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The Immediate Impact of COVID-19 on Postsecondary Teaching and Learning

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Universities and colleges worldwide have quickly moved campus-based classes to virtual spaces due to the COVID-19 pandemic. This article explores the impact of this sudden transition of learning and teaching based on experiences and evidence from six institutions across three countries. Our findings suggest that although online and remote learning was a satisfactory experience for some students, various inequities were involved. Many students lacked appropriate devices for practical work and encountered difficulties in securing suitable housing and workspace. Students were stressed, and faculty were, too, especially those in precarious employment. The lack of fieldwork and access to laboratories created special challenges. We are concerned that the lack of hands-on experience could cause a decline in enrollments and the number of majors in geography over the next few years. This issue must be addressed by making introductory courses as engaging as possible. It is too early to determine the extent to which online and remote learning can replace campus-based, face-to-face geography education once the pandemic ends, but the new academic year of 2020–2021 will be revealing. Nevertheless, the COVID-19 crisis has revealed preexisting problems and inequalities that will need our collective effort to address, regardless of the pandemic's trajectory. **Key Words:** academic continuity, COVID-19, emergency, pandemic, teaching.

In December 2019 a novel coronavirus (COVID-19) was detected in Wuhan, China, and has since spread around the world (Dong, Du, and Gardner 2020). High reproduction numbers (Liu et al. 2020) and serious health consequences (Fauci, Lane, and Redfield 2020) have forced countries to introduce measures to reduce community transmission of the disease (Anderson et al. 2020). This has included a move to online and remote teaching in colleges and universities around the world, which might have produced the largest unplanned educational experiment ever undertaken.

The results of the online and remote learning education experiment have the potential to affect the work of colleges and universities for a generation. If

the experiment shows that online learning is as successful as traditional face-to-face education, campus-based face-to-face education would decline, with the loss of regional campuses, campus construction projects, and class size limits. Alternatively, if the experiment is a failure, the status quo will presumably resume.

The serious and immediate economic implications of COVID-19 (Atkeson 2020; McKibbin and Fernando 2020) mean that policy and funding decisions about postsecondary education will be made by governments in a short time frame and based on the best information and evidence available at the time. Therefore, an early examination of evidence relating to the impacts on teaching and learning is

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critical to well-informed policy decisions. Moreover, emergencies are ephemeral events, and although overwhelming at the time and significant in people's lives, memory fades rapidly. As with other hazards investigations, there is a need for quick response research (Quarantelli 2002; Michaels 2003; Mackey et al. 2012).

In this article we view the transition through the eyes of six geographers at six different institutions in three countries (Table 1). The six institutions range from small to large and from primarily undergraduate to research-intensive, broadly representative of the range of English language postsecondary education in North America and East Asia. Our approach is informed by the literature on teaching under conditions of course disruptions, our understanding of institutional policies and practices transmitted to us by our various institutions, departmental discussions, observations of student response, and student feedback received over the duration of emergency online learning. We are aware that the prevalence of observed or experienced phenomena differs between courses, instructors, and students in the same department, so we cannot associate any phenomena with a particular institution or type of institution. Our approach, however, scopes the range of issues faced by geography students and faculty during the early stages of the COVID-19 pandemic. The evidence forms the basis for our analysis, conclusions, and recommendations. We reveal the challenges that COVID-19 has brought to teaching geography effectively, without, for example, the usual fieldwork-based or laboratory-based and outdoor forms of learning for hands-on geographic investigation (Bednarz, Heffron, and Huynh 2013). Our work answers a significant question, uses appropriate and effective empirical methods, is replicable, and has been subject to peer review (Bednarz, Heffron, and Huynh 2013).

What We Previously Knew about the Impacts of Course Disruptions

We know that online course delivery works in emergency situations. Overall, there are no measurable differences in learning outcomes and test scores between normal face-to-face classes and teaching under emergency conditions (Krane, Dicarolo, and Kahn 2007; Day 2015; Collings, Garrill, and Johnston 2018). The timing of disruptions could be a significant factor in student outcomes, however. A disruption at the beginning of the academic year might have less impact than one just prior to final examinations (Wilkinson et al. 2013). There could also be gender effects in student outcomes during remote teaching, with a broad decline in test performance of female students and higher test scores for most male students (Day 2015).

