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Challenges Faced by Students during COVID-19 in Higher Education Institutions in the Sultanate of Oman

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Abstract

Due to the COVID-19 pandemic, in-person classes were suspended worldwide, which has forced educational institutions to shift from face-to-face instruction to online learning. This study examines students' perceptions of support provided by Higher Education Institutions (HEIs) in the Sultanate of Oman during online learning in Spring 2020. It also highlights challenges encountered by students during this sudden shift. Eleven thousand one hundred eighty-one students from different HEIs participated in a national online questionnaire. The findings from this study revealed that, in general, students have reported being moderately satisfied with the support provided by their HEIs. Students' main challenges include inadequate internet connection, poor quality of audio /video during online teaching, and inability to interact successfully with faculty during online teaching. Moreover, having multiple people living in the same house (large family size) caused more challenges for students to find suitable places to study, acquire the necessary equipment, and have an adequate internet connection. Furthermore, students are highly concerned about not completing the academic semester and not graduating on time. As online education has become inevitable, HEIs need to organize more online learning capacity-building programs to accommodate faculty and students and increase student engagement. It is also vital for HEIs to provide equal education opportunities that cater to all learners' needs and living conditions irrespective of their economic, social status, and region (rural or urban).

1. INTRODUCTION

The 2019 coronavirus disease (COVID-19) spread rapidly worldwide, forcing educational institutions to shift from an in-person teaching mode to online education. The pandemic has caused 5.1 billion children and young people in 188 countries worldwide to stay at home after the closing of schools and HEIs (Affouneh, Salha, and Khlaif, 2020). Therefore, online education becomes an urgent necessity to ensure education while preserving the safety of both students and their teachers since students can take their classes from home using various equipment such as mobile phones or their personal computers. They can meet their teachers and interact with their classmates distantly using different platforms such as MS Teams, zoom, and google meets.

Distance education is not a new mode of delivery. However, many HEIs have lagged due to various reasons, including lack of infrastructure and resources, incapability of lecturers to cope with the virtual model of teaching, and unfamiliarity of students with online platforms and programs related to lack of training and experience for both the staff and students. This sudden shift was shocking and stressful for all stakeholders (e.g., students, parents, faculty members, and institutional leaders). Distance education requires more effort, preparation time, adequate infrastructure, and good digital content.

This study aims to investigate students' online education experiences during the pandemic from the student's perspectives. Specifically, it seeks to shed light on student perceptions of the support they received from their HEIs in Oman and the kinds of challenges they encountered. This can lead to extracting the areas needed for urgent assessment and support during and after the pandemic.

This paper is organized into five sections. Following this introductory section, section (2) reviews relevant literature. Section (3) describes the methodology used for this study by providing a detailed account of the research data collection method, the study design, and procedures. Section (4) presents the data analysis. It thus highlights the study's findings, and section (5) deliberates on the key results of this study to the research objectives, the study context, and the reviewed literature.

2. LITERATURE REVIEW

Several studies have investigated the support provided by HEIs and the challenges encountered by students during the sudden shift to online education. For example, in their research in Palestine, Abu Shekhadim, Awad, Khalilah & et al. (2020) found that their participants reported the support provided by the university to be moderate since the university did not offer training for students in which procedures for using virtual platforms were explained. However, Shawaqfeh et al. (2020) found that 61.4% of the students believed that the College of Pharmacy in Saudi Arabia could completely shift online education during the COVID-19 pandemic. Baticulon et al. (2020), in their study in Philipines, found that 44% of students stated that their universities were well-prepared for online teaching. Furthermore, Draissi & Yong (2020) found that the support provided to students in Morocco was not sufficient because of the inadequate infrastructure needed for the successful implementation of online education.

There are many challenges associated with online education: technical (resources), pedagogical (instructional), psychological, and domestic (home environment). Technical challenges mainly include poor internet connection that hinders students from accessing virtual platforms to attend their classes, as reported by many studies in different parts of the world (e.g., Baticulon et al., 2020; Sahu, 2020; Means and Neisler, 2020; Huang et al., 2020; Kamarianos et al., 2020). Likewise, Mahdy (2020), in his study in Egypt, stated that many students could not access their online learning classes due to poor internet connectivity. Similarly, in Saudi Arabia, students reported that poor internet connection and limited bandwidth have negatively affected students learning during the pandemic (Alnajjar Asif & Bano, 2020; Khalil et al., 2020). In addition, Lassoued, Alhendawi, & Bashitialshaaer (2020) examined the hindrances faced by 300 students in four Arab countries (Iraq, Algeria, Egypt, Palestine) during the COVID-19 pandemic. On the other hand, in the UAE, 74.5% of respondents had good internet access and the required devices for online as shown in a study conducted by Almuraqab (2020), which can be attributed to the robust internet connection in the country. This smoothened the shift to online education and facilitated learning during the pandemic. This can be due to the excellent infrastructure in the UAE, which positively enabled distance learning during the pandemic.

The absence of equipment needed for online classes is another technical challenge students face during the pandemic. For instance, Kim et al. (2020), in their study in the USA, found that only 11% of the students stated that having the equipment needed for remote learning like laptops. Many studies show that students depend more on their smartphones to attend online classes and access learning materials (Khalil et al., 2020; Mahdy, 2020). Smartphones are not always compatible with many online platforms and programs, which negatively affect students' experience during the pandemic. In addition, other studies (Baticulon et al.,2020; Abbasi et al., 2020; Lassoued et al., 2020) reported that some students lacked gadgets due to sharing them with their siblings who were taking online classes during the pandemic.

