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Teaching in Virtual Environments: Global Educational Development to Respond to Challenges and Opportunities of the COVID-19 Pandemic

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Abstract
Instructors and students from around the globe faced numerous educational challenges during the pandemic, such as appropriate course design, effective assessment techniques, and how to incorporate and assess fieldwork and experiential educational opportunities. In this paper, we reflect on online teaching design and innovations on topics such as virtual student exchanges and development and assessment of virtual lab/fieldwork. This paper shares examples from a series of interactive online trainings we organised to build capacity among faculty to respond to the shift in education brought on by COVID-19. We build upon expertise and interests of members of the Association of Pacific Rim Universities (APRU). In the series, pedagogical experts from a range of disciplines and countries facilitated discussion and collaboration by sharing case study examples of how to create a sense of community in virtual classrooms across geographies and leverage technological tools to meet shared global health educational challenges. We also addressed strategies to address equity and meet the needs of students beyond the classroom. These strategies and lessons can be applied to the future to continue to improve the educational experience for students and educational development for faculty.

Keywords
educational development; training; online; assessment; experiential education; learning community

Introduction

Universities around the globe have faced a multitude of educational challenges during the pandemic, including how to rapidly shift to a remote learning environment while also ensuring equitable access among all students. Many faculty and students were required to quickly adapt to a virtual learning environment for the first time. The challenges that we needed to overcome to do this were daunting. Universities were called upon to provide support to faculty through offering more professional development opportunities and better technology infrastructure. Despite facing a multitude of workplace challenges brought on by the pandemic, many faculty have demonstrated extraordinary resilience and resourcefulness in providing meaningful, rigorous, and quality experiences for their students.

The Association of Pacific Rim Universities

The Association of Pacific Rim Universities (APRU) is a non-profit network of 58 leading research universities, representing 19 economies. As the voice of knowledge and innovation, it uses its unique geographical reach across the Americas, Asia, and Australasia to bring together thought leaders, researchers, and policymakers to collaborate on effective solutions to 21st century challenges. Launched in 2007, the APRU Global Health Program (GHP) includes approximately 2,500 faculty, students, and researchers who are actively engaged in global health work. The main objective of the GHP is to advance global health research, education, and training in the Pacific Rim, as APRU member institutions respond to global and regional health challenges. The APRU network of university members together represent more than a half million employees and more than two million students[1]. One of five working groups, the APRU GH Working Group on Education and Technology focuses on advancement of education and training among members.

Teaching in Virtual Environments Series

In response to the COVID-19 pandemic and the need to shift courses to virtual education, members of the APRU Global Health Working Group on Education and Technology partnered with the University of Oregon Global STEM Education Program to organise a series of 12 interactive seminars to provide educational development and build capacity among instructors and around the world who were facing similar, sudden remote and online teaching challenges during the pandemic. We developed the series *Teaching in Virtual Environments* with three goals:

1. Create space where APRU affiliated faculty could connect to share resources and experience with teaching in remote settings.
2. Provide pedagogical, technology, and peer support to faculty across the APRU network who are facing similar remote teaching challenges.
3. Build community for faculty across the APRU network during this time when we cannot gather in person.

The session topics discussed here were either identified by us or specifically requested by participants. These were:

1. Creative ideas for online and remote assessment (two sessions)
2. Authentic experiential education
3. Building community in remote classrooms
4. Technology for remote teaching
5. Equity and access in remote teaching

6. Supporting students beyond the classroom

We organised each of the sessions so participants could learn from others and discuss teaching innovations and challenges at their home institution during their transition to online and remote teaching and learning environments. In each of the 90-minute sessions, we invited faculty experts in pedagogy from two APRU member universities to present a case study for 15 minutes each on evidence-based practices that informed their teaching in health-related fields and their personal experience teaching during the pandemic. These experts, co-authors on this paper, came from APRU network universities in Hong Kong, Mexico, the Philippines, Singapore, and the United States. The series has attracted faculty from beyond the APRU network with 350 faculty from 123 institutions across 25 economies and an average of 50 people attending each session.

In our mini-lecture case studies, we shared suggestions for modifications from our experiences and the literature for the short-term transition to remote learning and simultaneously reflected on ways we would apply these learning experiences and lessons learned in the future. After each mini-lectures and examples, all participants were invited to answer discussion and reflection questions in smaller breakout rooms, and then returned to the main room for reflection, reporting out, and sharing of ideas. We served as models and mentors to our peers through the discussion of our varied pedagogical approaches.

