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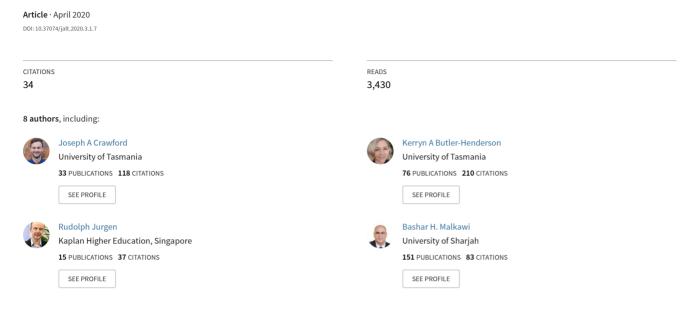
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COVID-19: 20 countries' higher education intra-period digital pedagogy responses

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Keywords

Article Info

Abstract

The Coronavirus 2019 (COVID-19) pandemic has created significant challenges for the global higher education community. Through a desktop analysis leveraging university and government sources where possible, we provide a timely map of the intra-period higher education responses to COVID-19 across 20 countries. We found that the responses by higher education providers have been diverse from having no response through to social isolation strategies on campus and rapid curriculum redevelopment for fully online offerings. We provide in our discussion a typology of the types of responses currently undertaken and assess the agility of higher education in preparing for the pandemic. We believe there are significant opportunities to learn from the pedagogical developments of other universities, in order to strengthen our collective response to COVID-19 now and into the future.

Introduction

The Coronavirus 2019 (COVID-19) pandemic has had such an extensive impact on the global higher education sector. Initial responses in countries impacted by the 180 million Chinese students (primary, secondary and tertiary) market were focused on the delivery of online training to students who were unable to leave China and the economic impact on universities who relied on the income from this international cohort (Perrotta, 2020). Faculties rushed to convert curriculum to an online environment, mindful of technology and websites that could be accessed from China. The spread to South Korea, then Iran and Italy resulted in the higher education sector in affected countries to change to focusing on their own operations (UNESCO, 2020). It was a test of organisational agility (Wu, 2020), with many initially focused on transitioning content to an online environment, and not necessarily on online pedagogy. Yet, it was also a demonstration of the impact of poorly resourced institutions and socially disadvantaged learners where limited access to technology and the internet impacted on organisational response or students' ability to engage in an online environment (Zhong, 2020). Many scholars questioned if higher education was prepared for the forthcoming digital era of learning (Houlden & Veletsianos, 2020). This paper will explore the first wave of responses from universities globally to summarise collective responses in the face of a pandemic.

Background

On 31 December 2019, the Wuhan City Health Committee (2019) reported a cluster of 27 pneumonia cases stemming from an unknown etiology, with a preliminary source linking this to the now closed Wuhan Huanan Seafood Wholesale Market. This was later determined to be a novel coronavirus (2019-nCoV). By 20 January 2020, there were 295 laboratory-confirmed cases, with 291 from Wuhan, China (European Centre for Disease Prevention and Control, 2020). Since these cases, there has been substantial growth across the globe. According to the World Health Organization (2020a), on 31 March 2020, there have been 697,244 confirmed cases with 33,257 deaths (4.77% mortality rate). The World Health Organization (2020b) has declared COVID-19 a pandemic. The top ten countries by reported cases are: China, Italy, United States of America, Spain, Germany, Iran, France, South Korea, Switzerland, and United Kingdom (World Health Organization, 2020a).

Consumer sectors are being affected by radical purchasing decisions based on components of fear. Toilet paper, disinfectants, tissues, pasta, and long-life foods are seeing significant growth in sales (Thom, 2020; Wright, 2020). Data connectivity is positioned as an important addition as individuals choose, or are required, to work and study from home (Morris, 2020; Perez, 2020). The higher education sector has been confronted by a need to respond to the evolving landscape in terms of Chinese student load, self-isolation guidance from national governments, and supporting staff and students who are unable to travel cross-nationally or to their local campus. Many universities are responding in diverse ways, and given the speed of the changes unfolding, are not likely discussing and studying the changes evolving globally. We also have observed some challenges unfolding with alternate delivery structures, particularly in relation to rapid digitalization of curriculum.

This paper begins a conversation to explore the first wave of responses from universities globally. A desktop analysis at the country-level of a select group of countries and their broader higher education response highlights the different approaches to higher education taken across the globe. We undertake this analysis for the purpose of answering the first of our research questions: How are universities responding to COVID-19? We continue to address this in our discussion to provide some preliminary types of current and forthcoming university responses.

Method

This manuscript adopts a desktop analysis approach with careful consideration as to the quality of the information source. In order to create an effective and rigorous status update for universities globally, it is critical that we seek to use reliable sources given the general fluctuation of information regarding COVID-19. For transparency, we used 172 sources, and provide a summary of sources used in Table 1. For developed nations, the emphasis was on the use of direct university and government sources (47.09%) supplemented by news articles, higher education news outlets, and other forms of communication. In developing nations and those whose language is not English; we required more supplement and translation support from co-authors.

Table 1. *Sources used for findings*

Source type	Example	n	%
News articles	CNN news articles	84	48.84
University website	University of Tasmania website	51	29.65
Government information	Government press releases	17	9.88
Higher education news	Times Higher Education	9	5.23
Reports and papers	Consultancy reports	7	4.07
University communication	Direct emails to student cohorts	4	2.33

To assure that we reviewed across the globe, we attempted to achieve a rough equality of countries across the World Health Organization's (2020c) six regions. We present these in Table 2, noting that some regions provide a slight skew because they are more affected by the COVID-19 spread. There are several countries that we deemed to have equivalent or similar strategies to the current sample. Our focus was to explore at least two countries from each region, with a stronger focus on countries that have differing strategies to others. The aim of this stratification was to support our digital pedagogy strategy. We also attempted to balance countries with high cases and those whose cases are just emerging.

Table 2. *Summary of countries reviewed by region*

Region	Countries
African region	Nigeria, South Africa
Eastern Mediterranean region	Egypt, Jordan, United Arab Emirates
European region	Germany, Ireland, Italy, United Kingdom
Region of the Americas	Brazil, Chile, United States of America
South-East Asia region	India, Indonesia
Western Pacific region	Australia, China, Hong Kong, Malaysia, Republic of Korea (South Korea), Singapore

Findings: how are universities responding?

The findings presented in this paper are organised by country, in alphabetical order.

