Swift Preparation for Online Teaching During the Pandemic: Experience Sharing from Healthcare Teaching in Hong Kong

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Abstract Online education has been developing for many years now across the world, but is not without its challenges. Organizational, personal and attitudinal factors may deter some staff from making the transition to online teaching. When we consider healthcare education, the barriers to the adoption of online methods are specifically related to the nature of the curricula involved. Hands-on practical skills training is one essential component in healthcare education that is not easily addressed by simply going online.

With the impact of the pandemic, teaching staff of our affiliated healthcare programmes at the Hong Kong Polytechnic University faced huge difficulties in redesigning their content for practical teaching in an online mode. Some of them adopted synchronous practical demonstrations, interspersed with discussion activities, while others used various teaching pedagogies to support active learning online. All of our staff aimed to strengthen the foundation of the students' knowledge while supporting them to keep practising their hands-on skills so that they would be able to master practical tasks when face-to-face teaching resumed.

Such a sudden and swift change from face-to-face teaching to an online delivery mode had a great impact on both teaching staff and students, forcing them to step out of their comfort zone to adopt new online learning methods. The change also challenged instructors to explore other teaching approaches and introduce tools specifically for online teaching and learning, adopting the Technology Pedagogical Content Knowledge (TPCK) framework (Mishra & Koehler, 2006) P, Koehler MJ, Teach Coll Rec 108(6):1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x, 2006).

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This chapter offers the opportunity to pause and reflect on the continuous professional learning and development (CPLD) challenges that our healthcare educators faced and how these challenges were addressed, drawing on the lessons learned from the COVID-19 context to support future planning of CPLD provision for our staff.

1 Introduction

Coronavirus 2019 (COVID-19) has imposed a huge impact on the socio-economic, medical and educational aspects of society globally. The prolonged effects of the pandemic created the largest economic slump ever since World War II (Novy & Jury, 2021). In addition to the unavoidable and huge medical expenses that have been incurred, negative consequences have been reported to both physical and mental health like peri-traumatic distresses, too (Asaoka et al., 2020). Higher education is a complex system involving a series of essential components including people, place, physical technology, social technology, personality, wishes and ideas. All of these components have been impacted by COVID-19 (Blankenberger & Williams, 2020).

In Hong Kong, the incidence rate increased dramatically from late January 2020 onwards. With the unknown transmission media, severity of the condition and heavy burden on medical management, all face-to-face (F2F) teaching activities were suspended territory-wide immediately. Under the unknown situation of COVID-19 development, the Hong Kong Polytechnic University swiftly took the decision to adopt online teaching, preferably in a synchronous mode, to replace all F2F teaching activities and provide continual support to students' learning – in this way keeping students actively engaged and motivated in teaching activities. Given the limited preparation time, all teaching staff faced immense pressure in preparing teaching content, adapting to the swift change, and most importantly, they had to overcome all barriers to online education in a short period of time.

Despite the fact that online education has been promoted worldwide for many years now, there are still personal, attitudinal and organizational barriers that deter its implementation within a higher education setting (Panda & Mishra, 2007). Barriers do not just apply to teaching staff, but also to students too. Commonly reported barriers include the limited availability and quality of resources to manage; the need to develop and implement newly developed teaching tools; departmental culture; insufficient time; poor infrastructure such as instructional design skills; lack of technical support; concerns about the loss of ownership of teaching materials; concerns that students may not react or engage well; anxiety about the workload of teaching staff; negative attitudes or reluctance to 'change'; poor motivation and a mismatch in expectations between students and teaching staff; poor communications between teaching staff and students; and the suitability of the discipline to suit online delivery methods (Buchanan et al., 2013; Keengwe et al, 2009; O'Doherty

et al., 2018; Panda & Mishra, 2007; Regmi & Jones, 2020; Sinacori, 2020; Walker et al., 2018). As discussed, the nature of the discipline and associated curricula in healthcare education also hinder its adaptation to online teaching and learning methods. One major barrier is the non-replaceable hands-on-practical skills training. Thus, taking these factors into consideration is necessary when planning online healthcare education.

In this chapter, we share the swift changes that our institution adopted when switching to an online mode of teaching in healthcare education and the challenges that we faced during the implementation phase. Then, we outline how teachers and students responded to the changes to teaching and learning online and the timetabling planning for resuming small-group F2F practical class teaching when the pandemic impact gradually subsided. Most importantly, we share our lessons learned from this experience for planning future continuing professional learning and development for teaching faculty when delivering online education.

2 Preparation and Ongoing Support for the Swift Change of Online Teaching

The key to a successful transition to online teaching relates to how we overcome barriers at personal, attitudinal and organizational levels (Panda & Mishra, 2007; Sinacori, 2020). With the sudden deterioration of health conditions under the pandemic situation, our university decided to move all teaching delivery into an online mode and immediately established basic standards for online teaching. We offered a series of training workshops on instructional designs, e-assessment and invigilation and provided appropriate software to support teaching staff to cope with the urgent transition. Despite having organizational support in place, teaching staff expressed huge anxiety regarding their ability to prepare and adapt to such a sudden change from F2F to online delivery – one month before the start of the new term.

Online education does not simply involve the change of delivery mode from F2F to online delivery methods but involves the thoughtful planning and integration of technological knowledge, pedagogical knowledge and content knowledge, as described in the TPCK model (Mishra & Koehler, 2006). In healthcare programmes, a majority of the core professional subjects require hands-on practical skills training with real-time feedback. Thus, during the planning process to support the teaching of our staff, we aimed not only to address the swift transition to online delivery but also facilitated their professional development in pedagogical design and class planning – taking into consideration the personal and attitudinal factors and the TPCK model, whilst targeting the same intended learning outcomes, minimizing the hindrance to students' learning and their study progression during this abrupt transition.

