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Applying Online Learning in Higher Education Institutions During the COVID-19 Pandemic: A Field Study in the United Arab Emirates (UAE)

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Abstract: The aim of this study was to evaluate the reality of the experience of applying online learning during the COVID-19 pandemic in higher education institutions in the United Arab Emirates during the 2019/2020 academic year by exploring the perceptions of undergraduate students at the Ajman University. The study was carried out using a descriptive method approach. The study population consisted of all students on the campus of Ajman University (n = 6620), where the sample of the study (n=1655) was taken used the random sampling method through a stratified sample technique. After verifying its validity and reliability, the researchers prepared a questionnaire, as a tool for the study, consisting of forty (40) items to achieve the objectives of the study. The results indicated that the readiness, training, and technical support for applying online learning of UAE universities during the Covid-19 pandemic, from the perspective students, came at a High level. Their perspective regarding the teaching and learning process through online learning came at a Moderate level, with regard to the challenges facing the online learning application, it came at a Moderate level, and their perspective regarding suggestions to improve the experience of online learning came at a high level. Students' responses differed based on the criteria of considering the two genders with preferred to female gender, college department with inclination toward the medical student in medicine college, the skills of the students using computer skills with considering the students who have skills in using computer.

Keywords: Online Learning, Covid-19 Pandemic, Evaluating, Higher Education Institutions, Undergraduate Students, Ajman University.

1 Introduction

A novel corona virus known as Covid-19, which was discovered in the last month of the year 2019 in a seafood market in Wuhan, is not only a serious public health emergency but an emergency on all societal levels: political, economic, social, and educational [1]. The World Health Organization (WHO) announced social distancing as a means of curbing the spread of this severe pandemic [2]. As a result of this announcement, colleges, schools and universities around the world have been shut down their campuses to follow social distancing measurements [3]. According to the United Nations (UN) report, the pandemic of COVID-19 caused the greatest disruption of education systems in history, affecting approximately 1.6 billion students in more than 190 countries across the globe [4]. As a consequence of this severe pandemic, the educational systems, through their educational institutions, have been motivated to create and develop modern learning strategies to support the continuities of education and training that are appropriate to the environment of this pandemic [5]. Online learning or distance learning has been adopted in most educational institutions as one of the solutions during the covid-19 pandemic [6]. On the other hand, although distance learning or online learning was a widespread matter of concern for political authorities, educational institutions, businesses, teachers, parents, and students alike, there was no other alternative. Most academic director are with idea of online teaching and promote it as the current solution during the pandemic[5]. Allen & Seaman indicated that online learning has become extremely prevalent in a number of higher education

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institutions around the world[7]. The major universities in developed countries have been started moving their education delivery virtually for the last 10 years and being away from the traditional learning approach [8]. Top ranked universities like Harvard, Yale, Cambridge, Peking and Oxford have started taking the same approach [9]. Having said that, this shift from traditional education system to online system is not easy and will not happen overnight. The speed of this transaction is related to different challenges and barriers [10]. Bao pointed out that shifting entirely to an online education requires a great deal of planning and organization [8]. Therefore, educational institutions had to assess the situation and determine their capabilities, needs, and readiness to manage this crisis and any similar to it in the future [11, 12]. Moreover, instructors should be proficient enough at online teaching via online teaching training and universities must have adequate information technological infrastructure and enough resources to enable instructors to be recorded and sharing the teaching materials to the students to have accessibility from anyplace and by using any kind of device, such as laptops, tablets, or smartphones [13]. One of the main concern with adapting the virtual learning approach is limited interaction between the student and instructors [14, 15]. Furthermore, Kuo, Walker, Schroder, & Belland pointed out that students should receive training that sufficiently ensures easy delivery of e-learning courses[16]. Students' level of satisfaction regarding e-learning systems increases when they have easy access to technology. It is important that online learners are familiar with the use of technology in order to make full use of the e-learning system because they will become frustrated when they are not familiar with the technology and this lowers their level of satisfaction [17, 18]. In the United Arab Emirates (UAE), 91% of residents use mobile internet and more than 98% of households have internet access [19].

In addition, mobile devices, such as smartphones, are used to access the internet primarily at home or at work [20]. The UAE government, through cooperation with both the ministry of education and the Etisalat Company, implemented ongoing online learning during the COVID-19 pandemic from March 2020 in all UAE education sectors, including public and private schools and undergraduate universities. The main purpose of this precaution is to have protection measurement of Covid-19 and to make sure that the targeted student can stay with their learning in suitable manner and with high-quality teaching methodologies. In order to ensure a successful online learning process during the COVID-19 pandemic, the Ministry of education in the UAE implemented professional training for teachers and allowed private schools to access their own online learning system. Moreover, it launched smart learning platforms and guidelines and instruction manuals to manage students' behavior on online learning. In addition, the UAE government offered free satellite broadband services for learners in areas with no connectivity and free home internet for families with no home internet connection [21]. Ajman University started implementing the online learning system after joining the UAE's efforts to take the necessary precautionary measures to limit the spread of the new Coronavirus known as (COVID-19) in light of the directives of the Ministry of Education in the UAE. Moreover, the university organized training courses for more than 300 faculty members, which included methods and mechanisms for online learning to ensure full readiness for this experiment and eliminate any challenges that could hinder the communication process. Furthermore, an interactive environment was provided that enables students and instructors to exchange views and ideas during the process of explaining educational materials, which suggests out that the online learning process is compatible with the skills of the current generation of students in their active dealing with information technology (IT).

2 Literature Review

2.1 Coronavirus Disease (COVID-19) Pandemic

A novel strain of respiratory tract infection associated with the COVID-19 virus emerged in December 2019 in Wuhan, China which is the sprawling capital of central China's Hubei province. This virus has spread rapidly in all countries of the world, regardless of whether they are rich or poor [1]. The WHO, on 12 January 2020, isolated this pathogenic virus and named it as the 2019 novel coronavirus [2]. According to [22], Coronavirus (COVID-19) is an enveloped, positive-sense, single-stranded, RNA virus genome in the size ranging from 26 to 32 kilobases that causes mild to severe symptoms of acute respiratory syndrome infections, which can be lethal. Similarly, the Ministry of Health and Prevention of the UAE defined it as a new strain of coronavirus that may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases.

2.2 Online Learning

Online learning as a model of education emerged in 1982 in California, the United States [23]. This model of education as its first application has had great potential to affect the planning, development, and construction of the education system at all educational institutions and across all educational levels [24]. Allen & Seaman suggested that online learning uses computers, laptops, other devices, and the internet as delivery mechanisms with at least 80% of course content delivered online [25]. It is clear that long text-based lectures were not appropriate for the online environment, and learners were not easily and quickly engaged in discussion activities [26]. According to [27], as online learning started to expand, the governments of

nations also began funding educational institutions that provided online programs to effect improvement in the quality of online learning. Garrison stated that online learning derives from constructivist theory learning in that it poses a major change in contrast to conventional distance education, which is focused on the concept of autonomy and the industrial development of prepackaged study materials [28]. Moreover, according to [29], online learning shifted learning from teacher-centered learning that is presented in a classroom environment during traditional learning to learner-centered learning, where learners have much more responsibility and ownership. Where those learners in the online learning environment have a chance to choose what to learn, when to learn, and who to learn with [30, 31]. Thus, a certain degree of self-guided learning is required in order to pass an online class [29]. Online learning, according to [32], is a form of distance education in which technology mediates the learning process, teaching is provided entirely via the internet, and learners and teachers are not required to be present at the same time and location. Luyt (2013) pointed out that features of online learning like access to the internet and the flexibility of online classes have made online learning an essential component of the learning system in higher education institutions[33, 34]. On other hand, Limperos, Buckner, Kaufmann, & Frisby pointed out that the existence of financial problems in some institutions of higher education and a large number of students' demands have directed the focus and shift of these institutions towards using online learning as one of the solutions that can be implemented[35]. Furthermore, Al-Qatawneh et al. pointed out that modern learning has become reliant on several advanced instructional methods, systems, and multimedia technologies, which has formed the shape of the e-learning platform [36]. Moreover, online learning has progressively become prevalent, providing learners flexibility in regard to the time and location they study, and enabling them to obtain knowledge rapidly via numerous sources of education [37]. Moreover, Chaney suggests that contemporary expansion of the use of the internet and technology has produced a surge in the demand for internet-based learning [38]. Furthermore, Sun & Chen described online learning as a rapidly growing environment that helps learners through the elasticity of working and learning outside of the restrictions of time and place[30]. Online learning is attractive to a variety of students and has become more familiar throughout educational environments including primary schools, secondary schools, and higher education institutions like universities [39, 36, 26] pointed out that online learning comprises a wide variety of programs that use the internet within and beyond school walls to provide access to instructional materials as well as to facilitate interaction among teachers and students [40]. Furthermore, according to [28], in the mid-1990s, advancements in educational technology and increased interest in asynchronous discussion groups gave rise to the term e-learning, which sought to describe learning delivered entirely online as well as learning that combines online and face-to-face elements, which is referred to as blended or hybrid learning. Online learning environments can be classified into three core categories: Asynchronous Online Courses, Synchronous Online Courses, and Hybrid Courses as seen in Figure.1

