Research article

Teachers and managers experiences of virtual learning during the COVID-19 pandemic: A qualitative study

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ABSTRACT

The closure of universities and schools interrupted learning outcomes and deprived students from growth and development opportunities as well as hindering their academic progress. Indeed, the COVID-19 Pandemic changed educational mechanism from traditional method to staying at home and virtual education globally. On the other hand, the educators and student particularly in developing countries faced shortage of necessary software and hardware infrastructures. Accordingly, introduction of virtual education along with some organizational and regional obstacles as well as poor planning caused low-quality online courses. Therefore, the present study extrapolated teachers' virtual education experiences during the COVID-19 pandemic. This qualitative study conducted on Iranian teachers using the conventional content analysis method in 2022. To do this, the targeted sampling method with maximum variation continued until data saturation. Hence, a total of 17 teachers (10 women and 7 men) included in the study. Data collected through five focus group discussions on the Sky room platform and two individual in-depth interviews. Male teachers had an average age of 44.42 years, while female ones had an average age of 47.80 years. The qualitative analysis categorized 22 themes as virtual education's pros and cons. Mental, physical, and social injuries; economic problems; insufficient virtual teaching skills; lack of virtual infrastructure; lack of motivation were identified as the main disadvantages of virtual education. Virtual education benefits included familiarity with modern science and education, time management, the durability of video and course topics, and not forcing students to attend class. Removing structural barriers (like creating a good platform for practical education and stopping new restrictive policies) and individual barriers (like economic and family problems, lack of motivation, psychological pressures, and occupational stress) could possibly improve virtual education. Virtual education should be different from face-to-face teaching because it can only meet some students' needs.

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1. Introduction

The World Health Organization (WHO) declared the pandemic of COVID-19 disease in March 2020 [1]. All social sectors, including education, experienced an unprecedented emergency due to the pandemic [2]. In response, social distancing has been proved as most successful preventive measure to control COVID-19 pandemic [3]. Consequently, the introduction of social distancing has severely hindered face-to-face education by which the virtual education introduced as necessary tool for education in the modern age [4]. To run such an educational method, teachers will be able to learn more about media. Moreover, costs will go down, and teachers won't have to worry about getting to school [5]. In addition, governments asked students to stay at home, so they could handle the situation while all schools and educational institutions closed to stop the spread of COVID-19. Consequently, the closure of schools, colleges, and universities was a stressful event with many constraints for educational management [6]. According to the UNESCO report (2020), the closure of universities and schools has several adverse effects on students, including learning disorders that rob students and young people of opportunities for growth and development [7–11]. Teachers may also suffer when schools and universities close. Their privacy and time with their families exterminated. They have to spend more time preparing content and getting ready for classes. Then, they have been stressed out because they didn't have enough tools for virtual education and have to plan new lessons. Moreover, they have to interact with devices more often. Additionally, electronic devices have hurt their emotional health in many ways [9,10,12].

To continue the learning process safely, governments announced holding online classes after some time. All educational institutions quickly switched to online education, a significant unplanned shift from traditional learning method to virtual education [13]. Students could enter the classroom at a specific time to discuss and exchange their ideas and connect to audio and video conferences online as they learned how to use virtual education platforms to deliver lectures and hold classes [4]. According to studies, high-income nations have positive experiences with virtual learning environments for vocational education [4,14]. In comparison, the situation was different in low- and middle-income nations, where few countries have experience with virtual education [14,15].

