaei F, Jalalodini A, Rezaie N, Salar A. Challenges of e-learning in medical sciences: A review article. Journal of Medical Education Development 2016;9:102-11.
10. Hosseini M, Ghahremani A, Mohammadi Shahbolaghi F, Hamadzadeh S, Tamizi Z. The advantages of electronic learning in nursing education: A review study. J Nurs Educ 2016;4:9-16.
11. Diab G, Elgahsh NF. E-learning during COVID-19 pandemic: Obstacles faced nursing students and its effect on their attitudes while applying it. Am J Nurs 2020;9:300-14.
12. Raoufi S, Manoochehri H, Zarifsanaiey N, Nikravanmofrad M. Developing an E-learning model for nursing education. J Clin Diagn Res 2020;14:11-6.
13. Abbasi S, Ayoob T, Malik A, Memon SI. Perceptions of students regarding E-learning during Covid-19 at a private medical college. Pak J Med Sci 2020;36(COVID19-S4):S57.
14. Olum R, Atulinda L, Kigozi E, Nassozi DR, Mulekwa A, Bongomin F, *et al*. Medical Education and E-Learning during COVID-19 pandemic: Awareness, attitudes, preferences, and barriers among undergraduate medicine and nursing students at makerere university, Uganda. J Med Educ Curric Dev 2020;7:2382120520973212.
15. Doyle L, McCabe C, Keogh B, Brady A, McCann M. An overview of the qualitative descriptive design within nursing research. J Res Nurs 2020;25:443-55.
16. Aurini JD, Heath M, Howells S. The how to of qualitative research: Sage; 2021.
17. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today 2004;24:105-12.
18. Holloway I, Galvin K. Qualitative Research in Nursing and Healthcare. John Wiley and Sons; 2023.
19. Al-Alwani A. Evaluation criterion for quality assessment of E-Learning content. E-Learning and Digital Media 2014;11:532-42.
20. Dewart G, Corcoran L, Thirsk L, Petrovic K. Nursing education in a pandemic: Academic challenges in response to COVID-19. Nurse Educ Today 2020;92:104471.
21. Ramos-Morcillo AJ, Leal-Costa C, Moral-García JE, Ruzafa-Martínez M. Experiences of nursing students during the abrupt change from face-to-face to e-learning education during the first month of confinement due to COVID-19 in Spain. Int J Environ Res Public Health 2020;17:5519.
22. Aristovnik A, Keržič D, Ravšelj D, Tomaževič N, Umek L. Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. Sustainability 2020;12:8438.
23. Fadyl JK. How can societal culture and values influence health and rehabilitation outcomes? Expert Rev Pharmacoecon Outcomes Res 2021;21:5-8.
24. Hadullo K, Oboko R, Omwenga E. Factors affecting asynchronous e-learning quality in developing countries university settings. Int J Educ Dev Using Inf Commun Technol 2018;14:152-63.
25. Nasr T, Mesbah S, Shaaban M, Shaheen M. Open student evaluation model in e-learning. Int J Comput Appl 2015;128:42-8.
26. Liguori E, Winkler C. From offline to online: Challenges and opportunities for entrepreneurship education following the COVID-19 pandemic. Los Angeles, CA: SAGE Publications Sage CA; 2020.