

Medical Students' Perceptions of Online Learning

During the COVID-19 Pandemic, Kuwait University: A National Survey

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Abstract: The study explored Kuwait University medical students' perceptions of online learning during the COVID-19 pandemic. An electronic survey was distributed to a representative sample of 986 students, with 518 valid responses collected (52.5% response rate). Most students (62.5%) reported intermediate computer literacy. Time spent on online learning increased significantly for students across all years. The main perceived advantages were avoiding traffic (83.2%) and the main drawback was internet connectivity issues (72.6%). Two-thirds of students (66.2%) felt online learning failed to replace the clinical teaching they received before the pandemic. The study concluded that while students had an overall positive attitude towards online learning and saw it as a valuable teaching tool, it was inadequate for replacing the core practical and clinical components of medical training. The authors recommend improving awareness of online learning's usefulness and providing training to ensure its efficient use.

Keywords: Online Education, Medical Education; The Middle East; Kuwait; e-learning; Students' opinions.

تصورات طلاب الطب للتعلم عن بعد

خلال جائحة كوفيد-19، جامعة الكويت: دراسة محلية استقصائية

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المستخلص: هذه دراسة استكشفت تصورات طلاب الطب في جامعة الكويت حول التعلم عبر الإنترنت خلال جائحة كوفيد-19. تم توزيع استبيان إلكتروني على عينة تمثيلية من 986 طالباً، وتم جمع 518 استجابة صالحة للتحليل (معدل الاستجابة 52.5%). أفاد معظم الطلاب (62.5%) أن مستوى إلمامهم بالحاسوب متوسط. زاد الوقت المنقضي في التعلم عبر الإنترنت بشكل كبير لدى الطلاب في جميع المراحل. كان تجنب الازدحام المروري (83.2%) أهم ميزة مدرّكة، بينما كان أكبر عيب هو مشاكل الاتصال بالإنترنت (72.6%). شعر ثلثا الطلاب (66.2%) أن التعلم عبر الإنترنت لم ينجح في استبدال التدريس السريري الذي تلقوه قبل الجائحة. خلصت الدراسة إلى أن الطلاب لديهم اتجاه إيجابي عام نحو التعلم عبر الإنترنت وأنهم يرونه أداة تعليمية قيمة، ولكنه كان غير كاف لاستبدال المكونات العملية والسريرية الأساسية للتدريب الطبي. يوصي الباحثون بتحسين الوعي بفوائد التعلم عبر الإنترنت وتوفير التدريب لضمان استخدامه بكفاءة.

الكلمات المفتاحية: التعليم عن بعد، التعليم الطبي؛ الشرق الأوسط؛ الكويت؛ التعلم الإلكتروني؛ آراء طلاب.

Introduction:

The COVID-19 pandemic has profoundly affected various sectors worldwide, with education being one of the most impacted areas. Traditional educational methods were disrupted, necessitating a rapid shift to online and virtual learning environments. In the field of medical education, this transition presented both challenges and opportunities, as institutions scrambled to adapt to the new normal.

Given the aspects that medical learning is heavily founded on—clinical exposure, patient contact, clinical skills, and physical examinations—the delivery of online learning presented some unique challenges. While each country had idiosyncratic variables to consider, Kuwait had its distinctive obstacles to overcome. Since KU medical school had never employed distance learning before the pandemic, the quick transition added some extra difficulties, varying from creating digital content to delivering it.

Abbasi et al. explored the perceptions of students regarding e-learning during the pandemic at a private medical college in Pakistan, highlighting the mixed feelings towards this sudden shift [1]. Ackerman and Gross delved into the effects of course choice on student perceptions, providing insights that could be valuable in understanding student responses to the increased options in online course formats during the pandemic.[2]

In Iran, Aghakhani and Shalbafan discussed what the COVID-19 outbreak taught about virtual medical education, emphasizing the need for a robust digital infrastructure [3]. Similarly, Alsoufi et al. assessed the impact of the pandemic on medical students' knowledge, attitudes, and practices regarding electronic learning, underscoring the importance of preparedness in such unprecedented times.[4]

Medical schools worldwide have varied in their responses to the pandemic. Arja et al. documented the response of one medical school to the challenges posed by COVID-19, providing a case study of adaptation and resilience [5]. Meanwhile, Atwa et al. compared faculty and students' perceptions of online, face-to-face, and blended learning methods during the pandemic, presenting a comprehensive view of the effectiveness and preferences for each mode of instruction.[6]

The lockdowns and restrictions not only changed the mode of instruction but also impacted the overall student experience. Banerjee et al. conducted a cross-sectional study from a medical school in Mauritius, shedding light on the broader implications of the lockdown on medical students [7]. Bao provided a case study of Peking University, offering a perspective on online teaching in higher education during the pandemic.[8]

Furthermore, Cosgrove and Bar-On emphasized the importance of meaningful patient care experiences in medical school, a component significantly affected by the shift to online learning [9]. The declaration of COVID-19 as a pandemic by the WHO marked the beginning of these sweeping changes, prompting a reevaluation of educational strategies and methodologies in medical education.[10]

On 11 March 2020, the World Health Organization (WHO) declared the novel coronavirus SARS-CoV-2 outbreak a global pandemic [10]. This declaration resulted in a worldwide lockdown of almost all educational institutions. Inevitably, in response to the outbreak and in line with WHO recommendations, many medical faculties worldwide had to defer lectures and clinical placements, including Kuwait University (KU). In response to the outbreak, Kuwait's Ministry of Health (MOH) suspended all public schools and educational institutions on 12 March 2020. The world was facing significant uncertainty, and the end of the pandemic was unclear. Consequently, the medical faculty at KU had to adapt quickly to continue providing education to its students via alternative routes. As traditional in-person teaching had to be put on hold, online learning, despite its limitations, was the only acceptable safe option, considering the significant health hazards associated with the SARS-CoV-2 virus.