To better understand the readiness of our teaching staff to deliver online teaching in synchronous and/or asynchronous modes, a needs assessment survey was conducted within our department. A response rate of 83.3% (n = 45) was obtained.

About half (51.1%) of the respondents reported that they were ready to provide synchronous online teaching for lectures/tutorial classes, while the remainder reported that they felt more comfortable using asynchronous pre-recorded lectures. In line with previously reported key barriers to online education (Bolliger & Wasilik, 2009; Panda & Mishra, 2007), our teaching staff commented that their concerns were around a perceived lack of technology skills, unfamiliarity with the required hardware and software that they would be using, resources and unstable Internet networks. Hence, we then swiftly provided technical support as well as offering training sessions on instructional design as part of our professional development provision to address the challenges that they faced, as well as their personal and attitudinal needs during this preparatory phase (i.e. one month prior to the semester commencement). Throughout the semester, we applied the concepts of adult learning methods (Trivett et al., 2009) such as experiential learning, coaching and just-in-time training to accelerate their professional development to support this rapid transition to online teaching.

Regarding technical support, as some teaching staff used a shared office, the department freed up individual rooms so that they could be booked for online teaching. We set up workstations with onsite/offsite technical support to assist with online teaching delivery. In terms of staff development for online teaching, we organized department-led online training seminars about technology enhancing learning tools, pedagogical and instructional designs, combined with staff consultation sessions as well as hybrid sessions of teaching demonstrations during the preparatory phase. Through these sessions, teaching staff who were unfamiliar with designing teaching pedagogies and/or options of available resources or online webpages for engaging students' learning were able to learn from their peers about how to restructure their class plans, while achieving the same intended learning outcomes of the subjects they were teaching, taking into consideration the TPCK framework (Mishra & Koehler, 2006). They were also asked to participate in real online synchronous classes run by the experienced staff to observe how the class was delivered and how students were kept engaged using the tools/webpages/software introduced in the training workshop through real 'hands-on' practice.

3 Challenges Faced by Teaching Staff During the Initial Implementation of Online Teaching

In the initial 2 weeks after the commencement of the online teaching semester, teaching staff in our department were invited to report back on the challenges and difficulties that they had faced during the implementation of the daily synchronous online teaching activities. They were given open-ended questions to reflect on their whole teaching process and were invited to share their views on a voluntary basis (Fig. 1). Through this facilitated self-reflection process, they fed back on the

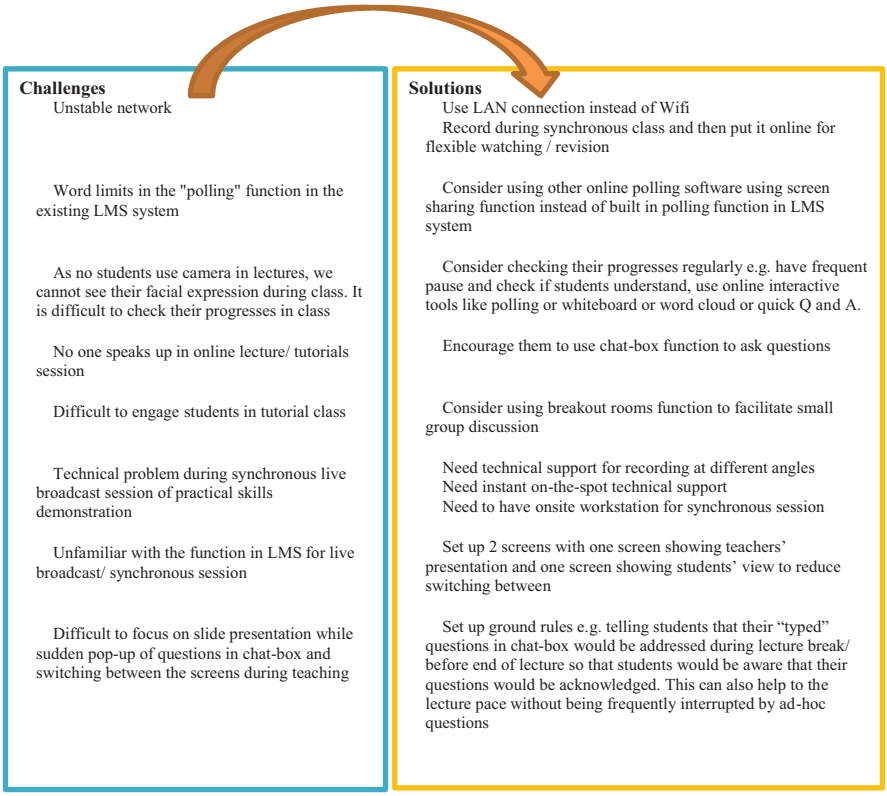

Fig. 1 Challenges and solutions raised in after class reflection by teaching staff. (Note: *LMS* = Learning Management System, *Q and A* = Question and Answer)

challenges faced during class planning and teaching delivery, the corresponding solutions used and tips for improvement. The key points obtained from the feedback were summarized and disseminated as part of an experience-sharing process (Baran & Correia, 2014) as an intensive professional development opportunity, which let inexperienced staff learn from peers – inviting them to consider adopting the suggestions or tips when restructuring their own classes.