Due to the COVID-19 pandemic in Iran, virtual education developed formally for the first time, too. This type of training is a way to plan, put together, present, and evaluate activities used to help people learnings. Traditional education programs, did not have many of the benefits that virtual learning does; such as access to information sources from anywhere and at any time, discussions with classmates that didn't happen in traditional one, low cost, ease of use, and immediate feedback on tests [16]. Teachers can also teach from home on their laptops or mobile devices, and students can quickly get educational content on their mobile devices 24 h a day [17, 18]. Furthermore, helping students to do well in school is one of the essential parts of distance learning and virtual education. Many studies have also shown that it is possible to be successful in different systems if you use suitable environments and support virtual learning systems and how they are used [19]. Additionally, through platforms like the Internet and virtual space, there are more and more ways for people to learn and get educated without having to meet in person [20]. In contrast, there are some challenges in virtual education as following: learning how to use online education platforms, paying attention to complex cultural and social contexts, lack of preparation of teachers for virtual education, lack of access to all infrastructure and equipment, inability to use mobile phone-based education for all age groups, lack of access to smartphones for all, low media literacy and technological capabilities, inability to virtualize all courses; and a limited number of learners and time to prepare online courses; poor Internet connectivity, relatively high cost of Internet packages; and electricity-related problems, especially in remote and rural areas [21].

With the growth and development of knowledge and technology and the demand for education going up, traditional education methods can no longer meet all student needs. Consequently, with all its advantages and disadvantages, virtual education can fulfil these needs. On the other hand, managers and planners do not think strategically enough and they have established very bad policies. Then, educational technology is suffering from some deficiency and its management has no enough efficiency. This has led to many problems in families and between teachers and students. To sum up, online training courses aren't as good as face-to-face classes at present because they aren't well-planned [22,23]. Accordingly, this study aimed to clarify pros and cons of virtual education during the Corona pandemic from the point of view of the educational staff. Importantly, Schools and student research centers may probably give a complete picture of virtual education.

2. Methods

We used the experiences of teachers, school principals, and research managers from academic centers in this study to find out a comprehensive overview of the research subject.

2.1. Study design and participants

This qualitative research carried out using the Conventional Content Analysis. Participants comprised of the teaching staff of schools and student research institute of Tehran. The sampling method was based on the goal and with maximum variation in the educational level (elementary/first, secondary/secondary), the position of the teaching staff (director of the research laboratory/ school principal/deputy executive/deputy teacher/deputy teacher technology), the type (schools/scientific research institutes), and the gender (m/f) of the participants. Study included male (n = 7) and female (n = 10) teachers, managers, or assistants at student research institutes in East Azerbaijan and Tehran provinces. This information collected through four online "focused group discussions" and two in-person "in-depth individual interviews" at the Research Institutes.

The four participating groups were:

- First and second groups: male and female teachers who selected from schools in Tehran and Golestan provinces. The study criteria included having more than 20 years of teaching experiences in Iranian schools (they taught both before and after the corona pandemic).
- Third group: managers or/deputies of student research institute selected from among the officials of student research institutes in East Azarbaijan and Tehran provinces.
- Fourth group: school principals in Tehran selected from principals or officials of schools in Tehran province.

2.2. The data collection tools and methods

- All interviews and focused group discussions conducted by the first and second authors of the article (M.F.G.), (A.J) and based on the questioning guide containing semi-structured open questions. Supplementary questions were also asked based on the participants' answers. At first, some open questions were raised. Then questions such as: have you had any problems providing courses based on the annual budget during the Corona period compared to before the COVID-19 Pandemic? In what lessons or at what levels were these problems more noticeable? Has virtual education had any advantages? What measures has your school thought of to solve the issues during the pandemic? Did Department of Education officials have a plan to solve your problems during the Corona era? Did the score at the end of the year during virtual education differ significantly from the same score in face-to-face education? Is there any difference in the amount of learning and knowledge of the students between virtual education and traditional face-to-face learning? Have any students dropped out of school during the coronavirus? Why? What is the role of families during the pandemic due to the virtualization of classrooms?

The interviews lasted about two to three months, and the duration of the interviews varied from half to 2 h. Two researchers conducted all the interviews, and the discussions continued until they obtained deep and sufficient data to the point of saturation.

