

## Sudden Transition of Pharmacy Education from Traditional to Distance Learning in the Era of COVID-19: Action Steps of a Leading Pharmacy School in Iraq

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### Abstract

Education around the world has been negatively affected by the new coronavirus disease (COVID-19) pandemic. Many institutions had to adopt distance learning in compliance with the enforced safety measures. Distance learning might work well for settings with stable internet connections, professional technical teams, and basic implementation of technology in education. In contrast, distance learning faces serious challenges in less fortunate settings with inferior infrastructure. This report aims to shed light on the immediate action steps taken at a leading pharmacy school in Iraq to accommodate for the enforced changes in pharmacy education. The University of Baghdad - College of Pharmacy went from less than minimal technology implementation to full distance learning in a remarkable time frame. Pharmacy students were able to finish academic year requirements and move on with the program. Final year students will graduate on time as competent pharmacists.

**Keywords:** E-learning, COVID-19, online education, pharmaceutical education,

**الانتقال المفاجئ للتعليم الصيدلي من التعليم التقليدي إلى التعلم عن بعد في عصر كوفيد-19 : خطوات العمل لكلية الصيدلة الرائدة في العراق**

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### الخلاصة

تأثر التعليم في جميع أنحاء العالم سلبيًا بجائحة فيروس كورونا المستجد (كوفيد-19) وكان على العديد من المؤسسات الانتقال إلى التعلم عن بعد وفقًا لتدابير السلامة المطبقة. يعمل التعلم عن بعد بشكل جيد في الأوساط التي تتوفر فيها خدمة إنترنت مستقرة وتمتلك خبرات تقنية محترفة ويتم فيها تطبيق أساسيات استخدام التكنولوجيا في التعليم. في المقابل يواجه التعلم عن بعد تحديات خطيرة في الأوساط ذات البنية التحتية المتدنية. يهدف هذا التقرير إلى تسليط الضوء على خطوات العمل الفوري التي تم اتخاذها في كلية الصيدلة الرائدة في العراق لاستيعاب التغييرات المفروضة في التعليم الصيدلاني بسبب جائحة كورونا. تحولت كلية الصيدلة في جامعة بغداد من أقل من الحد الأدنى من استخدام التكنولوجيا إلى التعلم الكامل عن بعد في إطار زمني قياسي تمكن معه طلاب الكلية من إنهاء متطلبات العام الدراسي والمضي قدمًا في البرنامج الأكاديمي وتمكن طلاب السنة النهائية من التخرج في الوقت المحدد كصيادلة مؤهلين لممارسة المهنة.

الكلمات المفتاحية : التعلم الإلكتروني، كوفيد-19، التعليم عبر الأنترنت، التعليم الصيدلاني، العراق.

### Pharmacy education in the College of Pharmacy

Educational institutions in Iraq are centrally controlled and licensed through the Ministry of Higher Education and Scientific Research (MOHESR) and the University of Baghdad College of Pharmacy (UOB

COPharm) is no exception. UOB COPharm offered a Bachelor degree in Pharmacy after the successful completion of a 5-year program and 172 units (215 credit hrs.). Each academic year is divided into two 15-week semesters. Each semester includes between 13 to 21 units/week (about 16 to 25 credit hrs./week).

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The University of Baghdad College of Pharmacy (UOB COPharm) established in 1936, it is the first pharmacy school in Iraq and the only one in the country till 1992. Additionally, it is the first school to offer graduate studies (higher diploma, MSc, and PhD) in pharmacy in Iraq. Nowadays, a large percent of faculty members teaching in the different pharmacy schools in Iraq are graduates of UOB COPharm at some point of their study program (BSc, MSc, and PhD). UOB COPharm had six divisions: Pharmaceutical Chemistry, Pharmacology and Toxicology, Pharmaceutics, Pharmacognosy, Clinical and laboratory Sciences, and Clinical Pharmacy. Currently, UOB COPharm has a total of 91 faculty members, 1,128 undergraduate students and 113 first year postgraduate students across the three postgraduate programs (High Diploma, MSc, PhD). Before COVID-19 pandemic, all pharmacy programs in Iraq including UOB COPharm were face-to-face in-class programs across all classes and does not include any on-line courses<sup>(1)</sup>.