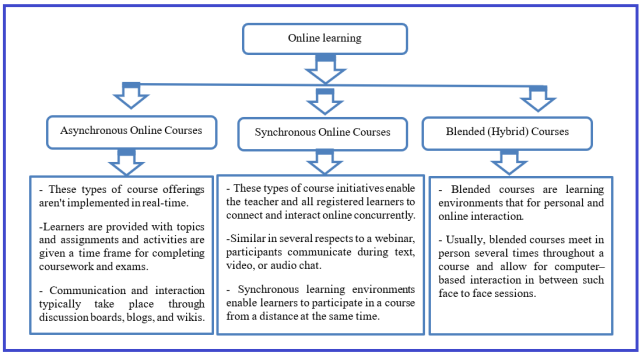

Fig. 1: Categories of online learning environments.

The fast spread of the Covid, like other daily life challenges, has had a major impact on students, teachers, and educational institutions around the world [41]. This forced most countries to close their educational institutions [42]. This procedure was created to stop the spread of the virus by having social distancing measures and to shield the students from the risk of contracting the virus. Because of the lack of knowledge and facts about how and when this epidemic will disappear completely from our lives and the lives of our students, Kaur [43] pointed out that most educational institutions around the world decided to take advantage of available technological and technical materials and resources and modern means of communication to create educational programs, software, and materials to be employed via online learning through the internet and web platform with the aim of continuing the learning system and teaching students in all scientific and academic disciplines. According to [44], online learning was applied and implemented at most educational institutions in the globe during the pandemic. On the other hand, Crawford [10] reported that the process of switching from traditional learning process to virtual one without challenges will happen direct in one night. Thus, this fast-shifting change in a learning system will surely be connected to diverse obstacles, problems, and challenges at this critical stage of learning. In reality, Covid-19 compelled experts and decision-makers in educational institutions to rethink traditional learning by considering and adopting online learning as a logical choice to address the risk of students ceasing to learn and study as the Covid-19 Pandemic spreads [43]. Thus, this shift in learning system is a test of how well educational institutions, like universities and schools, are prepared to deal with the crisis of a pandemic that requires the help of advanced technology, including hardware and software, to enable effective online learning [45]. As a result, In [46], pointed out the four most important factors related to the success of online learning environments and classes which can be seen

in Figure.2

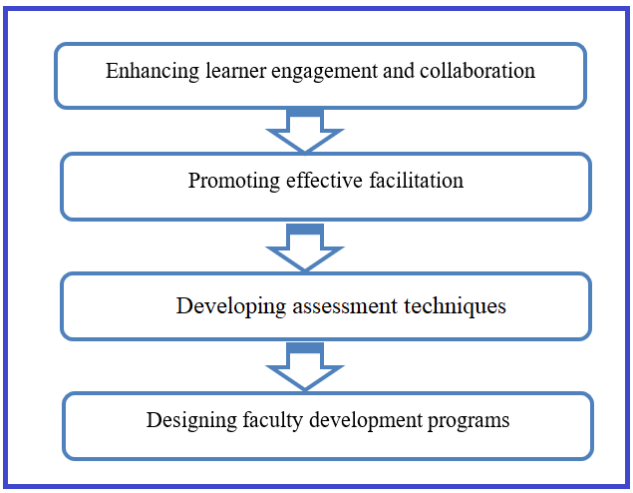

Fig. 2: The most important factors in the success of online learning classes.

Online learning is considered a blessing due to the various benefits and positive features given below as seen in Figure.3 [32, 47-50].

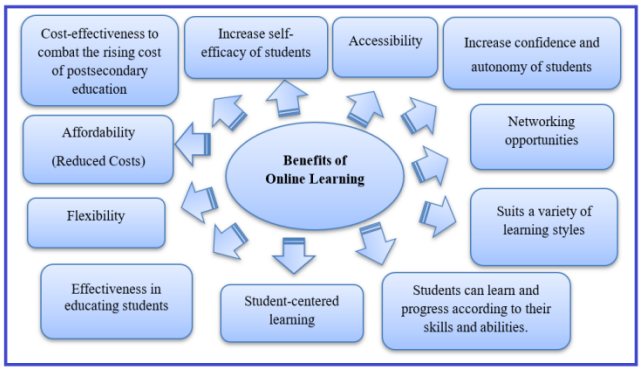

Fig. 3: Benefits of Online Learning [32, 47-50].

On the other hands [32, 51] refers to the disadvantages of online learning like poor accessibility in remote areas, online learning being more effective in digitally advanced countries, limited accessibility to faster, reasonably priced, and consistent internet connections, online learning potentially causing social isolation, online teachers tending to focus on theory rather than practice, and online learning being inaccessible to the computer illiterate population.

2.3 Previous Studies

Recently, numerous studies have highlighted the application of online learning during the spread of a pandemic COVID-19. Among these studies are the following: a study conducted by[52], aimed to discover the necessity of virtual learning and understand its strengths, weaknesses, opportunities, and challenges during crisis. The findings revealed that, in order to make online learning more competitive in these challenging times, more productive technology usage must be emphasized, that is, technology that has low procurement and maintenance costs but can effectively promote educational processes. Before implementing and embracing any e-learning tool or technology, the benefits and drawbacks must be considered. Also, a study was carried out Ayebi-Arthur [53] in a college of higher education located in a seismic activity area in New Zealand which was severely affected by seismic activities, which encouraged the college to apply online learning. The results showed that, following that tragic event, college students became more accepting and motivated to engage in online learning. The findings also revealed that technology helped them in overcoming obstacles during those trying times. The Heng & Sol study suggested to encourage virtual learning approach and have better adaption for it after the pandemic tackled. Gillett-Swan [54] suggested that the barriers to active participation through online learning appear particularly evident in group work activities. Furthermore, many faculty members are increasingly required to have higher levels of technical competence in addition to their normal academic workload and face challenges in this online learning environment. Likewise, the study conducted by Amir et al. (2020)[55] aimed to assess the learner's perspective of online learning versus conventional learning at Universities Indonesia. The results showed that learners will be able to adapt to modern learning methods such as completely online learning and that pedagogy approaches will be altered in the future as the COVID-19 pandemic spreads. Moreover, the study conducted by Schlenz et al. aimed to evaluate the students' and lecturers' perspectives on the application of online learning during the spread of the COVID-19 Pandemic [56]. The findings revealed that 53.2% of students preferred online learning instead of traditional learning (face-to-face), while 36.8% of students preferred face-to-face learning over of online learning. Also, students and their lecturers have suggested that online courses would be included in upcoming curriculum. Khalil et al. (2020) conducted another study in Saudi Arabia, in the Middle East, to gauge the opinion and feedback of the students of medical collage about the efficacy of the harmonized online courses at the Medicine School at Medical Sciences in University of Qassim [57]. The results, according to the aspects of effectiveness of the education, possible challenges to be faced, time scale and management, and future partialities, showed that during the implementation of virtual learning in the college, students had a moderate level of acceptance while all students reported that virtual learning saves time and furthermore student's accomplishment or success had been enhanced due to more effective use of time. Conversely, the results revealed that through lessons and online tests students faced a number of challenges, including methodological, material interpretation, technological, and behavioral problems. Suryaman et al. has done a research about the impacts of the current pandemic on education process[58]. The findings from the research about the effect of the pandemic discovered that there are many challenges, the students, their parent and

instructors face while using virtual approach for teaching like limited technological skills, parents need to put more effort in assisting their children through learning, interaction and getting socialized with the other students virtually and fees of internet. According to Putri [59], some of the challenges and difficulties encountered by learners, instructors, and parents in online learning were revealed. The online learning can bring barrier of limited communication between the students in which this will increase the struggle for the students with special needs and other students might face difficulties in sitting behind the screen for long period. Also, the students' parents face the difficulties of being more related limited self-control with learning from home. Moreover, according to a recent study [60], Romanian higher education institutions were not ready for purely online learning. The findings also showed that the most significant challenges and problems encountered with the implementation of online learning were technical problems, followed by instructors' lack of technology skills, and their learning methods being incorrectly adapted to the online learning environment. On the other hand, several studies on online learning have been conducted to investigate its usefulness, effectiveness, and positive influence on academic achievement [61-64]. The findings of these studies confirmed the positive attitudes of instructors and learners who believe in the potential of online learning to improve the education system and assert that it enhances and increases interaction and cooperation with learners, provides flexibility and allows learners to engage with lectures with increased comprehension. Furthermore, the findings revealed that when online learning is used in addition to traditional lectures, it improves learners' learning processes and increases their involvement with the lectures.

