Digital Educational Resources in Northern Alberta
Research Report

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Labour Education Applied Research North

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SECTION 1: EXECUTIVE SUMMARY

Since the early 2000s, the use of Digital Educational Resources (DERs) has become increasingly prominent in post-secondary institutions.[1] DERs are technologies that provide students enhanced control over the time, place, and pace of their learning.

Research Objectives

Labour Education Applied Research North (LEARN) is a joint initiative between the Northern Alberta Development Council (NADC) and four northern Alberta post-secondary institutions: Grande Prairie Regional College, Keyano College, Northern Lakes College, and Portage College. LEARN contracted R.A. Malatest & Associates Ltd. (Malatest) to research DERs for northern Alberta post-secondary education, including but not limited to: delivery, access, barriers, preferences, and best practices. The results of this project have provided LEARN with the data needed to look at improving integration of resources into northern teaching and will provide a platform for the development of a digital education strategy.

Methodology

The methodology involved secondary and primary research.

- A literature review of academic articles, reports, and other documentation from multiple jurisdictions including Alberta, other Canadian provinces, Australia, and the United States investigated the impact of DERs on access to and delivery of post-secondary education, barriers to using DERs, preferences for hard copy or electronic textbooks, and resource requirements for integrating DERs into post-secondary education.
- The environmental scan complemented the literature review and focused on public database searches to find resources, strategies, and policies utilized by other jurisdictions and post-secondary institutions to promote DERs.
- Eleven key informant interviews were conducted with individuals knowledgeable about the use and management of DERs. Each of the participating colleges nominated a representative to participate in an interview and NADC provided contact information for other stakeholders and partner organizations.
- A survey was conducted with students at the four participating colleges to examine their perceptions of, and experiences with, DERs. A total of 455 students completed the survey.

Findings

Improving Access to Digital Educational Resources

One factor influencing the accessibility of post-secondary education, particularly in rural and remote communities, is the distance students are from the institution. Living too far away from a post-secondary institution to commute can increase the cost of attendance (e.g. rent and transportation) and contribute to emotional and social challenges associated with relocation (e.g. family obligations). In Alberta, 93% of residents live within commuting distance to a post-secondary institution.[2]

[1] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

[2] Frenette, M. (2004). Access to College and University: Does Distance to School Matter? *Canadian Public Policy*, 30(4), 427–443. doi: 10.2307/3552523

DERs have the potential to improve access to post-secondary education, particularly for students who are low-income, academically underprepared, located in rural areas, or have employment and childcare-related responsibilities and therefore are unable to attend traditional classes.[3] DERs can make it easier for post-secondary institutions to distribute materials over a larger geographic area, enabling them to provide their programs and courses to students in rural and remote locations. They can also help reduce some of the costs students may incur attending post-secondary education (e.g. relocation, travel, and childcare). Furthermore, by enabling students to work while studying, DERs may encourage some low-income students to pursue a post-secondary education. DERs may also benefit rural and remote communities by enabling students to study in their home communities, thereby reducing the number of students who leave for school and do not return after graduating.

Enhancing Learning Experiences

DERs, which are one of the factors potential students consider when making decisions, can either enhance or serve as a barrier to enrollments. For example, if the program or courses that students want or need to take are available at different institutions, the availability of DERs may influence their enrollment decisions. At the institutions participating in this study, 23% of students said the availability of DERs at a specific college influenced their decision to enroll there. The 2017 National Survey of Online and Distance Education in Canadian Post-Secondary Education, however, highlighted that gaps and inconsistencies in enrollment data limited access to accurate information on the impact of DERs on student enrollment in post-secondary institutions.[4]

One of the benefits of DERs is flexibility for learners.[5] DERs provide students with the ability to learn at their own pace, study on their own schedule, and continue to meet their pre-existing work and family obligations. Although DERs provide learners with increased flexibility, retention rates for online courses tended to be lower than those for traditional classes.[6] A variety of factors may contribute to increased attrition rates, including students' misconceptions about the workload associated with online courses, family commitments and social obligations, challenges using online technologies, issues of isolation and low engagement, and a lack of discipline to undertake self-directed learning and independent thinking.[7] Nevertheless, this student survey found that 70% of students strongly agreed (26%) or agreed (44%) that DERs allowed them to complete their post-secondary education more easily.

Despite the increasing use of DERs at post-secondary institutions, there are ongoing debates about the effectiveness of these resources and their impact on higher education.[8] Results from several meta-analyses investigating the effectiveness of DERs versus traditional classroom learning found that DERs are at least as effective, and in some cases more effective, than classroom instruction. According to the

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[3] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928

[4] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

[5] Ibid.

[6] Bawa, P. (2016). Retention in Online Courses: Exploring Issues and Solutions—A Literature Review. *SAGE Open*, 1–11. doi:10.1177/2158244015621777

[7] Ibid.
Harris, B. (2013). *Distance Education Report*. Retrieved from http://californiacommunitycolleges.cccco.edu/portals/0/reportstb/report_distanceeducation2013_090313.pdf

[8] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928

student survey, about three-quarters or more of students who used a particular resource (e.g. online practice quizzes or tests, learning modules, online lectures and courses, electronic notes, training simulators, animated demonstration of course materials, and electronic textbooks) said it greatly improved or somewhat improved their learning. According to students, the most common benefits of DERs were more time to review the material and the ability to review material on their own schedule.