Teaching staff commented on both the technical and non-technical aspects of online teaching. Before the pandemic, the majority of the lectures and all the tutorial and practical sessions were delivered in a F2F format. Similar to other UK universities (Walker et al., 2018), our institutional learning management system (LMS) was used by staff for content management, e-assignment submission, text matching (e.g. Turnitin) for similarity checking and the uploading of pre-recorded videos as reference materials. With the onset of the pandemic when the delivery format was swiftly changed from F2F to completely online delivery, most of the teaching staff found

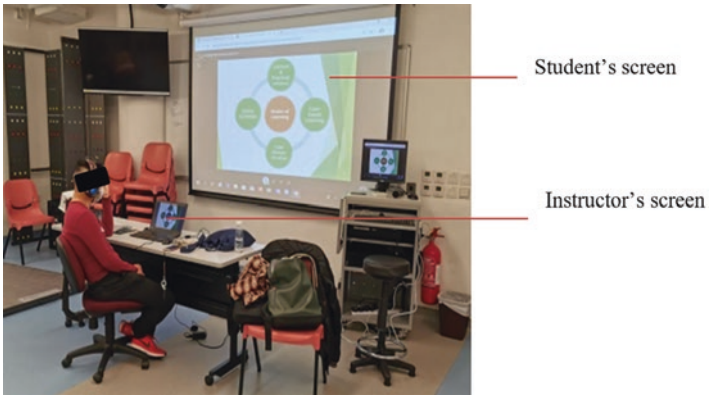

Fig. 2 Onsite equipment set-up (with technical support) for conducting online synchronous lecture/tutorial

themselves in an unfamiliar position in mastering the essential functions and plug-ins in the LMS, which supported their online synchronous teaching. For instance, they were unfamiliar with the use of Blackboard Collaborate Ultra for online synchronous lectures/tutorial classes; plug-in software or other tools such as Panopto; content package set-ups developed by other software; use of built-in functions; and other resources for interactive synchronous in-class activities. For non-technical aspects, some teaching staff commented that they felt more nervous during online teaching when compared to F2F teaching due to a lack of confidence over how to control teaching pace and the class plan. For instance, during F2F classes, teaching staff could see students' facial expressions which they could respond to by adjusting their teaching content and speaking speed, as well as by adding explanations to those abstract concepts. When converting the lectures to an online mode, teaching staff needed to restructure the class plan to make the lecture more interactive and engaging for the students. This further increased their workload substantially, especially for those who were unfamiliar with instructional design and technology.

Figure 2 shows the onsite workstation set-up for teaching staff to deliver online synchronous lectures and tutorial classes. With this set-up, they could see their own presentation screen and their students' viewing screen and could keep track of students' responses/typing in the chat-box. Not only were staff provided with onsite technical support (at the designated workstation) and offsite support (through instant communication using WhatsApp/phone and/or direct control at LMS), but they were also able to receive timely and on-the-spot technical support to ensure smooth and good quality online teaching, even if they were teaching online classes from their own offices or working from home. The departmental and university-led online training seminars for enhancing teaching pedagogies, online assessment and online proctored examinations were continuously delivered to meet the needs of frontline teaching staff throughout the semester.

3.1 Adaptive Changes for Online Teaching

Both synchronous and asynchronous modes of teaching have their pros and cons affecting teaching delivery and students' learning. As for healthcare education, communication skills are important. Encouraged by the peer support they received through experience-sharing sessions, the intensive training provided in the preparatory phase and attending the class delivered by experienced teaching staff who adopted the TPCK model in their own teaching, our staff became more willing and skilful in using synchronous communication tools to deliver lectures, tutorial sessions and practical sessions. This training and support enabled them to incorporate different pedagogies to keep students engaged through direct communication and interaction. The majority of the teaching staff adopted synchronous online lectures, tutorials/real-time practical demonstration, supplemented with asynchronous lectures and learning activities.

(a) Lectures – Synchronous and Asynchronous Mode

Synchronous online lectures were delivered 'live' at a scheduled time and involved interaction between teaching staff and students. In addition, these sessions allowed students to learn at a regular pace without lagging behind. Unlike F2F lectures where teaching staff can observe students' facial expression and responses immediately, it was not possible to see students' faces online or their responses at one time. Thus, when delivering online lectures to a large group of students, the teaching pedagogy was largely didactic. Lessons were delivered on an online synchronous platform that allowed teachers to share their lecture slides on-screen and deliver voice and video over the web. The content delivered was theoretical, and interaction was mostly one-way from teaching staff to students. With the intensive training sessions and peer-sharing sessions on the instructional designs and software demonstration, our teaching staff were provided with the ideas and skills to restructure their class plans. To keep students engaged, teaching staff used the different built-in functions (e.g. polling, MCQ quizzes, breakout rooms for small group in-class assignment and discussion) of the software that they were using (e.g. Blackboard Collaborate Ultra, Zoom, Microsoft Teams) and even incorporated other online interactive tools like Slido and Kahoot in order to encourage students' active online participation. Students' responses in these specifically designed activities provided an alternative way, other than direct F2F communication, of letting teaching staff monitor students' learning progress, allowing them to make appropriate instant adjustments to their teaching as required.