Literature review:

The COVID-19 lockdown affected almost every medical school in every nation. Classroom learning, traditional clinical skills labs, and clinical bedside teaching all had to be suspended [12,5,7]. A revolutionary metamorphosis to digitalised learning was the only safe option to continue providing medical education. The worldwide experience of online learning during the pandemic provides a glimpse into the overall perception of online learning, offering a chance to build a framework for better future applications.[30]

A study across 39 medical schools in the United Kingdom (UK) showed that the number of hours spent using online resources increased significantly during the COVID-19 pandemic, with an average of 7–10 hours spent using such resources per week [11]. The same study concluded that video tutorials were the most effective online learning method reported by students. Another national survey was conducted in China, reviewing undergraduate medical students' perceptions of the online learning provided during the COVID-19 pandemic [17]. The survey showed that, overall, 62.1% of students were satisfied with the ongoing e-learning, with female students being more satisfied than male students. However, students encountered some problems, especially in the first week, including network congestion (76.6%) and insufficient interaction (44.8%), and a minority thought the instructors' preparation of courses was poor (6.4%). It was also noticed that the more advanced the students were in their academic years, the less satisfied they were with the online learning transition [17]. Another cross-sectional study in China reviewed the association between medical students' prior experiences with formal online education and perceptions of such education developed in response to the COVID-19 crisis [35]. It also found that higher academic levels had lower evaluation and satisfaction scores. From February to June 2020, a cross-sectional study was carried out at Southern Medical University in China on the perspectives and experiences of medical faculty staff and students regarding the e-learning provided during the COVID-19 pandemic [18]. The study found that close to 90% of teachers had little to no experience in providing e-learning. In Egypt, a survey across 26 medical schools concluded that 54.6% of students did not find online learning to be as effective as in-person teaching, with a preference for recorded online lectures over other forms of online learning [20]. In Libya, a cross-sectional study in more than 13 medical schools found that only 21.1% agreed that e-learning could be used for clinical studies, while 54.8% disagreed.[4]

Although the pandemic paved the way for the online transformation of education, capitalising on the feasibility of online education, there remain some valid concerns about the efficacy of this recently adopted teaching approach. Nowadays, despite the removal of all pandemic restrictions, online learning has become an integrated approach in current medical teaching practice in many medical schools [34, 36]. Therefore, this study aimed to investigate the perceptions of KU medical students towards the online education they received during the COVID-19 pandemic—identifying the advantages and disadvantages of this digital transition.

Methods:

Study Design, Population, and Research Setting

This cross-sectional study was conducted at Kuwait University (KU) to investigate medical students' perceptions of online learning during the COVID-19 pandemic, identifying the main obstacles that students encountered and determining the potential benefits of online learning in the future. The survey study encompassed medical students from all three academic phases in the context of the COVID-19 pandemic restrictions and lockdown.

The Faculty of Medicine at KU

The medical education at KU consists of a total of seven academic years. The first year is a foundation year. The second to fourth years are the pre-clinical medical years when students receive most of their theoretical, scientific, and medical academic education. The fifth to seventh years are the clinical years when students are mainly attached to hospitals, and when they have the most clinical exposure and patient contact.

Before the COVID-19 pandemic, KU had already been using e-learning via the Moodle learning platform. However, its use was mainly limited to lecture slide uploads, schedules, examination results, and other forms of multimedia, such as e-educational materials. The use of these electronic platforms was not a fundamental part of providing medical education or a form of communication between students and the faculty, rather it was used only for information posting. When the pandemic hit, Microsoft Teams (MS Teams) were an essential tool to facilitate communication between the medical faculty and its students. MS Teams was used to deliver the remaining educational content for each academic year. In addition, it helped in delivering live lectures, presentations, problem-based learning (PBL), interactive sessions, and multimedia transfer between colleagues.

Study Questionnaire and Pre-testing

A validated questionnaire from a previous study conducted in the UK was used to collect data from the students [11]. The questionnaire was modified to include a question about students' computer literacy and provide an open-ended comment section for the students that can provide more space for expression. The questionnaire was then distributed to KU's foundational, pre-clinical, and clinical medical students. The survey questionnaire consisted of 28 questions with choices to choose from. The questions were written in English, since it is the official teaching language at KU, with the following sections: (1) demographic data (questions 1–3); (2) students' engagement with online platforms (questions 4–6); (3) medical school adaptations to COVID-19 (questions 7–11); (4) students' perceptions of online learning (questions 12–23); (5) role of online learning in clinical teaching (questions 24–28); and (6) open feedback (question 29).

The questionnaire was reviewed by two faculty members, and their feedback was incorporated during revision of the questionnaire. The questionnaire was then tested on 15 students similar to the target population, resulting in the items being understandable and suitable, according to the aim of the study. The questionnaire took an average of 5–7 minutes to complete.

The electronic questionnaire was developed using Google Forms and sent to all KU medical students via their university email addresses. To increase the number of responses, a soft reminder email was issued every month to the students. Participation was voluntary, and participants had to self-administer their answers without any external intervention. At the end of the survey, an opportunity for open feedback (question 29) was provided for students to reflect on any aspects they deemed essential.

Ethical Considerations

Ethical approval for the study was obtained from the Health Sciences Centre Ethical Committee at KU (reference number: VDR/EC/3730). The study was conducted by the principles and guidelines of the Declaration of Helsinki for medical research involving human subjects. Informed consent was obtained from all participants who agreed to participate in completing the questionnaire for this study.