Australia

Australian higher education has responded to COVID-19 with a varied effectiveness. These came in the form of first: responding to international student load concerns due to flight restrictions, then to domestic cases and the requirement for social isolation. Each positive test of a student on campus received significant commentary in the media. Some universities began with careful cleaning of campuses after student tests of COVID-19 were positive. The University of Sydney began with rapid building cleaning activities after their first case (University of Sydney, 2020). However, the majority are now progressing to alternative forms of learning. Some have a temporary halt to learning to design online learning (e.g. Macquarie University, 2020; Monash University, 2020; Victoria University, 2020) and others are intending to continue face-to-face learning with social distancing protocol and supplemented online recordings/offerings (e.g. University of Queensland, 2020; University of Technology Sydney, 2020). Others have made rapid progressions towards online learning without suspending offerings (e.g. Australian National University, 2020; University of Tasmania, 2020). In line with government bans of public gatherings of 500 people on 14 March (Worthington, 2020), some universities are continuing to offer face-to-face classes with alternative delivery structures for large lectures and seminars (University of Adelaide, 2020; University of Melbourne, 2020) including Flinders University and Deakin University (Ross, 2020). Some universities have not created significant responses for domestic students not requiring self-isolation (e.g. University of Western Australia, 2020). This evolution continued to Australian government bans of public indoor gatherings exceeding 100 people on 18 March (Bagshaw, 2020), and exclusions of all public gatherings exceeding two non-family/households announced on 24 March. This is likely to significantly affect those universities that did not move online immediately.

China

As the first country to report a case, China's higher education sector had little time to prepare. Yet during January, while there were numerous reports from the higher education sector in countries that rely on the Chinese student import trade, little information was emerging about how the spread of the virus was impacting universities in China. All schools, including primary, secondary and universities, were on break until after the Lunar New Year, with a planned return on 31 January. Beijing announced on 26 January, they would postpone the start of the spring semester (Berlinger et al., 2020). China's Ministry of Education then announced on 28 January, this would extend across the country, including government-run colleges and universities (Khaliq, 2020). Several standardised tests were cancelled on 28 January, including the Graduate Record Examination (GRE), the Graduate Management Admission Test (GMAT), the International English Language Testing System (IELTS), and the Test of English as a Foreign Language (TOEFL; ICEF, 2020).

Reports conflict with how quickly the higher education sector responded. While some reported rapid transition by 2 February (Leung & Sharma, 2020), others reported the transition did not occur until mid to late February (McKenzie, 2020; Qu, 2020). New York University Shanghai (2020) announced all classes would be taught online from 17 February, while Duke Kunshan University (2020) and Zhejiang University (2020) transitioned to online by 24 February. Many other universities, including Peking University and Tsinghua University reported a similar timeline for their transition to online delivery (Leung & Sharma, 2020), with Shanghai Jiao Tong University reporting their first online class on 1 March. Yet not all universities have the resources or academic capabilities or capacity to transition to online delivery (Leung & Sharma, 2020). The delay to the start of the spring semester was almost a month for many universities. Few higher education institutions offered online delivery prior to COVID-19, and many were not prepared for the transition, with numerous reports suggesting this was a short-term approach and onsite teaching would commence in two to four weeks. At present, they remain closed for onsite classes. With the transition to online in place for organisations, attention has now turned to the quality of the learning experience (Qu, 2020). Further, the ongoing physical social isolation is impacting the academic workforce that traditionally is up the front of the classroom (Cappelletti, 2020).

Egypt

Egypt is the most populous country in the Arab world with a total population of over 90 million (World Population Review, 2020). As of 29 March, Egypt reported 579 confirmed positive cases, with 36 deaths (WHO, 2020a). Similar to other Arab countries, Egypt has temporarily closed schools, universities, and other educational institutions (Ahram, 2020; *Reuters*, 2020a). This closure affects hundreds of thousands of students.

Notable private Universities have taken steps to carry out their teaching online during the period of campuses closure. For instance, the British University in Cairo offers e-learning using Moodle, Microsoft Class Notes, and Microsoft Teams software (The British University in Cairo, 2020). The American University in Cairo also took several steps to move from face-to-face classes to online classes (American University in Cairo, 2020). Some of the tools that are used to deliver online classes include Blackboard, Moodle, email, and Zoom (American University in Cairo, 2020). Some of these tools were well-known before the crisis, but the crisis has accelerated the plans to use them.

There might be some issues in implementing online learning by major state universities in Egypt like Cairo University and Alexandria University. This is due in part to the large number of students admitted (Ministry of Higher Education and Scientific Research, 2014). Other issues relate to the availability of the right hardware and software, networks,

and storage capacity. Some universities like Alexandria University have opted for live and recorded sessions (Alexandria University, 2020). Live situations can assess whether the technology infrastructure in state universities can smooth online learning considering the expected traffic and connectivity.

Germany

In March 2020, Western Europe became the epicentre of the COVID-19 pandemic, with Germany one of the most affected countries (Statistica, 2020). As of 29 March, more than 52,000 German residents are confirmed to have been infected and at least 389 people have died from the disease (WHO, 2020a). Germany's relatively low mortality rate has intrigued experts and rivaling theories are emerging (The Guardian, 2020; Sauerbrey, 2020). Like many other countries across the globe, Germany has implemented several measures counteracting and slowing down COVID-19 spread across the nation. As of 22 March, and for at least two weeks, new social distancing measures were enacted, with not more than two people being allowed to meet in public (unless they belong to the same family or household) and a distance of minimally 1.5 meters to be adhered to (*Spiegel*, 2020a). In a dramatic development, German chancellor Angela Merkel self-quarantined herself on 22 March 2020, having been in contact with a member of medical staff who tested positive shortly after meeting the chancellor; she has since tested negative (*CNN*, 2020; Sauerbrey, 2020).

Due to Germany's federal structure of 16 states (or *Länder*) operating and implementing laws and guidelines independently, although following the overall government's recommendations, different (often inconsistent) approaches to tackle the COVID-19 crisis have been implemented in the past. This independent decision-making process has also been adopted by many of the 424 higher educational institutions offering several thousand programmes in Germany (Statistisches Bundesamt, 2020).

The University of Passau (Bavaria), for instance, provides an excellent case study on how the higher education sector in Germany responds to challenges associated with COVID-19 (University of Passau, 2020). On 12 March, face-to-face teaching was suspended and one day later, university staff could work from home. The university library was closed and as a result, extensions were granted for theses, dissertations, and other written assignments (University of Passau, 2020). On 18 March, examinations were announced to be limited to an absolute minimum, and oral examinations were suspended. Notice was given: "Please note that oral exams must not be conducted via Skype, Facetime or other digital means, as there is no legal basis for this" (University of Passau, 2020). The University of Passau also announced that as of 21 March, the State Government of Bavaria imposed a state-wide lockdown. Residents were prohibited from leaving their homes unless there was for a permissible reason (such as work, seeking medical assistance, and purchasing items needed for daily life). Also, as a precautionary measure, electronic student ID's were disabled, with the University's assurance that students would not be put at a disadvantage. Additionally, the University announced that buildings will be closed from 24 March to 19 April 2020. (University of Passau, 2020). At the time of writing, it was unclear how teaching would continue in the summer semester, with a "general technical framework" for "virtual teaching" still in the process of being established (University of Passau, 2020).