Experiences With Digital Educational Resources and Electronic Textbooks

Our survey showed that students used a variety of DERs. On a weekly basis, about six in 10 students were using electronic notes and other resources (63%), online practice quizzes or tests (60%), or online lectures/courses (59%). Additionally, just over one-third of students were using electronic textbooks on a weekly (26%) or monthly (10%) basis. However, almost half (48%) of the students said they never used electronic textbooks.

Electronic textbooks can offer a range of advantages such as interactivity, multimedia, and the flexibility to cater to individual learning styles.[9] However, the student survey found 74% of students strongly (56%) or slightly (18%) preferred hard copy textbooks. Most students who preferred using hard copy textbooks reported that it was because of their ease of use (90%) and future accessibility (54%).

Only 8% of students preferred electronic textbooks. Those who preferred electronic textbooks did so because of their portability (72%), ease of use (53%), and price (50%). Less than half of the students who preferred electronic textbooks (43%) indicated that it was because of their interactive features.

Key informants did not have strong opinions regarding faculty preferences for electronic textbooks or hard copy textbooks. They suggested that barriers relating to faculty use of electronic textbooks may include habit or tradition (e.g. instructors were trained using hard copy textbooks and therefore continue to use them in their courses); lack of familiarity with, or support for, electronic textbooks; and varying publisher platforms and software requirements for different electronic textbooks.

It does not appear that libraries have any specific preference for the use of electronic or hard copy resources. Rather, libraries simply respond to the preferences of their clientele. The main barrier to libraries' development of electronic resources is meeting the various licensing, software, and hardware requirements of different publishers.

Open Educational Resources

Open Educational Resources (OERs), one of the most prominent types of DERs, are publicly available teaching, learning, and research resources that are generally free for students and faculty to access, e.g. free ebooks from Project Gutenberg or free educational videos on YouTube. OERs may be used to market post-secondary institutions and help highlight the knowledge and resources of the institutions that develop them. They can also help instructors better fulfil the objectives of their course by enabling them to customize the material they present in class. Furthermore, OERs can improve the learning experience for students and provide them with a richer understanding of the course material. However,

[9] Millar, M. & Schrier., T. (2015). Digital or Printed Textbooks: Which do Students Prefer and Why?, *Journal of Teaching in Travel & Tourism*, *15*(2), 166–185. doi: 10.1080/15313220.2015.1026474

given that there are no national policies or guidelines for the evaluation and licensing of OERs,[10] instructors need to review OERs prior to using them to ensure they are accurate, up-to-date, and relevant to the course. Furthermore,

Challenges With Digital Educational Resources: Broadband and Internet Access

The internet is the most widely used technology to deliver distance education (98%).[11] Digital divides pose a continuing challenge for individuals living in rural and remote communities. In 2012, 6% of Albertans did not have access to a high-speed internet connection.[12]

The survey found that 87% of students had access to a high-speed internet connection. Almost all students with access to a high-speed connection (91%) said it improved their ability to use DERs. Similarly, most students without access to high-speed internet (80%) said it limited their ability to use DERs.

Limited access to broadband and high-speed internet can negatively affect the use of DERs. Students with poor internet connections may experience lags and delays accessing and downloading materials, which can slow their progress through a course. Students lacking high-speed internet may be limited in their ability to engage in synchronous coursework, stream or share data in real time, and interact with their classmates online. Furthermore, students with an unreliable or slow connection may not be able to access virtual desktops. They may need to acquire and install a copy of course software on their computer in order to complete assignments, potentially adding costs to their post-secondary education.

Challenges accessing course materials can negatively affect students' perceptions of the course, their decisions about whether to continue in the course, and their learning outcomes. Nonetheless, instructors may use various mitigation strategies to help students overcome poor internet connections. For example, when designing courses, instructors should take into consideration that some students may have limited internet access and incorporate media other than the internet (e.g. flash drives and text descriptions of videos). Additionally, instructors can minimize the use of live streaming and provide students with the opportunity to download materials when they are able.

Challenges With Digital Educational Resources: Training and Support Needs

Not all individuals are equally comfortable with, or have knowledge of, computers and electronic resources. Therefore, training and support can help ensure all individuals have an equal ability to access, use, and develop DERs.

The survey found that one-quarter of students indicated that they required training or supports to use DERs throughout their program. In particular, students who were 46 years or older (47%) were more likely to report that they required training and support to use DERs.