In addition to the challenges mentioned above, students have encountered instructional (pedagogical) challenges due to a lack of interaction with classmates and peers, which was raised by several studies conducted to investigate students' perceptions of online education during COVID-19. For instance, Means and Neisler (2020) reported that their participants missed discussing the course content with peers and felt they lost the opportunity to deepen their understanding from such discussions. In the same way, Almuraqab (2020) stated that more than half of students (58%) believed that online education negatively affected collaboration and communication among students. Similarly, according to a UNESCO report (2020), the shift to a virtual teaching-learning model has resulted in the loss of social interaction between peers, which is regarded as an essential part of students' daily experience in HEIs. The studies above indicate that the virtual learning model might not tackle advanced learning methods such as group work, discussions, and interaction between peers/teachers. This can affect the students' acquisition and development of soft skills needed for the 21st century (World Bank, 2020).

Moreover, students encounter psychological challenges that can affect their online experience. Students have expressed uneasiness, stress, isolation, unhappiness, and depression. They were anxious about their studies, workload, online assessments, plans, possible delays in graduation, and the safety of themselves and their beloved ones. Baticulon et al. (2020), in their study in the Philippines, found that students experienced mental health difficulties during the lockdown, such as anxiety and stress, since they were required to adjust to new routines and norms. Similarly, Kim et al. (2020) found that 75%of students experienced anxiety and depression due to the crisis. Duraku and Hoxha (2020) in Kosovo found that 65.4% of their participants experienced moderate anxiety levels, while 26.9% reported severe anxiety and stress. Within the same

vein, Saddik et al. (2020) found that most students in the UAE experienced mild to extreme anxiety levels during the pandemic.

Moreover, students encounter challenges related to their home environment. For instance, students need to ensure available space to attend online learning. In a study conducted in Saudi Arabia by Allily et al. (2020), it was found that distraction and lack of focus at home when students want to interact with teachers is a huge issue for students. They attributed that to the fact that an Arab house includes many children and host intergenerational family members. Lassoued, Alhendawi, & Bashitialshaaer (2020) asserted that their participants found home environments unsuitable for online learning.

Similarly, Means and Neisler (2020) reported that finding a quiet place to study online was cited as a problem by 55% of the participants, while fitting the course in with family/home responsibilities was considered an issue by 54%. In addition, Kim et al. (2020), only 11% reported having a home environment supporting an online learning environment. Baticulon et al. (2020) found that their participants in the Philippines encountered many domestic challenges such as limited space conducive for studying and the need to fulfill responsibilities at home during the pandemic.

To sum up, studies indicate that HEIs shifted to online education rapidly to continue offering educational programs despite the limited time available for preparation. This has led to many challenges for HEIs and their students, which will be investigated in this study. Therefore, the research gap that this study address is two-fold. While various studies have tackled challenges students encounter during the COVID-19 pandemic in different contexts, few studies have been conducted in Arab regions considered a less researched part of the world. Secondly, most studies conducted in Arab areas included participants from one institution or one discipline, while this study comprises students from different institutions studying diverse fields. Therefore, its results will hopefully be more comprehensive and representative of the challenges encountered by students during the COVID-19 pandemic.

3. RESEARCH METHODOLOGY

The context of this research is students enrolled in HEIs in the Sultanate of Oman who shifted to online education during Spring 2020 after the suspension of face-to-face classes on Sunday, March 15, part of the country's efforts to curb the spread of COVID-19. The objectives of this study are:

- To explore students' perceptions of support provided by HEIs with online education
- To examine challenges faced by students during online education
- To inquire students concerns during online education
- To explore the impact of student demographic information on their perceptions

3.1 Data Collection Method and Analysis

The study used an online questionnaire to collect the data for this study. The questionnaire items were developed from the literature review (Abu Shekhadim et al., 2020; Almuraqab, Quacquarelli Symonds, 2020; Means and Neisler, 2020). Others were based on the researcher's knowledge and experiences. The questionnaire included many parts that tackled participants' personal information, their perceptions of the support offered by their HEIs, and the challenges and concerns they experienced during the pandemic. The questionnaire also had open-ended questions asking students what they appreciated about their lecturers and institutions and the challenges they encountered during online education in the spring semester. To check the validity of the questionnaire, several experts have reviewed its items, and the researchers modified it based on their suggestions. In addition, the items in the questionnaire were found to be reliable based on Cronbach's Alpha value (.874). The researchers used convenient sampling to distribute the questionnaire. Eleven thousand one hundred eighty-one students have responded to the questionnaire. We coded the data using Microsoft Excel and SPSS version 22. Descriptive data are reported as mean (M) and standard deviation (SD). We also used ANOVA to test significant differences between groups.

4. RESEARCH RESULTS

This section presents the results related to the main findings. It starts with describing the participants' demographic information. Then, it moves to present findings related to student perceptions of the support offered by HEIs. It also describes the challenges and concerns students encounter during online education.

4.1 Demographic Information of the Participants

The demographic profile of participants is described in terms of gender, the number of people living in the same house, siblings, specialization, and year of study. Out of the 11,181 students who participated in this study, 7,590 were female (67.9%), and 3,591 were male (32.1%).