To support faculty in applying workshop ideas in their own teaching, each session was structured to provide learning opportunities inspired by principles of teaching for transfer directly applicable to faculty educational development (Ambrose et al., 2010; National Research Council, 2012; Vandegrift et al., 2018). These included:

1. case studies and real-life examples in the expert mini-lectures;
2. opportunities for elaboration of the content through small breakout room conversations;
3. breakout room prompts designed to allow faculty to connect their prior knowledge and experience to the case studies and peer conversations;
4. multiple and varied representation of the content through mini-lectures, breakout room discussions, and final report-out discussion;
5. providing opportunities for feedback through use of polling software;
6. creating an inclusive environment where all voices were welcomed; and
7. opportunities for individual reflection built into each discussion prompt.

The objective of this paper is to share the best practices and examples we presented as pedagogical expert faculty from multiple countries and disciplines from seven topics in the series. While each faculty expert shared their own individual and institutional experiences through case studies as described below, we purposefully identified and highlighted commonalities across these experiences during the sessions. We have also included the breakout room discussion questions which provided links between our individual experiences and opportunity for participants to reflect on their own pedagogical practices and the many ways that we collectively, quickly adapted our teaching to new pandemic realities. Several common themes run throughout the breakout room questions such as current practice and ideas for new innovations (Table 1). We also reflect on how this workshop series created an educational development opportunity for faculty. Through sharing of common innovations and experiences with overcoming barriers, we built a global community of educators who could learn from each other and become better prepared to face future teaching challenges and provide support through our global network.

Table 1. Question prompts for the breakout room discussion for each session. Each question was designed to meet a teaching for transfer principle of connection to prior experience teaching experience, reflection on teaching challenges, or elaboration of the topic to future application (Ambrose et al., 2010; National Research Council, 2012; Vandegrift et al., 2018).

Session Breakout Room Question Prompts	**Teaching for transfer principle highlighted by breakout room question prompt**
Creative Ideas for Online and Remote Assessment	
What types of assessments (formative and summative) do you already use online? What works well? Where do you have challenges?	Connection to prior experience Reflection of challenges
What's your dream assessment to measure student learning?	Elaboration for future application
How can you adapt your assessment or dream assessments for online learning?	Elaboration for future application
Authentic Experiential Education	
How can you bring in active, integrated, project-based, or community learning to your remote/online teaching?	Elaboration for future application
How can you build in reflective practice, abstract conceptualization, concrete experience, or active experimentation for students?	Elaboration for future application
Building Community in Remote Classrooms	
How can you build a learning community and social presence?	Connection to prior experience Elaboration for future application
How can you create ongoing opportunities for cognitive presence in a remote learning environment?	Connection to prior experience Elaboration for future application
What design strategies can you use to show and maintain your teaching presence?	Connection to prior experience Elaboration for future application
Technology for Online Teaching	
How have you successfully integrated technology to support student learning?	Connection to prior experience
What are some challenges you have encountered?	Reflection of challenges
Discuss possible solutions to the challenges discussed in your breakout room.	Elaboration for future application
Ensuring Equity and Access in Online Environments	
What are the challenges you have faced with creating an equitable and inclusive remote learning environment?	Reflection of challenges
We presented some possible solutions today, discuss which of these you have tried or would like to try.	Connection to prior experience Elaboration for future application
What other suggestions do you have for improving equity in your learning environments?	Elaboration for future application
Support Students outside of the Classroom	
How are you encouraging peer collaboration and peer support with social distancing and isolation?	Connection to prior experience

What supports has your institution provided to students outside of the classroom during the pandemic?	Connection to prior experience
How do students learn about the resources?	Connection to prior experience
What additional resources do you wish your institution could offer students?	Elaboration for future application

Results

Creative Ideas for Online and Remote Assessment

Session description: *To respond to new realities of online learning, faculty continue to work on ways to develop assessments that measure student learning. Today we will share examples of assessments we have used in large STEM classes and ideas for creating meaningful assessments of student learning that work well in online environments.*

Breakout Room Questions:

1. What types of assessments (formative and summative) do you already use online? What works well? Where do you have challenges?
2. What's your dream assessment to measure student learning?
3. How can you adapt your assessment or dream assessments for online learning?

Two of the many challenges of teaching in virtual environments are gauging student understanding prior to summative assessments and providing students feedback by responding in an appropriate and timely manner. When instruction happens in person, both of these efforts are facilitated by the fact that we, as faculty, can observe reactions (e.g., read body language, see facial expressions) and communicate in real time (e.g., answer a question, alter the content of the class in response to feedback). Furthermore, many methods of gauging understanding and making adjustments are usually done when students and instructors are in the same room. For example, students may be asked to "think-pair-share," where they consider a problem individually, pair with one neighbor, and then share in discussion with the larger class (Kaddoura, 2013). Or, based on assessment of student understanding, an instructor may decide to devote additional time to reviewing a concept in response to a formative assessment.