#### **Technology implementation at UOB COPharm before COVID-19 era**

Information and communication technology (ICT) implementation in academia in Iraq is limited<sup>(2)</sup> and UOB COPharm was no exception. At administer level, the importance of ICT implementation and e-learning introduction was recognized. However, real life implementation was challenged by lack of infrastructure, a culture of technology rejection and common technology illiteracy among faculty and students<sup>(2,3)</sup>. As part of the University of Baghdad (UOB) administrative attempts at introducing e-learning culture and practice, Ibn Sina Unit for e-learning was established in each affiliated college in mid November 2018 to encourage e-learning, provide technological infrastructure and offer technical support. Additionally, UOB has an account through Google's G-suite for education and affiliated colleges and academic institutions were encouraged to implement various technologies in education. Ibn Sina Unit at UOB COPharm conducted a number of workshops to introduce and train faculty members on using Google classroom as an electronic course management (ECM) platform among other technical tools.

Despite these efforts, technologies like ECM, student response system, and even university email use were, in large, outcomes of sporadic personal efforts of technology-skilled instructors. Even though official university emails were made available to faculty since 2018, only 20 out of 91 total faculty members have activated their emails and were using them

before COVID-19 era. Official university emails were basically available for all students and faculty, however, students and faculty electronic communications were done mainly through social media platforms<sup>(1)</sup>. Additionally, ECM when implemented by the instructor, would be with students' personal emails even if the instructors were using his/her official university email.

Before the establishment of Ibn Sina Unit for e-learning, information technology services were administered through the "Information Technology Unit" formerly known as "Internet Unit". The IT Unit was providing basic support for faculty and students in accessing resources on the web and other basic services relevant to internet users. Currently, the IT Unit is still operating and providing the same services in addition to other technical services. The unit also provides required support for Ibn Sina Unit for e-learning.

#### **Education at UOB COPharm during COVID-19 period**

On March 17, 2020, the Iraqi government announced a week long total curfew<sup>(4)</sup>. Curfew was extended for four weeks in an attempt to control the escalating COVID-19 cases. As such, MOHESR announced moving all classes to virtual platforms to complete the academic year requirements with a modified academic calendar. Universities and colleges were given the authorities to choose the educational platform, organize class schedules, and take control on monitoring the educational process to ensure education integrity.

At UOB COPharm, distance learning was implemented using Google classrooms where the University of Baghdad had already registered for the G-suite for education. Virtual classrooms were created by the instructors, some with their university emails and others with their personal emails. Students had joined the class using class code that is initially conveyed to students through contacting class student representatives on their personal phone number. Some instructors continued using social media for communicating with their students in an attempt to include all the class in the virtual classrooms.

Initially students did not accept the idea of e-learning and there was a bulk withdrawal from virtual classrooms. Many reasons were behind this response. Mainly students were experiencing sudden transition to a new platform of education in an unprepared setting. The college administration and Ibn Sina Unit for e-learning took the lead on reassuring students and working with the faculty to

overcome the challenges experienced or anticipated by students in e-learning. This resulted in getting students back to the virtual classrooms to finish the first semester successfully.

While this was a good start to the transition to e-learning, it came with its fair share of problems. With user (student) accounts outside the university domain, it was challenging to reach out to all students and ensure equality in educational material distribution. Additionally, there were concerns about the privacy and integrity of the classrooms in terms of external users and assignments. The college students' perspectives on e-learning were recorded as part of a survey conducted by Ibn Sina Unit after the end of the first semester (April 2020). The survey was available to all undergraduate students across the five academic levels. The aim of the survey was to understand students' perception and needs to prepare for the second semester. Around 60% of all participating students agreed that e-learning was a good solution to avoid delaying their academic progress due to COVID-19 pandemic (Figure 1). In contrast, similar percent rejected the idea of continuing the use of e-learning as adjuvant to traditional learning after the pandemic ends (Figure 1). However, more than 60% of students agreed that e-learning would be "good" if they had a better internet service (Figure 1).

The first semester concluded mid-April and the second semester was to start on May 2<sup>nd</sup>. This two-week break was transformative thanks to the non-stopping efforts of the college administration and Ibn Sina Unit for e-learning.

#### **Action steps toward moving to full virtual education**

Main action steps in preparation for the second semester can be categorized into six domains: Establishing formal electronic communication system, virtual classes platforms organization, training and technical support to faculty and students, preparation for the final exams, supporting undergraduate students, and organizing class work for graduate students. Below is an elaboration on the work done in each domain.

#### **Establishing a formal electronic communication system within the college.**

This included:

1. Creating formal university student emails for all undergraduate students (1,128 students).
2. Activating formal university emails for all faculty.
3. Creating official emails for all (113 students) first-year graduate students in

preparation for coursework final exams for graduate students which was following a modified academic calendar.