Data Analysis

The data were analysed using the Statistical Package for the Social Sciences (SPSS) version 28 (IBM Corp, New York, USA). The data were processed to develop several graphical illustrations for the demographic characteristics of the participants, such as frequency tables and charts. The results were calculated for the categorical variables, and the chi-square test was used to test the associations between these variables. A t-test was used to test for differences in the means of two independent samples. A p-value ≤ 0.05 was considered significant.

Results:

Demographics

In this study, 520 responses were collected from 986 students (response rate = 52.7%); 74.6% (n = 388) were female and 25.5% (n = 132) were male. Most of the respondents were from academic years 3 and 4, wherein their age range is 20-22 years old. The respondents were mostly from phase two (54.6%), which encompasses pre-clinical students (n = 284), whereas 31% were clinical students (n = 161), and 14.4% were foundation-year students (n = 75).

Computer Literacy

Most students were at the intermediate level in terms of computer literacy (62.5%), followed by the advanced level (29%), with the smallest number of students at the beginner level (8.5%). No significant differences were noticed in levels between males and females across the seven academic years. Nonetheless, there was a substantial difference in computer literacy across students in different years.

Students' Engagement with Online Learning

Before the pandemic, students spent an average of 0–5 hours per week using an online learning platform (64.1% of their total learning hours). During the pandemic, students spent an average of 18 hours or more (33.6%) per week using an online learning platform. As a comparison, the difference in hours before and during the COVID-19 pandemic was found to be significant ($p < 0.05$), as shown in Figures 1 A, 1 B, and 1 C.

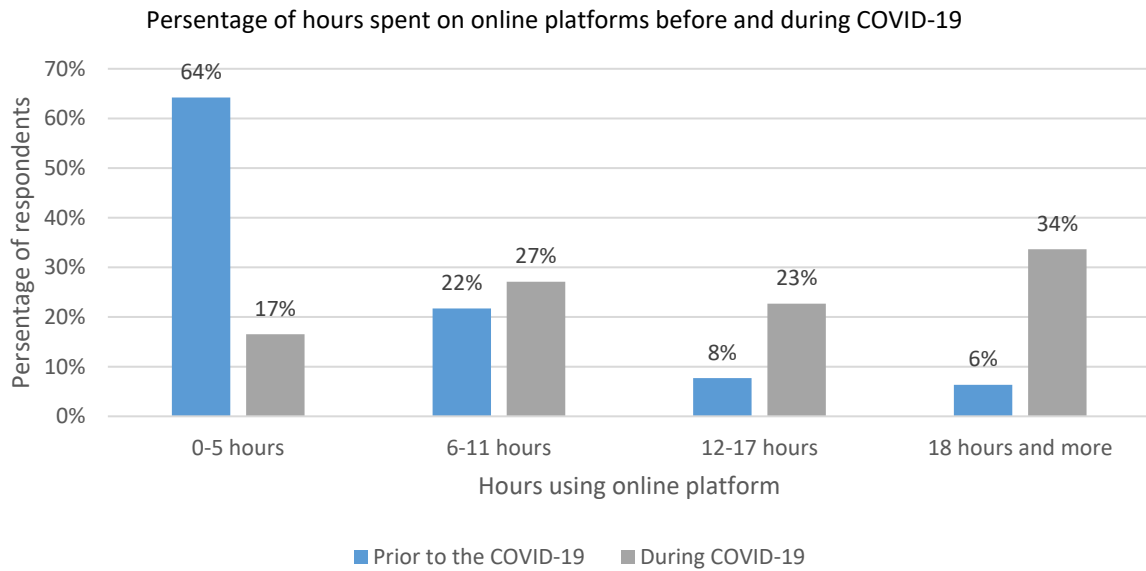


Figure 1.A: Weekly Hours Spent on Online Learning Platforms Before the COVID-19 Pandemic

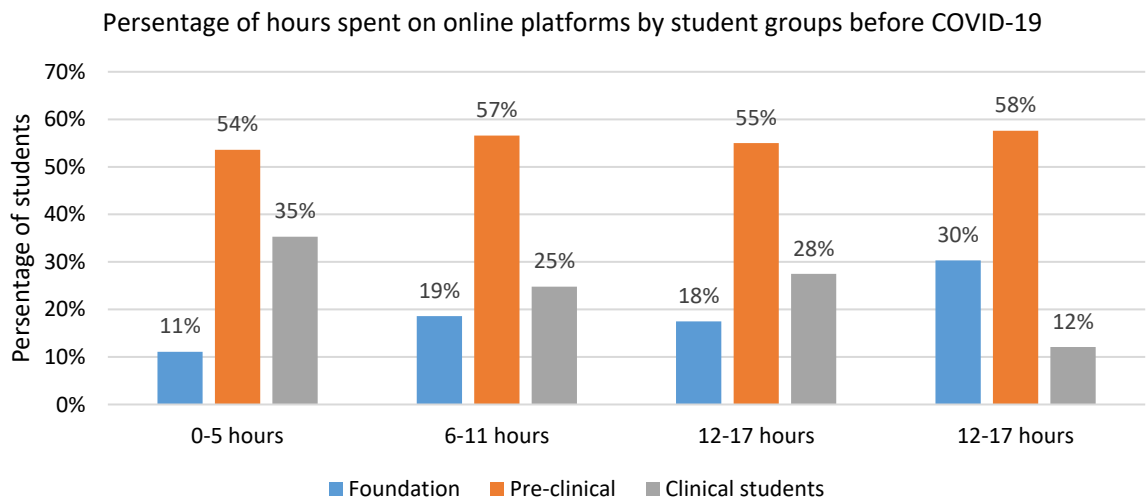


Figure 1.B: Weekly Hours Spent on Online Learning Platforms During the COVID-19 Pandemic

