

# Student Experiences and Perceptions of Emergency Remote Education during the COVID-19 pandemic

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## Abstract

This study reports students' perceptions of Emergency Remote Education (ERE) during Spring 2020 in Higher Education Institutions (HEIs) in the Sultanate of Oman. Online classes replaced face-to-face teaching in the middle of March 2020. Eleven thousand one hundred eighty-one students from different HEIs in the Sultanate of Oman participated in a national online questionnaire in July 2020. Students reported the availability of adequate infrastructure as a significant issue during ERE. Fewer than half (46%) participants owned laptops, while others shared laptops with other family members. Most students utilized mobile data; less than a quarter used Wi-Fi at home. Recorded PowerPoint lectures and live lectures were the most common teaching approaches. Students reported that faculties' use of YouTube videos and recording practical aspects in a laboratory/workshop setting deliver practical parts of the course. In this research, Humanities students have reported a positive experience with ERE; however, Engineering students were least satisfied with ERE. Moreover, students rated their perception of ERE as moderate in different areas (e.g., suitability of the online assessment, interactions between faculty and students, skills and knowledge gained, and quality of education). We recommend that government and HEI implement strategies, such as providing laptops and expanding Wi-Fi coverage, to address the challenges listed in the research. As online teaching is expected to continue, such measures are required to implement online classes effectively.

**Keywords:** online higher education; Emergency Remote Education; COVID-19.

## 1. Introduction

The spread of the COVID-19 pandemic, declared by the World Health Organization as a public health emergency on 30th January 2020, has radically disrupted all aspects of human life, including education. Higher Education Institutions (HEIs) worldwide have been completely closed, and teaching-learning has moved to online as a protective measure against the outbreak of COVID-19 [1,2].

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According to a UNESCO report [3], more than 98% of HEIs' students and teachers have been severely affected by the pandemic. The suspension of face-to-face classes in Oman started on 15th March 2020. Immediately, all HEIs implemented emergency remote teaching (ERE) to ensure the continuation of education. This decision required changes in teaching materials, curriculum, and assessment, leading to multiple pedagogical challenges among HEIs. Therefore, this study aims to investigate the impact of the COVID-19 pandemic on HEIs in Oman. Specifically, it aims to examine students' perceptions of online education during the pandemic in HEIs in the Sultanate of Oman.

The paper is structured as follows: Section 2 describes related literature on ERE worldwide and the Arab region. Section 3 details the study design, questionnaire, and research procedure. Section 4 presents the study results, and Section 5 includes the discussion and the conclusion.

## **2. Literature review**

Historically, online education started in the 1980s. Since then, many online tools, software, and hardware have been introduced and used in teaching, learning, and assessment. Online learning is defined as learning experiences in synchronous or asynchronous environments using different devices (mobile phones, laptops, etc.) with internet access [4]. Numerous research studies report the theories, models, and evaluation of online teaching and learning. The empirical research univocally agreed on the necessity of an efficient plan, careful design of materials, training for faculty and students, sufficient infrastructure, and suitable assessment methods. Without these, the quality of online education falters. The emergency caused by the COVID-19 pandemic did not give HEIs time to think about all the issues mentioned above, as ERE was implemented to ensure the continuity of teaching and learning.

ERE is different from online education in the empirical literature. Online education represents well-planned and designed teaching and learning using appropriate methods, adequate materials, and well-thought-out assessment criteria. In contrast, ERE is a sudden temporary move of instructional delivery to an online delivery mode due to a massive catastrophe [5]. It requires exploiting all available digital resources to teach the curriculum online [6]. Thus, ERE lacks the elements of virtual materials and assessment preparation, forcing faculty to use whatever is available to carry out online classes. ERE has been executed by most HEIs worldwide during the pandemic and has had a significant impact on them.