Asynchronous lectures, on the other hand, were based on the creation of pre-recorded video recordings of lectures – offering students the flexibility to learn at any time and anywhere without the need to attend timetabled sessions. A self-directed learning design approach is the key to helping students to keep up with their expected learning progress, enabling them to achieve the intended learning outcomes set at the subject level and even at the programme level. Students had to take several subjects at a time during the semester. Despite having greater control over their learning pace, with the overwhelming number of online activities set by

different subjects throughout the whole semester, they found it hard to adjust their learning pace to adapt to the swift change from the scheduled learning mode to the flexible learning mode. This was one reason why some students complained of having a heavy workload to manage at a time, due to challenges with their learning progress. Thus, achieving a balance between instructor-paced and self-paced learning is important. This could be illustrated by the phenomenon observed by the experience sharing of one subject team.

Originally, the subject team adopted a strict instructor-paced mode. The team set a weekly learning schedule for the students about which topic they were expected to learn and reminded students of the need to follow their study timetable to watch the pre-recorded video lecture – announcing that the online video would be removed after 1 week (Fig. 3) from the scheduled release date. From the figures below, it was observed that the majority of the students would watch the video on the day of the lecture (as scheduled in the subject timetable) and complete the learning tasks.

In the middle of the semester, students requested that the teaching team extend the video lecture broadcasting duration to allow flexible learning and to facilitate revision whenever it was needed. In response, the weekly release of new pre-recorded lectures based on the subject's teaching schedule was continued, but the video lectures were kept online without a limited viewing duration being imposed. As a result of this change, a substantial shift in video watching patterns was observed, with an unstructured and scattered study pattern emerging, extending over weeks and overlapping the study time of several lectures (Fig. 4); i.e. students were no longer able to follow the instructor-paced pre-set timetable to review the teaching content weekly.

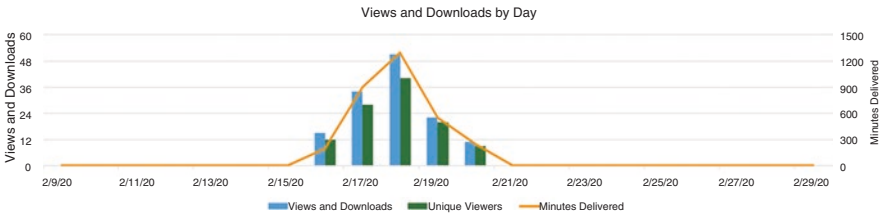

Fig. 3 Number of viewers (in bar chart) and duration of video watched (in orange line) of pre-recorded lectures with "fixed" broadcast period

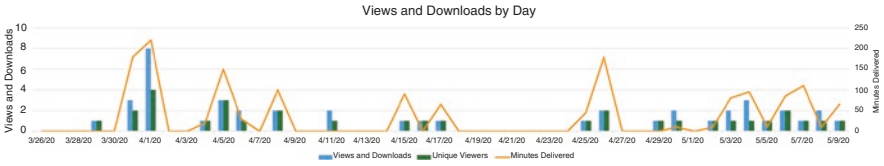

Fig. 4 Number of viewers (in bar chart) and duration of video watched (in orange line) of pre-recorded lectures without "fixed" broadcast period

These figures suggest that a self-paced learning design alone is not sufficient to ensure students' study progression. The combination of instructor-paced and a limited video 'broadcast period' did make a significant difference in influencing students' motivation to keep up a study schedule in their learning progress – assisting them to manage their study time effectively. Thus, balancing instructor-paced and self-paced learning activities is a crucial consideration in designing for the asynchronous mode of teaching and learning.

(b) Tutorials/Practical Classes

Synchronous tutorial classes used the same technologies as synchronous lectures, except that the focus was more on the active discussion of theoretical concepts, the application of theory into practice and the analysis and integration of practical skills used in clinical practice. With our annual intake of 150 students in our programme, these lessons were delivered to a much smaller group of around 25–30 students to ensure sufficient supervision and guidance could be given to facilitate students' learning. However, in order to have more in-depth and thorough discussions, students were further divided into sub-groups (in breakout room format). Students would then engage with each other within their corresponding small breakout groups, where they were able to communicate via video, audio or even web-based collaborative word-processing documents to discuss and exchange ideas. Before the end of class, the entire class would regroup and each sub-group would nominate one or two representatives to turn on their cameras and microphones to present their discussion findings using the sharing function in the LMS to facilitate their presentation (Fig. 5). Under COVID, the global prevalence of depression was substantially increased by 7 times, reaching a pooled prevalence of 25%

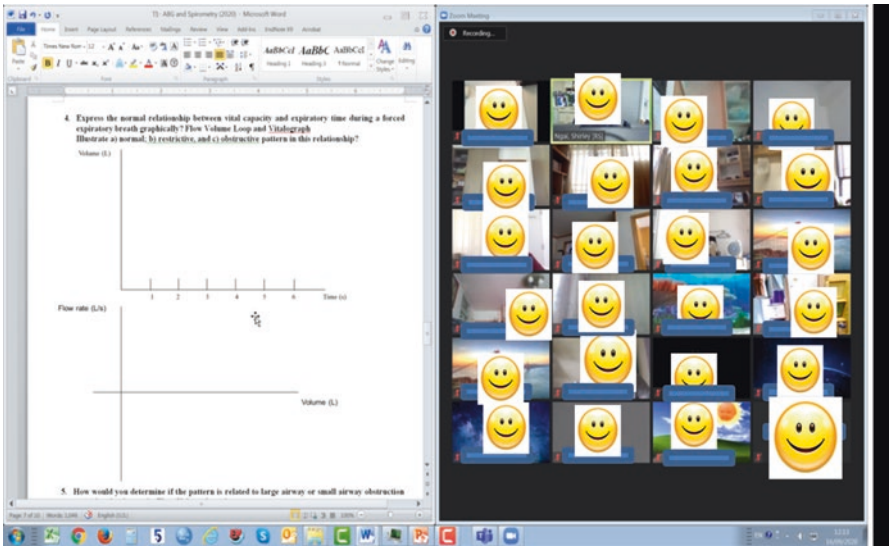

Fig. 5 Synchronous tutorial class – an example showing class assignment and discussion

(Bueno-Notivol et al., 2021). This was probably associated with the unpredictable nature of disease, loss of control and personal freedoms, social isolation and distancing. Through these collaborative activities, we aimed to keep students "communicated" and "connected" with each other to help them be "expressive," "supportive," "collaborative" and "engaged" within the online collaborative learning environment.