On the other hand, several studies, such as [65, 66] have shown that the knowledge and achievement gained by learners as a result of online learning are equivalent to those gained through face-to-face learning. Likewise, studies [67, 68] demonstrated that online classes will not have the same significance as traditional lectures and that learners would prefer to accept blended learning instead of only online learning.

3 Research Problem

The current pandemic or so called Covid-19 has had major different impacts on humans' aspects of daily life. The education sector is considered to be one of the main aspects affected by this pandemic, which has forced all the world's educational institutions into a paradigm shift in the education system from face-to-face to online learning in the context of the pandemic. The assessment of the quality and effectiveness of the impact of education and the success of the online learning system during the pandemic therefore needs to be studied by researchers and educational experts. The sudden and rapid transformation or shifting of the education system from a traditional learning environment to an online learning environment has had a significant impact on students' attitudes towards learning.

3.*1 Research Purpose*

The purpose of the research paper is to evaluate the reality of the experience of applying online learning during the COVID-19 pandemic in higher education institutions in the United Arab Emirates during the 2019/2020 academic year by exploring undergraduate students' perceptions of the implementation the online learning system at the Ajman University, one of the higher education institutions in the United Arab Emirates.

3.2 Research Questions

This research paper, therefore, raises the following main questions of study, which aim to clarify the reality of the experience of applying online learning during the COVID-19 pandemic:

- RQ1: What is the level reality of UAE Universities regarding readiness, training, and technical support for online learning during the COVID-19 pandemic from the perspective of Ajman University students?
- RQ2: What is the level of satisfaction regarding the teaching and learning process via online learning from the perspective of Ajman University students?
- RQ3: What were the challenges facing the online learning application from the perspective of Ajman University students?
- RQ4. What are suggestions to enhance the experience of using virtual learning approach from the perspective of Ajman University students?
- RQ5. Does the level of students' responses regarding the experience of applying online learning during a pandemic COVID-19 differ from the perspective of students according to gender, college, and computer skills?

3.3 The Significance of the Research

The significance of the study is demonstrated as follows:

- The COVID-19 pandemic threatens the progress and continuity of education around the world through the near-global closure of educational institutions, such as schools and universities, and thus online learning may be one of the main source solutions to have the learning not be stopped in the universities around the world.

- The study will highlight students' perception of the reality of the online learning experience during the COVID-19 pandemic with the consideration that students are the center of the educational and teaching process.

- This study aligns with the UAE Ministry of Higher Education's goals to update university teaching methods and strategies in accordance with the demands of the spread

of the COVID-19 pandemic in the world's countries.

- It may contribute to providing a clear picture of the difficulties and challenges that undergraduate students face during their studies with the online learning approach.

4 Method

4.1 Approach of the Study

This paper was analyzed by using a descriptive method which is one of reach types that defines the condition, the population of the community, and a situation which is under test by conducting quantitative date collection that can be used for statistical analysis. According to [69], the prime purpose of descriptive research is to examine phenomena and their specific features. Thus, a questionnaire instrument will be used to gather data from a sample of the population represented to the participants.

4.2 Population of Study

In this research the targeted population is the students of Ajman University, and the selected students are in their second year academic year of 2019-2020 which is happened during the current pandemic. 6620 graduate students are enrolled which is show in the below table.

Table 1: Study population.

	College	# students	(%)
1	College of Dentistry	944	14.3%
2	College of Pharmacy & Health Sciences	397	6.0%
3	College of Engineering and Information Technology	1209	18.3%
4	College of Architecture, Art and Design	531	8.0%
5	College of Business Administration	979	14.8%
6	College of Law	545	8.2%
7	College of Mass Communication	589	8.9%
8	College of Humanities and Sciences	1304	19.7%
9	College of Medicine	122	1.8%
Total		**6620**	**100.0 %**

4.3 Sample

Random sample method used by the researchers through a stratified sample to collect sample of students of 25% of each college which is in total 1,655 students (6620 * 25/100 = 1655). For instance, the calculated students from Business school will be 979 * 25/100 = 244.8 that is 245 students which is 245 /1655* 100 = 14.2%. the same method is used for other departments in table 2.

Table 2: Research sample.

College		# students	Percentage (%)
1	Dentistry	236	14.3
2	Pharmacy & Health Sciences	99	6.0
3	Engineering and information Technology	302	18.3
4	Architecture, Art and design	133	8.0
5	Business Administration	245	14.8
6	Law	136	8.2
7	Mass Communication	147	8.9
8	Humanities and Sciences	326	19.7
9	Medicine	31	1.8
Total		1655	**100.0%**

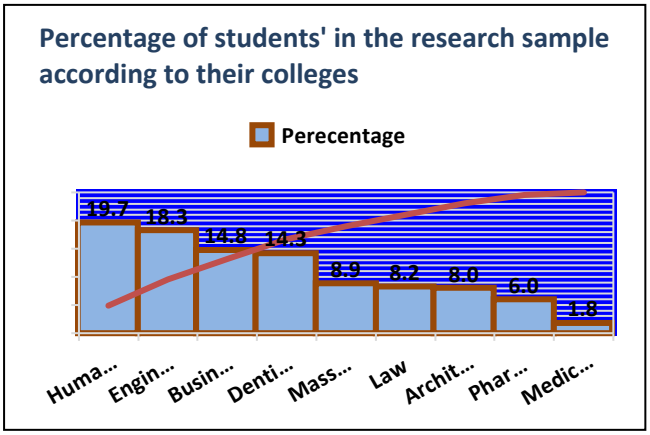

Fig 4. Research sample

A total of 1,655 questionnaires were distributed to students by sending a questionnaire link to them via e-mail or WhatsApp in order to collect the data needed to achieve the study objective. 1353 were replied to correctly and in full. A number of students (n=302) through the targeted colleges incorrectly responded to the questionnaire. Thus, the sample reached to 1353 students. The below table illustrates the geographical location data for the selected students who answered the questionnaire correctly.

Table 3: Demographic information of students.

Study variables	Variables levels	Frequency (f)	Percentage (%)
Gender	Female	894	54.02%

	Male	761	45.98%
	Total	**1655**	**100.00%**
College	Dentistry	248	14.98 %
	Pharmacy & Health Sciences	97	5.86 %
	Engineering and information Technology	274	16.56 %
	Architecture, Art and design	138	8.34 %
	Business Administration	255	15.41 %
	Law	149	9.00 %
	Mass Communication	137	8.28 %
	Humanities and Sciences	329	19.88 %
	Medicine	28	1.69 %
	Total	**1655**	**100.00%**
Computer Skills	Poor	472	28.52%
	Moderate	501	30.27%
	Good	421	25.44%
	Excellent	261	15.77%
	Total	**1655**	**100.00%**

4.4 Study tools

The survey was used to collect quantitative date from sample of students, and it was distributed to the students during the second year of academic of 2019/2020, throughout the spread of the COVID-19 pandemic. During the questionnaire development process, the literature and related studies in this field, such as studies conducted by [70] . The questions were consisted of two parts. The first part was accumulated the basic information for the learners, and the second part was designed more to understand the objective of the students with item numbers of 27.

- **The Validity of the Instrument**

A group of adjudicators (8 academic staff from UAE universities) with extensive experience in the geographical area of learning were questioned to report their opinions on the items of the questionnaire in relation to the study for accomplishing study aims and the number completeness of the questionnaire items. The academic experts' modifications and recommended improvements have been taken and, in order to accomplish the study objectives, deletions, revisions, and additions, were enacted and, as a consequence, the questionnaire after modification comprised (40) items.