At the University of California, Davis, while synchronous remote instruction still allows for real-time interaction, expecting all students to be able to connect and interact for every class meeting is often not equitable or inclusive. Some courses are even delivered asynchronously, with class content broken down into short video modules to facilitate self-paced learning and access. Engaging in formative assessment can be a challenge in this remote setting, especially if the methods used prior by an instructor have been solely in person. However, leveraging some of the features of best practices of remote teaching and online learning platforms can allow formative assessments to be conducted successfully. And they may be even more effective than in-person methods at reaching more students who due to anxiety may be less willing to participate during class.

Some formative assessment methods done in person we have easily adopted to the remote environment. Questions asked in person to facilitate discussion can be asked in "polling" features of Zoom or other conferencing software. The freedom of being able to type in a response, rather than having to raise a hand, actually makes the remote synchronous meeting more likely to elicit responses from a wider variety of students (Orlov et al., 2020). For

example, a question can be responded to in chat by 20 students and the instructor can easily summarise or mention these responses quickly. In person, for a single question, time limits usually allow responses from only 2-4 individuals.

Similarly, we can receive feedback and responses from more students in the remote setting by leveraging the online environment through synchronous and asynchronous technology. By designing a brief weekly survey in the course learning management system (LMS), every single student in the remote setting can participate easily and on their own time schedules. We have found this method works especially well in the asynchronous format, where there isn't an opportunity to hear from students in real-time. Instructors can award points for completion and participation to encourage responses. The content of the surveys, for example, could include a range of questions: content questions as formative assessments, questions about how students feel about course logistics, muddiest point/clearest point formative assessments (Angelo & Cross, 2012), emotional check-in questions, questions to encourage metacognition (Ambrose et al., 2010), exam wrappers (Lovett, 2013), questions about course and campus resources to raise awareness and gauge what is being used, interests related to the course, interests not related to the course, and an open space for questions/comments. By asking these questions in an online survey that students do on their own, more data from more students can be collected than when asked in a rush during in-person class time. Most online course platforms will export the responses into a spreadsheet that can be scanned quickly and used to inform instructional decisions, incorporate student feedback, and even create personal connection by allowing instructors to follow-up by creating response videos to answer student questions allowing for just-in-time teaching responses (Novak, 2011). One can also choose to reach out to individual students based on their responses, as we found that students in our courses were more apt to be honest and share their struggles online than in person.

The same can be done through discussion boards that not only encourage a one-way communication stream between instructors and students, but can also help facilitate student-to-student communication. These are a way to encourage learning from peers, provide students with regular and structured feedback as well as provide opportunities reflection as part of the learning process (National Research Council, 2012).

In addition to reimaging formative assessments, faculty at many institutions also have experimented with various modes of teaching and learning, and appropriate ways to assess students' performance. However, as the world dealt with the COVID-19 pandemic, academic institutions shifted away from traditional classes and assessments towards virtual ones (Elzainy et al., 2020; Khan & Jawaid, 2020). However, this also raised concerns regarding the effectiveness of online teaching and in particular, the authenticity and integrity of online assessments (Woit & Mason, 2003).

Despite challenges, this necessary change represented a unique opportunity for educators and academic institutions to rethink traditional methods of summative assessment and explore novel methods both to tackle the disruptions caused by the pandemic, and also look to the future as the growth of online education continues (Tan et al., 2020). We reflected on creative options to redesign our assessments. One such method is the implementation of summative assessments using open-ended questions with no clear answers. These "ill-defined" problems are often different than the "well-defined" problems that students may be expecting but better replicate real-world problem solving (Singer et al., 2012, p. 76). Building formative assessment opportunities through structured small group team-based learning focuses on learner preparation outside of class and application of knowledge in class (Brame, 2013; Whitley et

al., 2015). Questions posed to groups help prepare students to respond to summative assessment questions.

As an example from a environmental chemistry course at the National University of Singapore, in a group learning exam students must apply content they have learned to make a recommendation for how farmland should be allocated for different farming applications creating opportunities to build students' critical thinking capacity (Fung et al., 2019). Asking students open-ended questions such as this during class and/or on exams can provide opportunities to promote higher-order thinking skills (Han & Yap, 2020). These discussions can improve students' critical thinking skills and to apply, analyse, and evaluate course concepts. These key skills are valued by employers; therefore, engaging in open-ended assessments can help learners understand the content in real-time and prepare for future employment (Tan et al., 2020).