The University of Passau case is an example of a swift and rigorous approach. But in late March, due to the contact ban by the German Federal Government, the universities' responses converged. Lower Saxony's University of Göttingen announced that teaching is suspended with immediate effect, and the only events allowed to take place were "committees and other meetings necessary for the operation of the University" with video conferencing technology being strongly preferred over face-to-face meetings (University Göttingen, 2020).

Similarly, Heidelberg University (2020) announced its campus closure effective from 22 March 2020 for the rest of the semester. Students that were residing on campus were required to move out. However, they would be provided with a pro-rated cash reimbursement for the cost of room and board for the remainder of the semester (until mid-May). Online learning preparations have been put into place. Although the commencement ceremony scheduled for mid-May had to be cancelled, graduates will still receive their awards in a timely fashion (Heidelberg University, 2020).

Hong Kong

On 29 March, there were 682 confirmed COVID cases in Hong Kong (Worldometer, 2020). The city is geographically close to mainland China, having more than 100,000 daily border crossings (GovHK, 2020a), the number of confirmed cases remains relatively low. The Severe Acute Respiratory Syndrome (SARS) in 2003 caused 286 people to die and raised the awareness of the whole city on contagious viruses. The Hong Kong government suspended all kindergarten, primary and secondary schools from 27 January (GovHK 2020b; Zhang et al., 2020). For higher education, the Chinese New Year holiday in early February was extended for two weeks, and it was announced that online learning will be adopted for the remaining semester (Lau et al., 2020).

Implementation of online teaching at higher education in Hong Kong is not brand-new. Back in November 2019, when the extradition law protests were intense, several universities ended the first semester immediately or used online teaching (*South China Morning Post*, 2019). Consequently, the universities responded to the outbreak of COVID-19 in mainland China promptly (Chinese University of Hong Kong, 2020; Hong Kong Baptist University, 2020; Hong Kong University of Science and Technology, 2020; University of Hong Kong, 2020).

In the beginning, relevant online teaching training was provided to staff and students. The universities created videos and teaching guides and conducted online workshops to equip staff and students to use various online learning platforms (e.g. Zoom, Skype, Moodle, and Google Drive). The content of the training was based on the request from lecturers and developed by the information technology

team of the university, to ensure different stakeholders are competent and familiar with the relevant skills of online learning.

Later, universities developed synchronous and asynchronous online learning approaches. The online teaching can be conducted through real-time lectures, or lecturers can upload videos or use PowerPoint on learning platforms. This is to cater to students with different learning style preferences, and most importantly, international students who might be in different time zone and are unable to attend some lectures. Constant feedback from staff and students during the period has supported university quality reviews and monitoring of online learning and teaching. Actions are required by staff in response to the feedback as part of the quality assurance mechanism. Finally, the evolving situation of COVID-19 has led to updates for teaching arrangements (e.g. workshops, laboratory, and practicum are all suspended, and some students requested a partial refund of tuition fee; Chan, 2020). Information flow amongst stakeholders and flexibility to respond and react to the situation are continuing challenges for Hong Kong higher education.

India

With a neighbouring border with China, the low number of cases (979 as of 29 March; WHO, 2020a) relative to the large population size of India left many concerned that the number of community-acquired cases is higher than reported (Mansoor, 2020). Their health system is poorly underprepared should the number of cases reach the proportions seen in Italy or the United States of America (*The Economist*, 2020). Public gatherings continued, with a gathering on 24 February of students from the Manav Rachna International Institute of Research and Studies (MRIIRS), University at Faridabad to show solidarity with victims of COVID-19 (Hui, 2020). Whilst there has been no nationwide decision to shut down schools (Mansoor, 2020), most regional governments have announced schools in their areas will be closed (*The Economist*, 2020). Schools in Delhi were closed from the 13 March (Press Trust of India, 2020) and the Maharashtra government announced on 16 March, it would postpone all university examinations (Mansoor, 2020). Pondicherry University (*TNN*, 2020) announced on 17 March, it would suspend all academic activities, followed by the University Grants Commission advising all universities on 19 March to postpone examinations until the end of March (*The Economic Times*, 2020). The University of Hyderabad (2020) announced on 20 March, it would defer all academic activities and close their hostels, followed by the SRM Institute of Science and Technology and VIT, Vellore declaring the summer vacation for students (Sujatha, 2020). No universities could be identified as announcing a move to online instruction because of COVID-19 and many are implementing a shutdown or postponement strategy until the end of March.

Indonesia

There is little information from Indonesia regarding higher education, or COVID-19 in general. The University of Indonesia in Depok and Gajah Mada University in Yogyakarta (*Jakarta Globe*, 2020) have closed their campuses and staff are delivering training online. Whilst the University of Indonesia (2020a) has published a prevention protocol, the Gajah Mada University (2020) has published information about their strategy to move classes online. More than 200 Indonesian citizens who were enrolled at universities in Wuhan were evacuated by the Indonesian Government in early March (Souisa & Salim, 2020).

Indonesia announced its first two positive cases on 2 March (*The Star*, 2020a). As of 29 March, Indonesia's COVID-19 fatality rate was very high at more than eight percent (102 deaths from 1,155 confirmed cases; WHO, 2020a). As of 15 March, Indonesia's President Joko Widodo suggested people stay, work, study and pray at home for two weeks to prevent further spread of the highly contagious disease (Sutarsa et al., 2020; *Indonesia Expat*, 2020). The President further encouraged social distancing, while he deemed a national lockdown – or even a lockdown of 'red zone' epicentres – unsuitable for Indonesia (*Indonesia Expat*, 2020; *New Straits Times*, 2020a). With more than half of Indonesia's workforce working in the informal sector and 25 million people living below the poverty line, many people cannot afford to self-isolate as they risk losing their sole source of income (Sutarsa et al., 2020).

On 24 March, it was reported that all national exams – for elementary, junior high and high school students were cancelled (Ghaliya, 2020). The national exam for high school students had originally been scheduled for the week starting 30 March. At the time of writing, three main alternatives to the cancelled national exams were under consideration: (1) to use assessments based on cumulative grades on report cards from three years of study for high school students, (2) an online national exam or (3) minimum competency assessment evaluating students' literacy and numerical competence (Ghaliya, 2020).