During ERE, HEIs expose students to various synchronous and asynchronous online learning methods. Synchronous teaching is defined as the "interaction of participants with an instructor via the Web in real-time" [7,p.99]. It includes web conferencing tools, online discussion, and instant messaging. In contrast, asynchronous learning refers to "an interactive learning community that is not limited by time, place or the constraints of a classroom" [8, p2]. For example, students use materials or recorded presentations accessible on platforms like MS Teams or Moodle. Some studies investigated the most frequent forms of e-learning during the pandemic from the student perspective. Aristovnik and his colleagues [9] found that the most frequent forms of online classes used by lecturers in 62 countries were real-time video conferences (59.4%) followed by sending presentations to students (15.2%), video recording (11.6%), and communication using forums and chats (9.1%).

Other studies focus on student preference of online tools used by their HEIs during the pandemic. For example, Mahdy [10] found that students in 86 countries preferred Zoom, followed by WhatsApp and Google classroom, while Microsoft Teams, Edmodo, and Google Meet were less selected. In the same vein, Kapasia and his colleagues [11] highlighted that students in India mostly used Zoom, Google classroom, and YouTube live. However, most students used the WhatsApp group to collect study materials from teachers or friends. The authors highlighted that many participants depended on shared materials or recorded lessons rather than online live lectures due to poor internet connectivity.

Some studies have investigated the types of electronic devices used to study online. For instance, Mahdy [10] found that the most used gadgets by students were smartphones, followed by laptops, whereas the least used devices were desktop computers. Similarly, Kapasia and his colleagues [11] and Mishra, Gupta, and Shree [12] found that most of the students in India used mobile phones to attend e-learning while only a few had laptops. Other studies have focused on student satisfaction with online learning during the lockdown. In the UAE, Almuraqab [13] found that 55% of the students liked online learning and found it helpful 26% of them would like to study entirely online. At the same time, many students prefer to learn through blended learning, defined as a combination of online and face-to-face learning. On the other hand, Mishra, Gupta, and Shree [12] and Abu Shekhadim, Awad, Khalilah & and his colleagues [14] found dissatisfaction among students with online learning due to unfamiliarity with learning using smartphones and computers.

COVID-19 pandemic has significantly impacted students, especially in assessment design, regulations, and appeals. One of the radical changes that affected students during the lockdown was substituting face-to-face exams with online assessments [15,16]. HEIs should consider appropriate safeguards, including synchronized start times and log-on, tech support, and remote proctoring solutions [17]. Online assessment can create significant pressure for students. For instance, 55.92% of the participants in Salceanu's study [18] were unhappy with online assessment due to the large amount of homework to complete. Moreover, the online assessment might not be suitable in all educational contexts, such as clinical settings, laboratory work, performance tests, and viva-voce, among others.

To summarize, the studies mentioned above indicate that HEIs shifted to ERE immediately to continue offering their educational programs despite the limited time available for preparation. Due to the lack of preparations, students differ in their experiences regarding the platforms used for ERE, instructional techniques, and assessment methods. This study investigates students' experience during ERE with specific reference to HEIs in the Sultanate of Oman. Two significant research issues require attention based on empirical research. While various studies have tackled students' experience during the COVID-19 pandemic in different contexts, most have been conducted in Western contexts like Europe and the USA. Few studies are available in the Arab regions, a less researched part of the world. Secondly, most studies in the Arab region are focused on one HEI or one discipline. In contrast, the current study includes students from different HEI and different fields. Therefore, its results will hopefully be more comprehensive and representative of how students perceive their experience of ERE during the COVID-19 pandemic.

### **3. Methodology**

The purpose of this study is to reflect the experiences of students transitioning from face-to-face teaching mode to online instruction in response to the COVID-19 pandemic. Specifically, it aims to investigate student perceptions of ERE during the COVID-19 pandemic from different HEIs in the Sultanate of Oman (e.g., online platforms used, delivery methods of both theory and practical parts of the courses, assessment, and the effectiveness of these platforms and methods).