There is a range of different student responses to course disruptions, but most students who register for face-to-face classes prefer not to be taught online. Teaching during a course disruption reveals an important human connection between students and faculty (Day 2015). Despite that, students appreciate efforts made by the institution and by faculty to maintain academic continuity (Monti, Tull, and Hoskin 2011; Day 2015; Collings, Gerrard, and Garrill 2019). There was no evidence of an impact on student enrollments following an earthquake in Italy (Cerqua and Di Pietro 2017). Mental health issues are of concern, however. Students might be more distressed than is readily apparent (McCarthy and Butler 2003; Krane, Dicarolo, and Kahn 2007; Phillips and Phillips 2008; Davis, Grills-Tauchel, and Ollendick 2010; Watson, Loffredo, and McKee 2011; Carter et al. 2014; Trip et al. 2018), and faculty mental health could also be affected (Bell et al. 2016). Graduation might be delayed, and students are at higher risk of dropping out (Di Pietro 2018).

Online teaching during emergency conditions is facilitated by good working relationships with EdTech personnel (Day 2015), learning resource providers (Collings, Gerrard, and Garrill 2019), and professional development and training opportunities for faculty to model best practices of online teaching (Mackey et al. 2012; Slinger-Friedman et al. 2015). A positive attitude, faculty being available to students and colleagues, and quick decision making are all helpful (Collings, Gerrard, and Garrill 2019). Good communication between faculty and between students and faculty is important (Lord 2011; Slinger-Friedman et al. 2015; Hildebrand 2017; Tull, Dabner, and Ayebe-Arthur 2017).

Online assessment can facilitate final grade prediction, with in some cases a statistically significant correlation between online quizzes taken during the course and invigilated final examinations (Agnew and Hickson 2012; Collings, Gerrard, and Garrill 2019). There is no evidence that students take advantage of emergency situations to obtain special consideration (Collings, Garrill, and Johnston 2018). A focus on assigning a grade risks marginalizing the role of assessment in measuring students' accomplishment of learning objectives, however. Experiential learning approaches, such as fieldwork, study abroad, community service learning, and applied projects, present special challenges during course disruptions (Stainfield et al. 2000; Spicer and Stratford 2001; Fuller, Gaskin, and Scott 2003; Scott, Fuller, and Gaskin 2006; Stumpf, Douglass, and Dorn 2008; Kolivras, Luebbing, and Resler 2012; Slinger-Friedman 2018).

For both students and faculty, teaching under emergency conditions has produced valuable lessons, and they are carried over to the subsequent resumption of normal teaching. Earthquakes in New

Table 1 Characteristics of postsecondary institutions

	Macalester College	The Chinese University of Hong Kong	Okanagan College	The University of Texas at Austin	Sinclair Community College	Kennesaw State University
Location	Saint Paul, MN	Hong Kong, China	Kelowna, BC	Austin, TX	Dayton, OH	Kennesaw, GA
Types of degree awarded	Bachelor's degree	Bachelor's, master's, and PhD	Associate degrees and diplomas	Bachelor's, master's, and PhD	Associate, certificates, applied bachelor's	Bachelor's
Total enrollment	2,039	21,051 (17,374 undergraduate, 3,677 graduate; publicly funded programs only)	9,244 (academic and trades)	51,832 (40,804 undergraduate, 11,028 graduate)	25,000+	37,807 (34,499 undergraduate, 3,308 graduate)
Primarily residential?	Yes	No (most live at home or outside campus)	No (most live at home or outside campus)	Yes	No campus housing	Mixed
No. of full-time (tenured) faculty	195 full-time faculty	1,701 total	227 (academic)	1,500 (total = 3,133, includes tenure track, and non-tenure track)	300+ full-time	1,220 total
Geography department pre-COVID modalities	Face-to-face	Face-to-face	Face-to-face	Face-to-face	Face-to-face Blended/hybrid Fully online	Face-to-face Hybrid Fully online
Anticipated Fall 2020 modalities	Hybrid	Mostly online	Remote learning	Mostly online, some hybrid, a few face-to-face	Online and remote learning	Mostly online, some hybrid, a few face-to-face
No. of faculty (2020)	7 full time 2 part time	Approx. 30 (including adjuncts)	8 (including contract)	28 full time 2 part time	2 full time 5 adjunct	15 full time
No. of geography majors (2020)	76	Approx. 200 undergraduate, approx. 40 Phil/PhD	NA	573 undergraduate, 5MA, 21 PhD	22 geography, 17 geospatial technology	77 geography, 41 geographic information science, 28 geospatial sciences

Zealand, for example, prompted lecturers to rethink their engagement with students, focus on different assessment processes, and use their learning management system in new ways. Students were more accepting of teaching innovations, and some preferred to continue with online learning, even when it was possible to return to campus (Monti, Tull, and Hoskin 2011).

