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Ontario College and University Investments in Digital Learning During the Pandemic

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Table of Contents

List of Tables

Introduction

For decades, both the Ontario government and the province's postsecondary education (PSE) institutions have invested in high-quality digital learning[1] experiences. Government has funded support services through agencies such as Contact North[2] (established in 1986) and eCampusOntario (eCO, established in 2015) to improve access to online courses, programs and digital resources; government has also directly funded the development of online courses and programs through initiatives such as the Shared Online Course Fund (2013–2016; eCO, n.d.). Institutions have funded resources using approaches that are specific to local contexts, programming and strategic vision (HEQCO, 2020; Contact North, 2013; Donovan et al., 2019; Najafi et al., 2020). Many Ontario colleges also participate in OntarioLearn, a collaborative initiative that offers "1,500 shared online courses, over 650 online programs and on average, 100,000 student registrations each year" (OntarioLearn, 2022).

Data that map the evolution of online education in Ontario are scarce, but the trend toward digital learning was well underway in the early 2000s (Harrison, 2016). Before the pandemic, most institutions offered online and hybrid learning options alongside in-person classes and placements (Donovan et al., 2019; Johnson et al., 2019). Over time, institutional leaders expanded online learning options and invested significant resources to do so (Harrison, 2016; Donovan et al., 2019; Ministry of Colleges and Universities, 2017; 2018). The sector invested in technological improvements, including electronic textbook databases, complex high-fidelity simulation scenarios and dedicated research hubs for creating and enhancing digital learning (Ministry of Colleges and Universities, 2017; 2018). Institutions also recognized the importance of supporting faculty skill development in order to advance online learning initiatives (Bates, 2018; Donovan et al., 2019).

Studies released before COVID-19 revealed that student interest in online learning options was also growing, in part due to the convenience of technology-enhanced study options (Johnson et al., 2019; Harrison, 2016). Ontario student enrolments in online courses grew steadily each year between 2011 and 2017, with annual growth ranging from 14% to 25% per institution (Bates et al., 2017; Donovan et al., 2019; Johnson et al., 2019). In 2019, the annual growth in fully online course registrations across all institutions was 14%; Johnson

[1] Throughout this report, we use terms recommended by the Canadian Research Association for Digital Learning to describe three forms of digital learning. 'Online learning' refers to instances where all instruction and interaction within a course is fully online. 'Hybrid learning' is a blend of online and in-person instruction. 'In-person technology-supported learning' refers to digital resources and other technologies supporting in-person/on-campus instruction.

[2] Contact North is a "community-based bilingual distance education and training network" that "helps underserved residents in 1,300+ small, rural, remote, Indigenous and Francophone communities access education and training without leaving their communities" (Contact North, n.d.).

et al. (2019) also found that representatives from most Ontario colleges (82%) and universities (65%) anticipated continued growth in online course registrations in 2020. There were approximately 550,000 registrations in online courses in 2019 — and 150,000 students took at least one online course (Donovan et al., 2019).

The COVID-19 pandemic triggered a rapid acceleration of this growth: Ontario's PSE sector expanded online and hybrid offerings to ensure educational continuity for more than 660,000 students. Institutions managed this transformation using support from government and via incremental investments (i.e., expenditures beyond funds budgeted for online/hybrid teaching and learning activities). Research and reporting about campus closures through this period often focused on challenges and opportunities for students, faculty and staff (see: Pichette et al., 2020; Prowse et al., 2021; Ely et al, 2022; Lowes et al., 2020; Johnson & Seaman, 2020b) — responding to campus closures required communities to adapt quickly in an uncertain environment.

However, there is no public record of the scope and scale of institutions' investments that supported the transition to remote and online learning and enabled the sector-wide transformation of PSE. Recognizing this gap, HEQCO partnered with Colleges Ontario (CO) and the Council of Ontario Universities (COU) [3] to gather financial and enrolment data from Ontario colleges and universities; with this information, we provide an overview and analysis of how incremental investments transformed teaching and learning during campus closures and how these investments align with current learning trends. Our work provides stakeholders with an opportunity to examine how institutional investments contributed to Ontario's digital learning landscape both in the immediate context and more generally (i.e., how they may extend or advance the practice in the long term). It concludes with recommendations for how government and institutions can continue to support digital learning in the future.