When best designed, the open-ended questions in summative assessments follow the structure of the questions posed in class. This method can solve multiple limitations that traditional assessments face, such as cheating and accurate assessment of course competencies such as students' ability to understand, apply and analyse knowledge. It is harder for learners to duplicate answers, so this approach can help maintain the integrity of the summative assessments. Students must synthesise knowledge rather than the regurgitate facts. To assess learners' ability and creativity to apply their knowledge to solve problems rather than to memorise knowledge and answers, instructors can develop possible answers using keywords or phrases that illustrate the students' understanding of knowledge rather than structured answers. These pre-developed answers with keywords can be used to mark and grade the students' responses.

Open-ended questions can take inspiration from real-world problems and can also be contextualised to current events in the learner's own country. For example, learners at the National University of Singapore are asked to consider the perspective of a real-life occupational appointee, in this case, the Assistant Director of a Singapore Statutory Board, to simulate decision-making processes in national policies building on course content.
Constructivist praxis maintains that learners create their own understanding of the world based on their individual experiences and their interpretation of these experiences (Elliott et al., 2000). Understanding comes from making meaningful connections between the new knowledge and previous experiences. Since knowledge and experience are inextricably entwined, learning cannot happen effectively in the abstract but instead should be situated in a relevant context. Further, adult learners desire to see the practical value of what they are learning and learn better from assignments that mirror tasks that they might be undertaking in their workplaces. Therefore, we should incorporate practically-based assessments, which can stimulate better learning as well as retention of the material (Tam, 2000). The current environment is the perfect opportunity to be creative with assessments and grading systems that will truly assess learner's progress and growth, while focusing on what is important for learners (Ruiz-Primo, 2020).

Authentic Experiential Education

Session description: *Many of our educational programs are enriched or dependent on students having experiential education. How do we create those types of learning experiences in remote or virtual settings? In this session, we will share some of the innovative ways our institutions have developed experiential education for online environments.*

Breakout Room Questions:

1. How can you bring in active, integrated, project-based, or community learning to your remote/online teaching?
2. How can you build in reflective practice, abstract conceptualisation, concrete experience, or active experimentation for students?

Facilitating transnational and collaborative learning is critical for global health training. Well-designed experiential learning is crucial for training health professional students to provide real-world experiences (Hoffman & Silverberg, 2015). Yet numerous barriers hinder proper implementation of experiential learning programs, including limited availability of clinical sites, feasibility of sites to accommodate a large number of students, possible challenges with accessibility for students with disabilities, and potential disturbance to clinical staff and patients.

Innovation in teaching methodology has dramatically transformed the virtual educational landscape and required faculty to consider the student experience in new ways. Health professional students in Hong Kong faced a common challenge during the pandemic: limited opportunities for professional clinical practice. However, advancements in technology for education can help solve this problem by facilitating new alternatives to experiential learning. Immersive virtual reality (IVR) and augmented reality (AR) can enable health professional students with no clinical experience to have a personal first-hand clinical experience. The use of IVR with head-mounted headsets can be incorporated by working with interactive cases during class. In Hong Kong, pharmacy students are required to interpret clinical cases and attend pharmacy ward rounds during their third and fourth years of study. However, the lack of a systematic teaching strategy for pharmacy students limits the preparation of clinical cases, interpretation of clinical notes and clinical abbreviations, as well as effective assessment of clinical cases. Prior to the pandemic, the Chinese University of Hong Kong (CUHK) School of Pharmacy pioneered a project for the development of clinical cardiology pharmacy pedagogy using IVR techniques. The faculty developed two IVR teaching cases using the real-world patient cases at the Prince of Wales Hospital. This helped to bring the clinical ward setting and real-world, practical cases into the classroom. After receiving some guidance and instructions, through the use of IVR, students experienced first-hand clinical exposure in a classroom setting. The set of guided teaching material helped students to translate clinical knowledge step-by-step in real practice. In general, IVR in pharmacy education is still very new in Hong Kong. However, in this pilot, students found the use of IVR in clinical cardiology pharmacy education extremely valuable.

In addition to the use of IVR and AR technology in enhancing experiential learning, CUHK educators also invited real patients to join a course via the Zoom platform when the volunteers were unable to attend class in person. The interprofessional education (IPE) course involved students in medicine, pharmacy, and nursing. Prior to each class meeting, instructors prepared a patient case summary by interviewing the patients and briefing them on the upcoming class session. As a result, patients were both service recipients and learning facilitators. During class, all students prepared a patient care plan after understanding the perspectives of each discipline and patient needs. In addition to providing an important health service to patients, students also benefitted by improving their clinical skills through live virtual interactions with patients. The Zoom platform also enhanced international academic exchange. We have expanded the IPE course to connect with instructors and students in Canada for a similar collaborative experience to learn from peers across countries as the pilot before and during the pandemic has highlighted the value and ease of virtual interaction.