As we have previously discussed, hands-on practical skills teaching is essential in healthcare education. Thus, some teaching staff adopted synchronous, asynchronous or even a mixed mode of teaching pedagogies such as real-time practical demonstrations (Fig. 6a), or pre-recorded practical skills demonstrations (Fig. 6b), interspersed with discussion in tutorial classes to address this skills teaching. Other

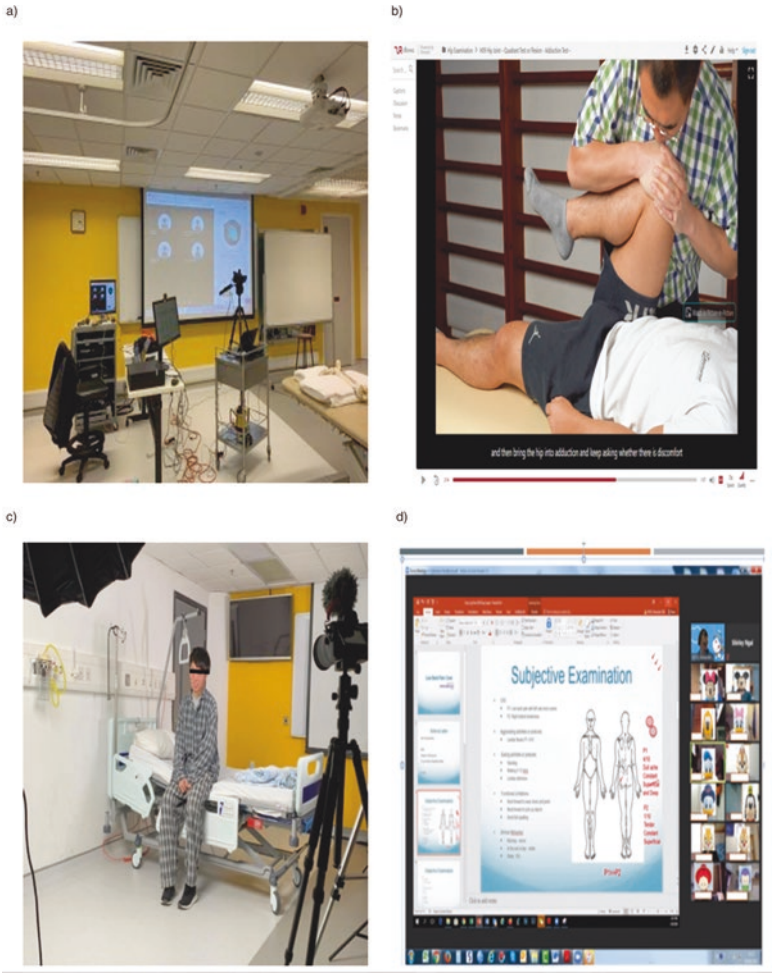

Fig. 6 Use of various teaching pedagogies in teaching: (**a**) interactive practical class set-up; (**b**) pre-recorded video of practical skills demonstration; (**c**) "simulated patients" recording; (**d**) interactive role play case discussion

staff made use of a range of teaching pedagogies, e.g. using "simulated" patient recordings for demonstrations (Fig. 6c), interactive role play for case discussion (Fig. 6d) and interactive case assignments to keep students engaged. For instance, some teaching staff asked students to submit video assignments to demonstrate their interview skills and communication with simulated clients and their instructions about exercise demonstration and prescription in video format to demonstrate their capability to achieve the pre-set subject intended learning outcomes. All staff aimed to build up and strengthen their students' foundational capabilities by keeping them practicing their hands-on skills – exercising clinical reasoning to prepare them as much as possible for the swift adoption of the practical skills once F2F teaching could be resumed.

The transition to online learning is not just about the teaching staff, it is also about how we prepare students to learn effectively online and keeping them engaged is crucial (Carter et al., 2020). Strategies include setting achievable learning goals and tasks so that students know what they are expected to learn. This involves designing for self-directed learning with appropriate guidance so that students are able to complete their tasks at a coordinated pace with a schedule and plan. This is important as it will prevent the course content from being squeezed and pushed back to the end of the semester, which can greatly impede individual learning. It's also important in keeping students engaged with the teaching and learning activities through regular communications, progress alerts and weekly reminders; being available and reachable are ways to keep communication and interaction open between teaching staff and students (Carter et al., 2020).

3.2 Interaction and Communication During Synchronous Online Teaching

There is usually a confluence of communication and interactions that occur during a traditional lesson that may be lost during online teaching. These forms of communication may range from the use of speech and hearing to vision, touch and utilization of space. Examples of this include the teacher walking around the classroom and using space to guide communication, or it can include students breaking out into smaller sub-groups and forming dynamic bubbles of communication in small sub-groups. Some forms of communication in traditional classrooms are listed in Table 1a.