- **Reliability of the Instrument**

Cronbach's alpha was used to verify the study tool's internal reliability coefficient. It was implemented to a pilot study that included (60) learners from outside of the study sample and the Cronbach alpha coefficient was computed (0.886), as shown in table 4.

Table 4. Alpha Cronbach's coefficients of reliability for questionnaire aspects of evaluating the reality of the experience of applying online learning during a pandemic COVID-19.

Table 4: Alpha Cronbach's coefficients of reliability for questionnaire aspects.

Aspect	Number of items	Reliability Coefficient of Alpha Cronbach
University Readiness/Training and Technical Support for Online Learning	7	0.809
Students Attitudes Towards the Use of Online Learning	10	0.819
Challenges Facing Students in Online Learning	7	0.852
Development and Improvement of Online Learning	6	0.805
Total	**40**	**0.886**

4.5 Data Analysis Measures

In this analysis, a five-dimensional Likert scale is implemented as follows: Very high (5) with intervals (4.21–5.00), High (4) with intervals (3.41–4.20), Moderate (3) with intervals (2.61–3.40), Low (2) with intervals (1.81–2.60), and Very low (1) with intervals (1.00–1.80)

4. 6 Statistical Analysis of the Data

The researchers utilized for data analysis the Statistical Package for the Social Sciences (SPSS) program to compute the percentage, mean, standard deviation SD, independent t-test tests, one-way ANOVA, and Scheffe test.

4.7 Ethical Considerations

This study was approved by the Research Ethics Committee / Deanship of Graduate Studies and Research of Ajman University (Reference number: H-F-H-2020-Jan-23) on 4 February 2020.

5 Findings

5.1 Findings of the Study Relative to RQ 1.

RQ1: What is the level reality of UAE Universities regarding readiness, training, and technical support for online learning during the COVID-19 pandemic from the

perspective of Ajman University students?

To answer RQ1 the researchers calculated the means and standard deviations of the answers for the sample of research for the of students on every single entry (1-7) of the tool, which were sorted it out in descendent order based on the means which presented in the Table 5.

Table 5: Means and standard deviation organized in descendent direction for the answers of the students related to the level reality of Ajman University regarding readiness and training and technical support to applying online learning.

No	Items	Mean	SD	Description
4	The university provided enough information for students about the online learning policy	4.16	0.95	Very high
2	The university provided explanatory information that includes steps for using the online learning system (manual - video)	3.81	1.06	High
7	The information and videos provided by the university on online learning are simple, clear, and sufficient	3.71	1.13	High
1	The university provides online learning technical support service for students	3.66	1.14	High
5	The university provides various ways to contact the technical support service	3.64	1.13	High
6	The online learning systems used by our university is easy and clear (Blackboard - WebEx - Zoom ….)	3.59	1.13	High
3	The university provides quick response to requests for technical support service	3.56	1.23	High
Overall mean for Items		**3.73**		**High**
Standard deviation		**1.11**		

The outcomes in above table displayed the mathematic mean of all questionnaire elements (1-7) was (3.73) with a standard deviation (1.11). This finding means that the reality of UAE Universities regarding readiness and training and technical support to applying online learning during a pandemic COVID-19 from the perspective of students of Ajman University, as one of the higher education institutions in the UAE, came at a high level. Table 5 also shows that students' responses to Item 4 “The university provided enough information for students about the online learning policy” had the highest average (4.16). Furthermore, it is clear from the students' responses to item 2 that "The university provided explanatory information that includes steps for using the online learning system (manual - video)" that this item was rated as having the second highest level, with an average of 3.81, a high level. Item 7 “The information and videos provided by the university on online learning are simple, clear and sufficient” ranked the highest third level, with an average of 3.71 and a high degree of readiness, training, and technical support to applying online learning.

5.2 Findings of the Study Relative to RQ 2.

RQ2: What is the level of satisfaction regarding the teaching and learning process via online learning from the perspective of Ajman University students? To answer RQ2, the researchers calculated the means and standard deviations of the answers of the study example of students on every single item (8-17) of the tool, which were organized based on descendent order for the means, as presented in table six.

Table 6: Means and standard deviation organized based on descendent order for the answers of the students about the level of satisfaction regarding the teaching and learning process via online learning.

No	Items	Mean	SD	Description
12	Distance learning increases social isolation	3.12	1.37	Moderate
16	Online learning provides the ability to refer to the recorded lecture at any time	2.99	1.36	Moderate
15	Online learning provides fast and sufficient feedback	2.95	1.34	Moderate
17	Online learning increases my academic achievement	2.89	1.27	Moderate
8	Online learning improves self-learning skills	2.86	1.40	Moderate

13	Using online learning is comfortable for me	2.81	1.33	Moderate
9	Online learning promotes interaction and discussion with the course instructor	2.79	1.33	Moderate
14	Online learning provides faster communication between students	2.64	1.34	Moderate
11	Online learning takes into consideration individual differences	2.60	1.33	Moderate
10	Online learning increases students' motivation to study	2.53	1.28	Low
Overall mean for items		**2.82**		**Moderate**
Standard deviation		**1.33**		

The results presented in Table 6 showed that the mathematic mean of all questionnaire items (8-17) was (2.82) with a standard deviation of (1.33). This finding means that the level of satisfaction regarding the teaching and learning process via online learning from the perspective of Ajman University students came at a moderate level of satisfaction. Table 6 also shows that students' responses to Item 12- “Distance learning increases social isolation” had the highest average (3.12) and came at a moderate level of satisfaction. Furthermore, it is clear from the students' responses to item 16- "Online learning provides the ability to refer to the recorded lecture at any time," that this item was rated as having the second highest level, with an average of 2.99 and came also at a moderate level of satisfaction. Item 15- “Online learning provides fast and sufficient feedback” showed the third highest level of satisfaction regarding the teaching and learning process via online learning from the perspective of Ajman University students with an average of 2.95 and came also at a moderate level of satisfaction. Similarly, items: 17, 8, 13, 9, and 14 with their respective average values of 2.89, 2.86, 2.79, and 2.64 all came at a moderate level of satisfaction. However, the lowest average (2.60) was obtained for Item 11− “Online learning takes into consideration individual differences” which came at a low level of satisfaction. Similarly, Item 10- “Online learning increases students' motivation to study” which also came at a low level of satisfaction.

5.3 Findings of the Study Relative to RQ 3.

RQ3: What were the challenges facing the online learning application from the perspective of Ajman University students?

To answer the RQ3, the researchers calculated the means and standard deviations of the answers of the study example for the students on each single item (18-24) of the tool, which were organized based on a descendent order for the means, as presented in table seven.

Table 7: Means and standard deviation organized based on a descendent order for the answers of the students about the challenges facing the online learning application.

No	Items	Mean	SD	Description
21	The weakness of the faculty members' skills in using online learning	3.71	1.26	High
22	The weakness of student’s skills in using online learning	3.29	1.29	Moderate
24	Weakness and delay of technical support services	3.28	1.28	Moderate
20	Online learning reduces the level of direct communication between students and faculty members	3.17	1.30	Moderate
19	Online learning reduces students’ motivation to learn	3.10	1.34	Moderate
18	Technical problems happening during the lecture (network failure or slowness - audio outage)	3.09	1.33	Moderate
23	I find difficulty in using the various applications in online learning	3.09	1.27	Moderate
Overall mean for items		**3.25**		**Moderate**
Standard deviation		**1.30**		

The outcomes in above table illustrated that the mathematic is the mean of all questionnaire items (18-24) was 3.25 with a standard deviation (1.30). This finding means that the level of the challenges facing the online learning application from the perspective of Ajman University students came at a moderate level. Table 7 also shows that students' responses to item 21- “The weakness of the faculty members' skills in using online learning” had the highest average (3.71) and came at a high level regarding the challenges. Furthermore, it is clear from the students' responses to item 22- "The weakness of student’s skills in using online learning " that this item was rated as having the second highest level, with an average of 2.29, and came at a moderate level. Similarly, items: 24, 20, 19, 18, and 23 with the respective average values of 3.28, 3.17, 3.10, 3.09, and 3.09 came at a moderate level regarding the challenges.

5.4 Findings of the Study Relative to RQ 4.

What are suggestions to improve the experience of using

online learning from the perspective of Ajman University students? To answer the RQ4, the researchers calculated the means and standard deviations for the answers of the study example of students on each single item (18-24) of the tool, which were organized based on a descendent order for the means, as presented in table eight.