The Response of Universities and Colleges to COVID-19

In contrast to previously described natural disaster situations, the COVID-19 pandemic has not extirpated infrastructure, and at its onset there was potentially some time to plan. The scale, scope, and speed of the ensuing transition to online learning in spring 2020 was unprecedented, however.

Timing of Institutional Response

Timing of the transition to online teaching was inconsistent across institutions. In some cases there was up to a two-week break prior to the implementation of online teaching, but in one case there was only three days' notice of the transition.

Faculty Preparations

For some faculty it was a matter of drawing on previous online experience to rework existing materials, but some instructors had little such experience. Fortunately, some form of training and assistance was provided to faculty in all six of our institutions. Colleges with previous experience of online delivery understood online best practices and had infrastructure in place that could readily be accessed to help with the transition. At Sinclair Community College, all geography instructors had both training and experience in online or blended modalities and instructional designers were assigned to assist with the transition. At Kennesaw State University (KSU), existing online courses were designed by trained faculty and peer-reviewed.

Student Consultations

In most cases there was insufficient time to consult with students prior to the online transition. Still, some colleges did survey students to better understand their needs. For example, Sinclair students were surveyed to understand their equipment and technical needs and provide assistance where needed (e.g., students were able to borrow laptops). At Macalester College, e-mails were sent to students enquiring about their concerns. This revealed concerns from some Chinese students about Zoom security issues and the potential for surveillance by the Chinese government. At the Chinese University

of Hong Kong (CUHK), students were offered workshops and practice classes to familiarize themselves with the technology.

Teaching

Faculty adjusted course formats, assignments, instruction methods, and assessment. All institutions encouraged the use of a limited range of technologies supported by their information technology departments. The perception of most faculty was that it would be difficult to replicate the face-to-face experience through remote teaching. Faculty did their best, however, and produced online lectures from home with Blackboard Collaborate (Okanagan College), Desire2Learn (KSU, Sinclair), or Zoom (CUHK, Macalester, University of Texas at Austin [UT-Austin], Sinclair). Chang's lectures at Macalester came from a creative makeshift home studio, but in most cases the lack of preparation time meant that lecture presentations were low-tech affairs. At CUHK and Okanagan, lectures were live and recorded. At Macalester and Sinclair there was posting of asynchronous materials but with additional synchronous sessions.

Assignments, Evaluations, and Assessment

One of the biggest challenges was the need to revise course assignments and develop evaluation and assessment strategies that adapted to a socially distanced setting but that still reflected learning objectives. Group projects became much more difficult to implement and were replaced by individual tasks (Chung, Housel). At Macalester, Chang graded papers on the basis of effort rather than quality. Technology for identity verification and monitoring of work environments is available for remote examinations but was rejected by Chung and Day because of concerns about Internet connections and computer availability. Alternative approaches included time-limited open-book exams based on different questions sets for each student (Day), essays, or take-home exams with more time allowed.

Grade Policies

Course grade policies were temporarily changed by many universities and colleges, with late withdrawals (CUHK, Macalester, Sinclair, KSU), retroactive withdrawals (Okanagan), pass-fail grading (UT-Austin, Macalester, CUHK), student option of pass-fail grading following submission of final grades (Sinclair), extension of refund period (Sinclair), and extension of the incomplete time frame as needed (Sinclair). Extended time to complete courses was also allowed (Macalester). Graduate programs such as those at UT-Austin will consider spring 2020 pass-fail grades and possible grade inflation while making admissions decisions for the next few years.

Table 2 What undergraduate students at Okanagan College liked and disliked about online teaching

What students liked	What students did not like
Issues raised in all three classes <ul style="list-style-type: none"> • Liked working at home • Not having to commute • Going back and looking at recorded lectures 	Issues raised in all three classes <ul style="list-style-type: none"> • Hard to work at home • Harder to communicate with professor • Hard to do labs in isolation • Lack motivation • Missed learning community • Missed social aspects of class
Issues raised in two classes <ul style="list-style-type: none"> • Sticking to original schedule • Not feeling pressured to speak in class • Got help when they needed it 	Issues raised in two classes <ul style="list-style-type: none"> • Poor Internet access • Eye strain due to looking at a screen all the time • Lack of exercise • Hard to work in groups • Missed deadlines due to lack of routine • Changing deadlines
Issues raised in one class <ul style="list-style-type: none"> • Tried something new • Labs worked well • Ability to screenshot slides 	Issues raised in one class <ul style="list-style-type: none"> • Not used to online teaching • Inadequate device

Notes: The results are based on students in three classes answering a bonus question on their final examinations. The classes were a first-year physical geography lab class (seventeen students, twelve responses); a second-year class in cartography, GIS, and remote sensing (eighteen students, eighteen responses); and a second-year class in geographical hydrology (twenty-one students, thirteen responses).