The use of an online classroom may not deliver a comparable experience to that of a traditional classroom. For example, vision is maintained, but screen size in modern electronic devices, especially in smartphones, is far smaller than the size of the visual field that is available within the traditional classroom. This is further limited by the partitioning of the screen during an online class, often leaving a small frame for viewing the video feed of the teaching staff and students. This restricts students' ability to communicate using non-verbal cues such as body language. Despite the limitations, online classrooms open up opportunities for different channels of

Table 1 Differences in modes of interaction between teaching staff and students during traditional F2F lessons and online synchronous lesson – (a) face to face (F2F); (b) online

1a. Modes of interaction between teachers and students – traditional F2F classroom	1b. Modes of interaction between teachers and students – online synchronous lessons
Verbal speech	Video feed from camera
Body language	Audio feed from microphone
Projecting a computer screen and lecture slides onto screen	Text-based chat-box (with identity or anonymous)
Drawing on the whiteboard or blackboard	Web-based collaborative word processor
Display of anatomical models, posters and clinical equipment	"Raising your hand" button
Demonstration of exercise and use of equipment	Live MCQ Quiz
Use of touch to teach practical skills for patient management	Whiteboard drawing
Movement and use of space around the classroom	Lecture slides and screen sharing
	Video recording playback

communication. These include the use of chat boxes and virtual whiteboards during online synchronous teaching. Table 1b includes a list of ways in which interaction can be supported within an online classroom. The use of these tools is effective and should not be perceived to be inferior to methods of communication used in a traditional classroom. However, they are different, and this also requires adaptations to lessons and lesson preparation to ensure that they are used effectively.

Tutorials are supposed to be interactive and involve discussion with other students. In a traditional classroom, students can commonly initiate discussions and exchange messages and ideas with peers who are in their surrounding physical proximity. This process helps individuals through the education process and students naturally communicate matters in a group size that is conducive to such discussion. Unfortunately, in an online environment, students cannot easily talk to a select number of their peers because when they turn on their microphones, what they say is sent to the entire class. Even if they want to use a private chat function to talk to specific students (e.g. in Zoom), it is almost impossible unless the co-host role has been assigned to them. Furthermore, individuals often cannot easily find a partner to initiate such small group discussions because of the lack of spatial organization within an online classroom and are only able to do so when they have been assigned to a breakout group by teaching staff (in the capacity of host) to initiate small group teaching and learning activities. Finally, teaching staff get disproportionate attention, especially when the instructor is the only person with the camera and microphone turned on, and this facilitates students' passivity during online lessons. Suppliers of these online systems used to deliver tutorials should further investigate this limitation in their platforms and develop tools to overcome this problem. Meanwhile, this lack of infrastructure highlights the importance of artificially arranging subgroups and preparing them prior to the synchronous lesson. This can be organized either via allocation or student sign-up under a public class list and a communication channel arranged for students within these sub-groups. All of these steps should be taken into consideration when planning for online synchronous teaching.

3.3 Perspectives from Students

From the introduction of online teaching and learning delivery onwards, we regularly kept track of students' engagement and attendance in class and collected feedback on online learning from time to time to evaluate how well the department and teaching staff could support learning under the current physical and environmental constraints. In addition, we conducted an in-depth evaluation of viewing statistics and peak video duration to see if a particular part of the content drew more attention, which might indicate a need for further explanation. The attendance for lectures and tutorial classes ranged from 78.3% to 100% in the first few weeks. In the second week of the semester, our department conducted a survey focusing on our students' online learning experience, with 340 undergraduate students completing it. Also, 84.4% of the respondents had attended synchronous online learning sessions, and 79.4% of the students considered online teaching helpful to their learning and were satisfied with the technical support provided. Half of the respondents regarded their online learning experience as either good or excellent. The main concerns of the students were technical issues, such as poor network connections, delayed responses in synchronous online teaching and a preference for using specific online learning platforms or software, e.g. Zoom, to be more preferable than the others. When comparing the different modes of online learning, students preferred the use of asynchronous pre-recorded lectures so that they could watch the videos anytime and play and re-play the videos based on their learning pace. This certainly helped to facilitate their progress with revision.

When comparing the rated score for the subject content in the student feedback questionnaire (SFQ, using a 5-point Likert scale, with 1 indicating strongly disagree and 5 indicating strongly agree) for the last academic year (before COVID-19) and that for this academic year (swift change to online under COVID-19), the mean SFQ for subject content and quality decreased slightly, and this change was similar across the study year (Fig. 7). However, when rating their online experience in terms of support in the online environment, workload, interaction with staff and usefulness of online learning materials, the scores were not in line with the rating of subject quality (Fig. 8). When reviewing the details of individual subject-based delivery methods, the Year 2 practical-based subject adopted all content delivered in a synchronous mode with the addition of online discussion forums, while the other two subjects adopted a mixed mode of asynchronous and synchronous content delivery. Despite students rating the asynchronous mode as "preferable," the attendance rate of synchronous lectures and tutorial classes in all of our departmental offered subjects was consistently more than 75%, based throughout the semester by tracking the learning analytics in the LMS. When comparing the actual learning experiences and understanding of content, subjects with more synchronous and interactive components were rated as enhancing the students' learning experience because individuals could interact with teaching staff to clarify concepts.