The majority of participants come from a large family size: 5,571 (49.8%) participants live with 7-10 family members, 3,217 (28.8%) live with more than ten people, and only 2,393 (21.4%) live with 3-6 family members in the same house. Moreover, 3020 (27%) of our participants have one sibling living in the same place and studying in HEIs, 2034 have two (18.2%), 1066 have three (9.5%), 529 have four (4.7%), and 792 (7.1%) have more than four siblings living in the same house, while 3740 (33.4%) of our participants do not have siblings living in the same place or studying in higher education institutions.

The participants are studying in different specializations: 3235 of them are specialized in Engineering (28.9%), 2769 in Business (24.8%), 1918 in Computer Science/ IT (17.2%), and 1413 in Nursing (12.6%). We have fewer respondents from other specializations: Applied Sciences (594), Education (244), Pharmacy (152), Language (101), Islamic Study (97), and Medicine (34). We also have 624 students from other specializations.

The majority of our participants are undergraduate students (99%): 2132 (19.1%) are still in the foundation program 2302 are in the first year of study, 2743 (20.6%) respondents are in the second year of study (24.5%), 2074 (18.5%) in the third year of study, and 1776 (15.9%) in the fourth year of study. We had only 63 MA students, 4 Ph.D., and 87 students in other years of their studies. Most of our respondents study at government HEIs (N=9108, 81%), with only 2073 (19%) students studying at private universities. Furthermore, our participants are learning in HEIs located in different regions in Oman. We have more participants from Muscat (N=3997, 35.7%), given that many HEIs are situated in the capital, while other participants came from different regions in Oman. The majority of the HEIs where our participants enrolled were towards the end of the semester when face-to-face teaching was suspended (N=6753, 60.4%), 3204 (28.7%) were at the middle of the semester, and only 1224 (10.9%) were at the beginning of the semester.

4.2 Students' Perceptions of the Support Provided by HEIs for Online Learning during the COVID 19 Pandemic

When students were asked about the support provided by HEIs to help them overcome the challenges during the Covid-19 pandemic, results indicate that students rated the support supplied by HEIs highly in three areas, as shown in Figure 1. Students felt that HEIs cared for their health during the pandemic, their HEIs provided them with detailed instructions on who to approach if they faced any technical problems, and timely information was available to students regarding the changes made in teaching was provided.

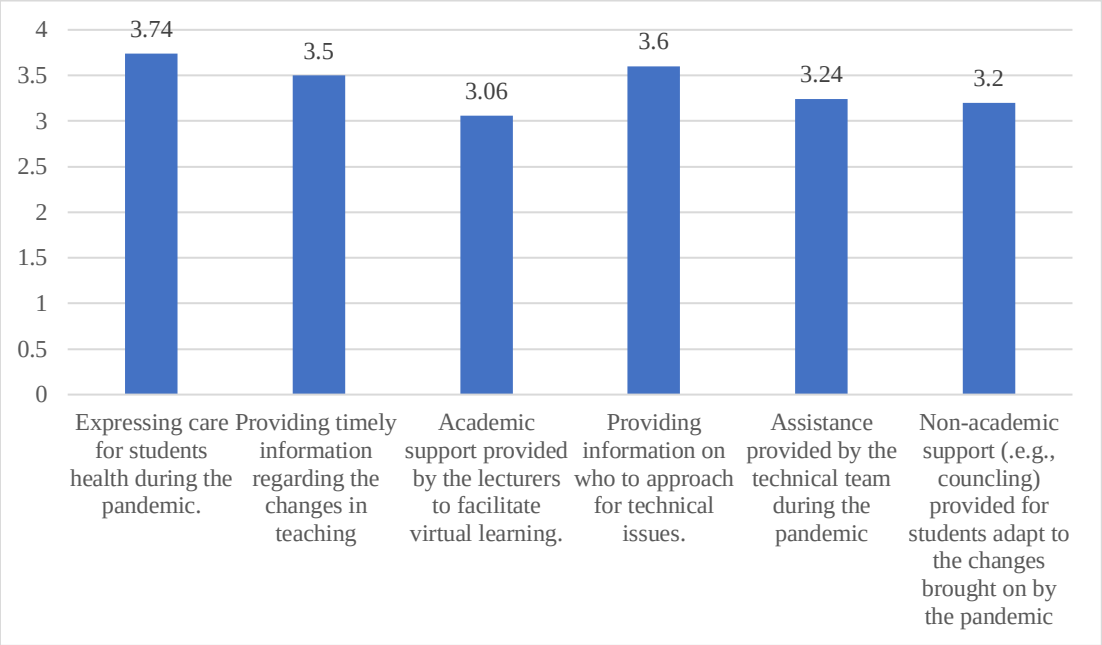


Figure 1: Student perceptions of support provided by HEIs

The data in Table 1 compares student perceptions of the support provided by HEIs based on years of study. It is noted that Ph.D., Master, and Year Four students were more satisfied with the support provided by HEIs than students in their first or second year of studies. It was expected that students in the foundation program and first-year would express lower satisfaction rates than students in higher levels. A one-way analysis of variance (ANOVA) test shows significant differences among students based on the different years of study and their perceptions of the support provided by the HEIs. However, the effect size between all the groups is small. Specifically, the statistically significant differences were found in the HEIs care for student health during the pandemic $F(7, 11173) = 2.854$, $p = 0.006$, with minimal effect size ($\eta 2 = .001$); timely information

provided by the HEIs regarding the changes in teaching F(7, 11173) =3.568, p<000, with minimal effect size (η2 =.002); instruction on who to approach if students encounter any technical issues F(7, 11173) =7.7, p<000, with minimal effect size (η2 =.004); support provided by lecturers to facilitate virtual learning F(7, 11173) =16.175, p<000, with minimal effect size (η2 =.004); assistance provided by the technical team during the pandemic F(7, 11173) =7.709, p <000, with minimal effect size (η2 =.006); help provided by staff and administration to adapt to the changes at the institution brought on by the pandemic F(7, 11173) =10.357, p <000, with minimal effect size (η2 =.004).