The University of Indonesia in Depok and Gajah Mada University in Yogyakarta (Jakarta Globe, 2020) have closed their campuses, and staff are delivering training online. Whilst the University of Indonesia (2020b) has published a prevention protocol, the Gajah Mada University (2020) has published information about their strategy to move classes online. More than 200 Indonesian citizens who were enrolled at universities in Wuhan were evacuated by the Indonesian Government in early March (Souisa & Salim, 2020).

The approach of Universitas Indonesia (UI), Indonesia's highest-ranked university, may serve as a case study. On 16 March, the Rector of UI published a letter on the university website that recommended online learning instead of face-to-face teaching for the rest of the term; staying away from campus when feeling unwell; and avoiding large-scale events as much as possible. However, he still thought that some activities were impossible to postpone or cancel, such as the UI Entrance Test, the National Competency Test or the oath-taking ceremony (Universitas Indonesia, 2020). On 30 March, a quarantine order for Greater Jakarta's approximately 30 million population seemed imminent (as more than half of the confirmed cases were from Indonesia's

capital – *Bloomberg*, 2020). Thus, a rethinking of the severity of the threat that the pandemic poses to the world's fourth-largest country is occurring.

Italy

The first cases of COVID-19 in Italy were reported on 31 January, when two Chinese tourists were tested positive in Rome (Ministero della Salute, 2020). An increasing number of cases were confirmed in the north of Italy, with the first death occurring near Milan on 22 February (Ravizza, 2020). Following the first case of death, the government imposed a multi-city quarantine in a number of locations found highly affected, called red zones. Despite imposed penalties and law enforcement, thousands of Italians travelled out of the north to avoid such restrictions. By the beginning of March, cases were reported throughout the peninsula and the main islands of Sicily and Sardinia.

Schools, public events, and religious services were cancelled in red and yellow zones, with the closure of all commercial activities and all school closures across the country to follow. The Italian Minister of University and Research announced that universities' online lessons would be delivered starting from 2 March and graduations would be conducted using Skype (De Giorgio, 2020). Only a small number of universities like the University of Basilicata installed thermal scanners to continue their learning and teaching activities (ANSA, 2020). Medical and other health-related internships and trips were suspended (Bronzini et al., 2020). On 4 March, the Italian government imposed the shutdown of all schools and universities. The universities of Bologna, Turin, and Milan as well as polytechnics of different cities set up remote learning and teaching with examinations and learning activities delivered to students online, especially via Webex.

The University of Turin has 80,000 students across 155 courses. There have been more than 2,500 video-conferencing sessions with more than 70,000 participants, 4,200 hours of recorded video by 3500 academics and researchers as of 13 March (University of Turin, 2020; Di Paco, 2020; RedazioneOP, 2020). In order to assist students, several public universities have also approved the postponement of fee payments from March to May (Di Paco, 2020). On 12 March, the Rector and the Managing Director of Bocconi University in Milan, a private university, sent a message to all the students and staff, focusing on resilience and innovation. They acknowledged the impressive effort of all the academics and staff and shared the extraordinary result of a total of close to two million teaching minutes that had been produced and delivered. Almost 9,000 students had watched videos on demand, with an average of 12 videos viewed per student, and more than 6,000 students participated in at least one live streaming session (over 800 sessions in all) (Verona & Taranto, 2020).

In the south of Italy, the University of Catania in Sicily was considered a green zone until the end of February. At the beginning of March, the University was closed for large-scale cleaning. The reopening was planned for 9 March, but later postponed, with e-learning starting from 19 March. A large emphasis of the media is on Italian students studying in other countries, particularly through learning mobility programs conducted under Erasmus+ projects (approximately 13,000 students). The 'crisis unit' of the Farnesina, the Italian Ministry of Foreign Affairs, is working to provide Italian students in foreign countries information and advice on how to return to Italy despite current travel restrictions (Stippoli, 2020; Ziniti, 2020).

Jordan

Like many countries, Jordan is strongly affected by the spread of COVID-19. Jordan has 246 confirmed cases as of 29 March (WHO, 2020a). To prevent the spread of COVID-19, Jordan closed its land, air, and sea border crossings (Jordan Times, 2020) and took extreme measures such as imposing a curfew (*The Guardian*, 2020), closing schools and universities (Ashara-Alwsat, 2020) and moving its university classes to online delivery (Khaberni, 2020; Jordan's Ministry of Higher Education and Scientific Research, 2020).

Teaching in Jordan began using chalkboards and soon graduated to transparencies and overhead projectors. Then PowerPoint took root in colleges with slides projected from a computer onto a classroom screen (Malkawi, 2007). With e-mail, videoconferencing, high-speed internet access, on-line legal libraries, and the like, education is quickly melding into a new shape. However, offering effective online classes requires more than simply taking the material from the conventional course and posting it onto a web-based repository. To be successful, the course needs to foster effective student engagement and be digitally dynamic. The solution is to offer a course that has a little bit of everything: personalised feedback from professors; discussion boards for interaction between students and law professors; quizzes with immediate feedback; and lessons containing the core reading materials.

During the COVID-19 crisis, Jordan universities are required to provide the Ministry of Higher Education and Research with the number of courses converted to online media and the number of students who log on to a university's online learning platforms (Hala, 2020). Some universities are using Skype to live broadcast professors' lectures, Google Classroom, Moodle, and Facebook (Al-albayt, 2020).

The current COVID-19 climate could provide a necessary platform for the digitalization of the curriculum for Jordan. For the foreseeable future, there will be only limited learning from university classes that have been moved online. 'Classroom professors' are likely required to undergo professional development and adopt continuous improvement philosophies to rapidly move to online delivery. Such university professors who taught effectively in face-to-face lectures and workshops may not find it effective or easy to deliver content digitally. The universities in Jordan are unlikely to be able to engage in training and development at the speed needed for this climate. It is also likely to be difficult for students who are used to conventional classrooms to learn online. The synthesis: a potential decline in learning quality in the short-term, despite best efforts.

Malaysia

Malaysia has been labelled "by far the worst-affected COVID-19 country in Southeast Asia" (*New Straits Times*, 2020b). However, the situation in Southeast Asia as well as other regions around the world is far from clear, as confirmed infections should not be confused with actual infections: restricted by testing capabilities, willingness, and frequencies. A mass religious pilgrimage – to some extent comparable to the thousands of infections linked to services of the Shincheonji Church of Jesus in Daegu, South Korea – at a mosque complex in Kuala Lumpur (held in late February, 2020) was a source of hundreds of COVID-19 infections, with 16,000 attendees from Malaysia and other Southeast Asian countries, holding hands and sharing plates of food during the event (*Reuters*, 2020b). In response to the alarming increase of infections in Malaysia, Prime Minister Muhyiddin banned all non-essential social activities (including religious, sport, social, and cultural events) from 18-31 March to combat the spread of COVID-19 under a nationwide Movement Control Order (Tee, 2020).