The interviews were recorded with the participant's permission, and the text was implemented as soon as possible after listening several times to determine the necessary feedback for the following interviews or the adequacy of the data. Qualitative research data and findings must be acceptable and reliable, and this issue necessitates accurate data collection. The researcher's first step in improving the data accuracy is to conduct more interviews.

In order to preserve the credibility, dependability, confirmability, and transferability of the study, the researcher made an effort to avoid introducing his own presuppositions. To ensure the transferability or external validity of the study, the sampling method used maximum diversity. The researcher was careful not to impose their opinions on the participants in order to maintain the internal validity of the data. The researcher also established an informal and relaxed relationship with the participants, creating a friendly atmosphere where they could freely express their opinions without any bias. To validate the points raised by the interviewees, member checks conducted after the initial interviews and analysis. This involved asking follow-up questions and identifying any contradictions in the participants' responses.

A subset of interviews independently analyzed by another member of the research team to ensure the dependability or reliability of the study and to confirm the results. In cases where there was disagreement in coding among the team members, a third person reviewed and finalized coding.

The data collection methods used in the study included interviews and focus group discussions. Participants from various specialties invited to participate in the interviews as many qualitative researchers believe that gathering data from multiple sources enhances the acceptability of the findings and improves the external validity of the study [24,25].

Combining interview and focus group data is a common practice in qualitative research. The combination of the two methods used for completeness and confirmation of the findings to have a comprehensive understanding of the findings. In addition, in-depth interviews and focus groups used as part of a mixed methods research strategy such as a complementary method to a survey. Combining the two methods can also promote critical thinking and deepen understanding of any topic.

The literature suggests that combining individual interviews and focus groups can contribute to knowledge production and synthesis. The integration of focus group and individual interview data made three main contributions: a productive iterative process, identification of individual and contextual circumstances surrounding the phenomenon, and enrichment of the conceptualization of the phenomenon. Despite differences in interpersonal dynamics between individual interviews and focus groups, the effect of modality on data is minimal.

Overall, combining interview and focus group data can enhance data richness, provide a comprehensive understanding of the findings, and contribute to knowledge production and synthesis.

2.3. Data analysis

The data collection methods included interviews, writing, observation, and audio recording. The primary codes extracted and classified in categories of advantages, disadvantages, and upcoming solutions regarding virtual education. The classes were determined based on the questioning guide. MAXQDA 2020 software was used for data analysis [26].

3. Results

3.1. Characteristics of the participants

This research included 17 teachers and principals of schools and research institutes in the study population (10 women and 7 men). The number of participants, places, durations, and method of interviews given in Table 1.

The Median ± IQR age of male teachers and managers was 44.43 ± 0.57, and for females, 47.8 ± 0.97 years. All of them had teaching experiences before and after the Covid-19 pandemic, and most had an education higher than a bachelor's degree (n = 14). In the qualitative analysis, 22 themes identified and classified as two main categories of disadvantages and advantages of virtual education. (Tables 2 and 3).

The main disadvantages of virtual education classified in seven groups: Policies of the Ministry of Education (five themes), mental, physical, and social injuries (two themes), Financial problems (three themes), Inadequate skills in virtual teaching (two themes), Lack of proper infrastructure in virtual education (two themes), lack of motivation (two themes), and the role of parents (two themes).

The main benefits of virtual education grouped into four categories such as learning about modern science and education around the world (two themes), time Management (two themes), the durability of the course's videos and topics (one theme), It does not require pupils to go to class (two themes) (Table 4).

1. **Policies of the Ministry of Education**

From the perspective of the participants, the need for proper management during the COVID-19 Pandemic was one of the main priorities of the education system, which has the following five themes:

- **Increasing statistics instead of improving quality**

Participants in this study stated that managers and officials strongly desire to improve existing conditions quantitatively rather than focusing on quality.