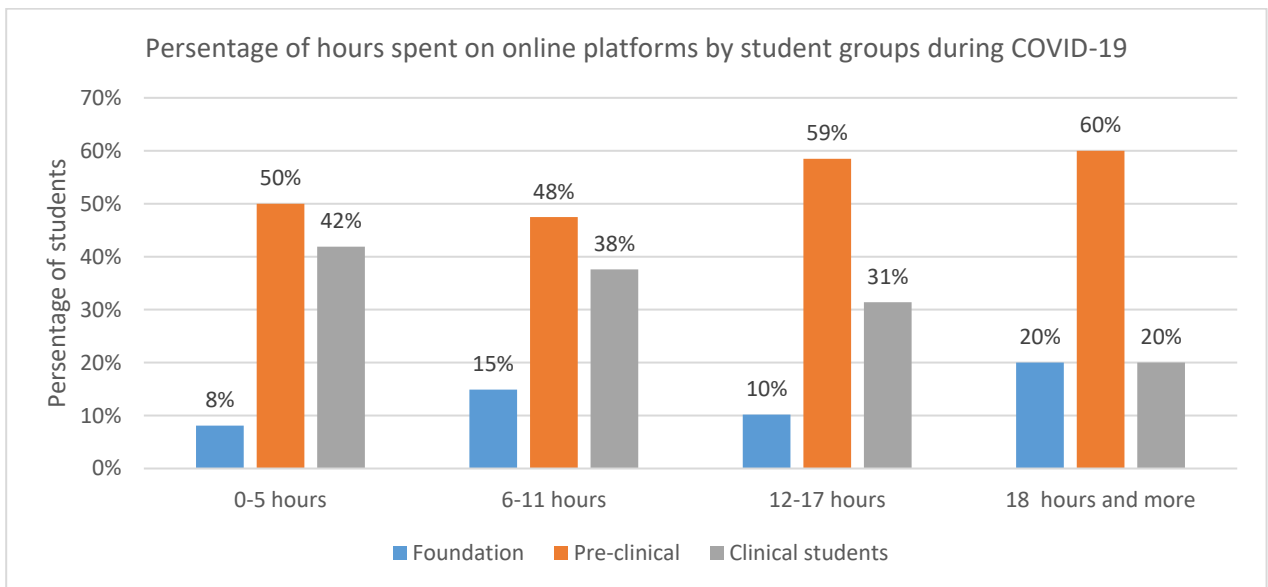


Figure 1.C: Comparison of Weekly Hours Spent on Online Learning Platforms Before and During the COVID-19 Pandemic

Before the pandemic, most students across all phases used a combination of video tutorials (90.15%), online question banks (44.9%), online digital flashcards (42.85%), and pre-recorded tutorials provided by the medical school (21.04%). While only (5.3 %, n=28) of students did not use any means of online learning (figure 2.A).

During the pandemic, there was no significant difference in the preferred used platforms with video tutorials remained the most used platform followed by online question banks. There was a significant increase in the frequency of using Live tutorial across all phases with a significant increase (figure 2.B, 2.C).

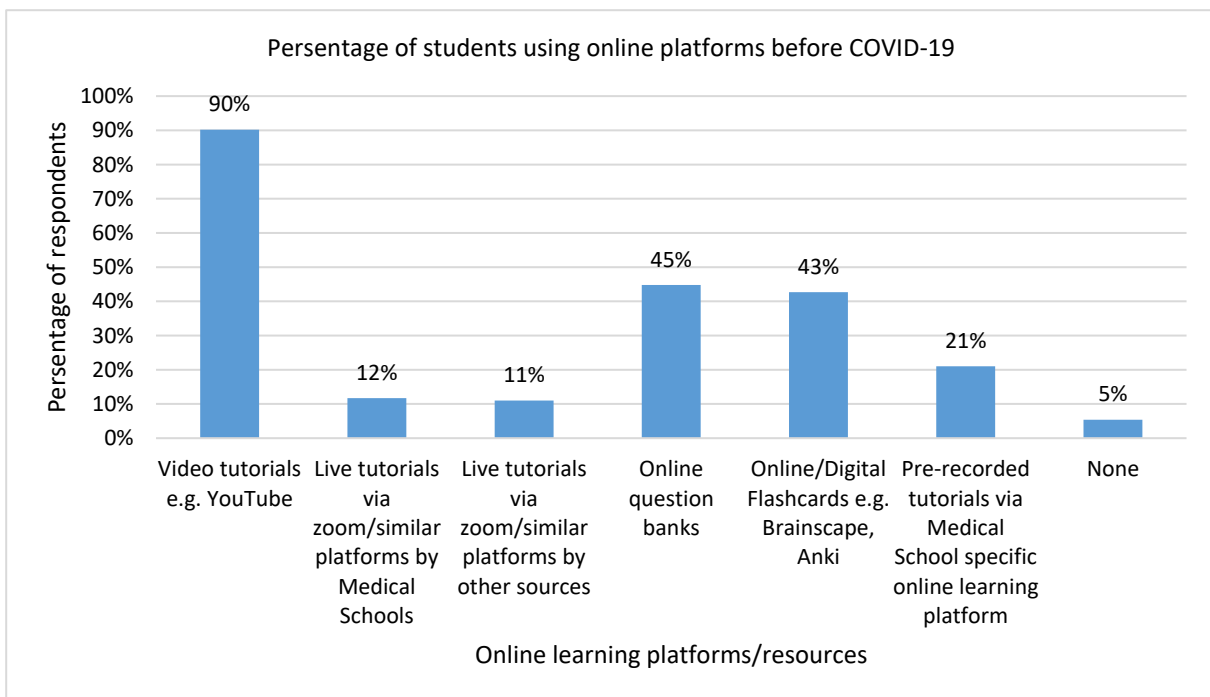


Figure 1.A: Preferred Online Learning Platforms Used by Students Before the COVID-19 Pandemic