Government Investments and the Virtual Learning Strategy (VLS)

Records of government COVID-19 support are publicly available and helpful to consider as part of the broader context of PSE's transformation. MCU supported Ontario's PSE through two key investments. The first was $25M in targeted pandemic response funding (announced on March 31, 2020) and was distributed to colleges, universities and Indigenous Institutes based on full-time enrolment (MCU, 2020a). In March 2021, Ontario issued an additional $106M in targeted funding to provide relief for a subset of 22 Ontario PSE institutions (MCU, 2021a; 2021d). These institutions received funding based on need: $62M was distributed to 12 colleges and $44M was distributed to 10 universities. These funds were designed to offset tuition or ancillary fee revenue loss due to the pandemic or

[3] CO and COU are member organizations representing the respective sectors in Ontario.

were used for expenses associated with online learning, personal protective equipment, enhanced cleaning, student financial supports and human resources (MCU, 2021d).

MCU also offered support via the Virtual Learning Strategy (VLS), announced in December 2020 as part of "Ontario Onwards: Ontario's COVID-19 Action Plan for a People-Focused Government." The initial VLS installment of $50M launched in January 2021 and was administered by eCO through a competitive RFP process. The strategy was built on three key pillars: driving innovation in hybrid learning; supporting lifelong learning and the rapidly evolving labour market; and strengthening Ontario's domestic and global leadership in virtual learning (MCU, 2020b; 2020c). Project proposals focused on the development, procurement and/or adaptation of various virtual learning content, supports and technologies in five investment Areas: Digital Content, Capacity, Fluency, Delivery and Indigenous Institutes (eCO, 2021a).

In March 2021, this VLS funding was awarded to 389 successful project applications. Every public college, university and Indigenous Institution in the province received project funds through this process (see Appendix A: Table A1 for funding details). Projects were completed by March 2022; resources created for students, faculty and the public were available beginning in spring 2022 on the eCO website (eCO, 2022a).

The remaining $21.4M of VLS funding was announced as part of the 2021 Ontario budget and was divided into two installments. Plans for the first $10.7M were announced in October 2021 (eCO, 2022b; MCU, 2021b; 2021c). Contact North received approximately $2.7M to enhance infrastructure and create a laptop and internet loaner program (MCU, 2021b). eCO was charged with distributing the remaining funds ($8M in total). Sixty-two projects launched in May 2022 and are scheduled for completion in February 2023 (See Appendix A: Table A2 for funding details, eCO, 2022c). Plans for the remainder of the VLS funds ($10.7M) have yet to be announced (MCU, 2021b; Government of Ontario, 2021).

Although Ontario colleges and universities offered many online courses and programs before 2020, moving *all* teaching and learning online required significant resources applied at a crucial point in the pandemic timeline (El Masri & Sabzalieva, 2020). Government's VLS timing and funding approach resulted in supports and digital resources that postdated the institutional transformations required for the 2020-21 and 2021-22 academic years.

Research Questions and Methodology

To better understand how Ontario institutions managed the transformation of PSE in the pandemic, HEQCO posed the following research questions:

- What incremental institutional investments (from March 2020 to April 2022) supported the transition to online learning?
- How many new online courses were offered at the height of the pandemic (in fall 2020) and after (in fall 2021 and fall 2022)?
- How do investments reflect or align with broader trends in the evolution of online and hybrid learning in Ontario and Canada as presented in the literature?

To explore college and university investments made during our two-year timeframe, we worked with Colleges Ontario (CO) and the Council of Ontario Universities (COU) to contact institutions, distribute a response form and encourage participation in the study. These forms invited respondents to answer: i) how many online courses they developed; ii) how many students were registered in these courses; and iii) how much was spent in three areas: technology-related infrastructure; incremental staffing for course development; and incremental funds for student services and supports.[4] All unique expense entries under these three categories can be found in Appendix B: Table 1 (Universities) and Table 2 (Colleges). Because we used different response forms for universities and colleges, we present data for the two sectors separately.