While these actions might be routine work for other institutions with established ICTs implantation, it took tremendous efforts to reach out to distant students and help them activate their university emails virtually.

#### **Class schedules and virtual classes platforms organization.**

As mentioned earlier, the college of pharmacy has students in 5 levels, with 5-7 courses per semester in the undergraduate program. Some courses had practical (laboratory) sections and the fifth (final) level had clinical sessions in public hospitals and public clinical laboratories. The laboratory and clinical practice parts were the most challenging to account for without impacting the students /graduates' competences. The main action steps with regards to classes organization included:

1. Creating 56 virtual classrooms for all undergraduate students in the 5-year Bachelor of Pharmacy program. These classes were all with official emails for both instructors and students. Students were added to the classes to ensure all students are registered for required classes as opposed to leaving it to the students to register for their classes. This resulted in 100% student registration for electronic classes compared to varying percent in the first semester (Figure 2).
2. Class schedules included timetables for synchronous and asynchronous education. Content delivery methods for the second semester included video lecture, PowerPoint plus audio commentary, handouts in the format of PowerPoint slides or pdf files, and live sessions (Table 1). Unlike the first semester, no lecture was to be delivered as handouts only. All instructors were providing asynchronous lectures as video (or PowerPoint plus audio) and a typed handout in the format of pdf or PowerPoint slides. The live sessions included discussions with the instructors over Google Meet, Free Conference Call and Zoom.
3. For classes with lab (practical) sessions, instructors were advised to do video demonstration of experiments. Students were challenged with group and independent projects, assignments, and quizzes relevant to the experiment to ensure sound pharmacy education.
4. Some pharmacy practice labs typically included patient-pharmacist consultation simulations with the instructors. For such labs, students submitted video recordings

of patient-pharmacist consultation simulations done at home with household members. Instructors reviewed these videos and provided feedback.

5. Clinical practice was replaced by virtual case presentations. Cases were carefully selected to simulate previous years' clinical practice experience. Students were challenged with other cases, quizzes, and assignments to ensure best learning outcomes.
6. The college created a YouTube channel where instructors would upload video lectures to enable easier lecture streaming by students due to poor internet services in Iraq. The channel was organized by levels and instructors were trained for uploading lectures and importing links into the classrooms. The YouTube channel was an innovative action step in response to students' complains from the first semester about difficulties in streaming video lectures uploaded to google classrooms due to poor internet services.

#### ***Training and technical support to faculty and students.***

E-learning is a new experience for both faculty and students. MOHSEER did provide virtual workshops and online resources for faculty to consult. Similarly, the UOB conducted many virtual workshops on distance education for affiliated institutions and faculty mainly through the UOB Central Ibn Sina Unit for e-learning. However, both resources were open to faculty and instructors from different programs and not specifically tailored to pharmacy education. Additionally, virtual workshops were attended by a massive number of faculty eager to learn about e-learning. To improve the quality of training experience, the administration and Ibn Sina Unit for e-learning at UOB COPharm took the following action steps.

1. Organization and administration of many workshops to train instructors on lecture recording. Training covered different applications like PowerPoint, Flashback and other means of recording lectures.
2. Organization and administration of workshops to introduce and train faculty on using google classroom features, taking attendance, engaging students into class materials, creating and managing assignments and quizzes and other topics relevant to e-learning.
3. Preparation of educational and training materials for students on accessing their university account and related features using different electronic devices (smartphones, tablets, and computers).

These training materials were in response to reports from students on difficulties in moving between personal and university accounts.

4. Preparation of educational and training materials for students on using classroom features, submitting assignments, taking quizzes and other issues relevant to e-learning.
5. Instructors were advised on the possibility of using some classrooms in the college building for lecture video recording specially instructors who prefer using a white board during the lecture.
6. Instructors and students were highly encouraged to seek technical help and ask questions in regard to using ECM, creating exams, answering exams, using live sessions applications and other issues relevant to e-learning.