#### ***3.1 Data Collection Tool***

The study used a quantitative survey method using a questionnaire as a data collection tool, an efficient way of collecting data from many respondents in geographically spread areas within a short time [19]. Another advantage of questionnaires is the possibility of generalizing their findings to the whole population [20]. Some questionnaire items were developed based on the literature review e.g. [2, 13, 14], while others were based on the researchers' experience during the COVID-19 pandemic. The questionnaire had three parts. Part one consisted of participant demographic information. Part two consisted of learning platforms used for online learning and their effectiveness, delivery methods, and effective approaches used to deliver the course's practical parts and effectiveness, and online assessment methods and their effectiveness. The participants rated the effectiveness on a five-point Likert scale: "very effective=5", "effective=4", "neutral=3", "ineffective=2", "very ineffective=1", or "not applicable". Part three included six items related to students' perceptions of the ERE; they expressed their opinion on a five-point Likert scale: "strongly agree=5", "agree =4", "neutral=3", "disagree =2", "strongly disagree =1".

#### ***3.2 Validity and Reliability***

To verify the validity and practicality of the questionnaire, it was piloted with a group of students in May 2020. In addition, to check the content validity, the questionnaire items were reviewed by experts in the field to examine readability, clarity, and comprehensiveness [21]. The experts' suggestions were used to revise the questionnaire. To ensure ethical considerations, we obtained permission from HEIs, and a research ethics form was completed and approved. The participants' informed consent was obtained before they participated in the online questionnaire, and they were assured that they could withdraw from the study at any time. The data collection lasted from the 20th June to 26th July 2020. The questionnaire was prepared in Arabic and English to choose the preferred language, and the questionnaire link using 'Google forms' was sent to all HEIs in Oman.

The Reliability of the questionnaire items was checked by applying Cronbach's alpha tests of interreliability correlations. As shown in Table 2, the questionnaire is reliable given that all the items are above the minimum threshold of 0.7.

**Table 1:** The cronbach's alpha of the questionnaire's sections.

	Number of items	Cronbach's alpha
Platforms/programs used for online learning	7 items	0.869
Method/s of online instruction used during the pandemic	5 items	0.861
Delivery of the practical parts of the courses	6 items	0.892
Assessment methods used during the pandemic	7 items	0.868
Students' satisfaction with the emergency online education during COVID 19	6 items	0.891

### 3.3 Data Analysis

Data were coded using Microsoft Excel and performed statistical analysis with the help of Microsoft Excel and SPSS version 22. Descriptive data are reported as mean (M) and standard deviation (SD). The effect size was calculated as recommended by Tabachnick and Fidell [22] and all p levels lower than .05 were considered significant. The scales were calculated and interpreted based on suggestions from Terno [23] as shown in Table 2.

**Table 2:** Scales' interpretations.

Range of Means	Interpretations
1.00 – 1.79	Very low
1.80 – 2.59	Low
2.60 – 3.39	Moderate
3.40 – 4.19	High
4.20 – 5	Very high

### 3.4 Study Group

In this study, the female participants are more than double the size of the male; out of the 11,181 participants, 7,590 (67.9%) are female, and 3,591 (32.1%) are male. The majority of participants come from a large family size: 5,571 (49.8%) live with 7-10 family members, 3,217 (28.8%) live with more than 10 people, and only 2,393 (21.4%) live with 3-6 family members in the same house. The participants study in different specializations. Of the 11,181 respondents, 3,235 (28.9%) were specialized in Engineering, 2,769 (24.8%) in Business, 1,918 (17.2%) in Computer Science/ IT, and 1,413 (12.6%) were in Nursing. We had fewer respondents from other specializations: Applied Sciences (594), Education (244), Pharmacy (152), Language (101), Islamic Studies (97), and Medicine (34). 624 students were in assorted other specializations. The overwhelming majority of our participants were undergraduate students: 2,132 (19.1%) were still in the foundation program, 2302 (20.6%) were in the first year of study, 2,743 (24.5%) in the second year, 2,074 (18.5%) in the third year, and 1,776 (15.9%) in the fourth year of study. The majority of respondents study at governmental HEIs 908 (81%), while 2,073 (19%) are enrolled in private HEIs. Furthermore, our participants study in higher education intuitions located in different regions in Oman. For example, 35.7% study in Muscat,