One of the teachers at Tizhoshan Boys' School, who was also a Golestan province official, stated: *"The administration is only interested in statistics and figures, and everything is fine in their eyes. The statistics and figures are excellent, but their quality is unimportant."*

Another principal of a boys' school in Tehran province stated:

> "Regarding the children's evaluation scores, they forced us to raise them, so I can say that we made excellent progress. The scores reached 20, but the education quality deteriorated."

- **Lack of support from the Ministry of Education for teachers**

According to the most of the participants, during the COVID-19 Pandemic, schools were left alone with their problems, and there was no exceptional financial and spiritual support for teachers.

Another Arabic teacher at a high school for boys in Tehran province said:

> "Education policy makers believes that it only costs money and has no output." Since the time of Corona, this is the third phone I have bought because my phone keeps hanging up. I have been working with it for two months. I bought a phone without receiving any support from education policy makers."

Another science teacher of the high school for girls in Tehran said:

" …. I had to go and get some tools from school, and I wrote the house on the fridge with a marker, and I did the experiments that were in the book and uploaded it to Shad[1]*." (Third group discussion).

3.2. Lack of clear framework for training

One of the biology teachers in Tehran said:

> "Of course, we have reached a stable situation where we know how to work with students, but education policy makers say something every day. They say to teach in person for a week. If the student does not come to school, do not send him any materials via cyberspace. Then, at the following week, they say that you shouldn't teach in person … these confusions may make more and more difficult … "

One of the mathematics teachers of the first high school for girls in Tehran said:

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[1] *Shad is a communication and educational software that was launched in Iran following the spread of the coronavirus and the absence of students in schools.

Table 1

The number of participants and the interviews' location, duration, and method.

Interview method/interviewee	Location	No. (person)	Duration (min.)
Focus group discussion	**Focus group discussion 1: Sky room**	5	2:32 min
	A male principal of a boys' primary school		
	4 high schools teachers		
	Focus group discussion 2: Sky room	4	2:00 h
	Only female high schools teacher		
	Focus group discussion 3: Sky room	2	2: 10 min
	A male director of a research institute in the city of Mianeh		
	A male high schools teacher		
	Focus group discussion 4: Sky room	4	2: 15 min
	A male principal of a high school in Tehran province, Baharestan city		
	3 male high schools teachers		
In-depth individual interview	A manager,	2	39 min
	A deputy		65 min

Table 2

Basic characteristics of teachers by gender.

Variable		Gender group	
		Female N	Male N
Total number		10	7
Age (Years)	)Median ± IQR (	47.8 ± 0.97	44.43 ± 0.57
	min	43	42
	max	54	46
Position in the school	headmaster	3	1
	Deputy of the school	1	0
	Teacher	8	4
Marital status	Single	1	0
	married	8	6
	divorced	1	1
Education	Bachelor's degree	3	0
	Master's degree	3	6
	PhD	4	1

Table 3

The classifications of identified disadvantages themes of virtual education.

Classifications	themes
Policies of the Ministry of Education	○ Increasing statistics instead of improving quality
	○ Lack of support from the Ministry of Education for teachers
	○ Lack of clear framework for training
	○ Incompatibility of curriculum with class time
	○ Using the teacher as a tool
Mental, physical and social injuries	○ Occurrence of mental illnesses
	○ Disruption of social interactions
Financial problems	○ Increasing social-economic gap
	○ Compulsion to buy virtual education supplies
	○ No ongoing education
Inadequate skills in virtual teaching	○ Lack of virtual teaching experience in teachers
	○ The need to have a lesson plan
Lack of proper infrastructure in virtual education	○ Disruption in learning due to lack of necessary infrastructure and resources
	○ No immediate feedback
lack of motivation	○ Lack of motivation for better teaching in teachers
	○ Lack of motivation for students to study
The role of parents	○ Development of negative morals
	○ Parents' literacy level

"I expected more initiative to come to the hands of school teachers as schools went online, but on the contrary, as virtual education progresses, decisions will be lost from our hands, and by the way, the ability to make decisions that we had in the classroom in person has been taken away from us."