#### ***Preparation for the final exams to conclude the academic year.***

With the increased incidence of COVID-19 cases and to ensure safety of students and faculty, MOHESR determined that final exams for all affiliated academic institutions will be administered on-line. Exams were to be administered in a synchronous mode with specific timetables specified by the university/college. This was the first time in the history of pharmacy education in Iraq that students take online final exams. While MOHESR issued regulations to ensure exam integrity and fair chance of students to participate, reality is that poor internet and, interrupted electricity service in Iraq and unfamiliarity of students with online exams mandated immediate actions by UOB COPharm administration and Ibn Sina Unit for e-learning to prepare for the worst. Final exams were run and administered by the undergraduate exam committee and supported by Ibn Sina Unit. Main final exam preparations included:

1. Creating classes dedicated to administering mock exams. Mock exam classrooms intended to familiarize students with the exam process and types of expected questions. Additionally, repeated mock exams helped reveal and resolve technical issues expected during real exams. Three mock exams were administered for each level with varying students' participation (Figure 3A).
2. The exam was administered in 2-3 parts rather than one full part during the allocated time period. This was to avoid internet instability problems. To elaborate, students might lose internet connection during the exam. Having the exam divided into more than one part ensures students

- submission of at least partial work rather than losing the whole exam. Additionally, in case of accidental reset of exam forms by the students before submission, the student will have to repeat that part only as opposed to reentering answers for the whole exam which would be time consuming and stressful for the student.
- An emergency phone number was allocated for students to call if they experienced internet problems and lost all sorts of electronic communications with the Exam committee during the exam. Several students used that phone number and a member from the exam committee or Ibn Sina Unit for e-learning was immediately available to work with them.
  - Commencing virtual graduation project defense for final (fifth) year students. Final year students have to submit independent graduation projects. Students had already finished the practical part of the project before campus closure. Instructors followed up with their students to finish project writing. A total of 181 students defended their graduation projects using synchronous video conference applications including Google Meet, Zoom, and Free Conference Call.

***Supporting students and faculty through the new learning experience and stress associated with COVID-19 pandemic.***

Changes to educational programs usually starts with pilot trials and gradually introduced. Following COVID-19 pandemic, students, and faculty, were switched suddenly to virtual mode which caused stress and uncertainty for students. Many students were questioning their capabilities and the system adequacy for e-learning. Additionally, the ongoing COVID-19 pandemic was another source of stress for students since some students were infected or had lost family member(s) due to COVID-19. To ease out these unprecedented times for students in the UOB COPharm program, college administration, Ibn Sina Unit for e-learning and all faculty had to be involved.

- A separate classroom was created for each level in the undergraduate program to provide technical support and enable smooth communication between college administration and students. These classes were intended to be a hub for students to convey their concerns and problems directly to the dean office, the vice dean office for student affairs, and the Ibn Sina Unit for e-learning.
- Many instructors continued communicating with students on social

media applications to reassure students and relieve social isolation.

- Students reporting positive COVID-19 themselves or their immediate family were constantly approached by instructors for reassurance.
- As the sudden transition to distance education impacted faculty as well as students, a class dedicated to delivering technical support to faculty was created. Additionally, faculty from the college were part of a free group chat application where they can informally exchange concerns, experience, and challenges during the new e-learning experience.

***Organizing class work for graduate students.***

UOB COPharm caters the largest graduate pharmacy program in the country. It offers graduate studies in the six main disciplines of the college. The graduate program includes two course-work semesters for all first-year graduate students. After passing the first year of coursework, graduate students conduct research depending on the specific program (6 months for higher diploma students, one research year for MSc students and two research years for PhD students) and discipline they joined.

There were a total of 113 graduate students in the first year across the three graduate levels in UOB COPharm for the academic year 2019-2020. The second semester for the graduate program started February 16, 2020. The first four weeks were in the traditional face-to-face delivery. After March 17, all classes were moved to online delivery. Main action steps taken for the graduate program were similar to those taken for the undergraduate program:

- Virtual classrooms were created by the instructors and students joined with their personal emails.
- A variety of content delivery methods were employed including synchronous and asynchronous education. Live sessions were conducted using Google meet, Free Conference Call or Zoom (Table 1).
- For final exams, official university emails were created for graduate students to ensure exam integrity. As stated earlier, three mock exams were conducted prior to final exams (Figure 3B). Exams were run by the graduate program exam committee and supported by Ibn Sina Unit.
- Some graduate students had their thesis/dissertation defense scheduled between mid-March and mid-April where curfew was enforced. For those students, virtual thesis/dissertation defense were

held successfully as scheduled using Goggle meet.