	0 F	1 Yr	2 Yr	3 Yr	4 Yr	5 MA	6 PhD	7 others
1. My institution has cared for my health during the pandemic.	3.77	3.75	3.70	3.70	3.79	4.10	4.00	3.85
2. My institution has given timely information regarding the changes in teaching	3.42	3.55	3.49	3.48	3.52	3.92	4.25	3.68
3. My lecturers have given adequate support to facilitate virtual learning.	3.09	3.05	2.98	2.95	3.20	4.19	4.25	3.41
4. My institution gave information on who to approach if I encounter any technical issues.	3.45	3.63	3.62	3.62	3.68	3.94	4.50	3.69
5. My institution technical team has provided satisfactory assistance during the pandemic	3.11	3.26	3.23	3.24	3.37	3.65	4.50	3.61
6. The staff and administration at my institution have done a good job in helping students adapt to the changes at the institution brought on by the pandemic	3.17	3.23	3.15	3.14	3.32	3.73	4.50	3.51

0= Foundation (N=2132); 1= Year 1 (N=2302); 2=Year 2 (N=2743); 3=Year 3 (N=2074). 4= Year 4 (N=1776); 5= Master (N=63); 6=PhD (N=4); 7=Others (N=87)

Table 1: Student perceptions of support provided by HEIs based on year of study

Table 2 illustrates student perceptions of support provided by the HEIs based on specialization. In general, it is observed that Medical and Engineering students are consistently dissatisfied with support provided by HEIs, while Nursing and Language students are happier than others. For example, Nursing students rated the HEIs care for their health during the pandemic the highest (4.02) while Medical students rated it the lowest (2.62). Humanity students rated the HEIs' provision of timely information regarding the changes in teaching the highest (3.97), while the Medical students rated it the lowest (2.41). The support provided by lecturers to facilitate virtual learning was ranked highest by Nursing students (3.66) and lowest by Engineering students (2.83). Applied Sciences students rated the provision of information on who to approach if they encounter any technical issues the highest (3.79), while the Engineering students rated it the lowest (3.5). Assistance provided by the technical team was rated the highest by Nursing students (3.55) and the lowest by Medical students (3).

Furthermore, Nursing students rated the support provided by staff and administration to help them adapt to the changes brought on by the pandemic the highest (3.63). In contrast, Medicine students rated it the lowest (2.56). Surprisingly, Medical and Nursing students have different opinions as these specializations are related. This could be attributed to how these students are supervised by various authorities and could be following different practices.

	1	2	3	4	5	6	7	8	9	10	11	12
My institution has cared for my health during the pandemic.	3.71	3.72	3.73	3.78	3.69	3.63	3.53	3.89	2.62	4.02	3.72	3.60
My institution has given timely information regarding the changes in teaching	3.32	3.57	3.52	3.70	3.36	3.97	3.37	3.78	2.41	3.68	3.35	3.53
My lecturers have given adequate support to facilitate virtual learning.	2.95	3.00	3.02	3.37	2.83	3.29	3.12	3.36	3.06	3.66	3.47	3.06
My institution provided information on who to approach if I encountered any technical issues.	3.79	3.62	3.67	3.44	3.50	3.39	3.71	3.57	3.53	3.68	3.69	3.51
My institution technical team has provided satisfactory assistance during the pandemic	3.13	3.24	3.25	3.30	3.13	3.34	3.28	3.30	3.00	3.55	3.34	3.24

The staff and administration at my institution have done a good job in helping students adapt to the changes at the institution brought on by the pandemic	3.20	3.16	3.17	3.28	3.05	3.32	3.21	3.50	2.56	3.63	3.34	3.20

1=Applied Sciences (N=594); 2=Business/Management (N=2769); 3=Computer Science/ IT (N=1918); 4=Education (N=244); 5=Engineering (N=3235); 6=Humanities (N=38); 7=Islamic Study (N=97); 8=Language (N=101); 9=Medicine (N=34); 10=Nursing (N=1413); 11=Pharmacy (N=152); 12= Others (N=586)