As of 16 March 2020, the response by most of Malaysia's 20 public universities was to encourage or mandate online learning (Lim, 2020), using live streaming on Facebook or YouTube, Lightboard Video Technology, Zoom, or in-house e-learning platforms (Lim, 2020; Ramadan, 2020; Teoh, 2020; Universiti Malaysia Sarawak, 2020). This approach can be viewed as a fragmented approach to achieving higher education learning and teaching quality. This includes assessment strategies such as lab research continuing to be allowed at Universiti Kebangsaan Malaysia and Universiti Malaysia Trengganu; face-to-face lectures going on as usual at Universiti Utara Malaysia and International Islamic University Malaysia; or Universiti Malaysia Perlis banning their students from leaving campus without express permission (Lim, 2020).

After the nationwide closure of all public and private institutions of higher learning, Malaysia's Ministry of Higher Education took the unusual step to also prohibit all *digital* learning activities on 17 March (Asia Pacific University of Technology & Innovation, 2020). Both public universities and private higher education institutes are forbidden to conduct "any Teaching and Learning activities including in online mode, as well as examinations, vivas, student development and research activities" during the above-mentioned Restricted Movement Period (Asia Pacific University of Technology and Innovation, 2020).

Nigeria

Nigeria is the continent of Africa's most populous country and announced the closure of its airports to international flights for one month from 21 March 2020 in response to the COVID-19 situation (Adigun et al., 2020). On the same date, the Federal Ministry of Health confirmed there were currently 22 confirmed cases but no reported deaths at that time. Advisory measures related to social distancing were recommended along with suggestions to restrict travel, postpone and cancel large gatherings (Nigeria Centre for Disease Control, 2020). All public and private schools were ordered closed in 10 of 26 states to prevent the spread of the disease (Adnan, 2020).

Following on from the directive to close all schools, the National Universities Commission (NUC) ordered all universities in Nigeria to close (Ezeri, 2020). This was scheduled to last for a period of one month commencing from 23 March 2020. This was issued as a 'directive from federal government to prevent the spread of the virus' according to a NUC spokesperson (Adedigba, 2020) Fast-tracking of ongoing second term exams in Unity colleges was also advised following the ordering of closure of 104 unity schools by the Federal Ministry of Education (2020). On 29th March 2020, it was reported that there was a lockdown order in Lagos, the most populous city in sub-Saharan Africa for one week (*CNBC*, 2020).

Republic of Ireland

The island of Ireland has been and will be playing a special role in the Brexit process (Blitz et al., 2019) as it remains the only European Union (EU) territory with a shared land border with the United Kingdom (UK). As of 29 March (RTE, 2020; WHO, 2020a), there were 2415 confirmed cases spread amongst 33 identified clusters with 36 COVID-19 related deaths in the Republic of Ireland. The highest number of cases can be found in two geographical locations, namely Dublin (55%) and Cork (9%) with County Monaghan remaining the only county with no confirmed COVID-19 case yet. It is worthwhile mentioning that Dublin and Cork are the two most densely populated regions in the Republic of Ireland. Travel-related cases account for 35 percent of overall cases with community transmissions making up 42 percent of all cases.

The first COVID-19 case on the island of Ireland was confirmed on 28 February (RTE, 2020). This was followed by the first confirmed case in the Republic of Ireland on 29 February (RTE, 2020), a male secondary school student who returned home from a mid-term skiing trip to Northern Italy. COVID-19 has since dramatically escalated on the island of Ireland resulting in business, restaurant, pub, and entertainment facility closures, 'home office' work arrangements, 'social distancing guidelines', and the country's health system's infrastructure struggling to source sufficient numbers of COVID-19 testing equipment. This is a worrying fact as the number of tested people in Ireland remains below average compared to other EU counterparts (RTE, 2020). In certain instances, patients must wait for up to seven days to get an appointment to be tested for COVID-19.

Trinity College Dublin (2020) was the first Irish university to immediately close its physical infrastructure and move to remote online teaching the same day one of its students was confirmed positive for the COVID-19 infection in early March. On 12 March 2020 (UCD, 2020), University College Dublin (UCD) president Professor Andrew Deeks informed both staff and students of the closure of all UCD's physical infrastructure taking effect from 13 March until 29 March 2020 except the library and medical research facilities to be utilised combating COVID-19. The Irish Prime Minister Leo Varadkar visited UCD's National Virus Reference Laboratory

on 19 March 2020 (*Independent*, 2020a) obtaining an overview of ongoing COVID-19 research.

In an unprecedented move in Irish history, on 16 March 2020 (Deeks et al., 2020) presidents of 21 higher educational institutions with the support of two student unions disseminated a cohesive and consistent message through email to all registered students in the respective institutions offering advice on COVID-19 and nationwide procedures to be implemented nationwide in order to maintain a satisfactory and safe learning environment utilising innovative educational technologies (EdTech) enabling remote learning and assessment.

Many of the Irish higher educational institutions (UCD, 2020; Trinity College Dublin, 2020; University College Cork, 2020; Queen's University, 2020), however, were not only closing their physical infrastructure until 29 March 2020. They have already informed both staff and students that both lectures and assessment, in a virtual and online environment, must be offered until the end of the academic year on 31 August 2020. UCD's Teaching and Learning (2020) – like many other higher educational institutions on the island of Ireland – has implemented dedicated teaching continuity measures for academic staff and students.

Republic of Korea (South Korea)

The first confirmed COVID-19 case in South Korea was on 20 January. On 29 March, South Korea had more than 9,500 cases and 105 deaths (WHO, 2020a). The outbreak and spread were primarily caused by a gathering at Shincheonji Church of Jesus at the Temple of the Tabernacle of the Testimony church in Daegu. However, South Korea learned from the 2015 outbreak of Middle East Respiratory Syndrome (MERS) (*Nature*, 2020) and has been widely praised for its disease control system and large-capacity healthcare system during the COVID-19 pandemic (Sonn, 2020). The country achieved slowing down the spread of the virus and maintain a downward trend in daily infections.

In South Korea, 1 March is the Independence Movement Day, and schools at all levels start the new academic year on 2 March. It is an important day for Koreans. Due to COVID-19, the Ministry of Education (MoE) postponed the school term (MoE, 2020) for the first time. All primary and secondary schools are on temporary vacation until 6 April (*The Korea Herald*, 2020). For higher education, the semester was postponed for two weeks, and the semester will be shortened from 16 weeks to 14 weeks (MoE, 2020). In addition, commencement and matriculation ceremonies are all cancelled to avoid mass gathering (MoE, 2020). Most of the universities adopted online teaching for one month (Seoul National University, Hankuk University of Foreign Studies). The universities provide face-to-face training workshops or guide for lecturers to be equipped with various modes of online teaching (HUFS, 2020). Also, examples of online teaching demonstrate to lecturers how to conduct lectures online, including voice-over PowerPoint teaching, uploading the videos on YouTube, real-time lectures using WebEx, Zoom or YouTube streaming. Lecturers are also encouraged to use a mixed mode of different teaching modes to deliver

online lectures (HUFS, 2020).