One of the teachers of the high school for girls in Tehran said:

Table 4

The classifications of identified disadvantages themes of virtual education.

Classifications	Themes
Learning about modern science and education around the world	○ Growing the network of educators
	○ Using the lesson plan, students can learn the fundamentals of online education.
Time Management	○ Increasing teachers' free time
	○ Saving intelligent students' time
The durability of the course's videos and topics	○ Using educational materials offline.
It does not require pupils to go to class.	○ Reducing agitation and hostility in high-risk areas
	○ Lowering consumer expenditures

"Education officials say that schools should be attended; on the other hand, the Ministry of Health says that the spread of Corona has increased in the first week of March. The words of these two home ministries do not match."

- **Budgeting for books does not match up with class time.**

In this regard, one of the science teachers at Tehran's high school for girls said:

"We got behind on budgeting for our books after … Most of the time, the last chapter was taken out because many schools couldn't finish the book."

The Research Director of the Tehran Girls' Student Centre said:

"Teachers have to pass school exams based on the book budget, even though they cut the number of books. They did this so that students could read the books aloud, and the teacher did not have to teach. "

The physics teacher at the high school for boys said:*"In the new system, we also had trouble with book budgeting in face-to-face teaching because there were so many basic science courses, even though it is now virtual."*

- **Using the teacher as a tool**

Most of our teachers complained about not being given the necessary facilities and their sudden entrance into our online education system.

A teacher, who worked at a girls' high school, said:

"Education very easily asks teachers to teach with the personal facilities they have … the private means and tools of teachers' lives have been provided to education."

The superintendent of one of Tehran's girls' conservatories said:

"How many of our teachers and students are dying in this pandemic … There is no such thing as thinking in our education at all."

2. Mental, physical and social injuries

During the coronavirus pandemic, students and teachers had many problems. These problems kept coming up in the focus group discussions, which had two main themes:

- **Occurrence of mental illnesses**

A teacher, who worked at a girls' high school, said:

"Our kids have trouble with their mobility because they don't go to school. After this corona, we will face depression and illnesses we don't know about."

A female high school teacher, who worked at a girls' high school, said:

"One of our students killed herself. His mother had died, and he had a lot of problems."

- **Disruption of social interactions**

According to the people who took part, virtual education is only valuable as a supplement to teaching. It cannot replace face-to-face

education, and if it keeps going like this for years, students will not learn anything about how to get along with others.

A male high school teacher, who worked at a boys' high school, said:

> "My daughter's teacher can't let her students see her because her husband won't let her. My daughter can't talk to her teacher because she thinks the teacher is a doll."

The head of student research center said:

> *"Problematic are the operational and practical areas, group and collective work, and how they deal with social issues. Children in first and second grade have never made friends or talked to a teacher."*

3. Financial problems
   - **Increasing social-economic gap**

Unfortunately, the socioeconomic divide widened dramatically during the pandemic. Almost all of the participants in this study were dissatisfied with the social class divide and the lack of necessary virtual teaching facilities.

According to the principal of a boys' school in Tehran province:

> "Poverty, financial difficulties, and anxiety have exacerbated students' problems and stress. I noticed that everyone in the workshop was a student from our school. "

   - Compulsion **to buy virtual education supplies**

One of the issues that poor students faced was a lack of a phone, tablet, and laptop. According to one of the teachers at Tehran's high school for girls:

> "Our student is without a phone." Put one of the kids on the morning shift and the other on the evening shift so they can both talk on the phone. "

   - **No ongoing education**

In the beginning, the problems were disastrous, and many students from low-income families dropped out of school due to a lack of cell phones.

According to one of Tehran's teachers:

> "Because many boys dropped out of school due to a lack of a phone, especially in poorer areas, families attempted to solve their financial problems by marrying girls."