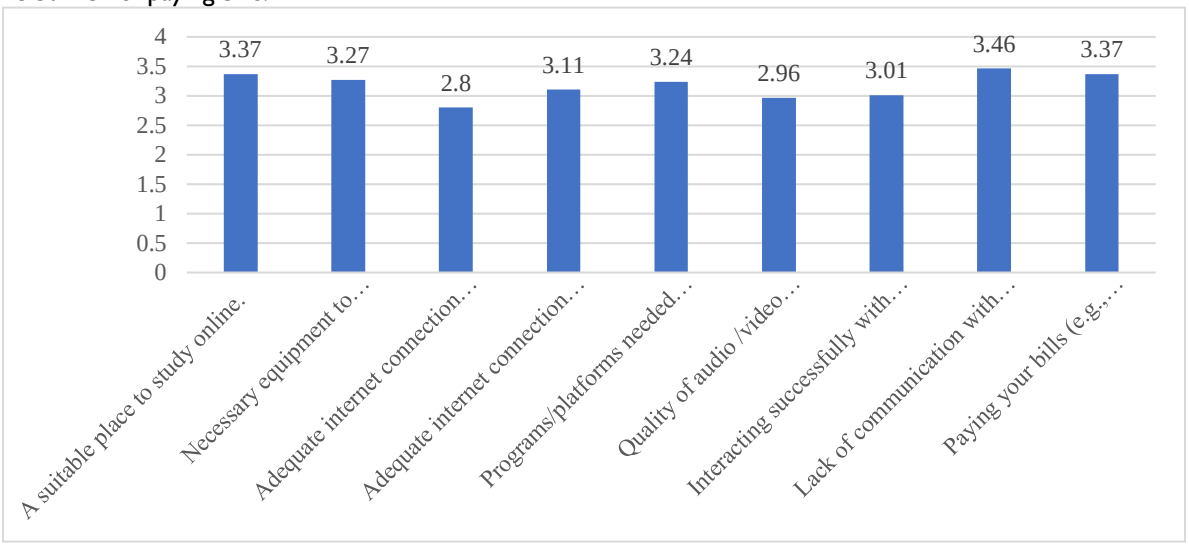
Table 2: Student perceptions of support provided by the HEIs based on specialization

A one-way analysis of variance (ANOVA) test shows significant differences among students based on specialization and their perceptions of the support provided by the HEIs. However, the effect size between all the groups is small. Specifically, the statistically significant differences were found in the HEIs' care for student health during the pandemic F(11, 11169) = 13.48, p<000, with small effect size (η2 =.01); timely information provided by the HEIs regarding the changes in teaching F(11, 11169) =14.18, p<000, with small effect size (η2 =.01); instruction on who to approach if students encounter any technical issues F(11, 11169) =5.93, p<000, with minimal effect size (η2 =.005).; support provided by lecturers to facilitate virtual learning F(11, 11169) =45.5, p<000, with small effect size (η2 =.04); assistance provided by the technical team during the pandemic F(11, 11169) =13.3, p <000, with small effect size (η2 =.01); help provided by staff and administration to adapt to the changes at the institution brought on by the pandemic F(11, 11169) =24.97, p <000, with small effect size (η2 =.02).

In this study, we also asked students an open-ended question about what they appreciated about their lecturers and institutions during the COVID 19 pandemic during online education. We have grouped the listed respected practices as mentioned by students: lecturer/teacher cooperation and support (905), implementation of online assessment (753), execution of online education, and more integration of technology (416) and providing students with sufficient information (132).

4.3 Challenges Encountered by Students during COVID 19

This section elaborates on the challenges students enrolled in HEIs in Oman during the COVID 19 pandemic. In this part of the questionnaire, students were asked to indicate their level of agreement with the nine items on a scale of five. As shown in Figure 2, all the challenges listed here are rated moderately by students though they vary in level of response. The top three rated challenges are fewer forms of interaction with classmates during online learning, weak internet connection, and the burden of paying bills.



The data in Table 3 indicates that Humanities students reported facing fewer challenges than students from other specializations. For example, they reported having the necessary equipment to study online the highest (4.00), while the Engineering and IT students rated it the lowest (3.17), (3.20), respectively. This is logical as most engineering and IT courses

Figure 2. Challenges faced by students during COVID 19

are practical and require more equipment (hardware and software) than other specializations. Similarly, Humanities students rated "Using programs/platforms successfully needed for online classes" the highest (3.82), whereas the Engineering, Medicine, and IT students ranked it the lowest (3.14, 3.15, 3.16), respectively.

	1	2	3	4	5	6	7	8	9
Education (N=244)	3.42	3.38	2.89	3.31	3.35	3.21	3.06	3.28	3.66
Pharmacy (N=152)	3.57	3.47	3.10	3.36	3.48	3.19	3.14	3.34	3.65
Humanities (N=38)	4.00	4.00	3.16	3.45	3.82	3.71	3.53	3.55	3.55
Nursing (N=1413)	3.60	3.47	3.04	3.34	3.51	3.32	3.31	3.41	3.43
Language (N=101)	3.22	3.32	2.99	3.46	3.50	3.27	3.56	3.48	3.42
Computer Science/ IT (N=1918)	3.31	3.20	2.70	3.01	3.16	2.86	2.97	2.99	3.39
Engineering (N=3235)	3.31	3.17	2.71	3.02	3.14	2.82	2.87	2.95	3.39
Business/Management (N=2769)	3.36	3.28	2.83	3.11	3.24	2.93	2.97	3.02	3.32
Others (N=586)	3.33	3.35	2.79	3.12	3.31	3.17	3.19	3.16	3.25
Applied Sciences (N=594)	3.37	3.33	2.68	3.01	3.19	2.87	2.96	2.96	3.22
Medicine (N=34)	3.12	3.26	2.82	3.59	3.15	3.09	3.12	3.35	3.18
Islamic Study (N=97)	3.37	3.31	2.82	3.36	3.31	2.91	3.13	3.04	2.77
Total	3.37	3.27	2.80	3.11	3.24	2.96	3.01	3.06	3.37

Note: 1-9 in this table refer to the statements in X axis in Figure 2.

Table 3 Challenges faced by students during the COVID 19 pandemic based on specialization

In this study, we also asked students an open-ended question about their challenges during online education. We have grouped the difficulties listed in the following areas based on the number of times the challenge has been mentioned: weak internet connection (3625), handling online assessment (2300), lack of time to study, and being prepared for final exams (1632), inability to understand online lessons (989), not having devices needed for online learning (645), failure to communicate and interact with teachers (265), and lack of appropriate space to study at home (199). These challenges are aligned with the challenges listed in Table 3.