The Korea Education and Research Information Service (KERIS) is a public institution under the Korean MoE that promotes various projects and academic research related to Information and Communication Technology (ICT) in education ranging from primary to higher education (KERIS, 2020). Although the use of technology in teaching has been implemented in South Korea for almost two decades, solely online teaching is new to lecturers and students. In general, the universities regard the online teaching approach as a temporary solution and expect to resume face-to-face teaching after the crisis.

Singapore

As of 29 March, Singapore had 802 confirmed COVID-19 infections (with two deceased, 629 hospitalized and 212 having been discharged; WHO, 2020a; Upcode Academy, 2020). The city-state's use of public-health best practices (that have built on the experience of the SARS outbreak in 2003) have garnered praise from the World Health Organization (Seet, 2020) and its success so far may be attributed to several factors: rapid and widespread deployment of testing; rigorous, technology-informed contract tracing; real-time integrated tracking and analytics; the availability of expert medical care; and an efficiently-imposed system of quarantine orders, stay-at-home notices and leaves of absence (Craven et al., 2020; Singapore Ministry of Health, 2020). In this context, Singapore's education system has not witnessed measures quite as drastic as some other countries reviewed in our article: universities and schools have not been closed (with some institutions of higher learning currently teaching fully online, while others pursue blended learning approaches). However, graduation ceremonies and other large-scale events have been postponed throughout, and overseas placements (including internships and exchange programs) as well as inter-university and other external activities have all been suspended (*Channel News Asia*, 2020a; Singapore Ministry of Health, 2020). Affected students are being provided with alternative, credit-bearing learning arrangements such as online learning. Singapore's Ministry of Education has asked about 2,300 students in the local Autonomous Universities and polytechnics to return from their official overseas placements as soon as possible (Ang, H. M., 2020).

One Singaporean polytechnic has launched a short online course on infection control and prevention of COVID-19 (Ang, J., 2020). At the National University of Singapore School of Design and Environment, one of its professors became ill with COVID-19 in late January. Consequently, all lessons were conducted online from 14 February with assessments and meetings suspended as precautionary measures (*The Star*, 2020b). Face-to-face classes at local universities (including those run via Private Education Institutions) are supported by online strategies, galvanizing a sudden EdTech boom. Universities use web-conferencing platforms such as Zoom, Webinar, and Panopto, partially as contingency measures, and partially integrated into their learning management systems (James Cook University, 2020; National Technological University, 2020; National

University of Singapore, 2020; Singapore University of Social Sciences, 2020). It remains to be seen whether this will be an event-driven adoption or whether educators will continue to use additional technological tools for their innovative andragogical practices in a post-crisis environment.

South Africa

In South Africa, there are 1,187 confirmed cases of COVID-19 on 29 March, with one reported death (WHO, 2020a). In response they issued regulations enforcing limitations of gatherings over 100 amongst other measures such as travel restrictions, self-isolating, and closing of schools (*South African News Agency*, 2020).

Some higher education institutions undertook precautionary measures following earlier concerns of a lack of urgency raised by the South African Union of Students (Kyama et al., 2020). The student union encouraged students to remain at home until formal decisions were made in the Ministry of Higher Education, particularly as one identified case was a student. Several institutions such as the University of Johannesburg, Fort Hare, Wits, and Cape Town suspended all face-to-face classes. Other universities such as Stellenbosch, Rhodes, and Witwatersrand suspended upcoming graduation ceremonies (Sobuwa, 2020). Following this, the Minister of Higher Education, Blade Nzimande, announced that all universities and colleges would be closed from 18 March until 15 April as an 'extended break'. Some university infrastructure and maintenance activities such as research work could continue, while institutions were advised to use the break to explore digital and online delivery methods for teaching and learning to support programmes at a later stage (Chothia, 2020).

The Ministry also placed travel restrictions on students or staff unless there is a critical reason, in which case the relevant authorities would need to be consulted. The advice was also given on self-isolating requirements for those with recent international travel. All symposia and conferences should be restricted and replaced with alternative formats. Universities were advised to develop mitigation plans for students residing on university campuses. They also advised some 12,000 South African students on study abroad experiences to stay in contact with their in-country contacts for further support and potential evacuation (South African Government, 2020).

South America (Chile and Brazil)

Latin America has strong ties to Italy with several flights a day to or from that country with Milan one of the major ports of exit from Italy and an epicentre of the pandemic (*PSB News Hour*, 2020). On 26 February, the first case in Latin America was identified as a man who visited the north of Italy in February (Rodriguez-Morales et al., 2020). Consequently, in Peru, Argentine, Venezuela, Chile, Brazil, Colombia and Puerto Rico, passengers arriving from Italy were subjected to fever checks and asked to sign declarations regarding any flu-like symptoms. Passengers suspected to be infected with COVID-19 were transferred to an isolation ward in a nearby hospital. As a new preventive measure, officials queried passengers regarding travel from a host of countries. Furthermore, Health Ministries are enforcing a four-to an eight-year prison sentence for quarantine violations (*PSB News Hour*, 2020).

Despite the enactment of these measures, as of 31 March, Brazil has reported 5,812 cases, and Chile has 2,738 confirmed COVID-19 infections (Worldometers, 2020). In total, the region has registered 341 deaths (Montanez, 2020). In order to combat the spread of COVID-19, Latin American countries have adopted typical preventive measures, e.g. cancellation of mass events, school and university classes, closure of borders, and restricting transit of foreign travelers (Montanez, 2020). Latin American universities reacted in vastly different ways to the pandemic, either keeping their premises open and functional or closing them down and moving to e-learning.

The University of São Paulo (USP) in Brazil announced on 11 March that it created a committee to monitor COVID-19 at the university, following the first case of a student affected (Globo.com, 2020). Following a geography student testing positive, USP suspended the geography course. At present, USP remains open and the Institute of Tropical Medicine team is investigating the genomic diversity of the virus that infected two patients in Brazil (Nuno, 2020). The Laboratory of Immunology at Incor (Heart Institute) at the Medical School of USP is developing a vaccine against COVID-19 (Bravo, 2020).