**Outcomes of the unprecedented movement**

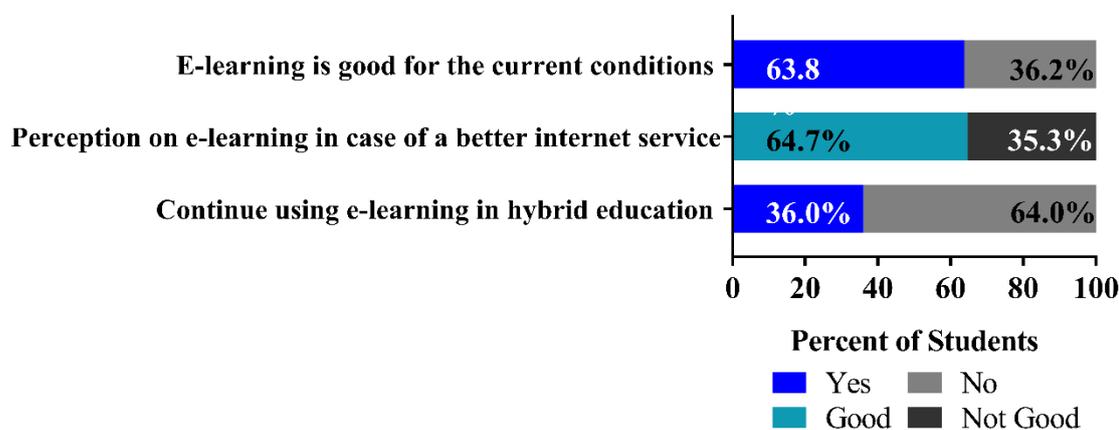
The experience of sudden transition from an all face-to-face program to an all online program can be viewed as a “full-size” pilot study where college administration, ALL faculty, and ALL students were exposed to pros and cons of applied ICTs and e-learning. Faculty had to rethink their delivery methods for many courses, especially practical sections. They also had to rethink assessments and evaluations to harmonize the non-proctored e-learning students. A range of delivery methods were used including mainly video lectures, slides plus audio commentary, handouts, external readings, and live session (Table 1). In

contrast to the first semester where some students left the virtual classrooms demonstrating their rejection for e-learning, no such case was recorded in the second semester. Students enrollment in the virtual classrooms remained at 100% throughout the second semester where students had sensed the real willingness of all faculty and college administration to help them pass these challenging times.

All the hard work and dedication of the college administration, Ibn Sina Unit for e-learning, and all the faculty at the UOB COPharm paid off at the end of the semester. For final exams, there was close to 100% participation of students in both the graduate and undergraduate levels (Figure 3A & B).

**Table 1. Lecture format used in the graduate and undergraduate programs.**

Lecture Format	Undergraduate Program		Graduate Program (2 <sup>nd</sup> semester)		
	First semester	Second semester	PhD	MSc	H Diploma
Live session	0	370	120	39	181
Video	92	542	63	35	96
PowerPoint + audio	122	359	82	64	141
PowerPoint	76	358	110	40	131
PDF	85	508	63	48	135



**Figure 1. Students' perception about e-learning experience after the first semester and before starting the second semester.**

Total number of students responding to the voluntary survey was 445 distributed across the five undergraduate levels of the program. The full questions wording on the survey was: E-learning is good for the current pandemic status = Do you think e-learning is good replacement for traditional learning in the current conditions

(YES/NO), E-learning with better internet service = What do you think about e-learning if the internet service was better? (Good/ Not Good); Continue using e-learning in hybrid education = Do you like to continue using e-learning as adjuvant to traditional face-to-face education after the pandemic ends? (YES/NO).

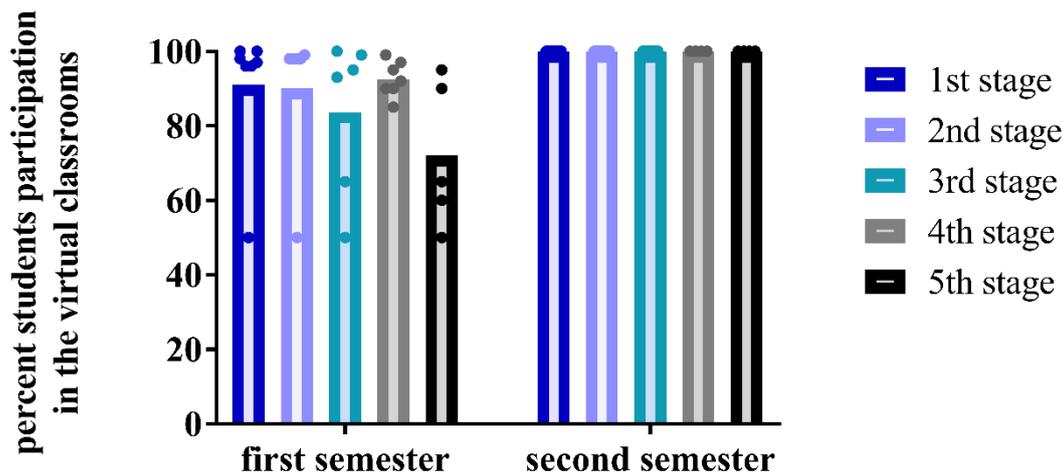


Figure 2. Students participation in virtual classrooms by grade.