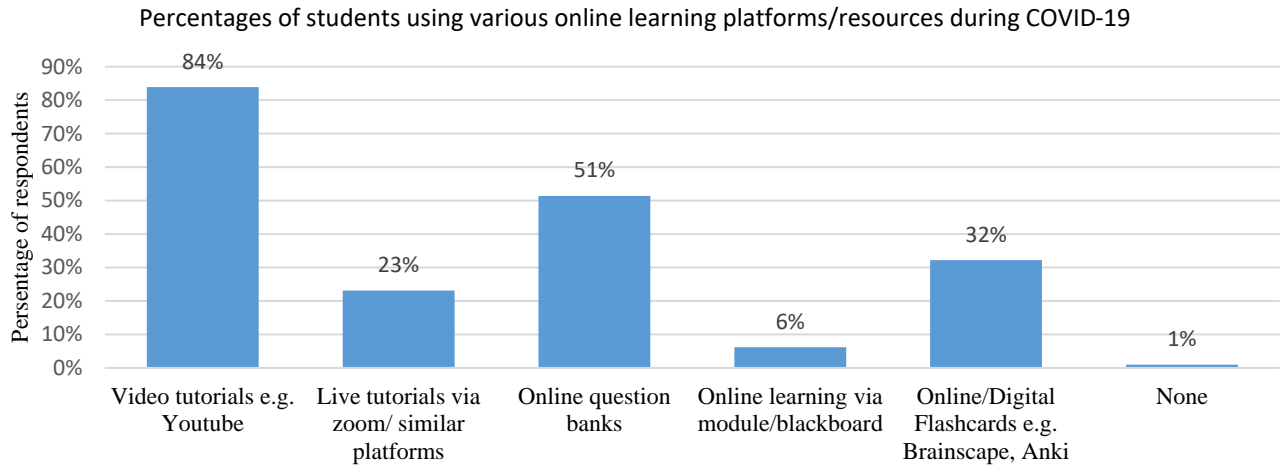


Figure 2.B: Preferred Online Learning Platforms Used by Students During the COVID-19 Pandemic

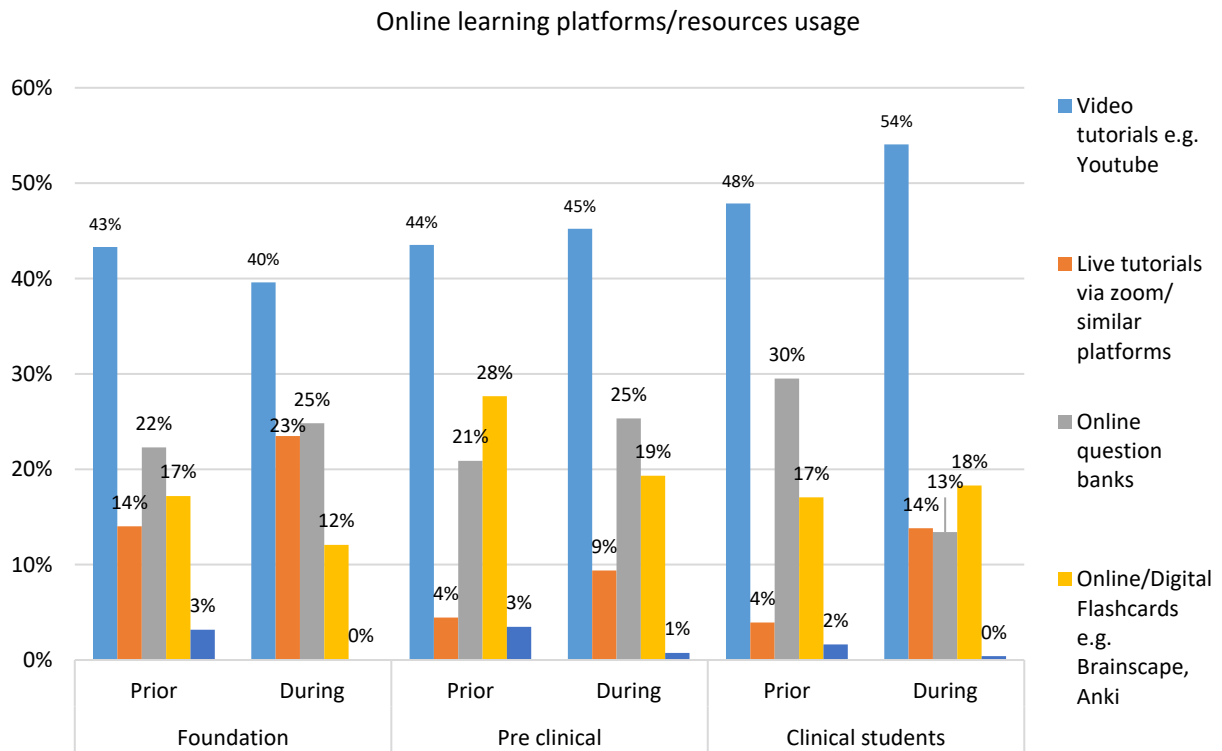


Figure 2.C: Comparison of Preferred Online Learning Platforms Used by Students Before and During the COVID-19 Pandemic

Medical school adaptations to COVID-19

In response to the pandemic, the medical school adopted an online learning system, by taking live tutorials via Zoom / MS Teams. Furthermore, students reported that they were introduced to new resources on existing learning platforms (33.6 %) and a new online learning platform with new resources (10.4%). Only a minority of the teaching was delivered via pre-recorded tutorials (4%).