The Pontificia Universidad Católica de Chile (UC) provides a different case study. They announced the progressive move toward online coordination for teams from all areas of the University (Pontificia Universidad Católica de Chile, 2020). Great effort was put in place to reach all the students, therefore several messages of updates where shared on the university's social media channels (e.g. the official FaceBook page of UC). By 16 March, the University aimed to have only 25 percent of staff working on campus, with a further reduction to no more than 10 percent of officials by 20 March. The decision was taken after the Chilean Ministry of Health confirmed that the country reached Phase 3, with the number of cases having increased significantly and without traceability. E-learning replaced classroom teaching, with academics preparing to conduct courses using the same academic schedule and employing the Canvas platform.

United Kingdom

As of 29 March, there were 17,093 confirmed positive cases, with 1,019 deaths (WHO, 2020a). The risk level throughout England had been raised to high. Early in February, the first UK case of the virus was a Chinese national student from the University of York (*BBC News*, 2020a). They had not attended campus or stayed in student accommodation. The Vice-Chancellor of the University stated that the university would be open and continue to operate as normal, while providing advice on precautionary measures. On 20 March, the British Government declared a nationwide closure of public houses, restaurants and other institutions while pledging a range of support packages for employees and employers affected by

the social distancing and isolation requirements (*BBC News*, 2020b). On the 25 March, the Prime Minister revealed new measures in the face of a 'national emergency' that the public must be isolated in their own homes with minimal contact with others for a period of 3 weeks.

Since then, the situation has changed drastically in the UK. UK universities are not only facing uncertain times in relation to the unknown factors related to 'Brexit' and the impact of leaving the European Union (e.g. recruitment and student experience), but are now responding to a number of students being unable to attend their place in university due to travel restrictions with no endpoint currently in sight (Gov.uk, 2020). There has been a flurry of measures announced by the British Government from 20 March which has required a shift in higher education learning and teaching.

In addition, Universities UK (2020) recently stated they are now seeing measures across the sector such as shifting to online delivery of teaching as far as possible, encouraging working from home, postponing graduation ceremonies, cancelling open days, and changing examination arrangements. Scotland's universities are also deploying similar measures (*BBC News*, 2020c). Some Universities (e.g. University of Hull and University of Exeter) had already suspended face-to-face teaching. Universities may not be planning to fully close and are committed to supporting students living on or nearby to campuses while maintaining infrastructure particularly around some research priorities which cannot be left unmonitored (*BBC News*, 2020d, 2020e). There is also a recognised need to support international students separated from friends and family (Morgan, 2020).

There is a growing tension for those seeking entry to University in the next academic period. The British Government has closed down schools except for some students with special circumstances (such as those being children of people identified as 'key workers' such as healthcare staff), meaning 'O' level and 'A' level exams have been suspended or cancelled (*BBC News*, 2020f). Morgan (2020) outlines that admissions to university may be affected by these measures. Bothwell (2020), reports that universities should focus on introducing more flexible admission processes, delay start dates and relax some entry requirements. This does not necessarily mean reducing English requirements for international students, rather they should instead be providing extra support and opportunities for those that have not met such requirements to improve those skills whilst on their course. Advance HE (2020) are also offering online services to maintain as flexible a service as possible. There has been some controversy over what appears to be universities suggesting a move to unconditional offers for places amidst the COVID-19 confusion, with arguments being posed that this may affect student decision making where they might choose a course that is not in their best interest (*BBC News*, 2020g). Meanwhile, some students are creating voluntary groups to help support fellow students and members of their communities during the advised social distancing and isolation measures put in place (*BBC News*, 2020h, 2020i).

Since leaving the EU on 29 February 2020, the government of Northern Ireland is only obliged to follow UK directives, being 'officially' part of the UK and not obliged to follow EU guidelines anymore. Although, having only left the EU a few weeks ago, there is still ongoing confusion not only among the two governments but more so among citizens living in border regions due to conflicting policies, guidelines and travel restrictions imposed by respective administrations. For instance, all schools, colleges, and universities in the Republic of Ireland were closed on 13 March (HSE, 2020), while Northern Irish schools, colleges, and universities remained open until 20 March (Public Health Agency Northern Ireland, 2020). This caused widespread confusion and anxiety among many employees usually commuting daily between the two jurisdictions. Since global travel restrictions imposed by the Department of Foreign Affairs and Trade (2020), Republic of Ireland-based employees found themselves left in limbo over the period of approximately one week being advised against all non-essential travel including the UK and Northern Ireland (Department of Foreign Affairs and Trade, 2020). However, Northern Ireland-based employees were still allowed traveling to the Republic of Ireland as the UK government only implemented widespread travel restrictions on the 17 March 2020 (Gov.uk, 2020) one week after EU member states instigated theirs.

United Arab Emirates

As of 29 March, the total number of COVID-19 cases in the United Arab Emirates (UAE) has reached 468, with two reported deaths (WHO 2020a). The UAE has a low infection rate, and a low death rate. Right from the start, in the light of the COVID-19 pandemic, the UAE has been successful in containing the spread of the virus by taking several safety measures. The measures include the closure of all schools and universities, cancelling public events, suspending entry into the country, precautionary measures by food outlets, limiting flights, country-wide disinfection, and adopting working from home for employees (*CNBC*, 2020). In response to the COVID-19, all UAE universities have moved their teaching online (KHDA, 2020).

As a result of this world-changing situation, many UAE universities have suddenly been thrust into a new world of digital delivery. Zayed University will adopt Adobe Connect, University of Sharjah and United Arab Emirates University have adopted Blackboard systems, and Heriot-Watt University Dubai will virtual learning tool, called Vision (*The National,* 2020; UAEU, 2020). Hamdan Bin Mohammed Smart University was the first e-University in the UAE (inaugurated in February 2009) and has extensive experience in delivering content online (HBMSU, 2020a). Therefore, HBMSU is assisting other higher education institutions in implementing online classes. Educators and professors in UAE universities have been attending training on effective online delivery in higher education (HBMSU, 2020b).

Online education is a complex issue. It is important to set realistic understandings and expectations of how it can support students affected by COVID-19 measures. Universities are not progressing strategic moves to online teaching. Rather, they are moving to emergency online delivery of in-person content. UAE higher education institutions are uniquely positioned to continue to engage

students in interactive discussions (whether synchronous through web meeting tools) or asynchronous (through discussion boards and other tools). It is not yet clear whether these digital pedagogy evolutions are going to create permanent fixtures in UAE higher education or whether they will be reverted at the eradication of global COVID-19.