4. Lack of proper infrastructure in virtual education
   - Disruption **in learning due to the lack of necessary infrastructure and resources**

The teacher of the boy's primary school said:

> "The north of Tehran declares that there is no internet." That's why the school is online. That means we don't have internet in the north of Tehran in the 21st century, which is a pity."

   - **No** immediate **feedback**

The teachers complained about not receiving feedback from their students and considered this as one of the main problems in teaching. They thought of receiving feedback as a way to deepen students' learning, and based on that, they could apply different methods in their education.

One of the teachers of the high school for girls in Tehran said:

> "When we are not in front of the students, we don't have feedback on whether they have learned the material or not. The student has solved the exercise, but it is unclear whether he did it himself or not. "

- **Invalid evaluation**

One of the teachers continued:

"Students become illiterate. They learn to get score by cheating. They create a cheating telegram channel."

5. Lack of motivation

This category included two themes: lack of motivation for better teacher teaching and lack of motivation for students to study.

- **Lack** of **motivation for better teaching in teachers**

Teachers do not have much motivation to train and update themselves, and they did not even think about content analysis because of the coronavirus.
One of the principals of the boys' school in Tehran said:

"The first thing for a teacher is to have motivation, which is created by giving teachers the necessary facilities … "

Another one continued: *"In public schools, there is no extra pay between a good teacher and an indifferent one."*

One of the principals of the boys' primary school in Tehran said: *"With a bit of extra pay, colleagues can be given the necessary motivation to make significant progress in 3 or 4 months.*

- **Lack of motivation for students to study**

One of the teachers said:

"Student doesn't have any motivation. It may be because they don't like the subject"

Another teacher continued:

"Motivation and interest of students are very important. Children were more active and had less stress before the coronavirus. "

6. Inadequate skills in virtual teaching

According to the participants in the study, one of their biggest problems was their lack of skills in virtual teaching, which divided into the following three themes:

- **Lack of** virtual **teaching experience in teachers**

At the start of the COVID-19 Pandemic and the change in the school system, teachers and parents had to deal with many problems (from face-to-face to virtual education). Teachers and parents think that steps should be taken to train people on the job for this change.
One of the teachers said:

" … Teachers don't know how to make a video for students … "

Another teacher continued:

"There is no training in the system of the Ministry of Education since we faced this corona crisis."

- The need to have a lesson plan

Most of the participants did not accept the lesson plan in the format provided to them, and in their opinion, the lesson plan in one class should be different from another one.
One of the high school teachers said:

"My teacher didn't teach even though all the students were in the class and said that I don't have a lesson plan, so, unfortunately, I'm not ready to teach today. He wanted to teach us how important a lesson plan is."

7. The role of parents

This category includes the two themes of negative moral development and parental literacy level, each of which described below.

- Development **of negative morals**

Most participants complained about their families' cooperation in doing homework and attending classes. Their opinion was that this work causes the development of negative morals and a lack of adherence to tasks in students, which ultimately leads to a lack of effective learning.
One of the teachers of the first high school for girls said:

> "The student sent me the solutions to the exercises, but it is unknown whether his sister, his mother, or someone else did these exercises."

One of the other teachers of the high school for boys in Tehran province said:

> "We don't know who is sitting on the line … "

- Parents' **literacy level**

The main discussion in the virtual space was parents' low literacy level, which is the biggest problem in software such as Shad, etc. Parents have not received the necessary training at all.
The principal of the boys' primary school in the north of Tehran said:" *The main discussion in the virtual space was parents' low level of literacy, which is the biggest problem in software like Shad, etc. Parents have not received the necessary training at all.* ".
The director of the high school for boys in Tehran province said:

> "It goes back to the family's literacy. If they are literate, the children will rely on them more".

3.3. Advantages of virtual training

Although virtual education has many challenges, the participants believed that education has become more advanced with modern and new methods.

8. Learning about modern science and education around the world
   - **Growing the network of educators**

One of the teachers of the research center for girls in Tehran said:

> "We created virtual scientific associations … and we have international collaborations … "

And the director of the research center for girls in Tehran said:

> "We are doing international projects … today the borders have disappeared."