The online learning provided by the medical school followed a pre-set curriculum for 87% (n = 451) of students, 1% (n = 5) of students received online learning based on student requests, and 12% (n = 61) received online learning using a combination of both.

Most students (51%) found that the online learning sessions lacked interaction. By contrast, 27% found online learning to be interactive because of the opportunities to interact via speech (49%), chat boxes (33%), and live quizzes (14%).

Students' perceptions of online learning

Students rated their experiences of online learning using a Likert scale, with 1 being strongly disagree and 5 being strongly agree (Table 1). Overall, students did not find online learning to be engaging or enjoyable, with limited opportunities to ask questions. In general, it's found that more students were neutral when asked whether online learning should be more interactive but did not find it as effective as face-to-face teaching.

Table 1: Student Ratings of Online Learning Experiences Using a Likert Scale

Statement	Mean	±SD
The teaching is often stimulating	2.35	1.24
I find it easy to engage in the lesson	2.42	1.44
I feel able to ask the questions I want	2.95	1.48
I enjoy the online teaching	2.37	1.55
I would like the online teaching to be more interactive	3.10	1.39
I feel that online teaching is as effective as face-face teaching	2.22	1.51
I prefer online teaching to face-face teaching	2.41	1.61
The teachers are well prepared for the teaching sessions	3.01	1.29
I feel I am being well prepared for my profession	2.40	1.38
My Internet connection can be problematic	2.35	1.38

Main advantages and disadvantages of online learning

Avoiding traffic was considered the main advantage of online learning (83.2%), which saved students' time. Furthermore, the results showed that online learning is more comfortable than face-to-face learning (62.2%), provides greater flexibility (47.6%), enables students to learn at their place and pace (40.5%), and cuts costs (27.6%), as shown in Figure 3. A.

On the other hand, students stated that the main barriers to effective online learning included internet connection problems (72.5%), family distractions (57.7%), anxiety (55.4%), timing of the tutorials (51.1%), and lack of space (36.6%), as shown in Figure 3. B.