15.7% in Dhofar, 11.6% in Al Dakhiliyah, 11.2% in Al Batinah South, 9.6% in Al Batinah North, 9.4% in Ash Sharqiyah South.

#### 4. Results

##### 4.1 Student Experience with ERE

This part describes information related to participants' experience with ERE during the pandemic, such as equipment and tools used for online education, type of internet connection, learning platforms used, different teaching approaches, delivery of the practical part of the courses, and online assessment. It is striking to note that fewer than half of the participants have their own laptop 5,140 (46%), 4,046 (36.2%) share the same laptop with other people, and 195 (17.8%) do not have a laptop at all. The majority of participants used laptops 7,827 (71%) and smartphones 7,781 (70%) for online learning, while only 865 (8%) used tablets or 624 (6%) desktop computers. 4,751 (42.5%) used mobile data for internet connection, and only 2,717 (24.3%) used Wi-Fi, while the rest have mixed between the two. Table 3 illustrates that Moodle (78%) and Microsoft Teams (70%) are used more than other platforms during ERE. Students also rated the effectiveness of these tools. As seen in Table 3, three platforms are rated high (WhatsApp, Moodle, and MS Teams) while the rest of the platforms are rated moderate.

**Table 3:** The different learning platforms.

learning Platform	Count	Percentage	Mean	Std. Deviation	Interpretation
E-learning (Moodle)	8693	78%	3.47	1.223	High
Microsoft Teams	7798	70%	3.40	1.304	High
WhatsApp	7710	69%	3.60	1.273	High
Google Classrooms	5882	53%	3.19	1.350	Moderate
Zoom	5721	51%	3.02	1.356	Moderate
Blackboard	4930	44%	2.80	1.321	Moderate
Blogs	4516	40%	2.62	1.295	Moderate

The lecturers used different instructions during ERE; the data in Table 4 shows that recorded PowerPoint lectures are used the most (83%), followed by live lectures (61%), and interactive simulations (56%). Participants also rated the effectiveness of the different approaches. Recorded PowerPoint lectures were rated high, while all other approaches were rated moderate.

**Table 4:** Instructional approaches used during the COVID-19 pandemic.

Method/s of online instruction have your lecturers used during the pandemic	Count	%	Mean	Std. Deviation	Interpretation
Recorded PowerPoint lectures	9285	83%	3.55	1.150	High
Using online discussion boards/forums	8536	76%	3.11	1.139	Moderate
Live lectures on Microsoft Teams/Zoom/Google Classroom	6864	61%	3.37	1.220	Moderate
Interactive simulations	6249	56%	3.03	1.089	Moderate
Inviting guest speakers online	5354	48%	2.87	1.120	Moderate

In addition, student perceptions of the different teaching approaches was obtained per specialization. It is found that Language students rated recorded PowerPoint lectures the highest (3.96) while Engineering students rated it the lowest, though moderate (3.40). Engineering students also rated online discussion boards/forums the lowest (2.97), whereas Medical students rated it the highest (3.93). Live lectures were rated the highest by Humanities students (4.19), and it is rated the lowest by Islamic Studies (3.10). Overall, it is noted that Engineering students repeatedly rated all online teaching approaches lower than other specializations.

**4.2 Student Perceptions of Mode of Delivery of the Practical Parts of the Courses during ERE**

The lecturers followed different approaches to deliver practical parts of the courses. As can be seen from Table 5, all these modes are rated moderate by students. Looking closely at the data, YouTube videos were mostly used (61%), followed by video recording the practical parts in the HEI's lab/workshop (55%), a practice rated more effective than YouTube videos.