We received responses from 26 Ontario institutions, or 57% of recipients: 12 of 22 universities and 14 of 24 colleges. Responding institutions represent 73% of all university undergraduate full-time enrolments and 55% of college full-time enrolments.

Findings

University Investments

All 12 responding universities reported incremental investments, ranging between approximately $980K and $27M, to provide online learning opportunities and supports during the reporting timeframe. Collectively, these universities invested approximately $107M. Table 1 summarizes how financial investments were distributed. The majority of funding (44%) went to Technological Infrastructure. See Appendix B: Table B1 for a list of all unique reports under each area of investment.

[4] These categories mirror broader investment trends in PSE revealed through our review of the literature and advice from institutions. Respondents took care to omit any resources that were purchased using VLS funding.

Table 1

Incremental University Investments Between March 2020 and April 2022

Area of Investment	Sum of Investments ($)	Percentage of Investment (%)	Full-time Equivalent Staff Hired
Technological Infrastructure	$46,633,088	44%	--
Additional Staff for Course Development	$37,448,001	35%	1,137
Other Student and Faculty Services	$22,524,327	21%	--
Total Investments	**$106,605,416**	**100%**	

Note. Table 1 indicates the sum of university investments and the percentage of total investment in our three investment areas (Technological Infrastructure, Additional Staff for Course Development, and Other Student and Faculty Services), as well as the number of full-time equivalent staff hired at universities as a result.

College Investments

Twelve of the 14 colleges in our sample reported making incremental investments to provide online learning opportunities and supports during the timeframe. The two colleges that did not report incremental investments indicated that they relied on VLS and targeted government funding to support online learning expenditures. Collectively, the 12 colleges invested approximately $89M, ranging between $386K and $28M. Table 2 provides a summary of how financial investments were distributed across the three categories. Over half of the funds (52%) went toward additional staff to support online course development. See Appendix B: Table B2 for a list of all unique reports under each area of investment.

Table 2

Incremental College Investments Between April 2020 and April 2022

Area of Investment	Sum of Investments ($)	Percentage of Investment (%)	Full-time Equivalent Staff Hired
Technological Infrastructure	$23,657,167	26%	--
Additional Staff for Course Development	$46,122,674	52%	1,119

Area of Investment	Sum of Investments ($)	Percentage of Investment (%)	Full-time Equivalent Staff Hired
Other Student and Faculty Services	$19,453,997	22%	--
Total Investments	**$89,233,838**	**100%**	

Note. Table 2 indicates the sum of college investments and the percentage of total investment in our three investment areas (Technological Infrastructure, Additional Staff for Course Development, and Other Student and Faculty Services), as well as the number of full-time equivalent staff hired at colleges as a result.

University Online Course Offerings and Registrations

HEQCO asked participating universities to report the number of "online courses" developed for fall 2020 using incremental investments, as well as the total number of online courses and registrations for fall 2020 and fall 2021.

Universities included in our sample reported incremental investments that supported the development of 2,880 new online courses in fall 2020, which saw 114,640 registrations. All responding universities indicated that they would continue offering the courses they developed for the pandemic in the future. The total number of online courses and registrations for fall 2020 and fall 2021 are included in Table 3.

Table 3

Total Number of University Courses and Registrations, Fall 2020 and Fall 2021

Term	# online courses offered	# registrations
Fall 2020	16,997	898,863
Fall 2021	9,057	548,130

Note: Table 3 shows the total number of online courses and registrations offered by participating universities in fall 2020 and fall 2021.

College Online and Hybrid Course Sections and Registrations

Colleges reported "online and hybrid course sections" developed during the fall 2020 term using incremental investments. To describe total online and hybrid course sections offered in fall 2020 and fall 2022, colleges reported proportions. Differences between college and university reporting ("online courses" versus "online and hybrid course

sections") relate to sectoral preferences used in the reporting templates and may reflect differences in what data were easily accessible at the time and/or how administrative data on online and hybrid courses are typically gathered. Colleges also reported both for-credit and non-credit courses, though most of these courses reported (98%) were offered for credit.

Participating colleges used incremental investments to develop 18,552 new online and hybrid course sections[5] for fall 2020, which saw 478,210 registrations. The proportion of college course sections offered in online and hybrid formats for fall 2020 and fall 2022 are included in Table 4.