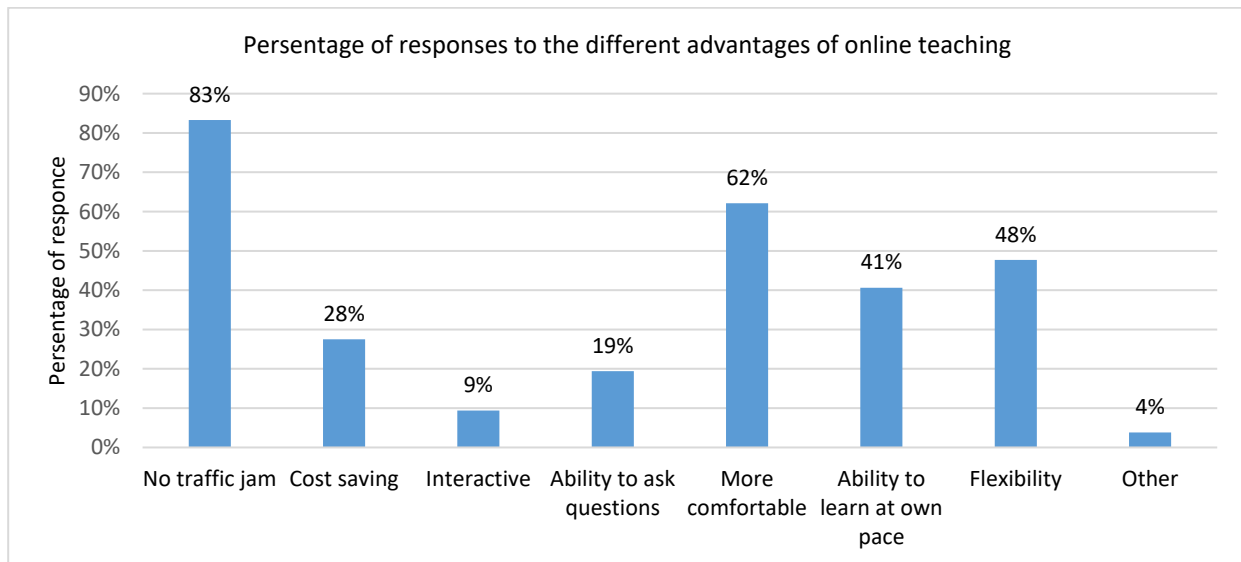


Figure 3.A: Perceived Advantages of Online Learning

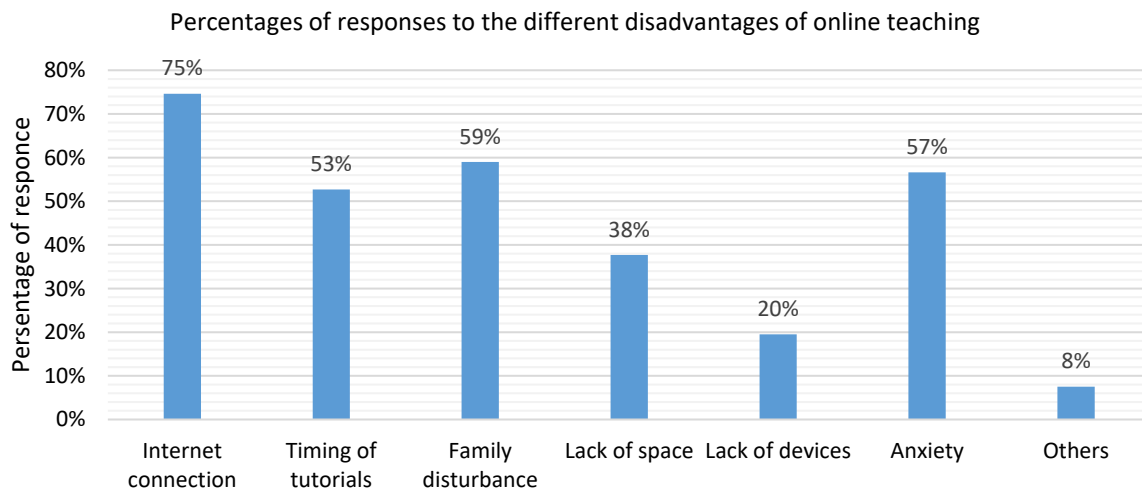


Figure 3.B: Perceived Barriers to Effective Online Learning

Role of online learning in clinical teaching

The results showed that online learning failed to replace the clinical education students received via direct patient contact, according to 66 % (n = 343) of students. Most medical students (68.8 %, n = 358) felt that they could not learn or acquire practical clinical skills through the provided online learning.

Likewise, sub-analysis showed that 49% (n = 255) of medical students believed that their exams and exam performance were affected by the COVID-19 pandemic. In total, 15% of written exams were postponed and 41.5% of practical exams were modified in some way, which caused students some anxiety.

Furthermore, a thematic analysis was conducted on open-ended questions that are offered at the end of the questionnaire. The results showed that 2.1% (n =11) reinforced the fact that online learning can be beneficial, especially for BPL sessions. While 8.8% (n =46) thought that online learning harmed their learning and failed to replace practical sessions and teaching new skills. Some students (1.7%, n = 9) thought it was boring, and 3.8% (n =20) said that lectures' hours were too long, whereas 1.9% of students (n = 10) mentioned that the timetable was condensed, or delivering a message to the medical faculty that mental health was being affected negatively.

Discussion:

According to WHO guidelines regarding social distancing and lockdown, given the health hazards associated with the SARS-CoV-2 virus, many medical schools had to resort to online learning as an alternative means of education [23].

Medical Students' Perceptions of Online Learning

The findings of this study reveal that most students thought that online learning had failed to take the place of clinical teaching. This was also evident in China, Pakistan, and Malaysia [1,8,13]. Sub-analysis in China showed that higher academic levels were associated with lower satisfaction with online education [35]. This association is expected, primarily because senior medical students spend most of their remaining academic years in hospitals learning and practising hands-on procedures; therefore, clinical placement is their primary learning method [29]. Many medical schools design their curricula such that the final years consolidate students' previously gained knowledge, put it into practice, enhance it with clinical judgement, and prepare them for their near-future professions [22,9,21]. As a result of the lockdown, there was a significant reduction in patient exposure and bedside teaching, which compromised the clinical and surgical skills of medical students [15]. In a study done in the UK, a lower score was given for being 'well prepared for my profession', compared to previous similar studies that were conducted before the pandemic [11,19].

Furthermore, a considerable number of students in our study perceived online learning to be a tedious experience, and they believed that it lacked interaction. This was also emphasised by a study conducted in India, where almost 66% of students believed that face-to-face interaction is necessary [16]. It is important to note that the face-to-face interaction component can be applied to both student-and-teacher and student-and-peer interactions; while the former can help teachers provide a suitable environment for students, as well as react immediately to any potential lack of understanding, the latter is equally as important because peer mentoring can also provide psychological support for students [16,37].

In this study, more than half of the KU medical students reported feeling anxious, even though they had not been formally or clinically diagnosed with any anxiety disorders. The survey's open comment section revealed that a sizable portion of students were suffering from mental health issues at the time of conducting the study. Given the significant circumstances the world was experiencing, it may be false to attribute the association between online learning and mental health problems. However, in Poland, causes of anxiety and stress, in the context of online learning, were mainly attributed to unreliable internet connections, especially when undertaking remote exams, which could be a potential cause of exam failure should the connection fail [24]. This could be explained by the fact that people, generally, suffered from mental illnesses, including depression, anxiety, and phobias, during and even before the pandemic [39]. During the pandemic, different aspects could have contributed to amplifying the effect of mental health issues, including isolation, fear of contracting a potentially fatal virus, and fear of losing loved ones. The pandemic emphasised the importance of students' mental health, highlighting possible stress and anxiety that could have gone unnoticed and were only elucidated after conducting this study. It is important to note that several universities in developing nations started including mindfulness and meditation as part of their curricula to reduce students' anxiety even before the pandemic, in addition to having a student support committee in each institution given that medical studies could put students under a considerable amount of stress [6]. However, KU still needs to address mental health issues openly with its students, diminishing the fear of stigma, regardless of the pandemic.

Advantages and Disadvantages of Online Learning in Medical Education

During the pandemic, universities in different parts of the world faced different challenges based on their local resources and expertise. KU had to overcome various challenges associated with Kuwait's economic and social norms throughout the process of the online transition.

Medical students at KU found that an unstable internet connection was the most significant disadvantage of online learning. The same issue was observed worldwide. When the pandemic first started in China, most Chinese students believed that a poor internet connection was a key disadvantage of the online education system [17]. By contrast, in a study in Egypt, less than half of students experienced internet connection problems [20], and only a quarter of students in the UK reported trouble with the internet [11]. In Iran and Pakistan, the lack of stable online access was a significant disadvantage [1,28,2]. Each nation's local infrastructure and resources played an essential role in the efficacy of online learning. It is worth considering that the potential internet overuse by students throughout the nation at the same time for scheduled sessions may have also affected the speed of the internet and its stability. Apart from internet reliability, no other technical issues were reported; in addition, no electricity cuts or power outages were reported in Kuwait. In addition, given that the number of international students at KU is almost negligible, the university did not have to deal with complex tutorial schedules for students across different time zones. The survey also revealed that a lack of devices was seldom an issue for students; however, some financially struggling students may have been disadvantaged.