**Table 5:** Different approaches used to deliver the practical parts of the courses.

How did your lecturers teach the practical parts of the courses?	Count	%	Mean	Std.	Interpretation
Using ready-made videos from YouTube	6791	61%	3.23	1.203	Moderate
Video recording the practical parts in the lab/workshop	6177	55%	3.3	1.257	Moderate
Using live streaming	6033	54%	3.09	1.262	Moderate
Using simulation training	4959	44%	2.91	1.201	Moderate

Likewise, students rated the different approaches to deliver the practical parts of the course across the different specializations. Medical students rated simulation (3.78) and live streaming (3.73) the highest, while Humanities students rated video recording (3.86) and videos from YouTube the highest (3.74). However, Engineering students rated all approaches moderately. This is due to the nature of the Engineering specialization that requires learners to be physically present in the workshops, impossible to achieve with remote education.

**4.3 Student Perceptions of Online Assessment**

Out of the 11,181 students who participated, 8,420 (75.3%) were assessed during the ERE, while 2,759 (24.7%) were not. Table 6 illustrates online assessment per specialization. It shows that the majority of Foudation students had not been assessed (52%), a trend continued in Islamic Studies (31%), Education (30%), Nursing (28%), and Medicine (20%). Conversely, the most assessed students online are from the following specializations: Humanities (91%), Pharmacy (89%), Computer Science/ IT (86%), Engineering (85%), and Applied Sciences (85%).

**Table 6:** Online assessment per specialization.

	Assessed-count	Assessed-Percentage	Not assessed-count	Not assessed-Percentage
Applied Sciences	392	85%	70	15%
Business/Management	1724	82%	386	18%
Computer Science/ IT	1358	86%	222	14%
Education	168	70%	71	30%
Engineering	2211	85%	395	15%
Humanities	31	91%	3	9%
Islamic Study	66	69%	30	31%
language	78	85%	14	15%
Medicine	24	80%	6	20%
Nursing	849	72%	330	28%
Pharmacy	118	89%	15	11%
Foundation	1013	48%	1119	52%
Others	388	80%	98	20%
<b>Total</b>	<b>8420</b>	<b>75%</b>	<b>2759</b>	<b>25%</b>

Students reported the different types of online assessments that were used during the COVID-19 pandemic. As shown in Table 7, the most used assessment approach was continuous assignments 7,862 (93%), followed by assignment-based assessment for a summative assessment 7,429 (88%), online quizzes 7,157 (85%), and summative assessment by open-book exam 6,370 (76%). The data indicate that among the different assessment approaches used during ERE, all approaches were rated high by students except for online presentations, and the external examiner was rated moderate.

**Table 7:** Different types of online assessment.

Assessment methods used by your lecturers during the pandemic	Count	Percentage	Mean	Std.	Interpretation
Continuous online assignments	7862	93%	3.96	1.055	High
Assignment-based for the final	7429	88%	3.94	1.152	High
Online quizzes	7157	85%	3.70	1.159	High
Open book exam for the final	6370	76%	3.66	1.209	High
Voice tools (e.g., real-time online discussion, telephone) for oral testing to verify student work	5539	66%	3.41	1.243	High
Online presentations	5430	64%	3.29	1.207	Moderate
External examiners online	3863	46%	2.89	1.157	Moderate

Interestingly, students from all specializations preferred continuous online assignments except for students from Business/Management, Islamic Studies, Medicine, and Pharmacy. They preferred assignment-based assessment for summative assessment.

#### 4.4 Student Perceptions toward the ERE During the Pandemic

Students rated their perceptions of ERE in six items on a 5-point Likert scale. Table 8 shows that students rated ERE moderate in different areas (e.g., suitability of the online assessment, the interaction between faculty and students, skills and knowledge gained, and quality of education) but rated the statement "remote learning is as effective as attending regular classes" to be low.