Although the COVID-19 pandemic had affected the traditional way of teaching and learning tremendously, it has also opened more options to enhance teaching and learning through the use of innovative technology. New possibilities to enhance better experiential learning and increase global collaborations will continue to emerge even once we have returned to more traditional in-person experiential educational experiences. We should continue to explore these avenues as exciting ways to use technology in our "global classrooms."

Building Community in Remote Classrooms

Session description: *Creating a sense of community in our remote classrooms where students and faculty have the same sense of purpose and connection can feel very different in remote teaching than in our physical classrooms. In this session we will explore suggestions for building connection with students in online and remote environments*.

Breakout Room Questions:

1. How can you build a learning community and social presence?
2. How can you create ongoing opportunities for cognitive presence in a remote learning environment?
3. What design strategies can you use to show and maintain your teaching presence?

In these times of uncertainty, human losses, economic crisis, and isolation, the obstacles to learning have been paramount. In a scenario where students and faculty are confined into their homes, campus facilities are empty, and socialisation is not possible, a sense of community among students can be very hard to build. The School of Medicine and Health Sciences at Tecnológico de Monterrey was fortunate to have a structure in place to respond to these needs. Since 2014, the school has utilised a learning communities model defined by a group of students and faculty with common goals, interests, and professional beliefs who experience their learning process together and focus on each other's wellbeing (Shochet et al., 2019). The ultimate objective of a learning community is to transform the learners and mentors into a community of practice among health professionals.

The carefully established structure of the nine learning communities were key to a rapid pandemic response. Tecnológico de Monterrey is one of 31 campuses across Mexico, which together represent almost 100,000 students (Times Higher Education, 2020), and the School of Medicine and Health Sciences has influence in four different cities across the university. Each interdisciplinary learning community at Tecnológico de Monterrey has approximately 180 students from medical, dentistry, clinical psychology, biosciences, and nutrition, as well as 10 to 20 faculty. The motto and central mindset, "*Nemo Resideo"* means in Latin "Leave no one behind." Each community is named after the character and strengths classification established by Peterson and Seligman (2004) with Latin names to evoke the underpinnings of medical tradition. Each learning community also has a color, name, and animal: wolf (Humanity), lion (Courage), deer (Fidelity), eagle (Justice), elephant (Prudence), bear (Wisdom and Knowledge), bull (Temperance), horse (Transcendence), and owl (Truth) (Figure 1). All of these elements are designed to build a strong sense of community and meaningful connections between students and faculty.

Figure 1: Description of the Emblems of the Learning Communities at School of Medicine and Health Sciences at Tecnológico de Monterrey

During the COVID-19 pandemic, our learning communities organisational structure proved to be an asset in the effort to build community within remote classrooms. Students had already been part of a learning community group since their first day in the program. Nonetheless, keeping the sense of community alive while migrating to a fully online learning environment was a considerable challenge. We put into place several different strategies with the goals of creating a strong online presence and developing and preserving a sense of identity and belonging.

As soon as the pandemic forced campus closures, clinical health students and faculty organised a virtual clinic to provide supervised medical, nutritional, and psychological counseling for patients. This served to restore students' sense of purpose and identity as part of the healthcare team. Hundreds of patients were counseled by clinical students and their mentors via telephone, videocall, or web-based chat. Students responded to common inquiries and needs regarding COVID-19, such as testing options, symptom checking, mental health services, and questions on healthy habits to prevent illness. In this way students were able to maintain a cognitive presence with their clinic-based work (Garrison et al., 1999).

Beyond the clinical opportunities, the infrastructure that had already been established for building community proved even more essential during the pandemic. A dedicated WhatsApp group for each learning community was an effective way to communicate and provide essential information to keep students and faculty safe. These groups provided the benefit of instant access for support or advice. Even while physically isolated, students could connect with each other easily for everyday situations like academic inquiries, COVID-related questions, mental health challenges, and shared interests and skills (such as yoga, cooking, or photography). Virtual small groups were also implemented by the learning communities. Some small groups met with mentors for regular videocall sessions on topics such as mental wellbeing, coping with stress, academic performance, and remote socialisation. Other small groups were designed and study groups with faculty available to clarify academic questions.

We found it was also particularly important to provide students with opportunities to get to know faculty. Each learning community shared their dedicated faculty profiles, interests, picture, and contact information on social media sites such as Instagram and TikTok. These sites were widely visited and will strengthen the community ties when students and faculty return to in-person education.