United States of America

Like other western countries, the United States of America initially responded to meet the needs of Chinese students who were unable to travel and address the impact of reduced enrolments as a result. With the first suspected on-campus case reported the week of 17 February, the response from higher education across the US was to support staff and student safety, with many organisations publishing resources on self-protection and prevention. With the country's head of state and many media outlets downplaying the impact of COVID-19, and spring break leaving many campuses empty, the higher education sector did not begin a significant online education response until March, with several eminent institutions making an announcement early in March, and many others joining by mid-March. Then the infection rate dramatically increased, and by late March, the number of confirmed cases in the USA had surpassed China. As of 29 March, there were 103,321 confirmed COVID-19 positive cases, with 1,668 deaths (WHO, 2020a). Harvard University (Herpich, 2020) announced on 10 March, it would move to full online delivery by 23 March (as did Massachusetts Institute of Technology: MIT). Yale, Princeton, Stanford, and the University of California, whereas Southern Oregon University (2020) announced on 19 March, it would also deliver all instruction remotely by the same date. Many universities moved Spring Break by one week to allow the transition to online, with an analysis of higher education in Texas (Bawab, 2020) revealing that whilst the majority will return with online instruction, some institutions as of the 22 March have yet to decide. Whilst some websites (Clark, 2020) by mid-March were reporting only 5 percent (260 out of 5,300) higher education institutions had decided to move to online instruction with minimal on-campus presence, anecdotal evidence suggests most higher education institutions have made the transition.

Discussion

The synthesis and meta-analysis of the twenty countries across all six World Health Organization (2020c) regions show distinct similarities and differences to the approach taken in higher education. Table 3 summarises the meta-analysis from the above information, including the economic status of each country, using the World Economic Situation and Prospects (WESP, 2020) categories, the COVID-19 status according to the number of cases per one million population (Worldometer, 2020), and UNESCO (2020) monitoring of school closures. This analysis highlights certain trends across the globe.

Nearly all the countries categorised as developed economies are reporting a high number of cases per one million population. None have taken the approach of extending

their semester break and most are closing campuses and moving to online instruction, except for the United States of America. This contrasts with the countries categorised as developing economies. While the majority have closed their schools, Brazil and Singapore continue to only have localised closures and not a country-wide policy. According to UNESCO (2020), there is no country-wide policy on school closures for Brazil, Canada, Greenland, Russian Federation, and the United States of America. Universities in China, Hong Kong, India, the Republic of Korea (South Korea), and South Africa took the approach of moving the semester break dates (extending or starting early). Of these, China, Hong Kong, and, to some extent, the Republic of Korea (South Korea) and South Africa have implemented an online instruction strategy to support students to continue with their studies.

Except for Malaysia, Republic of Korea (South Korea) and Indonesia, the analysis also shows that countries closer to China or with a larger number of COVID-19 cases per one million of their population have a digital strategy for higher education across the nation. Interestingly, Malaysia's response was to move online but higher education providers have now been instructed not to provide online tuition to restrict movement (Asia Pacific University of Technology & Innovation, 2020). There is an opportunity for higher education providers in countries who have yet to experience a growth in cases to establish their online instruction strategy now.

However, migrating from traditional or blended learning to a fully virtual and online delivery strategy will not happen overnight and is associated with many challenges with many questions to this stage remaining unanswered, such as the lack of 'home office' infrastructure (Do academics have sufficient recording and internet bandwidth available?), student infrastructure (How can students access online and virtual content from remote locations? What about accessing content from jurisdictions where Internet access is monitored and restricted by the Government?), and general skillsets needed to professionally design and offer online/virtual education, just to name a few.

Table 3. Synthesis and meta-analysis of higher education response by country.

WESP (2020) category	Country	COVID-19 Cases/1M pop#	Extension of semester break	Reported campus closures*	Reported move to online teaching
Developed economies	Australia	166	No	All	All
	Germany	745	No	All	All
	Italy	1,616	No	All	All
	Republic of Ireland	530	No	All	All
	United Kingdom	288	No	All	All
	United States of America	431	No	Some	Some
Developing economies	Brazil	20	No	Some	Some
	China	57	Yes	All	All
	Chile	112	No	All	Some
	Egypt	6	No	All	All
	Hong Kong	86	Yes	All	All
	India	0.8	Yes	All	Some
	Indonesia	5	No	All	Some
	Jordan	25	No	All	Some
	Malaysia	81	No	All	No
	Nigeria	0.5	No	All	Some
	Republic of Korea (South Korea)	188	Yes	All	Some
	Singapore	144	No	Some	Some
	South Africa	22	Yes	All	Some
	United Arab Emirates	58	No	All	Some

1M pop = 1 million population; # = Worldometer, 2020 (30 March 2020), *UNESCO, 2020 (30 March 2020)

The analysis highlighted the variability within nations for higher education organisations to implement digital strategies, largely based on the resources available to the organisation and the cohort of students attending the organisation. This was more noticeable in countries

categorised as developing economies. For example, Jordan reported several low technology solutions to support online instruction, including narrated PowerPoint presentations and freeware, such as Skype, Google Classroom, Moodle, and Facebook. They can engage their students with the resources available, so that the impact on learning is minimised where possible. Whilst many higher education organizations in countries where schools are closed have initially focused on transitioning to the online environment, the focus is now on online pedagogy. Never has there been a time for a coordinated, collaborative, and collective global response to the best practice principles for online instruction. And in a time of global crisis, there is an opportunity for shared resources and expertise across the world to ensure the education of our students can continue in the face of COVID-19.

We caveat this paper with recognition of the lack of information to date on the pedagogical approaches and principles being adopted with the rapid movement to digital education. This has the potential to be an enabler of more flexible and innovative digital methods of education, but it could also lead to less quality assurance activities while the focus is on revenue mitigation. Universities undergoing a rapid change period need to be conscious of their ability to continuously monitor the quality of the learning design.

Conclusion

This paper highlights what we term the intra-period COVID-19 response for a series of universities across twenty countries. This analysis demonstrates diverse responses to a complex challenge. With the presence of more accurate data, it would be possible to map out rates of technological adoption among the countries' universities from extended starting periods as an opportunity to 'wait out' the fourteen-day travel quarantine. On one side of the extreme, one group of universities did very little to respond and opted to meet their government's minimum standards (e.g. 1.5-meter distance or reduced social gatherings). On the other side, universities rapidly closed their face-to-face operations and moved to digitalised education. Some universities, like the University of Tasmania, were already partially prepared for this endeavor given the University had some blended or fully online offerings. Other universities had a lot more ground to cover.

The aim of this paper was to discuss university responses across the world. The goal: to support a knowledge-sharing activity across a balanced sample of universities. At this stage, there is a recognition that the sector needs to unite to postulate a future where students can be supported digitally, without compromising academic quality and standards of the curriculum. We suspect the status updates from each of the university's positions will change significantly in the coming months as governments mandate diverse directives relating to gatherings, social outings, and similar. Universities have a role in the transition to support a society that needs to stay at home for periods of time, and higher education may be a valuable addition to their productive home environments in the short and potentially medium-term.

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