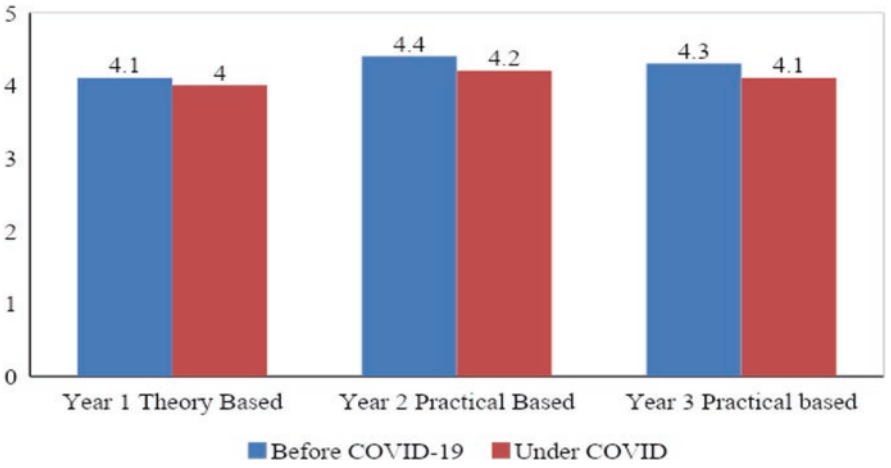

Fig. 7 Comparison of SFQ score of the SAME subject conducted before COVID (using traditional F2F method) and under COVID (with the swift change to online mode). One subject in each study year was chosen as shown as example

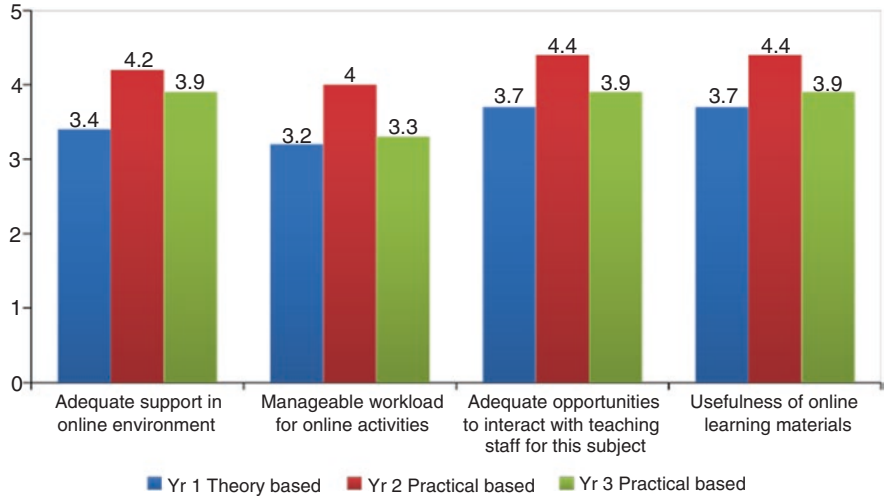

Fig. 8 Comparison of SFQ score about students' experience about online learning (under COVID)

3.4 Perspectives from Teaching Staff About Their Learning Journey

By the end of the semester, teaching staff were interviewed and invited to reflect on the difficulties that they had faced, the pedagogies that they had adopted and how they had restructured their course content. The common comments included

difficulty in mastering the computer skills and technology-based interactive tools within a short period of time, preparing quality practical skills demonstrations and/or teaching videos, exploring available online resources and catering for students' diversities in learning. Despite the challenges that they had faced, staff reported that they strived to adapt to the online teaching mode in the best way possible.

For computer and technology-related activities, the time required to master the required level of skills varied between staff, and this became evident when reviewing the booking schedule of workstations and the need to have onsite technical support during online teaching activities. The frequency of bookings and requests appeared to be associated with age categories. The majority of our teaching staff fell into the categories of Baby Boomers and Generation X, while some were in the category of early years of Generation Y (Jiri, 2016). The differences in technology development and advancement milestones as well as the levels of technology mastery across generations (Luc et al., 2021) may partly explain the phenomenon that we observed. When discussing the efforts required to prepare digital or technology-based tools to support or supplement online teaching, teaching staff commented that the nature of subject content, resources availability and teamwork were the key determining factors. For instance, functional anatomy is one core fundamental subject in our programme with both theory and practical components. During F2F practical sessions, the team used to adopt different practical tools such as real human bones, plastinated specimens, plastic models to enhance long-term memory and better understanding of the human body in 3-dimensions (3Ds). With the suspension of F2F classes, the team had to explore other virtual anatomy software or videos to support students' learning. However, it was difficult for the students to perceive and visualize the spatial orientation and neurovascular relationship. Extra effort was needed to present and explain the teaching materials without observing or palpating the body structures and organs in cadaveric prosection or F2F interactions with teaching staff and peers. The team members took the initiative to explore available resources and drive the substantial change in teaching pedagogy to supplement their online teaching provision, whilst keeping the subjects' intended learning outcomes unchanged.

Being part of the Generation Z community, students share similarities in learning preferences and tend to be more sophisticated in their use of technology (Luc et al., 2021; Mosca et al., 2019). They are more familiar with digital communication and are expected to have instant and on-the-spot responses (Venter, 2017), in contrast to traditional F2F communication, which emphasizes the importance of verbal and non-verbal cues. This also explained why students preferred using the chat box function in the LMS to type questions during online lectures/tutorials or even use the collaborative whiteboard to type and discuss ideas during small group peer discussions in online tutorials, rather than switching on the microphone for direct verbal communication. During the pandemic, teaching staff, regardless of the generation diversity, were forced to adapt to and cater for students' learning styles and preferences within a short period of time. It was the "needs" and "determination" to change that made teaching staff, regardless of their prior experience and attitude

towards online education, able to step out of their comfort zone to learn, apply, adjust and modify, driving them on to leap forward to follow the technology-driven trend. This was evidenced by the increased percentage of subject-based online activities recorded in the LMS as reported at the departmental level by the university's education development centre.