Overall, Tecnológico de Monterrey has relied on a multi-layered online presence via learning communities to provide a sense of continuity through mentoring activities, constant communication, and reimagining the students' sense of purpose to build a strong community.

Technology for Online Teaching

Session description: *As faculty quickly transitioned to remote teaching in early 2020, many tried new technologies to engage students online. As we continue to design courses for online environments, how do we selectively choose technologies that best meet the learning needs of students?*

Breakout Room Questions:

1. How have you successfully integrated technology to support student learning?
2. What are some challenges you have encountered?
3. Discuss possible solutions to the challenges in your breakout room.

The quality of online instruction can be impacted by faculty communication skills, technological competence, providing informative feedback, administrative skills, responsiveness, monitoring student learning, and providing student support (Roddy et al., 2017). Many faculty (especially with the rapid transition to online learning) were most concerned with their technological competence and what technology would be most appropriate for their purposes. Technological competence can be learned through campus infrastructure support and targeted educational development (Mishra & Koehler, 2006). However, rather than focus on "what technology," if we can start from "what are the course goals?" it can be easier to select technology to meet specific goals that align with course objectives, assessments, and activities (Wiggins & McTighe, 2005).

In fall 2020, the University of Oregon offered a dually online and in-person *Online Learning Strategies* course for students who needed an on-campus course. We started with our goals of providing students with an opportunity to practice integrating new learning strategies into their content-heavy courses by engaging in pre-work and post-work practice for each class, building a sense of community, and using class time to collaboratively problem solve and hear student voices (Darby & Lang, 2019). We also focused on building social presence, cognitive presence, and teaching presence in our course structure and interactions (Garrison et al., 1999).

To meet these varied goals, we turned to software that our teaching team had already used or found easy to learn. With so many additional challenges related to teaching in-person and remotely simultaneously coupled with pandemic fatigue, we decided that simplifying our technology choices would improve the experience for students and faculty alike (Flaherty, 2020). Therefore, we used LMS non-graded surveys for weekly pre-work and post-work to maintain a cognitive presence so students had at least three opportunities each week to engage with course material. Pre-work included readings, videos, and reflection questions. Post-work included reflective and metacognitive prompts to put pre-work and class material into context of students' academic experiences. We used an LMS discussion board for a welcome post where students shared images of their artistic creations, pets, hometowns, and excitement and fears about remote learning, designed to build a social presence and allow students to see each other and faculty as "real people." To continue to build a social presence, each post-work also included a required discussion board post where students could share some learning ideas they were trying in courses. To build a teaching presence, all navigation and accessibility of LMS material was carefully designed by two online teaching award-winning faculty, and the

teaching team provided regular feedback to students on discussion board posts. We also posted LMS video announcements to maintain teaching and social presence.

With so many possible technologies to use in class, we returned to considering our goals. This led us to use of collaborative documents during breakout rooms, polling software, and Zoom chat to capture student voices. We started class with music to welcome students as they entered the room or joined the Zoom to build community (Freedman & Voelker-Morris, 2021). And we recorded each Zoom session and provided captioning to improve the accessibility of the material for students. As the term progressed, the teaching team felt more confident integrating more technology while still remembering the goals and always considering whether the technology was supporting our goals or was just a new fancy toy that might ultimately distract from student learning.

Ensuring Equity and Access in Online Environments

Session Description: *Not all students have the same access to technology and Internet connectivity. How can we teach and create equitable learning environments for our students when their access may vary widely?*

Breakout Room Questions:

1. What are the challenges you have faced with creating an equitable and inclusive remote learning environment?
2. We presented some possible solutions today, discuss which of these you have tried or would like to try.
3. What other suggestions do you have for improving equity in your learning environments?

The shift of teaching from the classic face-to-face mode to flexible methods (i.e., remote, virtual, modular) brought about by the COVID-19 pandemic exposed equity and access issues both in teaching and learning (Santos, 2020). These challenges were relevant in low- and middle-income countries, but also in high-income settings. Not all faculty members had appropriate technological gadgets to prepare lesson plans, revise existing syllabi, or efficiently deliver their courses remotely. Outdated computers or no personal access to one, limited use of tablets and smartphones for remote teaching, or poor Internet connectivity were common concerns among students and faculty alike. Despite numerous webinars and institutional trainings on modification of instructional styles to employ remote teaching, the faculty's readiness and confidence to adequately teach in an online environment varied widely.