- **Using the lesson plan, students can learn the fundamentals of online education.**

> *"Teachers and students are familiar with modern world science and virtual space and are looking for new materials,"* said the girl's school teacher.

According to Tehran's teachers:

> "I learned office software years ago but never used it. I'm back now, reading that article."

According to a teacher at a boys' school in Tehran:

> " … We carry the children on their own feet during virtual education. It means that the child gains more abilities ".

9. Time management
   - **Having more free time for teachers**

Teachers at a boys' school in Tehran province stated:

"Virtual education provided numerous benefits for me. I completed tasks that had been on my mind for a long time, such as writing a book, which I completed this year."

- **Not wasting the time of intelligent students**

"Students who are very smart were delighted with virtual teaching because their time was not wasted in commuting to school," said the teacher of the boys' school.

"Students who had a strong relationship with technology and knew the applications enjoyed virtual learning," said a teacher at a research center for girls in Tehran.

10. The durability of the course's videos and topics
    - **Using educational materials offline**

"Kids who couldn't come to school for whatever reason had the opportunity to be in class with online learning," said the director of Tehran's research center for girls.

"Smart students may see this video more than once," one teacher at a girls' school in Tehran said.

11. It does not require pupils to go to class
    - **Reducing agitation and hostility in high-risk areas**

The boy's teacher stated:

"Schoolyard brawls have decreased … In addition, child theft on the way to school has decreased."

- **Lowering consumer expenditures**

The teacher at Tehran Student Center said:" that saving time and money is another benefit of virtual education."

"One of its benefits is that air pollution and commuting have gone down," said the first-grade teacher for boys.

4. Discussion

This study identified disadvantages and benefits of virtual education. Virtual education's disadvantages include policies of the ministry of education, mental, physical and social injuries, financial problems, inadequate skills in virtual teaching, lack of proper infrastructure in virtual education, lack of motivation, the role of parents. Its advantages included learning about modern science and education around the world, time Management, the durability of the course's videos and topics; it does not require pupils to go to class.

The impairment and educational challenges of the coronavirus pandemic crisis in Iran and other countries worldwide were identified qualitatively in 29 fields by 2021. Online education is a pressing need in the learning and teaching process, with numerous benefits that necessitate management and executive solutions to the challenges of corona disease and post-corona disease. Our research also revealed a lack of necessary infrastructure and resources, as well as a lack of immediate feedback and invalid evaluation [27].

Teachers complained about students' tardiness and absence, as well as their lack of interest, lack of immediate feedback, and limited communication with students. They only used assignments, end-of-semester tests, and periodic online tests to measure and evaluate students and could not produce a reliable and valid evaluation [28]. Another issue mentioned by study participants was mental, physical, and social injuries, which resulted in mental and psychological illnesses and disruptions in social interactions. Furthermore, female sex, insufficient sleep, and poor academic performance strongly related to the risk of depression, anxiety symptoms, and suicidal thoughts during the middle school period. The prevalence of psychological problems among adolescents who studied via distance education was high [29].

In Serbia, after one year, professors held online classes and improved their knowledge of online technology and educational equipment. Students were also satisfied with the quality of online education, but they stated that nothing could replace traditional education and socializing with peers [30]. Experiences in promoting critical thinking in the three main categories of belief systems, educational management, and critical thinking in education are diverse. Virtual platforms are capable of shaping structure, behaviour, and culture [31]. In other studies, dissatisfaction with virtual education associated with the lack of feedback, communication channel problems, unpreparedness of the message recipient, and weakness in educational content. The most common code related to dissatisfaction with virtual education was lack of immediate feedback, disruption in learning due to lack of necessary infrastructure and

resources, and lack of lesson planning [32]. Other studies demonstrated that in virtual education, teachers do not prefer to design their own content, but mostly use ready-made resources. Participants in our study also referred to content development [28].