Table 8: Means and standard deviation organized based on a descendent order for the answers of the students about the suggestions to improve the experience of using online learning.

No	Items	Mean	SD	Description
30	Providing technical support quickly and continuously	4.24	0.95	Very high
29	Developing the programs used in online learning continually	3.70	1.23	High
28	Providing continuous training for different and updated applications for online learning using various methods (manual/ online training video)	3.55	1.23	High
27	Providing moral and encouraging incentives for students in online learning	3.53	1.16	High
25	Adjusting the distribution of assignments, quizzes, and the final exam	3.35	1.37	Moderate
26	Coordinating with the communications network for the provision of strong and sufficient packages for students to guarantee the effectiveness and continuity of online learning	3.34	1.32	Moderate
Overall mean for items		3.62		High
Standard deviation		1.21		

The outcomes in above table illustrated that the mathematics is the mean of all questionnaire items (25-30) was 3.62 with a standard deviation (1.21). This finding indicates the level of feedback and proposal in enhancing the online learning process came at high level for the students from Ajman University. Table 8 also shows that students' responses to Item 30- “Providing technical support quickly and continuously” had the highest average (4.24) and came at a very high-level regarding suggestions to improve the experience of using online learning. Furthermore, it is clear from the students' responses to item 29- "Developing the programs used in online learning continually" that this item was rated as having the second highest level, with an average of 3.70, and came at a high-level regarding suggestions. Similarly, items: 28 and 27, with the respective average values of 3.55 and 3.53, were also at a high level. However, the lowest average, 3.35, was obtained for item 25− “Adjusting the distribution of assignments, quizzes, and the final exam” which came at a moderate level regarding suggestions. Similarly, item 26- “Coordinating with the communications network for the provision of strong and sufficient packages for students to guarantee the effectiveness and continuity of online learning” which also came at a moderate level.

5.5 Findings of the Study Relative to RQ 5.

RQ5. Does the level of responses of students' regarding the experience of applying online learning during a pandemic COVID-19 differ from the perspective of students according to gender, college, and computer skills? To answer the study's fifth question, mean scores and standard deviations were computed. Different methods were used to identify the differences among the T test, averages and other tests. The importance of differences between means was determined using Scheffe's test for post hoc comparisons. The following are the results of the study participants' responses, arranged by study variables:

- **Gender Variable:**

The independent sample test (T) has been used to determine the significance of variations in averages regarding the experience of applying online learning during a pandemic COVID-19 from the viewpoint of students based on male and female, as seen in table nine.

Table 9: The means and standard deviation of the students’ answers based on their genders.

Gender	N	Mean	Std. Deviation	T. Value	Sig (tailed)
Female	894	3.3550	0.66868	4.290	0.000*
Male	761	3.2169	0.63320		

* Statistically significant at ($\alpha \leq 0.05$)

The outcomes have been shown in the above table shows the calculated value of T which is 4.290, and this value is bigger than the T value which indicates an important alteration in the level of significances (0.000). This is also lesser than 0.05 which is the required arithmetical meaning level in which is the mean between the two genders by favoring female gender.

- **College Variable:**

The outcomes of the Analysis of Variance are illustrated in the below table by College variable by One Way ANOVA trail for the students’ answers.

Table 10: Analysis of variance according to college variable by One Way ANOVA test.

		Sum of Squares	df	Mean Square	F	Sig (tailed)
College	Among the Groups	70.612	8	8.827	22.628	0.000
	Within Groups	640.890	1643	0.390		
	Total	711.502	1651			

*Statistically significant at (α 0.05 ≥)

It is obvious from the above table that the statistically significant differs at value of 0.00 which is fewer than 0.05 which is mandatory statistical significance value. This is based on the viewpoint of the student on the collage variable. A Schiffe test comes to the study to identify the causes of the variances and compare them in which the results are shown the below table.

Table 11: The outcomes of the Scheffe Test in order to understand the causes of variances of the students' answers based on the college variable.

(I) College	**(J) College**	**Mean Difference (I-J)**	**Sig.**
Medicine	Dentistry	.52823*	.022
	Business Administration	.79703*	.000
	Engineering & IT	.84446*	.000
	Mass Communication	.89888*	.000
	Pharmacy & Health Sciences	.11985	.999
	Humanities & Sciences	.69116*	.000
	Law	.77355*	.000
	Architecture, Art, and Design	.83925*	.000
Dentistry	Medicine	-.52823*	.022
	Business Administration	.26880*	.003
	Engineering & IT	.31624*	.000
	Mass Communication	.37065*	.000
	Pharmacy & Health Sciences	-.40838*	.000
	Humanities & Sciences	.16293	.293
	Law	.24532	.074
	Architecture, Art, and Design	.31103*	.005
Business Administration	Medicine	-.79703*	.000
	Dentistry	-.26880*	.003
	Engineering & IT	.04744	.999
	Mass Communication	.10185	.969
	Pharmacy & Health Sciences	-.67718*	.000
	Humanities & Sciences	-.10587	.845
	Law	-.02348	1.000
	Architecture, Art, and Design	.04223	1.000
Engineering & IT	Medicine	-.84446*	.000
	Dentistry	-.31624*	.000
	Business Administration	-.04744	.999
	Mass Communication	.05442	1.000
	Pharmacy & Health Sciences	-.72462*	.000
	Humanities & Sciences	-.15330	.342
	Law	-.07092	.996
	Architecture, Art, and Design	-.00521	1.000
Mass Communication	Medicine	-.89888*	.000
	Dentistry	-.37065*	.000
	Business Administration	-.10185	.969
	Engineering & IT	-.05442	1.000
	Pharmacy & Health	-.77904*	.000

	Sciences		
	Humanities & Sciences	-.20772	.231
	Law	-.12533	.944
	Architecture, Art, and Design	-.05963	1.000
Pharmacy & Health Sciences	Medicine	-.11985	.999
	Dentistry	.40838*	.000
	Business Administration	.67718*	.000
	Engineering & IT	.72462*	.000
	Mass Communication	.77904*	.000
	Humanities & Sciences	.57131*	.000
	Law	.65370*	.000
	Architecture, Art, and Design	.71941*	.000
Humanities & Sciences	Medicine	-.69116*	.000
	Dentistry	-.16293	.293
	Business Administration	.10587	.845
	Engineering & IT	.15330	.342
	Mass Communication	.20772	.231
	Pharmacy & Health Sciences	-.57131*	.000
	Law	.08239	.987
	Architecture, Art, and Design	.14809	.707
Law	Medicine	-.77355*	.000
	Dentistry	-.24532	.074
	Business Administration	.02348	1.000
	Engineering & IT	.07092	.996
	Mass Communication	.12533	.944
	Pharmacy & Health Sciences	-.65370*	.000
	Humanities & Sciences	-.08239	.987
	Architecture, Art, and Design	.06571	.999
Architecture, Art, and Design	Medicine	-.83925*	.000
	Dentistry	-.31103*	.005
	Business Administration	-.04223	1.000
	Engineering & IT	.00521	1.000
	Mass Communication	.05963	1.000
	Pharmacy & Health Sciences	-.71941*	.000
	Humanities & Sciences	-.14809	.707
	Law	-.06571	.999

The above table illustrates the outcomes of the study to identify the main causes of the variances by depending on the college variable. The outcomes of the study came in favor to the medical students in Medicine academy.

- **Computer skills:**

The outcomes of the Analysis of Variance are illustrated in the below table by Computer skills variable by One Way ANOVA trail for the students' answers.

Table 12. Analysis of variance according to Computer skills variable by One Way ANOVA test

		Sum of Squares	df	Mean Square	F	Sig (tailed)
Computer skills	Among the Groups	34.956	3	11.652	28.420	0.000
	Within Groups	676.898	1651	0.410		
	Total	711.855	1654			

It is obvious from the above table that the statistically significant differs at value of 0.00 which is fewer than 0.05 which is mandatory statistical significance value. This is based on the viewpoint of the student on the Computer Skills variable. A Schiffe test comes to the study to identify

the causes of the variances and compare them in which the results are shown the below table.

Table 13. The outcomes of the Scheffe Test in order to understand the causes of variances of the students' answers based on the Computer Skills variable.