The shift in teaching modality in the middle of the academic year also led to increased anxiety among students. As was experienced by the faculty, access to technological implements to participate in flexible learning were major challenges in countries like the Philippines, where not all students have their own electronic devices available for remote learning (e.g., laptops/computers, tablets, smartphones). Further, a fast and stable Internet connection was not always reliable, and the reality is that not all students even have access to Internet at their homes. In addition, attendance at synchronous sessions plus compliance to self-paced online course requirements became more complicated when coupled with the range of students' domestic responsibilities at home amid the uncertainty of the pandemic.

Improvements to telecommunications infrastructure are necessary to accommodate the technological demands of remote learning. Though this was not immediately addressed in

response to the sudden shift to remote learning, increasing the reliability of available Internet service must be done. We must also pay attention to lowering its cost to assure access among financially challenged educators and learners. The provision of electronic devices to educators to efficiently deliver their courses and to all students in need to optimally participate in remote learning must also be prioritised by academic institutions to address disparities in access. However, this can be costly. The University of the Philippines, the national university of Philippines whose student body cuts across social classes, expanded its Student Learning Assistance System to include devices for learning and connectivity through mobile wifi and Internet subsidies (University of the Philippines, 2020a). Another program, *Kaagapay sa Pag-aaral ng mga Iskolar ng Bayan (Stand with the State Scholars in their Education)*, was implemented to seek creative ways to finance the additional costs of remote instruction. This program sought financial support from alumni, civil society, and donors to fund sponsorships or other forms of assistance for remote learning so that no student will be left behind (University of the Philippines, 2020b).

As we found at the University of the Philippines, academic institutions must also exercise creativity in redesigning courses to an online format. For example, access to recordings of class sessions should be made available to students who may not have the means to participate synchronously. Offline access to learning materials through printed course packs or study guides must also be made available to learners who are technologically challenged. We had to consider the need for flexibility in terms of deadlines for assignments and other academic requirements to respond to the possible stressors of an inconducive learning environment at home. By practicing compassion and flexibility, students and educators were better supported during a highly emotional time.

Support Students Outside of the Classroom

Session Description: *In addition to adapting online teaching methods, universities have focused on creating opportunities to support the full student experience beyond the classroom. In this session our faculty experts will share examples of programs designed to support the full educational experiences for students.*

Breakout Room Questions:

1. How are you encouraging peer collaboration and peer support with social distancing and isolation?
2. What supports has your institution provided to students outside of the classroom during the pandemic?
3. How do students learn about the resources?
4. What additional resources do you wish your institution could offer students?

While moving education online, the COVID-19 pandemic also forced educators to examine teaching and learning from a new angle and focus on factors significantly impacting students' academic performance and emotional wellbeing during this crisis. Through a study on 1,000 university students, Kaparounaki et al. (2020) reported an increase in anxiety by 73%, depression by 60.9%, and overall suicidality, including suicidal thoughts, plans, and attempts (Fountoulakis et al., 2012), by 20.2%. Marelli et al. (2021) found that the pandemic has greater impact on students' psycho-emotional wellbeing than on administrative staff. The key factors affecting young people's mental health include, but are not limited, to school and university closure, loss of routine, and loss of social connection. (YoungMinds, 2020) Therefore, matters related to support outside of the classroom need to be addressed to meet students' needs during

this time. Lloyd-Jones (2021) recommends coaching, care, and collaboration as the necessities to maintain an uninterrupted learning environment and ensure successful student learning outcomes. She also proposes emotional, instrumental, and informational support to maintain continuity in student-instructor relationship and peer relationship among students. Based on this framework, we introduce the following practices that we have carried out since the beginning of the pandemic.

At The Hong Kong University of Science and Technology (HKUST), students, especially those who are either in the first year or international, are provided coaching on how to cope with stress and anxiety during a crisis and delivered the message that "we are all in this together." Instructions are context-specific, practical, and can be applied in real-life situations easily. Second, at several APRU member universities, peer collaboration through coursework and virtual social events is encouraged, even more than before, to maintain the continuity of students' peer relationships. Regarding coursework, the HKUST instructors give students flexibility to choose the implementation method (e.g., literature review, in-person interview, or online interview), the way they collaborate (e.g., in-person meeting or online meeting), and sufficient time to conquer communication barriers. According to Alley (2014), "video-tailored feedback leads to greater attention compared to text-tailored feedback." Following this finding, an instructor from another APRU member university, as reported during one of our session breakout rooms, videotapes herself giving oral feedback on students' coursework and providing research supervision on students' techniques and shares the videos with her students. Last but not least, although instructors focus on academic matters most of the time, their role has changed greatly during this difficult time, as students started encountering emotional challenges triggered by the pandemic, which have negatively impacted their academic performance. The instructors have made individual connections with students through individual meetings and phone calls and provide or introduce support as needed.