3.5 Reflections on the Timetabling Planning for Resuming Small Group F2F Practical Teaching

Face-to-face classes featuring hands-on skills taught in-person are considered to be an indispensable part of the healthcare curriculum. Thus, when the pandemic gradually settled, we urgently needed to restructure the timetable to offer an intensive F2F block-teaching so that students could catch up with the progression pattern of their corresponding study year and minimize the impact of study delay. Catering for social distancing measures, infection control and the teaching staff–student ratio under the constrained space were all key concerns during the timetable planning. The whole process required the engagement of programme management, teaching staff and students.

In usual class schedules, students attended 2 h class per subject and swapped to other subjects for the entire day (i.e. attended 2 h class per subject for four subjects a day being taught by four different teaching staff in four different classrooms in one day). Under the pandemic, we adopted the "one classroom one group one day" principle for timetabling. In brief, each group of students would stay in one classroom for all teaching-related activities of the same subject to minimize the staff-to-student and student-to-student contact. If another group were to use the room, they would not be scheduled until the next day. After thorough daily cleansing, the surfaces that had been potentially contaminated by one group would rest overnight for over 12 h before being used again, giving viruses an opportunity to naturally perish, especially given the half-life on most surfaces is a few hours.

In view of the increased student preparedness after online teaching and considering the uncertainty of campus opening duration because of an endemically circulating virus, the total contact hours for F2F teaching were substantially reduced and concentrated over a short duration of time, which made the "one classroom one group one day" principle for timetabling implementable for students across different study years.

During F2F practical classes, the content was adapted to focus on essential hands-on practical skills with prior learning through the aforementioned adapted teaching pedagogies. The similarities in overall subject assessment results between the same study year under the pandemic (i.e. academic year of 2019/20 semester 2) and the previous year (i.e. academic year of 2018/19 semester 2) may suggest that the use of online education could free up the class time for essential F2F practical skills teaching or even more complicated integrated hands-on case practice using

the flipped classroom approach. The swift change due to the pandemic has forced all educators in different sectors to move out of their comfort zone and rapidly transform to technology-based education within a short period of time. With its smooth implementation, the currently adopted teaching pedagogies and the newly designed "timetabling" principle, perhaps, could be continued under the COVID-19 associated "new normal" lifestyle.

4 Future Directions for Preparing Teaching Staff to Implement Online Education

The sudden and swift change of teaching mode has had a great impact on both teaching staff and students, forcing all of us to step out of our comfort zones to make the transition from traditional F2F to online teaching. It also provides an opportunity to explore the potential of other teaching pedagogies to supplement online teaching delivery.

We have learned that preparing students on how to learn efficiently and effectively through online education and keeping them engaged are crucial responsibilities (Carter et al., 2020). Strategies include setting achievable learning goals and tasks so that students know what they are expected to learn; self-directed learning with guidance so that students are able to complete their learning at a coordinated pace with a schedule and plan to prevent the squeezing of their learning of course content at the end of a semester, which would greatly impede their learning; keeping students engaged with the teaching and learning activities through regular communications, progress alerts and weekly reminders; and being available and reachable are ways to keep communication and interaction between teaching staff and students open (Carter et al., 2020).

As discussed, generation diversity (Jiri, 2016), the concept of learning (Schunk, 2012) and differences in learning strategies (Luc et al., 2021) may partly explain the discrepancies in expectations about teaching and learning between teaching staff and students (Williams et al., 2017). Even when support at an organizational level is provided, the challenges and barriers to change may still exist or need a longer time to be solved if the generational differences associated with personal and attitudinal barriers are not addressed. Thus, professional development should not be limited to solving the problems that teaching staff face but should also support the teaching staff, helping them to understand their expectation differences with the students and how to bridge the expectation gaps (Luc et al., 2021; Oh & Reeves, 2014; Williams et al., 2017) by providing clear direction and structure; serving as a role model and mentor; engaging students with interactive feedback; and using their life-learned experience to facilitate students' learning (Williams et al., 2017). Furthermore, the interests of teaching staff in association with their teaching profession should also be considered (Kennedy et al., 2009). Thus, professional training provided by department-driven initiatives is as important as the university-driven provision. The

latter addressed the general framework for online teaching, while the former focused on infrastructural deployment (hardware and software) during the course design/planning to ease the psychological and technical barriers that teaching staff perceived at personal and attitudinal levels, as well as the support to instructional design on planning content restructuring. All of these considerations are essential to ensure the intended teaching and learning outcomes are still achievable without deviation (Carter et al., 2020; Panda & Mishra, 2007). This suggests that individualized or more generation-focused continuous professional development and learning provision should be developed to address personal diversity.

The pandemic has represented a significant turning point, pushing education forward to enter the digital era. Despite the swift changes in teaching practice, the developed online pedagogies still have room for further improvement and refinement. Relevant and ongoing feedback as well as continual professional learning and development both during and after the transition will be necessary to continually refine the teaching tools, making them sustainable to meet the ongoing changing needs in education (Sinacori, 2020).

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