4.4 Student Concerns during COVID 19

Presented in Table 4 are areas that concern our participants; the data shows that the most concerning issues for students were their health and the health of their loved ones, and their fear of not completing the academic semester. Other issues were of less concern, albeit high, like feeling lonely and concerned over increased workload during online education.

	Mean	STD	Results interpretation
1. You felt worried about your health and the health of your loved ones.	4.46	0.78	Very high
2. You felt lonely since you were not able to visit relatives and friends.	4.04	1.11	high
3. You felt peaceful and happy to be home with your family members.	4.23	0.91	Very high
4. You felt worried because hygiene measures (using hand sanitizer, gloves, and masks) were not properly adhered to.	4.35	0.86	Very high
5. You are concerned that you will not be able to complete the academic semester.	4.46	0.85	Very high
6. My institution workload has significantly increased during online education.	4.08	1.03	high
7. You were concerned that you would not be able to graduate on time.	4.20	1.05	Very high

Table 4 Student concerns during the COVID-19 pandemic

The data in Table 5 shows that students living with 3-6 people reported feeling worried about their health with a value of 4.43. Students living with more than ten people reported a higher level of worry with a value of 4.5. Interestingly, students living with more than ten people reported feeling lonely (4.08), whereas students living with 3-6 people expressed less loneliness (3.98).

	3-6 people	7-10 people	More than 10 people	Total
1. You felt worried about your health and the health of your loved ones.	4.43	4.45	4.50	4.46
2. You felt lonely since you were not able to visit relatives and friends.	3.98	4.04	4.08	4.04
3. You felt peaceful and happy to be home with your family members.	4.15	4.25	4.26	4.23
4. You felt worried because hygiene measures (using hand sanitizer, gloves, and masks) were not properly adhered to.	4.31	4.36	4.38	4.35
5. You concerned that you would not be able to complete the academic semester	4.39	4.47	4.48	4.46
6. My institution workload has significantly increased during online education.	4.09	4.08	4.09	4.08
7. You were concerned that you would not be able to graduate on time.	4.14	4.20	4.25	4.20

Table 5 Student concerns during the COVID 19 pandemic based on the number of people living together

4.5 Student demographic information in relation to challenges faced during online learning

This analysis is based on the number of people living in the same house versus challenges such as a suitable place to study online or access to enough equipment for online learning (e.g., laptops, webcam, headset). It is evident from the table and figure below that the more people living in the same house, the more difficult for students to find a suitable place to study online. Students who live with 3-6 people reported the suitability of the place to study online to be high (3.49). Students with more than ten people residents rated the place suitability as moderate (3.24). Thus, it is evident that as the number of people living in the same house increases, the place's suitability decreases.

	Mean	interpretation
3-6 people (N=2393)	3.49	high
7-10 people (N=5571)	3.40	high
More than 10 people (N=3217)	3.24	Medium
Total (N=11181)	3.37	Medium

Table 6: Availability of a suitable place to study online versus the number of people living in the same house

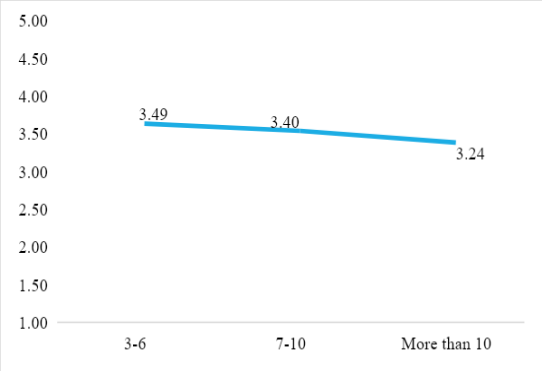


Figure 3: Availability of a suitable place to study online versus the number of people living in the same house

Furthermore, the same trend is observed in relation to the number of people living in the same house and the availability of the necessary equipment to study online (as shown in the table and figure below). The more people live in the same house, the less equipment available to study online. Those students who lived with 3-6 people reported high availability of necessary equipment to study online (3.42), while those with more than ten people rated equipment availability moderate (3.13).

	Mean	interpretation
3-6 people (N=2393)	3.42	high
7-10 people (N=5571)	3.29	moderate
More than 10 people (N=3217)	3.13	Moderate
Total	3.27	Moderate

Table 7: Availability of the necessary equipment to study online versus the number of people living in the same house

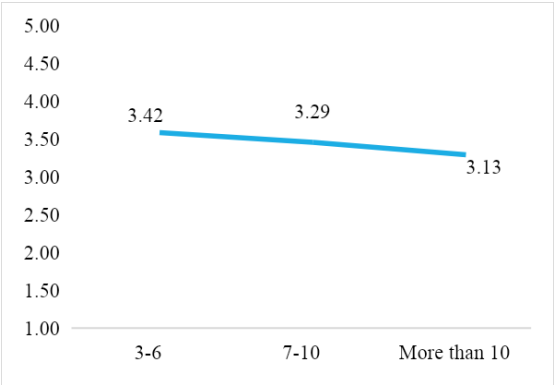


Figure 4: Availability of the necessary equipment to study online versus the number of people living in the same house

Moreover, a similar trend is observed in the number of people living in the same house and the adequacy of the internet connection. However, all are at moderate levels (as shown in the table and figure below). Those students living with 3-6 people reported the adequacy of the internet to be 2.98, and those with more than ten people rated it at 2.66.