Table 4

Proportion of College Course Sections Offered in Online and Hybrid Formats, Fall 2020 and Fall 2022

Term	% of online/hybrid course sections offered
Fall 2020	73%
Fall 2022	29%

Note: Table 4 shows the proportion of college course sections offered in online and hybrid formats in fall 2020 and fall 2022.

Despite fewer options in the fall 2022 term compared to fall 2020, online and hybrid course options increased at Ontario colleges by approximately 19% between 2019 and 2022.

Discussion

Together, our participating colleges and universities invested nearly $200M to support educational continuity during COVID-19–related campus closures between March 2020 and April 2022. Though not captured in our reporting, institutions also supported their transformations with pre-pandemic budget allocations for digital learning and funding from decentralized budgets for investments made at the faculty and program levels. Targeted government funding received in March 2020 and, to 22 institutions, in March 2021, also helped advance virtual learning strategies during campus closures. The

[5] A particular course may have multiple sections associated with it. College course sections are included as separate units in this summary.

transformation of Ontario's PSE system was truly unprecedented: in the fall 2020 term alone, college and university online courses resulted in more than a million registrations.

Institutional investments not only prioritized immediate needs but were also strategic — funding amounts and spending priorities ensured resources were used where support could bring strategic benefit (e.g., with particular courses or programs, or to leverage existing infrastructure). Institutions also deployed innovative learning activities such as virtual games or simulations in fields that rely heavily on in-person instruction, as well as in work placements, labs and hands-on learning environments (see a list of investments in Appendix B: Tables B1 and B2; Doreleyers & Knighton, 2020). These activities, once considered supplemental to in-person instruction, were particularly important in the health-care sector. For instance, Ontario (and Canada more broadly) shifted nursing programs to web-based delivery, which required the creation of complex learning and assessment simulations (Peachey et al., 2021).

Strategic investment categories also corresponded with funding trends present in the literature prior to the pandemic: for infrastructure and innovative tools, faculty and staff development and for wellness supports. Institutions were already aware that faculty and staff training are vital for developing and delivering digital learning courses and programs across an institution (Bates, 2018; Donovan et al., 2019; MCU, 2017, 2018; Johnson et al., 2019; Johnson & Seaman, 2020a; 2020b; 2021c). In spite of this recognition, before the pandemic, few faculty reported experience teaching online in Ontario, and many reported having limited time to dedicate to training and course adaptation (Johnson et al., 2019; Johnson & Seaman, 2021c). Some faculty also reported a preference for teaching in-person (Sener, 2010; Harrison, 2016). Campus closures forced opportunities for faculty to gain experience and skills, which can also shape preferences and attitudes (McQuirter, 2020).

Institutions also mobilized online supports for faculty, staff and students' well-being, offering remote mental-health services; this is especially notable because only a handful of institutions offered similar services prior to widespread campus closures (Rashid & Genova, 2020). Enhanced mental health services were important for students, faculty and staff, as the sudden changes across PSE destabilized and distressed many campus community members (Rashid & Genova, 2020; Canadian Alliance of Student Associations, 2021; Johnson & Seaman, 2021a; 2021c) and created ongoing challenges for faculty and staff in balancing their work and home-life. Online support options — including counseling, tutoring and virtual office hours — will continue to be important as institutions intend to retain or expand online and hybrid learning options (Brennan et al., 2021; Brown, 2022; Johnson & Seaman, 2021b; 2021c; Li et al., 2021; Zhu et al., 2021).

College and university investment priorities overlapped with categories outlined in the government-funded VLS program — digital content, capacity, delivery and technologies.

These resources became available after immediate pandemic-based needs; additionally, the VLS used a project-based rather than direct-funding approach. This meant that the majority of VLS funding supported niche resource development and/or digital content driven by local needs and individual users.