**Table 8:** Student perceptions of ERE during the COVID-19 pandemic by year of study – Mean & SD.

	0	1	2	3	4	AVG	SD
1. The assessment methods used in my university/college during the pandemic were suitable.	2.98	3.12	3.03	3.04	3.21	3.08	1.25
2. My university/college provided quality education during the pandemic.	2.85	2.81	2.72	2.75	2.99	2.82	1.23
3. The staff could engage students online	2.98	2.86	2.78	2.84	3.07	2.90	1.23
4. Overall, my lecturers have shown care and concern for me as they make changes in their courses in response to the pandemic	3.17	3.15	3.05	3.02	3.27	3.13	1.21
5. I believe that remote learning is as effective as attending regular classes.	2.49	2.47	2.55	2.55	2.79	2.57	1.41
6. I have gained a lot of skills and knowledge from learning online.	2.69	2.87	2.91	2.85	3.15	2.90	1.33

0= Foundation (N=2132); 1= Year 1 (N=2302); 2=Year 2 (N=2743); 3=Year 3 (N=2074). 4= Year 4 (N=1776) VH=Very high, H= High, M=Moderate, L=Low, VL=Very Low

When comparing students' perceptions of ERE based on specialization, it is observed that Engineering students reported the lowest perception (2.8) with the skills and knowledge. In contrast, Islamic Studies students reported the highest (3.6). Engineering students also rated staff ability to engage students the lowest (2.7), while Nursing students rated it the highest (3.5). Moreover, Medical students rated the suitability of the assessment methods during ERE the lowest (2.7), while Nursing students rated it the highest (3.6), although these two fields (medicine and nursing) are related.

#### 5. Discussion

In this study, we analyzed student perceptions of ERE during Spring 2020 in HEIs in the Sultanate of Oman with the participation of 11,181 students from government and private institutions. The findings concerning participants' online learning experiences during the pandemic showed that fewer than half (46%) of our participants own laptops, and the rest share laptops with other family members. Therefore, this study shows that Omani students were technologically not ready for ERE in Spring 2020. In addition, the findings revealed that the majority of our participants used laptops and smartphones for ERE during the pandemic. This is in line with the findings of other studies in different countries [e.g., 10,13] who found that the most used devices by students were smartphones and laptops while the least used devices were desktops. This could be attributed to the fact that ERE was sudden and students could not equip themselves with the requirements in a short time. Hence, to

make online learning successful in the future, it is necessary to equip Omani students with required devices such as laptops or tablets.

Regarding internet connectivity, the findings revealed that many of the participants had used their mobile data for internet connection while less than a quarter have used Wi-Fi at home (24.3%). This shows that students lack internet connections that help them benefit from online education during the beginning of the pandemic. Though we assume more students might have subscribed, the number of broadband internet subscribers in Oman has increased by 6.9% compared to last year in November 2019. Internet connectivity issues are significant across all the governorates, including the capital, which is reflected in students' low rating of internet adequacy in all the regions (2.5- 2.9).

Indeed, internet speed is a concern for countries all over the world, given that many studies have stressed the importance of having a fast and robust internet connection allowing students to be able to attend and participate in virtual classes [24, 25, 26,27]. Therefore, Oman needs to improve its online infrastructure, especially internet connection, speed, and internet prices so that students can benefit from the online learning experience in future.