	Mean	interpretation
3-6 people (N=2393)	2.98	moderate
7-10 people (N=5571)	2.80	moderate
More than ten people (N=3217)	2.66	moderate
Total	2.80	moderate

Table 8: Adequacy of an adequate internet connection for students versus the number of people living in the same house

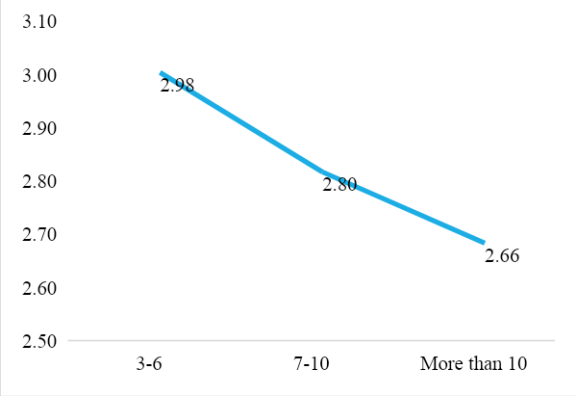


Figure 4: Adequacy of internet connection for students versus the number of people living in the same house

4.6 Male versus Female Perceptions of the First Online Learning Experience

This section compares male and female students' perceptions of support provided by the HEIs, concerns, and challenges faced during online education.

It can be observed from table 9 that female students are more satisfied with the support provided by HEIs than their male counterparts based on an independent t-test. For example, female students reported significantly higher ratings (3.52) in "providing timely information regarding the changes in teaching" than male counterparts (3.44). They also expressed a higher rating with a value of 3.66 for "providing information on whom to approach if they encounter any technical issues" than their male counterparts (3.47). Furthermore, they reported a significantly higher rating of 3.28 for "assistance provided by the technical team" than male students (3.16).

	Male	Female	Independent t-test (2-tailed)
1. My university/college has cared for my health during the pandemic.	3.78	3.72	t=2.79,df=11179, p=0.005
2. My university/college has given timely information regarding the changes in teaching	3.44	3.52	t=3.40,df=11179, p=0.001

3. My lecturers have given adequate support to facilitate virtual learning.	3.00	3.08	t=3.19,df=11179, p=0.001
4. My university/college provided information on who to approach if I encounter any technical issues.	3.47	3.66	t=7.89,df=11179, p<0.000
5. My university/college technical team has provided satisfactory assistance during the pandemic	3.16	3.28	t=5.11,df=11179, p<0.000
6. The staff and administration at my institution have done a good job in helping students adapt to the changes at the institution brought on by the pandemic	3.16	3.22	t=2.64,df=11179, p<0.000

Table 9: Student perceptions of support provided by HEIs based on gender

Although the female students expressed higher satisfaction with the support provided by the HEIs, they have reported being more concerned than their male counterparts. For example, female students reported an increase in workload (4.15) significantly more than the male students (3.94); they expressed more concerns (4.24) for not being able to graduate on time than the male counterpart (4.11). An independent t-test showed that the difference between male and female students is significant for all the items, as shown in table 10.

	Male	**Female**	**Independent t-test (2-tailed)**
1. You felt worried about your health and the health of your loved ones.	4.41	4.48	t=4.37, df=11179, p=<000
2. You felt lonely since you were not able to visit relatives and friends.	4.00	4.05	t=2.29, df=11179, p=0.026
3. You felt peaceful and happy to be home with your family members.	4.18	4.26	t=4.00, df=11179, p=<000
4. You felt worried because hygiene measures (using hand sanitizer, gloves, and masks) were not properly adhered to.	4.27	4.39	t=7.17, df=11179, p=<000
5. You concerned that you would not be able to complete the academic semester	4.37	4.50	t=7.74, df=11179, p=<000
6. My university/college workload has significantly increased during online education.	3.94	4.15	t=10.30, df=11179, p=<000
7. You were concerned that you would not be able to graduate on time.	4.11	4.24	t=6.54, df=11179, p=<000

Table 10: Student social concerns during the COVID-19 pandemic based on gender

It is noted that male students reported facing more challenges than female counterparts in some areas. For example, male students expressed significantly more difficulties paying bills (3.45) than female counterparts (3.33). However, female students reported having significantly more challenges with the availability of the necessary equipment to study online (3.30) than males (3.22), as shown in table 11.

	Male	**Female**	**Independent t-test (2-tailed)**
1. Having a suitable place to study online.	3.40	3.36	t=1.85,df=11179, p=0.064
2. Having the necessary equipment to study online.	3.22	3.30	t=3.29,df=11179, p=0.001
3. Having an adequate internet connection for students	2.81	2.79	t=.69,df=11179, p=0.488
4. Having an adequate internet connection for lecturers	3.16	3.09	t=2.81,df=11179, p=0.005
5. Successfully using programs/platforms needed for your online classes.	3.26	3.24	t=.785,df=11179, p=0.433
6. Quality of audio /video during online teaching	2.97	2.96	t=.464,df=11179, p=0.643
7. Interacting successfully with lectures during online teaching	3.02	3.00	t=.811,df=11179, p=0.41
8. Performing well in your studies since all of your classes are online.	3.08	3.06	t=.923,df=11179, p=0.35
9. Lack of communication with classmates during online learning	3.49	3.44	t=1.92,df=11179, p=0.05
10. Paying your bills (e.g., tuition, accommodation, internet access).	3.45	3.33	t=4.7,df=11179, p<000