(I) computer skills	(J) computer skills	Mean Difference (I-J)	Sig.
Poor	Moderate	-.08103	.274
	Good	-.16028*	.003
	Excellent	-.44217*	.000
Moderate	Poor	.08103	.274
	Good	-.07925	.321
	Excellent	-.36114*	.000
Good	Poor	.16028*	.003
	Moderate	.07925	.321
	Excellent	-.28189*	.000
Excellent	Poor	.44217*	.000
	Moderate	.36114*	.000
	Good	.28189*	.000

The results in Table 13 verify that the origin of the significant difference in students' perspectives based on the variable "Computer Skills" was severed the students with excellent knowledge about using computer.

6 Discussion

The gained outcomes from the first question for this research which is related the universities in UAE regarding the provided training, readiness and the technical assistance to use virtual learning during the current pandemic, specifically targeting the student of the university of Ajman, came to a high level by meaning the arithmetic mean is 3.73 with standard deviation equals to 1.11 as illustrated in table 5. This result means that students, from their perspective, have satisfaction and conviction regarding readiness, training, and technical support to applying online learning during a COVID-19 pandemic in their university. The results are consistent with many studies that have focused on universities' readiness, training, and technical support for applying online learning during the Covid-19 pandemic, from their students' perspective [71, 55, 53, 72]. The results of these studies confirm that students will be able to adapt to modern learning methods such as entirely online learning and blended learning in the future as the COVID-19 pandemic spreads. Further, the study conducted by [57] states that during the implementation of online learning in the College of Medicine and Medical Sciences in Qassim University, students had a moderate level of acceptance of online learning during the Covid-19 pandemic. These results show that students are happy with virtual learning process because it gives the students spare time in which leads to success in achieving their optimum goal through their journey at their universities. Furthermore, the research was done by [56] to check the preferability of the student using the online approach and reported that 53.2% of the student were with the idea of using online learning process which is preferred over the traditional learning process. the study conducted by [56] showed that 53.2% of students preferred online learning instead of traditional learning which was accepted by only 36.8% of the students[56]. Yet, the observations in a study which researched by [60] reported that Romanian universities were not able to use the virtual learning process properly during the pandemic as they were not ready for it.

The second research question focused on the level of students' satisfaction regarding the teaching and learning process through online learning from their perspective at their university. The results obtained showed that it came at a moderate level, with an overall arithmetic mean of 2.82 and a standard deviation of 1.33 as indicated in Table 6. Therefore, most items have a medium mean, and this indicates that the degree of approval of the respondents is neither high nor low, and that they have mostly selected moderate. This result means that students, from their perspective, have moderate satisfaction and conviction regarding the teaching and learning process during a COVID-19 pandemic in their university. Researchers may attribute this finding to Ajman University's educators' lack of experience in teaching courses through online learning, as well as their monotonous instructional method and medium-quality-designed course content, as well as their lack of technical skills and their teaching style which is incorrectly adapted to the online environment. Moreover, according to Palmer [73], courses should be designed and organized by good instructors with clear goals and objectives. This may assist students in being as prepared and ready for the course as possible. Furthermore, Lee (2011) indicated that educators should be prepared to provide many types of support to students, such as emotional support, pedagogical support, and technology support[74]. Martin & Bolliger [75] emphasized that good interaction is a significant feature of a perfect teaching and learning process. Furthermore, some instructors were able to find solutions while others were not interested in making an effort to learn how to teach online [76]. The finding is consistent with several studies that confirmed that students' satisfaction regarding the teaching and learning process through online learning from their perspective came at a moderate level [77-79].

The third research question focused on the challenges facing the online learning application from the perspective of Ajman University students. The results obtained showed that it came at a moderate level, with an

overall calculated mean of 3.25 and a standard deviation of 1.30 as indicated in Table 7. Therefore, most items have a medium mean, and this indicates that the degree of the respondents regarding challenges facing the online learning application is neither high nor low. This result means that students of Ajman University have moderate convictions regarding the challenges facing the online learning application in their University during a pandemic COVID-19 in their university. The results as shown in Table 7 also revealed that the biggest challenge facing the application of online learning from the students' perspective was the faculty members' lack of skills in using online learning. Researchers may attribute this result to Ajman University's educators' lack of experience in teaching courses through online learning, as well as to their monotonous instructional method and medium-quality-designed course content. Researchers may also attribute this result to insufficient training of faculty members in online learning and their weak professional development programs. Moreover, the result also suggests that the weakness of students' skills in using online learning is one of the challenges facing the application of online learning from the students' perspective. This may affect the students' understanding of their course materials. The discovery of this paper is constant with the finding of other studies and like other studies students reported their happiness and comfortable in the learning process via virtual learning at a moderate level [54, 56, 80]. The fourth question regarding this research was about giving feedbacks on enhancing the involvement of the students from the university of Ajman regarding the virtual learning approach. The obtained outcomes demonstrated that the result was at a high comparing to calculated mean of 3.62 and a standard deviation of 1.21 as indicated in Table 8. Therefore, most items have a high mean, and this indicates that the degree of the respondents regarding suggestions to improve the experience of using online learning is large. This result means that students of Ajman University having high convictions regarding their suggestions to improve the experience of using online learning during a pandemic COVID-19 in their university. The results shown in Table 8 also reveal that the important suggestion to improve the experience of using online learning from the students' perspective was the necessity of providing technical support quickly and continuously, especially when the number of students connected was high. Researchers believe this problem has a major role in reducing student motivation and their engagement to learn [76](Suresh, Priya, and Gayathri, 2018). The finding is consistent with several studies that confirmed that students' satisfaction regarding the teaching and learning process through online learning from their perspective came at a moderate level [60, 57, 59, 58]. The fifth question of the research is used to understand the difference of the students responds based on their genders, their technical skills in using computer and the department of the college during the current pandemic. Our findings, illustrated in Table 9, 10, 11, 12, and 13, showed that the responses of students regarding the experience of applying online learning during a COVID-19 pandemic varied based on the students' genders with favor for females and students' knowledge on using computer with favor of students with poor knowledge about using computer, and on students' enrolments in the college with favor of medical student in Medicine college.

7 Limitations

The study provides, from the students' perspective, relevant information regarding the manner in which the online learning process took place during the COVID-19 pandemic in one of the renowned higher education institutions in the United Arab Emirates. It helps inform how the online learning and teaching process can positively progress and become more accepted by students and teachers. However, the study also has some limitations. One limitation is the fact that the non-probability sampling was employed, and that the research was only conducted at one university in the United Arab Emirates. Consequently, the results cannot be generalized to the entire Emirati higher education system. Moreover, Ajman University had some experience with the e-learning platform prior to the COVID-19 pandemic, although only the platforms' core tools were used before the pandemic. It may be beneficial to expand the sample to include other universities from the United Arab Emirates in order to generalize the results, but also to make comparisons according to the universities, fields of study, and the universities' past experience in online learning, and according to the existence of training programs for teachers during this transition period. Moreover, it would be useful to conduct longitudinal studies that would highlight how universities have adapted to teaching and learning exclusively online, whether students and teachers are adapting to the method of learning online, the level of teacher interaction with students, how students are progressing, the level of academic achievement, and how well students' attitudes have improved towards online learning.

8 Conclusion

The study offers an evaluation of a perspective regarding the reality of the experience of applying online learning in higher education Institutions during the COVID-19 Pandemic at Ajman University, a famous university in the United Arab Emirates. The perspective of the students came at a high level. Therefore, this indicates that the students will increasingly accept and adapt the online approach mechanism in learning process over time, and this will have a positive impact on the enhancing the quality of education. It is imperative that universities develop training courses for instructors and develop programs for stimulating the performance of instructors and, implicitly, the quality of the teaching and learning process through online learning. The challenging issue facing the application of online learning from the students' perspective

was the faculty members' lack of skills in using online learning. It may be that this requires specialized professional training programs for faculty members on how to manage classes and teach through online learning platforms. Moreover, the technical problems happening during lectures, like network failure, slowness, or audio outages, are still issues which are moderately difficult to solve due to the capacity of the servers owned by universities.

The results of our study lead to some educational implications and recommendation for future research on the application of online learning in higher education institutions.

- Building on the conclusions of the studies conducted prior to the pandemic, the technology acceptance model can be developed and improved in relation to the structure for using online learning platforms.
- In order to have an engaging and stimulating learning environment for student learning through online learning, teachers need to be appropriately trained in handling the new online teaching approach following their experience of teaching their students during the Covid -19 pandemic.
- Increase teachers' awareness that change is inevitable and that they must be open to change and try new models of teaching during pandemics such as the Covid-19 pandemic.
- It is imperative that higher education institutions in the UAE and other countries of the world be prepared to develop the infrastructure required to have a strong and solid educational system such as online learning used in the Covid-19 pandemic in order for them to be ready for any other crises in the future, such as the current pandemic in which we are now living.
- Institutions of higher education shall provide students with technical and technological support by assisting them in obtaining the required electronic devices at the appropriate cost.