Additionally, student participation, learning and assessment interrupted by sudden changes in teaching methods and changes in assessment methods. The proposed solution was free communication between students and teachers to ensure mutual understanding and acceptance of concepts [33]. At the same time, inefficiency and difficulty in maintaining academic coherence, flexibility in learning, and creating a suitable teaching-learning environment, insufficient skills in virtual teaching, ineffective learning, weak planning, invalid assessment, and problems with software and hardware systems were other problems mentioned [34,35].

Acquaintance with modern science and the modern world of education, time management, the durability of video and course topics, and not forcing students to attend class were among the advantages of virtual learning in the present study. Past research has also found a positive relationship between students' self-efficacy and satisfaction with online learning. In addition to students' self-confidence, they also implement and apply their learning skills in an online environment. The results showed that self-efficacy, time management, and past online learning experience are other factors related to the satisfaction and usefulness of online learning. Students' trust in online learning is the strongest positive predictor of happiness and use of online classes. The results show that exploring the purpose and reasons of students to participate in online courses, beyond the set of skills and learning strategies, are helpful instructions to follow in the evaluation of online classes [36]. Most of the challenges of virtual learning among teachers and students were mainly underprivileged infrastructure and lack of proper preparation, especially including poor internet connection, high cost of internet, and unstable internet resources. Virtual learning opportunities included the convenience and appropriateness of virtual learning due to the possibility of participating in a virtual class and holding a virtual class from anywhere and at any time, easy access to educational materials and the learning aspect of virtual technology. If the challenges would be adequately addressed, virtual learning presents a massive opportunity for the future of higher education institutions. Educational institutions should be taken seriously to use the potential benefits of virtual education [37]. Finally, other studies pointed out that there are not many possibilities for e-learning in the country. Still, there are significant potentials that can be relied on to improve the education system accordingly. Then, they can not only retain the students of their countries, but also attract students from other countries to continue their studies [38].

5. Benefits and restrictions

Benefits:

The utilization of different methods for collecting data, including focused group discussions and in-depth individual interviews, allowed the researchers to utilize the benefits of both methods.

Recruitment of participants from various locations by using both online and in-person methods due to the limitations of the coronavirus.

Restrictions:

Small sample size, which can limit generalizability, similar to the case in many qualitative studies.

Inability to conduct interviews in schools due to the spread of the coronavirus and the following restrictions.

The researchers attempted to address the limitations by conducting focused group discussions and video interviews on the Sky Room platform. Despite the limitations, the study provides valuable insights into the views of educators from different levels.

6. Conclusion

There are both pros and cons to virtual training. One of its benefits is that it helps people across the world to learn in a better and different way. It also gives students a chance to learn for themselves. It also saves money on gas and time, reduces pollution, and makes pupils safer.

On the other hand, the lack of social interaction among students in the long term can disrupt learning social relations. In addition, removing structural barriers (creating a suitable platform for efficient education and preventing new restrictive policies) and individual barriers (economic, family problems, lack of motivation, psychological pressures, and occupational stress) can effectively affect virtual education. Our findings, suggest that virtual education is a supplement to face-to-face education so that teachers can use it as one of the suitable platforms for education and that virtual education alone cannot meet all the educational needs of students.

Data availability statement

Data will be made available on request.

Additional information

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CRediT authorship contribution statement

Monireh Faghir Ganji: Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology, Investigation, Formal analysis. **Azam Jafari Malvajerd:** Writing – review & editing, Writing – original draft, Methodology,

Investigation. **Ahmad Moradi:** Writing – review & editing, Writing – original draft, Investigation. **Alireza Amanollahi:** Writing – review & editing, Writing – original draft, Investigation. **Alireza Ansari-Moghaddam:** Writing – review & editing, Writing – original draft, Methodology. **Hamed Basir Ghafouri:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.heliyon.2024.e24118.

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