Resources developed under the project-based model are typically driven from the 'bottom up' by individuals or teams who design and deploy them for use in a single course or specific program. Broader use of such resources is often dependent on a faculty member or student who encourages others to use them (Conrad & Veletsianos, 2022; see Barker et al., 2018 for examples of the typical ways individuals come to use open digital resources). 'Top down' approaches, as were used by institutions in response to the pandemic, typically involve strategic institutional leadership, which considers institutional context — including programming, faculty/student skills and local policies — in planning how project-based digital resources are used (Conrad & Veletsianos, 2022; Marín et al., 2022). Combining 'top down' and 'bottom up' approaches can provide structure and incentives to change educational practices (Marín et al., 2022).

Institutional investments that ensured the immediate transformation of teaching and learning activities will also have longer-term impacts. These impacts are already evident in increases in online and hybrid course offerings across Ontario colleges and universities. With investments in technological infrastructure and faculty and staff training, colleges and universities are now well positioned to grow their online and hybrid offerings even further according to institutional priorities, as well as to increase PSE access and success for historically marginalized learners (Lambert, 2021; Carey & Trick, 2013; Colvard et al., 2018 Contact North, 2019; Jung & Rhea, 2000; Lightfoot et al., 2018; Richardson, 2015). In-person learning will also benefit from ongoing technological innovations and investments: greater technical integration will enhance learning experiences for all students.

Expanding online and hybrid offerings will also impact future institutional budgets. The development of innovative online and hybrid courses is resource-intensive, both in terms of technological infrastructure and supporting staff capacity (Harrison, 2016). While faculty may be better equipped for teaching in online and hybrid contexts because of resources provided during the pandemic, many institutions report that they will retain support staff because faculty are still developing expertise and will require ongoing assistance to do so (Brennan et al., 2021; Singh et al., 2021). Further evolution in course delivery formats will also increase the need for expanded online student supports, including mental health, tutoring, advising and accommodation resources (Brennan et al., 2021; Li et al., 2021; Zhu et al., 2021).

Conclusion and Recommendations

During the pandemic, institutional investments were particularly transformative; these funds were applied strategically and guided by local contexts and institutional priorities, resulting in an immediate impact on student opportunities. Colleges and universities included in our sample report that these investments will continue to support online and hybrid programming into the future.

Ontario institutions have cultivated their own digital resources, technologies and capacities over the past decade. Today, nearly all learning, even in-person learning, incorporates some degree of digitization. The ongoing digital evolution of Ontario's institutions will require future investments in infrastructure, staff capacity, curriculum development and cybersecurity to maintain and build upon the high-quality learning experiences institutions already offer (El Masri & Sabzalieva, 2020; Johnson & Seaman, 2021c) and to support a broader digital transformation in Ontario PSE aimed at ensuring graduates are well-prepared for tomorrow's labour market.

Government can continue to support Ontario's digital landscape with funding that builds on previous investments. The transformation achieved in the pandemic offers important evidence to show that a strategic investment approach, with institutional leadership identifying opportunities for growth and support, is an effective means of achieving both short- and longer-term impacts on students' educational experiences.

As government considers future investments, HEQCO recommends a direct-funding approach — in other words, to distribute future virtual learning funding to institutions directly instead of through a project-based funding model (as used with previous initiatives, including the VLS). Providing envelope funding — where a pre-determined amount of funding outside of operating grants is allocated for a specific purpose — can support institutional differentiation and build capacity and technological innovations specific to local programming. Resources will be needed for a range of initiatives, reflecting different institutional environments and community needs.

Envelope funding can also focus on key government priorities, which would ensure institutions use the funds in ways that advance their own objectives while also maximizing their alignment with provincial goals. For example, funding can be directed at objectives such as improving access and outcomes for historically underserved students, such as those with disabilities, mature learners and students from lower-income backgrounds. Government should work closely with postsecondary partners to develop priorities and goals.

Direct funding can be administered using a variety of models that include robust accountabilities. For example, government can require some form of "matching funds" to

encourage institutions to continue investing in ways that advance shared priorities. Government can also use a "barrier to entry" model, where institutions choose whether to be considered for the envelope funding only if they meet the conditions set by the government in program details; institutions should be required to collect and report data related to such objectives.