International and Out-of-State/Region Students

In Canada, international and out-of-state/region students were in all cases allowed to return home and complete their courses with no impact on the residency requirement of the postgraduation work permit program. It was also announced on 22 April 2020 that international students could apply for the Canada Emergency Response Benefit, providing income replacement during the pandemic. The U.S. government gave permission for international students to take all online classes in the United States or their home country with no impact on their student visa status for spring 2020. In both the United States and Canada, though, many international students and out-of-state/region students decided to stay due to travel concerns or restrictions.

Residences

Students living in university or college residences were required to leave, but there were exceptions. At UT-Austin, students who could not return home were relocated into a single dorm, a cost-saving and management decision that had the positive effect of creating a supportive community. This also helped international students who feared returning home due to uncertain visa, immigration, or international travel policies. This was also the case at other institutions where some students were permitted to remain on campus (e.g., Okanagan).

Libraries

In some cases (e.g., UT-Austin) the libraries closed immediately, but in other cases the libraries remained open for students for a short time (e.g., Okanagan, Macalester) or maintained a minimal physical service (e.g., CUHK). The use of online library resources

was widely encouraged, with CUHK purchasing additional e-copies of course readings.

Faculty Research

Inaccessibility of research labs and field sites, restricted access to human subjects, and the need to spend more time preparing courses have affected the research activity of faculty and graduate students. KSU and Macalester are allowing faculty a one-year extension for required reviews (pretenure, tenure, and post-tenure). These policies have been facilitated by a statement on faculty review and reappointment processes during the COVID-19 crisis from the American Sociological Association, endorsed by the American Association of Geographers (AAG), among others (see American Sociological Association 2020).

Faculty in Precarious Employment

One of the implementation issues was the difference between permanent faculty and those in precarious employment, including graduate students. None of our institutions offered additional or supplemental pay to facilitate the transition to remote teaching. At Sinclair, however, the college assured that all faculty (including adjunct faculty) who are ill (and/or taking care of household members who are ill) will be paid through the term, even if adjustments are made to their load. In addition, all faculty were provided with laptops, headsets, and high-resolution cameras, as needed. The administration at UT-Austin announced that no faculty cuts would occur, but salaries would be frozen for at least one year. No distinction was made between tenure or tenure-track faculty or lecturers.

Study Abroad Programs

Some universities and colleges scrambled to close study abroad program and evacuate students, resulting in logistic and financial challenges. Planned international work was canceled at CUHK, KSU, Macalester, Sinclair, and UT-Austin.

Observed Impacts on Learning

The move to remote instruction had a significant impact on faculty, students, and programs at all of our institutions. Many students liked asynchronous courses because they could participate at hours to fit their schedules. Others preferred courses taught synchronously.

Students with previous experience in an online environment were better positioned to make the transition to remote learning. A survey administered to Sinclair students enrolled in introductory social science courses ($n = 356$) found differences in the confidence of students to complete tasks before and after the pivot. The study showed that students with previous online experience were more successful in their ability to concentrate on school subjects, study when there were other interesting things to do, finish homework by the deadline, and motivate themselves to do schoolwork.

For students at Okanagan, where lectures were live and recorded, there were both pluses and minuses to their overall experience (Table 2). Students liked working at home because they were comfortable there and enjoyed working at their own desk. They saved time, could sleep longer, and did not worry about commuting issues. On the other hand, many students did not have a quiet home space. They did not have a desk, their environment was noisy, there were domestic chores and childcare responsibilities, and there were distractions on the Internet when students were online all day.

Many students at Okanagan found it difficult to be motivated by remote classes. The lack of community, the sense of isolation, missing their friends, not getting out, and not exercising all factored into this. Students found it hard to communicate with their professors. What seemed like a simple question turned into a lengthy e-mail trail as students struggled to express what they did not understand. Although some students have difficulty with deadlines at the best of times, it was even harder when students lacked a schedule and routine structure in their lives. Keeping to deadlines was also complicated when well-intentioned faculty changed deadlines at short notice, which sometimes affected well-organized students.