9 Delimitations of Study

- Subject limits: The study was limited to the experience of applying online education at Ajman University, as it is one of the higher education institutions in the United Arab Emirates.
- Human limits: having specific group of students from the university of Ajman in UAW limited the research paper.
- Spatial limits: Ajman University in the United Arab Emirates.
- Time limits: Second semester of academic year (2019/2020).

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Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

References

[1] C. Huang, Y. Wang, X. Li, L. Ren, J. Zhao, Y. Hu, L. Zhang, G. Fan, J. Xu, and X. Gu, "Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China," The lancet., **395(10223)**, 497-506, 2020.

[2] WHO, "Coronavirus disease (COVID-19) pandemic.," World Health Organization., 2020.

[3] C. M. Toquero, "Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context," Pedagogical Research., **5(4)**, 2020.

[4] P. Brief, "Education during COVID-19 and Beyond," United Nations, 2020.

[5] UNESCO, "Global Education Coalition," 2020.

[6] B. Williamson, R. Eynon, and J. Potter, "Pandemic politics, pedagogies and practices: digital technologies and distance education during the coronavirus emergency," ed: Taylor & Francis., 107-114, 2020.

[7] I. E. Allen and J. Seaman, "Digital Compass Learning: Distance Education Enrollment Report 2017," Babson survey research group., 2017.

[8] W. Bao, "COVID-19 and online teaching in higher education: A case study of Peking University," Human Behavior Emerging Technologies., **2(2)**, 113-115, 2020.

[9] A. G. Picciano, "Theories and frameworks for online education: Seeking an integrated model," Online Learning, **21(3)**, 166-190, 2017.

[10] J. Crawford, K. Butler-Henderson, J. Rudolph, B. Malkawi, M. Glowatz, R. Burton, P. Magni, and S. Lam, "COVID-19: 20 countries' higher education intra-period digital pedagogy responses," Journal of Applied Learning Teaching., **3(1)**, 1-20, 2020.

[11] L. F. J. Ban Hassan Majeed, H. .Salim, "Tactical Thinking and its Relationship with Solving Mathematical Problems Among Mathematics Department Students," International Journal of Emerging Technologies in Learning (iJET)., **16**, 9, 247-262, 2021.

[12] I. A. A. Duha Khalid Abdul-Rahman Al-Malah, Haider Th, and Hussain Ali Mutar, "Cloud Computing and its Impact on Online Education," IOP Conference Series: Materials Science and Engineering., **1094**, 012024, 2021.

[13] B. H. Majeed, and L. d Jawad, "The Impact of CATs on Mathematical Thinking and Logical Thinking Among Fourth-Class Scientific Students," International Journal of Emerging Technologies in Learning (iJET)., **16 (10)**, 194-211, 2021.

[14] M. Adnan and K. Anwar, "Online Learning amid the COVID-19 Pandemic: Students' Perspectives," Online Submission., **2(1)**, 45-51, 2020.

[15] H. T. S. A. Nabaa Ali Jasim, "Design and Implementation of Smart City Applications Based on the Internet of Things," International Journal of Interactive Mobile Technologies (iJIM)., **15(13)**, 4-15, 2021.

[16] Y.-C. Kuo, A. E. Walker, K. E. Schroder, and B. R. Belland, "Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses," The internet higher education., **20**, 35-50, 2014.

[17] M. Nakamura, "The state of distance education in Japan," Quarterly Review of Distance Education., **18(3)**, 75-87, 2017.

[18] L. F. J. Ban Hassan Majeed, Haider Th.Salim, "The impact of teaching by using STEM approach in the Development of Creative Thinking and Mathemati-cal Achievement Among the Students of the Fourth Sci-entific Class," International Journal of Interactive Mobile Technologies (iJIM)., **15(13)**, 172-188, 2021.

[19] Knoema, "No Emirados Árabes - Share of households with Internet " 2018.

[20] F. L. Statistics, "Fedral Competitiveness and Statistics Authority," ed., 2017.

[21] T. U. A. E. G. portal, "Distance learning in times of COVID-19," 2020.

[22] Y. Chen, Q. Liu, and D. Guo, "Emerging coronaviruses: genome structure, replication, and pathogenesis," Journal of medical virology., **92(4)**, 418-423, 2020.

[23] R. Rowan, "Executive Education at Computer U. Fortune " 1983.

[24] L. Harasim, "Shift happens: Online education as a new paradigm in learning," The Internet higher education., **3(1-2)**, 41-61, 2000.

[25] I. E. Allen and J. Seaman, "Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003," Sloan Consortium., 2003.

[26] M. Kebritchi, A. Lipschuetz, and L. Santiague, "Issues and challenges for teaching successful online courses in higher education: A literature review," Journal of Educational Technology Systems., **46(1)**, 4-29, 2017.

[27] B. Gates, Why word is used, Microsoft Lett., **69(5)**, 53-60, 1998.

[27] H. E. Kentnor, "Distance education and the evolution of online learning in the United States," Curriculum teaching dialogue., **17(1)**, 21-34, 2015.

[28] D. R. Garrison, E-learning in the 21st century: A framework for research and practice. Routledge., 2011.

[29] L. F. Koch, "The nursing educator's role in e-learning: A literature review," Nurse education today., **34(11)**,1382-1387, 2014.

[30] A. Sun and X. Chen, "Online education and its effective practice: A research review," Journal of Information Technology Education: Research., **15**, 2016.

[31] B. Gates, Why word is used, Microsoft Lett., **69(5)**, 53-60, 1998.

[31] H. T. H. H. Alrikabi, "Enhanced Data Security of Communication System using Combined Encryption and Steganography," International Journal of Interactive Mobile Technologies., **15(16)**, 144-157, 2021.

[32] D. Indira and A. Sakshi, "Online Learning," International Education Research Journal., **3(8)**, 32-34, 2017.

[33] B I. Luyt, "Bridging spaces: Cross-cultural perspectives on promoting positive online learning experiences," Journal of Educational Technology Systems., **42(1)**, 3-20, 2013.

[34] N. S. Alseelawi, E. K. Adnan, H. T. Hazim, H. Alrikabi, and K. Nasser, "Design and Implementation of an E-learning Platform Using N-Tier Architecture," international Journal of Interactive Mobile Technologies.,**14(6)**, 171-185, 2020.

[35] A. M. Limperos, M. M. Buckner, R. Kaufmann, and B. N. Frisby, "Online teaching and technological affordances: An experimental investigation into the impact of modality and clarity on perceived and actual learning," Computers Education., **83**, 1-9, 2015.

[36] S. Al-Qatawneh, N. Alsalhi, A. Al Rawashdeh, T. Ismail, and K. Aljarrah, "To E-textbook or not to E-textbook? A quantitative analysis of the extent of the use of E-textbooks at Ajman University from students' perspectives," Education Information Technologies., **24(5)**, 2997-3019, 2019.

[37] B. Gates, Why word is used, Microsoft Lett., **69 (5)**, 53-60, 1998.

[37] B. Plangsorn and S. Poopan, "Development of Producing and Using E-Books Competencies of Teachers in Chachengsao, Thailand," World Journal on Educational Technology: Current Issues., **9(2)**, 112-117, 2017.

[38] E. G. Chaney, "Web-based instruction in a rural high school: A collaborative inquiry into its effectiveness and desirability," NASSP Bulletin., **85**,628, 20-35, 2001.

[39] N. R. Alsalhi, M. E. Eltahir, and S. S. Al-Qatawneh, "The effect of blended learning on the achievement of ninth grade students in science and their attitudes towards its use," Heliyon., **5(9)**, e02424, 2019.

[40] J. H. Waldeck, "The development of an industry-specific online learning center: Consulting lessons learned," Communication Education., **57(4)**, 452-463, 2008.

[41] M. Mailizar, A. Almanthari, S. Maulina, and S. Bruce, "Secondary school mathematics teachers' views on e-learning implementation barriers during the COVID-19 pandemic: The case of Indonesia," Eurasia Journal of Mathematics, Science Technology Education., **16(7)**, 2020.

[43] B. Gates, Why word is used, Microsoft Lett., **69(5)**, 53-60, 1998.