The study's findings also revealed that Moodle and Microsoft Teams are used more than other platforms, though students. They rated WhatsApp as the most effective platform. This could be attributed to the popularity of WhatsApp among Omanis, and it seems these students have depended on shared materials, recorded lessons, and instant messaging rather than attending live lectures. Sobaih and his colleagues [28] reported that students perceived social media (WhatsApp) as a more appropriate tool for communication than other free online communication tools due to its familiarity and simplicity. Furthermore, the findings of this study showed that students have rated recorded PowerPoint lectures to be the most effective instructional approaches compared to other approaches; this is because they can play the recording whenever needed, rewinding or forwarding to the points on which they want clarification. However, in the future, HEIs must encourage online synchronous lectures as they give students more opportunities to interact with their lecturers, discuss and clarify issues, and share thoughts and opinions with their fellow students leading to a better understanding of the topics studied [29, 30]. The study indicated that while many students have been assessed online, a significant minority have not been assessed, and their assessment has been postponed. Students reported the most common assessment was continuous online assignments. This shows that HEIs in Oman have responded to the suspension of face-to-face assessment with online assessment methods. However, applying assessments during ERE on courses designed for face-to-face learning is a challenging task [16]. In the future, HEIs should opt for assessment more suitable to the online mode of learning by focusing more on formative than summative assessment, and higher-order thinking skills should be prioritized [15,31,32]. Furthermore, HEIs must ensure academic integrity during online assessment through various means such as using plagiarism detection tools, employing an academic integrity policy, and utilizing online proctoring software.

In addition, the findings of this study revealed that the Engineering students expressed the lowest perception with different online teaching approaches, while Humanities and Islamic Studies students reported the highest. This is due to the nature of the engineering courses, which require a physical presence in workshops and laboratories. This is corroborated by the findings of previous studies with specializations require hands-on skills

such as medicine, they reported online education effective as face-to-face in obtaining theoretical knowledge, and it is less effective to teach the practical competencies [10, 33, 34].

The staggering speed with which ERE was implemented did not allow HEIs to plan how practical courses should be taught thoroughly. HEIs need to improve the way practical courses are delivered in the future by providing virtual resources and equipment that enable lecturers to mimic laboratory work or live-stream experiments from the laboratory [10]. Also, the study's findings revealed that Ph.D., Master's, and Year Four students reported higher satisfaction with ERE than students in the first year or second year of study. This is in line with other studies [9, 15], where they noted that undergraduate students felt less satisfied with distance learning than graduate students. This means that HEIs in Oman need to support students at the early stages of their studies by organizing consulting groups that can support these students with tutorials and explanations if they encounter any difficulties.

Notably, the study's findings revealed that the participants do not have a high perception of ERE, and they do not consider it as effective as attending regular classes. This is because it is the first experience for many lecturers and students, and both sides need time to adjust and find the best practices for the delivery of online courses. Various studies have reported similar findings [9, 35, 13, 36]. Other studies [34,10] have found that students considered online learning less effective than face-to-face learning to increase skills and social competencies. It is imperative for HEIs in Oman to design effective interventions and well-thought-out strategies for the smooth running of education during any catastrophe. The HEIs need to think about using online tools creatively, and interactive, so online learning is successful.

## **6. Conclusion and Suggestions**

COVID-19 pandemic has severely affected the teaching-learning process across the world. ERE has been utilized to resume education and safeguard students' and faculty's health. However, students do not consider it as effective as attending regular classes, as this study shows. The findings indicate that Omani students were technologically not ready for online learning. Thus, the government should strengthen the technology infrastructure and resources to make education accessible, equitable, and improve online learning experiences for students, lecturers, and society by and large. In addition, the HEIs should exert more effort to overcome educational disruption in the future caused by crises by providing better resources, enhancing the instructional technology infrastructure, providing more training for the faculty, and investing in new online learning resources.

Future work should compare students' online education experience with their first ERE experience, which was implemented immediately after the COVID-19 pandemic. Teaching practical courses online needs to be thoroughly investigated to establish effective teaching strategies and tools that enable students to acquire practical skills and technical competencies related to their disciplines during online education. Finally, future research can focus on the difficulties encountered by students and teachers during the move to online education and the kinds of support provided by HEIs to assist them in overcoming these difficulties.

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