In general, students told us they were stressed. They worried about course completion and the impacts of remote learning on their grades. It was broader than that, though. Depending on their circumstances, students juggled remote learning, child

care, employment and caring for aging family members. Students and family members lost paid employment, and were sometimes financially pressured into working under conditions that they felt unsafe. Younger students who previously felt invincible now felt vulnerable in a world they never imagined, back home with their parents, concerned about their own safety, as well as that of their family and friends. Mental health issues are expected to emerge, and many universities and colleges have established funding for psychological counseling.

The situation was worse for international students. Harassment and discrimination based on perception of a Chinese origin of the virus was a common experience for Asian faculty and students in North America. There were other challenges as well. Students who returned home from North America to Asia, Europe, or the Middle East had to manage time differences, especially difficult with afternoon courses. For students whose native language is not English, e-mails and online communication that lack body language signs made students feel more stressed, which affected motivation and participation. For students coming from some regions in the Global South, going home after the campus was closed was not an option, because their hometowns had insufficient digital infrastructure to support their remote learning. After the campus and the dormitories were closed, many international students struggled to find local accommodation with short notice. Meanwhile, they were emotionally stressed, worrying about their families back home. Those who did return home worried about whether they would be able to return to the campus in fall 2020 because restrictions on international travel and immigration policies are highly uncertain everywhere.

Despite all of this, our general impression is that student attendance at online classes was comparable to that for face-to-face classes (Okanagan, CUHK, Macalester). At UT-Austin attendance was down 30 to 50 percent the first week back to classes but within a few weeks was back to what it was earlier in the semester, and by the end of the semester many classes were nearly 100 percent.

Graduate and undergraduate research projects have also been affected. Projects that require access to lab or other facilities, rely on face-to-face interviews and participatory observation, or need international travel have been affected. In cases where primary data could not be collected, some CUHK and Macalester students analyzed secondary data. Advising meetings and defenses were challenging to schedule because faculty and students were overwhelmed by the sudden transition. Some faculty and students found remote advising by video conferencing or messaging to be less effective, especially when there were contentious issues. At CUHK, graduate students could attend their oral defense by video

conferencing or returning to work in the laboratory, but both required prior approval.

Observed Impacts on Teaching

Although online teaching through Web-based conferencing was live and in real time, we found it harder to interact as faculty with students, to be invigorated, or to have fun, compared with face-to-face classes (UT-Austin, Okanagan, Macalester). We all found that remote teaching can take much more time than face-to-face instruction. Despite the travel time saved by working from home, our workloads have increased. For example, e-mail volumes for Day increased approximately 50 percent compared with the same time in the previous year, and we have all participated in large numbers of virtual meetings.

Programs were compromised by the need to be remote. Face-to-face courses frequently include hands-on, experiential learning, such as local field activities, field camps, internships, practicum experiences, study abroad courses, undergraduate research projects, and student conferences. These activities draw students to geography, have a major impact on student learning, and solidify student commitment to geography as a major. Faculty canceled such activities at all of our institutions, which frustrated and disappointed both students and faculty.

Some events had to be canceled or moved online. KSU's twenty-fourth annual Symposium of Student Scholars was transformed into a virtual symposium. This enabled students to present their research in a professional manner and include the presentation on their resumes.

As a substitute for a human geography field trip to London and Sheffield planned for May 2020, Chung experimented with virtual field trips with Google Street View following the same path they planned to take. UK researchers interacted with the students via virtual meetings. One of Chung's colleagues videoed a one-day field trip in Hong Kong that resembled a museum multimedia guide. Both field approaches limit perceptions to sights and sounds, however. They are less applicable in the Global South and rural areas where there is less Street View coverage.

Discussion

Although academic continuity was broadly achieved, we have identified several issues that need to be addressed.

Student and Faculty Inequities

The impacts on students and faculty were unequal. We have identified inequities in response to home circumstances, access to technology, and physical

and mental health issues. Students' classwork was affected due to lost jobs (many were service workers or teaching and research assistants), new work (e.g., delivery and babysitting), new work schedules (for essential workers; e.g., police, medical or hospital, government), caregivers (children or COVID-19 patients), time taken to provide or supervise online or home schooling, sharing computers with multiple siblings, and becoming the sole source of support for a family when other family members lost jobs or income. Impacts varied with the courses, the teaching method associated with different geography sub-disciplines, the types of institutions, countries or regions, and the socioeconomic contexts and cultural background of faculty and students.