Regardless of the particular model government chooses, a thorough understanding of the short- and long-term impacts of funding for digital learning requires more data on outcomes. The state of data on online and hybrid learning in Ontario is a work in progress, and considerations around improving data collection should go hand-in-hand with any shift in how funding is distributed. This paper represents a first step for PSE stakeholders and the public to understand the rapid transformation of educational activities across the sector during the pandemic. Additional data related to digital investments, enrolment patterns and student outcomes can inform and further enhance the high-quality digital programming offered across Ontario.

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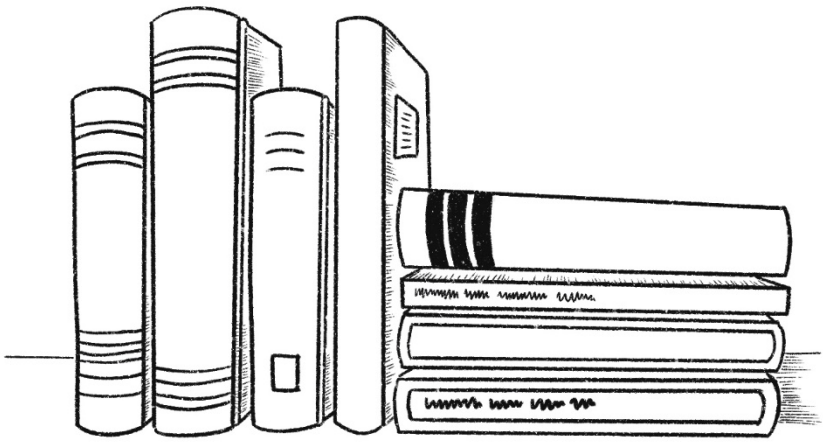

Ontario College and University Investments in Digital Learning During the Pandemic

Appendix

Appendix A

Table A1

First Round of VLS Funding ($50M) by Project and Activity, March 2021

Investment Area	Funds ($)	Funds (%)	Projects Receiving Funding (#)
VLS Administration (through eCO)	$1,945,000	4	N/A
eCampus-Led Projects	$5,665,073	11	3
Indigenous Institute Virtual Learning Grant	$2,500,012	5	9
Projects	$39,147,806	79	389
Digital Content	$24,498,532	49	312
Digital Capacity	$8,764,616	18	33
Digital Fluency	$4,903,404	10	30
Digital Delivery	$981,254	2	14
Total Investments	**$49,257,891**		

Note: Table A1 presents the number of dollars, percentage of total funding, and number of projects in receipt of funding dedicated to the four VLS Investment Areas, as well as the four Project sub-categories, by March 2021.

Table A2

Second Round of VLS Funding ($8M) by Project and Activity

Investment Area	Funds ($)	Funds (%)	Projects Receiving Funding (#)
VLS Administration (through eCO)	$406,000	5	N/A
Virtual Teaching and Learning*	$950,000	12	N/A
Projects	$6,700,000	83	62
Digital Content	$3,800,000	47	40
Digital Capacity	$2,900,000	36	13
Total Investments	**$8,056,000**		

Note. Table A2 provides the number of funds, percentage of total funds, and number of projects developed during the second round of VLS funding, dividing by three investment areas, as well as between two subcategories under the 'Project' category.

Appendix B: Additional Findings for Institutional Investments

Table B1

University Strategies and Investment Areas to Educate Students Online, Starting in March 2020

Technology Investments	
I.T. Infrastructure Expansion	MyVlab
	Network capacity
	Network services for online student access
	Zoom software subscription
	Bandwidth
	LMS
	VPN services
	Software licensing
	A.V equipment for development of online and hybrid courses
	Virtual lab technology
	Remote exam proctoring tools
	Virtual simulations
	Electronic library resources
	Virtual event support
	Mobile internet
	Student laptops
	Respondus
	Alibaba cloud service
	Digital Distribution Software
	6000 Power Apps per plan EDU
	Licenses for MacCheck Remote
	Proctoring
	Wireless access growth
	Network appliances and switches
	Storage & servers
	Camtasia
Classroom Enhancements for Remote/Hybrid Delivery	Investment to support RTC
	Video capture equipment
	Computers
	General classroom enhancements
	Echo360
	OWLs Classroom
	AV and video conferencing growth classroom modernization
Additional equipment for staff/faculty to work at home	Laptops
	Computers equipment