The discussion about technology access and equity during the pandemic was triggered by "the systemic inequalities that exist in higher education and the fact that students are unequally placed to succeed in their university studies during the COVID-19 crisis" (Raaper & Brown, 2020). When students scattered around the world have different accessibility to technology, provision of technological devices and online support becomes essential (Raaper & Brown, 2020). HKUST set up a proxy service for students located in areas with restricted Internet connection. A HKUST instructor also created "shortcuts" to learning resources in the learning management system so that students did not have to do the searching themselves while having no efficient Internet connection. Online assessment considers the access restriction these students face and is designed in a way that is "fair" to all (Montacute, 2020).

Conclusions

The case studies from the workshop series highlight many varied ways in which individual faculty across the APRU network have experienced the transition to online, remote, and virtual teaching while continuing to keep students at the center of instructional design decisions. In our mini-lectures and case study examples, we described high-impact practices such as learning communities and experiential education which can improve learning experiences for students (Kilgo et al., 2015; Kuh, 2008). In our own teaching, we implemented strategies designed to create high-quality online learning experiences through both synchronous and asynchronous learning environments. Many strategies we discussed included incorporation of regular formative and summative assessment to build critical thinking skills while using technology to enhance the user experience (Darby & Lang, 2019; Garrison et al., 1999). We also provided

examples of strategies used to support students outside of the classroom during a time of heightened anxiety. Our work was motivated by a strong commitment to building community, creating equitable learning environments, and working with individual instructions and university infrastructure to meet the needs of students which had changed, sometimes dramatically, because of the pandemic.

Collectively, we designed the series as an educational development activity for our global faculty colleagues. Our goal was to share our individual teaching strategies with other faculty and provide an opportunity for faculty to reflect on ways to incorporate new ideas to their own teaching environments. To achieve this, we included personal examples and discussion questions that we hoped would be useful, engaging, and relevant. In each session we purposefully provided participants with opportunities for reflection and discussion of ways to creatively apply (and hopefully adapt and modify as necessary) our innovations into their own teaching and learning environments. Faculty professional development is an important component of implementation of evidence-based teaching practices such as those that we presented (Durham et al., 2020). To accommodate the iterative nature of educational development, we collected post-surveys, to modify the topics for future sessions. For example, we added topics on technology and equity and inclusion, and revived online assessment so that the educational development met participants' needs.

Additionally, we envisioned that the sessions would provide faculty across the APRU network with a growing support network of other colleagues facing similar pandemic-related teaching challenges. The participants and ensuing connections ended up expanding well-beyond the established network. Faculty participants realised that while the specific details varied widely, our collective challenges and commitment to student learning resonated deeply across institution type, global geographic location, and discipline. In our observations, faculty were hungry to talk with other educators, who could sometimes simply share in the empathy and acknowledgement of the extreme adversity facing faculty and students. As stated in a recent Digital2Learn podcast "faculty just saved higher education" (Digital2Learn, 2021) and these sessions, while grounded in evidence-based practices and case studies, provided faculty an opportunity to share their common experiences. Faculty found this network and commonality in both the speakers presenting expert case studies and colleagues they met in the breakout rooms. In our observations and conversations especially with faculty who attended multiple sessions, this educational development series became an important component of teaching support for many faculty. Research has found that supports (real or perceived) are three times more important to the implementation of evidence-based practices than the ubiquitous barriers faculty face in teaching (Bathgate et al., 2019a, 2019b). The APRU Virtual Teaching network is one more support tool that faculty could lean into as they reacted to the changing pandemic-induced teaching and learning environment.

The series has also provided us with a glimpse into the potential leverage of a global teaching network to shape conversations about student and faculty experiences and development of future pedagogical professional development. We created an opportunity for a culturally diverse group of educators to reflect on how our educational models can be improved as we return to the classroom once the pandemic ends. Many universities have Teaching and Learning Centers and campus technology supports for faculty during the transition online and back to in-person learning. However, the APRU network is well-situated to provide educational development opportunities to faculty and bring together a much larger educational community with a broad global reach. Particularly throughout the pandemic, with activities such as this series, we have come to realise the value of our global networks to support each other. Together

this larger network can provide assistance to faculty as we continue to experiment with new teaching improvements to continue to keep students at the center of our work.

Additionally, faculty have an opportunity to rethink how we teach as we return to the classrooms. Simultaneously, educational developers have an opportunity to re-examine and reconsider the opportunities for supporting faculty and resiliency in higher education. Together as we process the lessons learned by the rapid pandemic-induced changes, we have the potential to reshape the future of higher education through our individual classroom practices, conversations with our fellow educators, professional development offerings, and global networks.

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