The difficulties of international students living and studying in a new country are well documented (e.g., Calder et al. 2016; Yan 2017). There is also a hidden world of domestic students, however, whose circumstances force them to live on the edge, effectively homeless (Klitzman 2017; Mendoza 2019; Wilson, Williams, and Leach 2019). In this pandemic, although some students liked the fact that they could work from home, this assumed that they had a home environment conducive to productive working conditions. For many international students and other students for whom finances were an issue and who commonly live in cramped, overcrowded, and temporary accommodations, it was not easy. They lacked privacy and quiet workspaces and found it hard to focus without access to library and study areas.

Prior to the COVID-19 pandemic it was recognized that stress levels among undergraduates were high (Flatt 2013). Since then, stress has intensified for all, but perhaps more so for those who have already been vulnerable. As previous studies have revealed, there are more depressive symptoms among female students and international students than among male and domestic students (Acharya, Jin, and Collins 2018). Moreover, female students subjected to physical and psychological interpartner violence have depression symptoms that produce academic disengagement (Schrag, Wood, and Busch-Armendariz 2020).

There are also documented concerns that racial and ethnic minority populations might be more susceptible to poor physical health in a pandemic (Hutchins et al. 2009), which is the case with COVID-19 (Abuelgasim et al. 2020; Bhalra et al. 2020; Raifman and Raifman 2020). This affects racial and ethnic minority students, staff, and faculty directly. Being sick stops students and faculty from effectively working at their studies and jobs, with an indirect impact because of the physical and mental demands of looking after family and friends. There are growing concerns that the pandemic's impact on education could exacerbate preexisting low-income, black, and Hispanic achievement gaps (Dorn et al.

2020). Health inequities confronting these minorities should also be taken seriously (Khunti et al. 2020).

The issue of technology access also warrants consideration. Many students struggled with older and underpowered computers, tablets, and phones and poor Internet connections. It was already known that although most students have laptops (Pan, Graham, and Luyegu 2018), some institutions have large numbers of students who do not. The COVID-19 situation has revealed the extent of the problem, which surprised many of us. In addition, some regions of the Global South lack sufficient digital infrastructure to support returning international students. The “digital divide” (Chakraborty and Bosman 2005; Greenstein and Prince 2006) is still with us.

There are also inequities from a faculty perspective. Faculty in precarious employment are more vulnerable than those who are not, and those in tenure-track positions are more vulnerable than those who have tenure. Faculty doing international research have modified research arrangements due to a potential inability to legally reenter the country. Race, ethnicity, and family circumstances all play a role in the ability of faculty to do their job.

Our work shows that COVID-19 has compounded preexisting inequities in teaching and learning. We suggest that broader recognition of these issues in a COVID-19 context provides an opportunity and incentive for dealing with issues that affect student success in “normal” times. There is a risk, however, that remote teaching and learning will become normalized and that structural inequalities will harden within the new normal (Murphy 2020).

Recruitment into Geography Major Programs

With the exception of AP Human Geography courses offered in some U.S. high schools, geography is not widely taught at the Grade 11 or 12 level in North American high schools, and recruitment into geography major programs relies on attracting students in first- or second-year undergraduate courses. This might be more challenging when we move online. To illustrate, Sinclair and KSU offer many courses in both online and face-to-face environments, but most recruitment into geography major programs (both online and face-to-face) is from the students who take face-to-face introductory human and physical geography courses that count toward general education requirements. Distance learning environments require high levels of motivation and clear goals (Logan et al. 2017). Most students in introductory geography courses, however, are exploring the subject for the first time and need additional motivation.

The need to make our presentation of introductory material more engaging is now more widely recognized and has produced a province-wide initiative to rewrite first-year physical geography labs in

British Columbia, Canada. Okanagan College is one of several collaborating institutions (MacKinnon et al. 2020). Elsewhere, COVID-19 prompted the release of new online virtual field experiences for introductory physical geography labs. Available for download and adaptation at http://www.public.asu.edu/~atrid/111_OnlineGeovisualizationLabs.html, the labs were used in spring 2020 by more than 700 students at Arizona State University.

The Future of Campus-Based Face-to-Face Teaching

Neither students nor faculty wanted to be in this situation. It was not what the students signed up for. If they had wanted it, distance learning could be undertaken by students with less time, effort, and money than is needed for face-to-face learning. Students do not travel halfway around the world to take a remote or online course. An Okanagan international student framed their experience of remote learning as “a great experience although challenging. It would never be an alternative to real learning.” Students appreciated the efforts made by faculty to ensure that their course was completed, but for the most part they looked forward to a return to their classroom environment.