First virtual semester: mid-March to mid-April; second semester: May to August 2020. In the first semester, it was left to the students to join the virtual class while in the second semester

students were registered in google classrooms by Ibn Sina Unit for e-learning using official students' university accounts. Each data point represents a single class (subject).

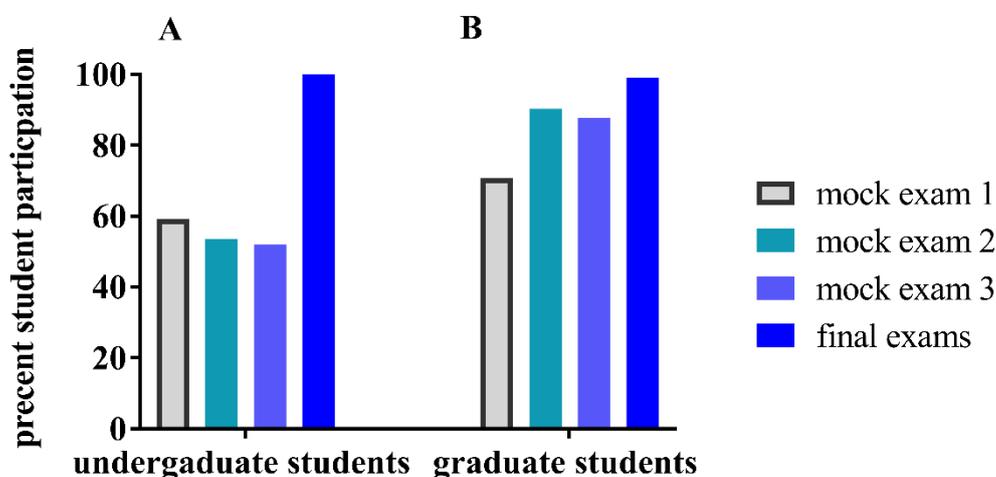


Figure 3. Percent student participation in mock and final exams.

Three mock exams were organized for each of the 5 levels in the undergraduate program (A) and the 3 graduate programs (High Diploma, Master, PhD), (B). Mock exams were delivered

in a separate virtual classroom for each level. Final exams were delivered in a separate virtual classroom for each subject in each level for the undergraduate and graduate programs.

### Future directions

The university of Baghdad - College of Pharmacy is one of the lead pharmacy schools in Iraq. It was and continues to be the pioneer in proposing new strategies for further pharmacy education in the country. The college administration is attentive to the need of implementing different ICTs into education to ensure graduates competences.

While it was stressful and challenging to go from an all face-to-face program to all online program over couple weeks, this experience undeniably has positive future outlooks. The actions steps taken over the period from March through August represent the pillars for ICT introduction to the UOB COPharm community including faculty, current and prospective students. For example, creating and activating all faculty and student university emails established professional electronic communications.

The forced use of ECM exposed faculty and students to new organized platform for class materials that is accessible anywhere and anytime. Additionally, students enjoyed the luxury of turning in their assignments and classwork while being miles away from campus and this is expected to help in future implantation of ECM. It is now in the plan of many faculty members to continue using this technology in case of resuming traditional face-to-face classes. This comes in accordance with the University of Baghdad and the affiliated College of Pharmacy strategic plan to increase the implementation of ICTs into education.

The implementation of online courses as a permanent component of the UOB COPharm curriculum might not be feasible in the near future due to many regulatory and administrative considerations outside the scope of this report. However, it is still feasible to incorporate hybrid modules into existing courses. For example, flipped classroom methods can be applied where the didactic part of the course can be delivered as online video lectures. The in-class time would be then used for active learning and student engagement in group discussions.

The next academic year (2020-2021, planned to start in December in the modified academic calendar) will mostly include sizable distance learning component in observance of COVID-19 pandemic. UOB COPharm administration and faculty have come across a long distance in optimizing pharmacy education for online delivery. The work is still ongoing to prepare for the next academic year. Lessons learned from the 2019-2020 academic year will shape a better experience for faculty and students in the upcoming semester.

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