[42] D. Cucinotta and M. Vanelli, "WHO declares COVID-19 a pandemic," Acta Bio Medica: Atenei Parmensis., **91(1)**, 157, 2020.

[43] G. Kaur, "Digital Life: Boon or bane in teaching sector on COVID-19," CLIO an Annual Interdisciplinary Journal of History., **6(6)**, 416-427, 2020.

[44] K. Goldschmidt, "The COVID-19 pandemic: Technology use to support the wellbeing of children," Journal of pediatric nursing, vol. 53, p. 88, 2020. K. Goldschmidt, "The COVID-19 pandemic: Technology use to support the wellbeing of children," Journal of pediatric nursing., **53**, 88, 2020.

[45] K. Mukhtar, K. Javed, M. Arooj, and A. Sethi, "Advantages, Limitations and Recommendations for online learning during COVID-19 pandemic era," Pakistan journal of medical sciences, vol. 36, no. COVID19-S4, p. S27, 2020.

[46] S. Oncu and H. Cakir, "Research in online learning environments: Priorities and methodologies," Computers Education., **57(1)**, 1098-1108, 2011.

[47] C. de la Varre, J. Keane, and M. J. Irvin, "Enhancing Online Distance Education in Small Rural US Schools: A Hybrid, Learner-Centred Model," Journal of Asynchronous Learning Networks., **15(4)**, 35-46, 2011.

[48 J. Lorenzetti, "Academic administration-running a MOOC: Secrets of the world's largest distance education classes," Magna Publication, Wisconsin., 2013.

[49] G. Mahajan, "Attitude of teachers towards the use of Technology in Teaching," Educational Quest-An International Journal of Education Applied Social Sciences, **7(2)**, 141-146, 2016.

[50] D. D. Prior, J. Mazanov, D. Meacheam, G. Heaslip, and J. Hanson, "Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior," The Internet Higher Education., **29**, 91-97, 2016.

[51] M. Sadeghi, "A shift from classroom to distance learning: advantages and limitations," International Journal of Research in English Education., **4(1)**, 80-88, 2019.

[52] C. B. Hodges, S. Moore, B. B. Lockee, T. Trust, and M. A. Bond, "The difference between emergency remote teaching and online learning," 2020.

[53] K. Ayebi-Arthur, "E-learning, resilience and change in higher education: Helping a university cope after a natural disaster," E-learning and Digital Media., **14(5)**, 259-274, 2017.

[54] J. Gillett-Swan, "The challenges of online learning: Supporting and engaging the isolated learner," Journal of Learning Design., **10(1)**, 20-30, 2017.

[55] L. R. Amir, I. Tanti, D. A. Maharani, Y. S. Wimardhani, V. Julia, B. Sulijaya, and R. Puspitawati, "Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia," BMC medical education., **20(1)**, 1-8, 2020.

[56] M. A. Schlenz, A. Schmidt, B. Wöstmann, N. Krämer, and N. Schulz-Weidner, "Students' and lecturers' perspective on the implementation of online learning in dental education due to SARS-CoV-2 (COVID-19): A cross-sectional study," BMC medical education., **20(1)**, 1-7, 2020.

[57] R. Khalil, A. E. Mansour, W. A. Fadda, K. Almisnid, M. Aldamegh, A. Al-Nafeesah, A. Alkhalifah, and O. Al-Wutayd, "The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' perspectives," BMC medical education., **20(1)**, 1-10, 2020.

[58] M. Suryaman, Y. Cahyono, D. Muliansyah, O. Bustani, P. Suryani, M. Fahlevi, and A. Munthe, "COVID-19 pandemic and home online learning system: Does it affect the quality of pharmacy school learning," Systematic Reviews in Pharmacy., **11(8)**, 524-530, 2020.

[59] R. S. Putri, A. Purwanto, R. Pramono, M. Asbari, L. M. Wijayanti, and C. C. Hyun, "Impact of the COVID-19 pandemic on online home learning: An explorative study of primary schools in Indonesia," International Journal of Advanced Science Technology., **29(5)**, 4809-4818, 2020.

[60] C. Coman, L. G. Țîru, L. Meseșan-Schmitz, C. Stanciu, and M. C. Bularca, "Online teaching and learning in higher education during the coronavirus pandemic: students' perspective," Sustainability., **12(24)**, 10367, 2020.

[61] F. M. Alsaaty, E. Carter, D. Abrahams, and F. Alshameri, "Traditional versus online learning in institutions of higher education: Minority business students' perceptions," Business Management Research., **5(2)**, 31-41, 2016.

[62] M. Burac, J. Fernandez, M. Cruz, and J. D. Cruz, "Assessing the impact of e-learning system of higher education institution's instructors and students," in IOP Conference Series: Materials Science and Engineering., **482(1)**, 012009: IOP Publishing.

[63] L. Lochner, H. Wieser, S. Waldboth, and M. Mischo-Kelling, "Combining traditional anatomy lectures with e-learning activities: how do students perceive their learning experience?," International journal of medical education., **7**, 69, 2016.

[64] K. Odit-Dookhan, "Attitude towards e-learning: The case of mauritian students in public teis," PEOPLE Int. J. Soc. Sci, 4, pp. 628-643, 2018.

[65] P. L. H. Wu, "Does online learning work better than offline learning in undergraduate medical education? A systematic review and meta-analysis," Med Educ Online., **4(1)**, 1666538, 2019.

[66] S. Zogas, A. Kolokathi, K. Birbas, G. Chondrocoukis, and J. Mantas, "The e-Learning Effectiveness Versus Traditional Learning on a Health Informatics Laboratory Course," in ICIMTH., 109-112, 2016.

[67] E. Galy, C. Downey, and J. Johnson, "The effect of using e-learning tools in online and campus-based classrooms on student performance," Journal of Information Technology Education: Research., **10(1)**, 209-230, 2011.

[68] B. Gates, Why word is used, Microsoft Lett., **69(5)**, 53-60, 1998.

[68] M. Tagoe, "Students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana," International Journal of Education Development using ICT., **8(1)**, 91-103, 2012.

[69] H. Nassaji, "Qualitative and descriptive research: Data type versus data analysis," ed: Sage Publications Sage UK: London, England., 2015.

[70] E. Asady, W. Ghanima, L. P. Jelsness-Jorgensen, F. Klok, S. R. Kahn, H. Stromme, and H. S. Wik, "Health-related quality-of-life questionnaires for deep vein thrombosis and pulmonary embolism: A systematic review on questionnaire development and methodology," Research practice in thrombosis haemostasis., **5(5)**, e12556, 2021.

[71] S. Alqabbani, A. Almuwais, N. Benajiba, and F. Almoayad, "Readiness towards emergency shifting to remote learning during COVID-19 pandemic among university instructors," E-Learning and Digital Media., **18(5)**, 460-479, 2021.

[72] K. Heng and K. Sol, "Online learning during COVID-19: Key challenges and suggestions to enhance effectiveness," in Cambodian Education Forum., 2020.

[73] S. R. Palmer and D. M. Holt, "Examining student satisfaction with wholly online learning," Journal of computer assisted learning., **25(2)**, 101-113, 2009

[74] D. Y. Lee, "Korean and foreign students' perceptions of the teacher's role in a multicultural online learning environment in Korea," Educational Technology Research Development, **59(6)**, 913-935, 2011.

[75] F. Martin and D. U. Bolliger, "Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment," Online Learning., **22(1)**, 205-222, 2018.

[76] M. Suresh, V. Vishnu Priya, and R. Gayathri, "Effect of e-learning on academic performance of undergraduate students," Drug Invention Today., **10(9)**, 2018.

[77] D. Irawan, "Lestari.(2020). Psychological Impacts of Students on Online Learning During the Pandemic COVID-19 1," Jurnal Bimbingan dan Konseling.

[78] A. Nafrees, A. Roshan, A. N. Baanu, M. F. Nihma, and F. Shibly, "Awareness of Online Learning of Undergraduates during COVID 19 with special reference to South Eastern University of Sri Lanka," in Journal of Physics: Conference Series., **1712(1)**, 012010, 2020: IOP Publishing.

[79] R. Mardiah and I. Anastasia, "EFL Students Online Learning Experience During Pandemic," in 4th International Conference on Language, Literature, Culture, and Education (ICOLLITE 2020).,580-585, 2020: Atlantis Press.

[80] H.-C. Wei and C. Chou, "Online learning performance and satisfaction: do perceptions and readiness matter?," Distance Education., **41(1)**, 48-69, 2020.