Geographers were pioneers in the deployment of e-learning and the development of online distance education courses, particularly in the field of geographic information science (e.g., Harris 2003; Unwin 2012). Especially for nontraditional students, online degree programs and online courses provide a level of flexibility that a traditional, in-person experience designed for traditional college-age students does not. Flexibility has become even more important during the pandemic. The “unquestioned hegemony of the appeal of online learning” (Callahan 2010, 869) is problematic, however.

A campus-based education provides a life context for learning. For many students it is their first time living away from home, meeting people from different backgrounds, and making their own decisions. This is all part of what students get when they attend a university or college. Will students, their parents, or sponsors be willing to pay high tuition fees for an online program? This debate is already beginning to take shape (Zimmerman 2020).

At present (late August 2020), enrollments are up in some institutions (Sinclair, KSU), stable in others (CUHK, UT-Austin), and slightly down at Okanagan. Although private universities and colleges like Macalester do not distinguish international from domestic students on tuition and fees, most public institutions charge international students higher tuition and anticipate lower international enrollments where remote teaching resumes in fall 2020.

We completed academic year 2019–2020 with an emergency shift from face-to-face courses to a

Table 3 Recommendations for consideration by geography departments**Short term**

- Examine first- and second-year course content and focus on the most interesting and relevant aspects to maintain recruitment into geography major programs. This might require changes to upper level courses to address deficiencies created by changes in lower level courses.
- Undertake systematic faculty and student satisfaction surveys on a recurring basis to provide information for adaptive course management to enhance student and faculty experience. Incorporation of the student voice is an effective tool in course design (Tasch and Tasch 2016).
- Identify locally relevant key indicators for performance of faculty and students that will provide data on the success of face-to-face and remote teaching during the pandemic, with continuation of the surveys into post-pandemic time.
- Provide enhanced services and accommodations for disadvantaged students. These could be wraparound or stand-alone services and include the provision of computers, Internet, and housing.
- Be inclusive. Digital spaces could potentially make it more difficult for faculty to see inequalities, prejudices, discrimination, disparities, racism, and sexism issues, so inclusive face-to-face learning environment principles should be followed in digital space.
- Design courses and programs that support the mental health and well-being of students and faculty. Initiatives could involve better orientations, flexible deadlines and grading practices, and greater emphasis on kindness, consideration, and inclusiveness in the learning environment. This could be done through more student involvement in course design and implementation.
- Use the pandemic as a learning focus. Viewed through the various lenses of different subfields of geography or through the key concepts of a particular geography course, geographers can contribute to our understanding and mitigation of the multiscale impacts of COVID-19 (Chung, Xu, and Zhang 2020). This can “convey the qualities of geography that capture its distinctive benefits as a subject of study” (Bednarz, Heffron, and Huynh 2013, 19).
- Use the analytics functions of course learning management systems. This will provide an opportunity for faculty to measure student engagement, identify any issues, and follow up with affected students.
- Provide community-based (service) learning. Like the New Zealand earthquakes of 2010, the pandemic has revealed opportunities for communities to be “new spaces of learning” (Pawson 2016), where students’ research on local pandemic-linked socioenvironmental disruptions can inform planning for recovery of community well-being. It is well documented that geography students and communities benefit from work in the community (Jurmu 2015; Kim 2018).
- Encourage students to learn independently from faculty. Provide a space that enables students to reach faculty when they need to, but encourage students to work independently. Initiatives like flipped classrooms could provide an opportunity to decenter the role of the instructor and empower students for self-motivated learning (Graham et al. 2017).
- Identify new ways of building student engagement. This might involve looking at experiences outside of education, such as gamifying learning activities. Such approaches are known to work well in geography classes (e.g., Kim and Shin 2016; Sim et al. 2020).

Longer term

- Use the emergency teaching experience to enhance teaching and learning in the conventional classroom. The pandemic has revealed problems that existed prior to the pandemic. Many of the initiatives we suggest here would make sense regardless of the pandemic’s trajectory.
- Plan to provide more blended or all-online courses. Some students like online delivery, and the Sinclair Community College and Kennesaw State University experience demonstrates the effectiveness of online geography programs.
- Undertake strategic planning. Although institutional budget challenges might negatively affect departments, there is a rare opportunity to realign qualifications and departments to the needs of society, the economy, and the planet. Departments should identify and secure a niche within their institutions, recognizing the fact that institutional response to the pandemic could produce shifts in institutional mission. Such changes were already underway (Nellis 2017) but will likely accelerate.

remote, online environment, with the expectation that it would be temporary. As the pandemic lingers, though, we now face the new challenge of more thorough adoption of distance education methods and techniques into a format that will work for students who would prefer to be in a face-to-face situation. Compared to “extensive” online learning focusing on compiling digital self-study resources, we need much more effort to effectively deliver “intensive” online learning involving synchronous online encounters among teachers and students (Bryson and Andres forthcoming).