Understandably, students not being in a classroom environment is associated with many potential distractions that can interfere with the quality of learning. One of the distinctive challenges that KU students faced was family distractions. More than half of the KU students agreed that family distractions were a major drawback of online learning, compared to only 25% of students in the UK [11]. In Kuwait, due to social customs and norms, it is not uncommon for university students to live with their parents, while living on campus is uncustomary [3]. A factor that may have played a role in this custom is the small geographical size of Kuwait as a country, which does not necessitate undergraduate students commuting to universities located in other cities. Other studies found that students who returned to their parents' homes during the pandemic had lower levels of satisfaction in general [26]. We find here that external distraction was an important disadvantage of online teaching, which may be avoided in some cultures while in others it may not be an obtainable option.

Regrettably, KU was underprepared for the rapid and significant teaching changes resulting from the lockdown. Thus, it was unfortunate that KU's prior experience utilising online platforms was deficient, especially with the added time pressure to deliver the remaining medical curricula promptly. Given the lack of prior use of online learning by KU, the materials and online courses developed by the medical school were constrained. As a result, students used YouTube as a resource four times more often than the tutorials provided by the university. The overwhelming quantity of resources KU students had access to, with the limited originality of university contents, has produced a plethora of choices, uncertainty, and discrepancies in standards, which by previous studies when a similar result was obtained it was attributed as a reflection of the university's failure to fulfil its duty to educate students [14,25]. Therefore, these restrictions associated with the pandemic have been lifted, and the university should start to establish a well-studied curriculum for its students to be efficiently utilised, using a hybrid method of teaching.

This study also revealed that more than three-quarters of respondents believed that the most significant benefit of online learning was the avoidance of traffic. This relates to the fact that personal transportation is the primary means of commuting in Kuwait, given the subpar public transportation and the scorching environment, which create traffic congestion, especially during rush hour. Students also preferred online learning because they felt more at ease, had more freedom, and could learn at their own pace, as affirmed in previous studies [20].

Students in this study were less satisfied with online learning than with the previous traditional classroom learning. They believed that online learning had failed to replace face-to-face teaching. Therefore, it is unwise and premature for medical schools to transition quickly to online learning. It is concerning that after the pandemic, many medical schools explicitly implemented online learning in their curricula. It seems that online learning is a double-edged sword that does not come without compromises; thus, well-structured medical curricula should be employed by universities to overcome any shortcomings. Face-to-face teaching in the medical field is irreplaceable, but the hybrid education system is favourable for better education.

Limitations and Future Work

This study is the first to study the impact of online learning in Kuwait during the COVID-19 pandemic. The responses were collected from a single medical school, which is the only medical school in Kuwait, with a representative sample of 520 medical students across three academic phases: pre-professional, pre-clinical, and clinical years. However, there were still some limitations. For example, 74.5% of this study's participants were female, making the sample a sub-ideal sample from which to conclude. Moreover, as the responses were collected during a lockdown, online learning was the primary and only source of education, which may have affected how students used it and reacted to it.

Additionally, this survey was carried out during a global pandemic, which may have clouded students' perceptions and responses due to uncertainty and anxiety. During the completion of this study and afterwards, all pandemic restrictions were lifted; therefore, many medical schools may have updated their online resources. Follow-up research should be conducted to get a deeper understanding of the value of online education platforms, utilizing the various functionalities of the online learning system.

Conclusion:

This study concluded that online education had a generally favourable effect in providing some of the medical syllabi, with the overall positive attitude among students suggesting it is a potentially valuable tool in delivering medical education given its feasibility, especially in emergencies. However, it failed to replace clinical teaching and practical teaching, which are the core of medical training. Therefore, when providing online education to medical students, it is vital to consider the different needs of different learning phases.

In non-urgent situations, online learning platforms could still be used to provide medical education even after the COVID-19 pandemic, especially when they are integrated with traditional in-person methods in a hybrid format. Nonetheless, online learning cannot replace clinical teaching and is particularly deficient in the teaching of new clinical skills.

Recommendations:

The following are recommendations to enhance and maximise the potential of online learning in medical education:

- Regular assessment and feedback are essential. Feedback from students and the faculty should be regularly taken by the medical school administration to address any gaps in the system. Therefore, awareness levels among tutors as well as the students should be improved, regarding the usefulness of online learning and online training in medical and professional education.
- Faculty training and support. A comprehensive training and establishing guidelines for the faculty members to effectively design and deliver their modules.
- Artificial intelligence-based clinical scenarios play an important role in teaching medical students a professional way of medical practice under different levels of circumstances. This kind of electronic program can be offered via online learning platforms. However, traditional learning and bedside teaching are irreplaceable and offer unique benefits that cannot be fully replicated virtually.

List of abbreviations:

- COVID-19 – coronavirus disease of 2019
- SARS-CoV-2 – severe acute respiratory syndrome coronavirus 2
- KU – Kuwait University
- WHO – World Health Organization

- E-learning – Electronic learning
- PBL – problem-based learning
- MS Teams- Microsoft Teams
- UK- United Kingdom

Declaration and Acknowledgement:

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Health Sciences Centre Ethical Committee at KU (reference number: VDR/EC/3730). The study was conducted by the principles and guidelines of the Declaration of Helsinki for medical research involving human subjects. Informed consent was obtained from all participants who agreed to participate in completing the questionnaire for this study.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests" in this section.

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