	Monitors
	Webcams
	Peripheral devices
	Chairs
	Computer accessories
Other	Virtual labs
Incremental Staffing – for course development	
Instructional Designers	Senior Instructional Designer
	eLearning assessment specialist
eLearning & Curriculum Specialist	Manager of eLearning
	IT staff and overtime
IT specialists in support of course development	Co-op and other student employees
Other	Part-time media support
	Online learning partners
	Students (Media Designers) & eLearning Tech Staff
	Classroom Technology Support for instructors
	Teaching Assistant/Graduate Assistant and sessional instructional resources
	Mental health and crisis management services for all students
Other Investments	
Accessibility Services/Mental Health (access to staff and resources)	SAS/SWC student accessibility services, including payroll and operating expenses
	Support services for international students including ancillary support services
International student supports (e.g., writing centre, language)	Enrolment support services
	Language
	SAS International Services
	Writing
	Development of virtual supports and services
Campus health and wellness centre and/or services	Student wellness and accessories including payroll and operating
	Remote support services
	Remote and hybrid work models
	DE Teaching Support Centre for Pedagogical Innovation

Note. Table A1 shows the unique purchases that universities made in key Investment Areas — Technological Infrastructure, Incremental-Staffing and Other Investments — to educate students online, starting in March 2020.

Table B2

College Strategies and Investment Areas to Educate Students Online, Starting in March 2020

Technology Investments	
I.T. Infrastructure Expansion	Splashtop
	Virtual Desktop Infrastructure licenses to support students remotely (VmWare Licenses)
	New servers to support VDI (HPE servers)
	MS Licences for remote desktop
	Hyflex Classroom Pilot Project
	Bongo Virtual Classroom
	Proctortrack
	H5P
	Hypothesis
	Pressbooks
	Library & Learning Services Software
	Work from home technology equipment
	Student virtual access to academic software
	Cell phones & Mobile hotspots
	Headsets for Softphone Users
	Campus Licenses: Zoom, Grammarly, Padlet, AdobeCreative Cloud, Microsoft Azure Lab Services, PhotoUpload software, Lab Software
	KGIT Devices to support rural students connectivity to attend classes
	Extended WIFI at campuses into parking lots for students and staff access when buildings were closed; WebEx licensing and remote access to hands on learning labs;
	Webcams
	Audio equipment for staff members in roles that required these pieces of equipment and/or software
	Specialized software
	Portable hard drives
	Filming/live-streaming gear
Classroom Enhancements for Remote/Hybrid Delivery	Lab upgrades to support delivery of remote content
	Software to allow for and enhance online delivery and access to learning materials
	Microphones
	Screens
	Server/Connectivity Enhancements (e.g., VPN Access for students abroad China
	Enhance Internet Connectivity in Indigenous/Remote Communities
	AppsAnywhere,
	LinkedIn Learning
	MyWorkDrive,

	software applications to protect College assets (Malwarebytes/Anti-virus software, extra Blackboard Learn/Collaborate Minutes & Storage, etc.)
	Loaner laptops for students who did not have access to necessary equipment
Additional equipment for students at work at home (i.e., computers)	Simulation licenses
	Software programs for remote access
	NetLab
Additional equipment for staff/faculty to work at home (i.e., computes	Laptops and diverse electronic devices
	Telecom licences (Avaya)
	Proctoring software (Respondus Monitor),
Other technology related expenses	Wireless network upgrades to student residences for remote learning
	License plate recognition software
	Graphics / Sign Making software and equipment Signage
	Filters
	Electronic signing software
	Virtual classroom software
	Internet sticks and laptops
Incremental Staffing - for course development	
Faculty	Remunerated part time faculty who took part in digital learning PD courses
Instructional Designers	Instructional Design Technologist
Other Investments	
Other	Virtual internship programs
	Modules to help students navigate the services, tools and the learning environment available in an online atmosphere
	Supplemental time on SWFs for FT faculty to support online development
	Increase digital collections so that all course readings/films could be used/streamed in virtual instruction.

Note. Table A2 shows all the unique purchases that colleges made in key Investment Areas — Technological Infrastructure, Incremental-Staffing and Other Investments — to educate students online, starting in March 2020.