Table 11: Students' academic concerns during the COVID-19 pandemic based on gender

5. DISCUSSION

In this study, we analyzed student perception of online learning during Spring 2020 in higher education institutions in the Sultanate of Oman through the participation of 11,181 students from government and private institutions. The findings pertain to student perception of support provided by HEIs to help them overcome the challenges during the pandemic. The research revealed that students rated the support supplied by HEIs between high and moderate. Students felt that HEIs cared for their health during the pandemic, provided instructions on whom to approach if they encountered any technical issues, and offered timely information on the changes made to teaching. This shows that HEIs in the Sultanate of Oman have demonstrated good governance of the crisis and have tried hard to maintain the safety and welfare of their students despite the short time for the preparation. This is in line with other studies performed in the Arab world, including Palestine (Abu Shekhadim, Awad, Khalilah & et al., 2020) and the UAE (Bensaid and Brahimi, 2020).

The results also indicate that students moderately rated the support provided by lecturers to facilitate virtual learning and to help them adapt to the challenges brought on by the pandemic. Blackmon and Major (2012) highlighted that lecturers significantly affected students' online learning experience if they provided sufficient support to their students. Consequently, the HEIs need to ensure that lectures offer adequate support to their students when they are teaching them online. Many techniques can achieve this, such as personal meetings with students, tackling their needs, and creating more collaborative work between peers.

The findings also revealed that Ph.D., MA, and Year Four students are more satisfied with the support provided by the HEIs and lecturers than students in the first or second year of their studies. This is in line with other studies (e.g. Aristovnik,Ravšelj, Tomaževič and Umek, 2020; Baticulon et al, 2020). This means that HEIs in Oman need to support students at the early stages of their research by organizing consulting groups that can help students with tutorials and explanations if they encounter difficulties installing or using the software.

When comparing student satisfaction with support provided by HEIs during the pandemic based on specialization, the findings revealed that Medicine and Engineering students were consistently dissatisfied with the support provided by HEIs. This corresponds with other studies that reported medicine students expressed dissatisfaction with the online mode of teaching (e.g., Mahdy, 2020; Saddik et al., 2020). This is due to the nature of the Medicine and Engineering courses which require practical training, an impossibility during the pandemic. Therefore, HEIs need to improve the way practical courses are delivered in the future by providing virtual resources and equipment that enable students to acquire practical skills such as online laboratory demonstrations and 3D virtual tools to mimic an actual situation (Khalil, Mansour, Fadda, et al., 2020; Mahdy, 2020).

This study also examined different challenges encountered by students enrolled in HEIs in Oman during the COVID-19 pandemic. The findings revealed that the students moderately rated all challenges. However, the highest-rated challenge was students interacting successfully with peers and lecturers during online teaching. These results are corroborated by the findings of many studies that emphasized that the online mode of teaching lacks interaction among peers/teachers (e.g., Means and Neisler 2020; Almuraqab, 2020; Duraku & Hoxha, 2020; Amita, 2020; Ali, 2020; Khalil, Mansour, Fadda et al., 2020). This can be attributed to the lecturers' unfamiliarity with the new mode of delivery which makes them rely on a one-way interaction during online sessions (Aristovnik et al., 2020; Almuraqab, 2020) or give more emphasis to the content and neglect the importance of online pedagogy (Alnajjar et al. 2020). This entails HEIs training their lecturers and providing them with the necessary training to successfully conduct online teaching, boost learners' interaction, and increase their involvement during online learning. The lecturers should be motivated to use a more synchronous teaching model (audio conferencing, videoconferencing, webchats) because it allows students to interact more with their lecturers and classmates, which contributes to students' understanding of the content (Papadima-Sophocleous & Loizides, 2016). Furthermore, HEIs should encourage their faculty to implement pedagogies that strengthen learner autonomy (Draissi & Young, 2020) which could be achieved by spreading awareness of the expected role of learners as autonomous and encouraging students to be accountable for their learning.

Another challenge was the adequacy of internet connection for students since it did not allow students to take online classes. Indeed, poor internet connection has been a problem for many years in Oman (Al-Mahrooqi and Troudi,2014; Slimi, 2020) and other countries (Duraku & Hoxha, 2020; Allily et al., 2020; Ali, 2020; Huang et al. 2020; Means and Neisler, 2020; Lassoued et al., 2020; Alharbi, 2020;). Therefore, Oman needs to improve its digital infrastructures such as internet connection, prices, and speed so that online education can take place and students can benefit from the opportunities it provides.

6. CONCLUSION

In summary, students are the ultimate targets of education, and addressing their needs and challenges must be the priority for all HEIs, especially during online education. This requires HEIs to ask serious questions about their ability to continuously monitor the quality of online learning designs, materials, teaching methods, and services (e.g., advising and counseling services) offered to students to overcome the obstacles they encounter. Due to emergency conditions, online

education has become a requirement. We should all take it as an opportunity to advance our technological infrastructure, upskill and develop faculty both pedagogically and technically. In addition, governments in all countries must consider increasing equity and access to all learners. HEIs and governments must strive hard to provide inclusive education opportunities that cater to all learners' needs and living conditions irrespective of their income level, region (rural or urban), or economic and social status. Future work should focus on the teachers' perceptions of online education and what kinds of support their HEIs have provided, and the challenges they encounter during their online teaching. In addition, future research should explore the student's and teachers' experiences during the COVID-19 pandemic using qualitative methods to take in-depth insights into their experiences.

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