In addition to covering textbook content and some versions of practical work, we have to work harder on building relationships with the students and establishing a community of learners with a passion for geography. We anticipate that many educators with little or no prior experience in online education will become intrigued by online pedagogy and contribute to its development. Adopting new modes of instruction also provides opportunities for faculty to reimagine and reassess course structure and content, teaching methods, and various pedagogical strategies. This widespread online engagement will significantly shape what happens to the academy and our discipline over the coming decades.

Examination of the immediate impacts of COVID-19 on geography teaching and learning at our six institutions enables us to make short-term and longer term recommendations for the consideration of geography departments (Table 3).

What Remains Unknown about Teaching and Learning under Emergency Conditions

Although there is a modest amount of literature on teaching and learning under emergency conditions, there is much more to be learned. What lessons can be learned and transferred to online and face-to-face learning in emergency and post-pandemic situations? One of the challenges is that it is very difficult to construct a controlled experiment when everything has changed. Moreover, the pandemic is a stressful time for many students, faculty, and staff, so how reliable and transferable are the results into post-pandemic times?

Course management offers many new challenges. How can we detect bullying and other forms of aggressive behavior? How do we monitor student

engagement? How much time will this take? Should we, and can we, find ways of using artificial intelligence to improve course management? How can we measure, monitor, and facilitate wellness in ways that work for a diversity of people with different stressors in their lives? How can racial and ethnic groups be treated fairly in an online environment, and, perhaps more important, how can individuals be treated fairly, when personal information about students is confidential and unavailable to faculty?

We wonder whether remote learning will cause faculty to rethink course curricula. Will a move to an online environment force us to rethink what is effectively teachable and what is not? Will there be a change in the balance between knowledge and skills in course content? Will appreciation of students' diversity factor into changes in course content? Arthur Strahler's physical geography curriculum, for example, was originally developed for mostly white male students (Day 2010), so perhaps a redesign that considers the gender, race, and ethnicity of students is overdue. How important is fieldwork and experiential learning? Virtual environments are becoming much more "real," but can we use virtual substitutes to promote the same types and levels of learning and engagement in all students? Or are the benefits confined to particular types of students? What contribution can students make to curriculum redesign?

There is no clear consensus on approaches to student assessment in remote emergency teaching. The type of assessment, the method and timing of grading, and the need for fairness and integrity are all challenges that require investigation.

The impacts of the pandemic on recruitment and enrollment in geography programs are also uncertain. Are there different levels of engagement in the subject after different learning formats (face-to-face, hybrid, online)? What are the factors that induce levels of engagement among different groups of students? What contributions can we geographers make to post-pandemic recovery? What are the carbon impacts of face-to-face teaching versus remote teaching? Are the dynamics of group work different?

The next few years will unquestionably see large numbers of studies relating to emergency remote teaching and learning. We suggest that well-designed, multi-institutional, quantitative studies with large samples are the best way of answering these questions.

Conclusions

We have observed that universities and colleges accomplished the move to online and remote learning surprisingly easily, but the sudden shift to remote and online teaching disadvantaged many students and faculty.

Most students appreciated what university and college faculty did but would prefer to work in a face-to-face environment. Some students appreciated the

flexibility of the online environment, but we see no evidence that the majority of students want to move away from campus-based learning. Starting and completing an entire term of online teaching, however, might change student perceptions of the value of online teaching and its flexibility. Students who experienced a well-designed and executed online class and enjoyed the experience might be more likely to try distance education in the future.

The future of campus-based education is secure for now, but the current situation is not economically sustainable, and there is growing uncertainty about the future. We are concerned that recruitment into geography major programs would likely be adversely affected if the primary mode of future teaching is online. ■

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Author contributions

All authors shared their experiences and contributed to the analysis. Terence Day coordinated the article and was lead author in the writing process. I-Chun Catherine Chang, Calvin King Lam Chung, William E. Doolittle, Jacqueline Housel, and Paul N. McDaniel all contributed to the writing.

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