[10] Howell, S. & O'Donnell, B. (2017). *Digital Trends and Initiatives in Education: The Changing Landscape for Canadian Content*. Retrieved from http://www.omdc.on.ca/Assets/Research/Research+Reports/Digital+Trends+and+Initiatives+in+Education/Digital+Trends+and+Initiatives+in+Education.pdf

[11] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

[12] Service Alberta (2017). *Final Mile Rural Connectivity Initiative*. Retrieved from http://www.servicealberta.ca/FMRCI.cfm

Although half of the students surveyed reported experiencing challenges using DERs, most of the difficulties were associated with the resource itself rather than access to the necessary technology. About half of the students reported that the resource they were trying to access was unavailable or offline (55%) or the resource did not work as expected (49%).

Overall 88% of students reported that they had the necessary technical resources needed to access DERs. However, students aged 46 years and older (19%) were more likely than younger students (18-25 years – 7%; 26-35 years – 3%; 36-45 years – 6%) to state that they did not have the necessary resources. Furthermore, students who self-identified as Indigenous (82%) were less likely than non-Indigenous students (91%) to say they had access to required resources. For students who lacked the necessary technical resources to access DERs, the most common problem was the slow speed of their computer or device (65%).

Various training and support may help students and faculty access and use DERs. For example, orientation sessions can provide a general overview of available DERs at the institution and describe the platform used (e.g. Moodle). Classes and presentations can highlight the benefits of DERs, give detailed introductions to specific DERs, or illustrate how to complete common tasks using the resource. Online tutorials can introduce a specific DER, provide an overview of how to use the resource, and give detailed instructions about using advanced features of the resource. Help desk or IT support staff can answer specific student and faculty questions about a particular DER or provide troubleshooting support. Support staff are generally knowledgeable about DERs and may even specialize in specific resources. Additionally, course instructors who regularly use DERs can provide basic support to students concerning their use. Instructors can direct students to appropriate institutional resources when student questions are beyond their abilities.

Promotion of Digital Educational Resources and Open Educational Resources

Post-secondary institutions need to promote DERs to ensure their adequate and appropriate use. Without an overall program or strategy for DERs, their development and use is sporadic and restricted to individual instructors. Efforts to promote the use of DERs may involve advertising campaigns to increase awareness of DERs, developing policies that address the use of DERs, and integrating DERs into course and program design.

To increase the use of DERs at post-secondary institutions, it is necessary to demonstrate their efficacy (e.g. cost savings for institutions and students, and improved student and program outcomes) and make them easier to access and use. Furthermore, having policies related to DERs provides faculty and instructors with direction regarding the role and use of DERs in coursework. Pairing this with appropriate support and training will help position faculty and instructors to use DERs to enhance learning environments and student outcomes more effectively.

Similarly, post-secondary institutions can promote the use of OERs by positioning OERs as a marketing tool, using them to reduce program costs, establishing clear policies concerning their use and development, providing incentives to encourage their development and use, and encouraging collaboration between institutions to develop OERs.

Recommendations

While DERs have the capacity to level access to post-secondary education, planning their implementation requires thought and consideration. Recommendations to support the appropriate implementation of DERs include the following:

Recommendation #1: Develop a Strategic Vision for Digital Educational Resources in Northern Alberta

LEARN should develop a strategic vision or guiding framework to promote and support the continued development and use of DERs in northern Alberta post-secondary institutions. By working together to achieve a shared vision and leveraging each other's knowledge and expertise, institutions can maximize the use of their resources to enhance the accessibility, affordability, and quality of educational opportunities in the north. The vision should:

- establish common goals and priorities for DERs in northern Alberta post-secondary education;
- describe the desired role of DERs in northern post-secondary institutions;
- determine the intended outcomes for institutions, faculty, and students that DERs will contribute to;
- identify strategies for addressing systemic barriers to developing and using DERs in the north;
- specify the roles and responsibilities of stakeholders; and
- determine the resources required to realize the vision.

Recommendation #2: Develop Institution-Based Toolkits to Support the Development and Use of Digital Educational Resources

Institutions should develop and tailor toolkits to meet institutional needs and support faculty and students in developing and using DERs. The toolkits may be comprised of various resources such as:

- descriptions of institutional policies, governance mechanisms, and information technology infrastructure related to DERs;
- practical guides to assist faculty in the development and use of DERs;
- a list of considerations for faculty when selecting DERs;
- a description of pedagogical practices that support the effective use of DERs;
- an inventory of resources (e.g. grants/funding, faculty time, and networks/collaborations) that are available to support faculty with the development of DERs;
- orientation materials to introduce students to DERs;
- an inventory of and centralized repository for DERs; and
- centralized resources to help faculty and students troubleshoot any technological challenges they may experience when using DERs.

To ensure they meet the needs of the intended users and to garner support for their use, faculty should be involved in the design and development of the toolkits and associated resources. Furthermore, faculty can offer the insights required to ensure the resources will support the development and use of DERs that align with program and course objectives, as well as the needs of students.

Recommendation #3: Ongoing Monitoring of Student Use of Digital Educational Resources

DERs are intended to enhance students' learning experiences and achievement of outcomes. To ensure this goal is being met, institutions need to collect and monitor data systematically regarding student preferences for DERs, students' use of DERs, and student outcomes for courses that are delivered using

DERs. This information can be gathered through administrative databases, library collections management systems, annual surveys, course evaluations, or other means. Ongoing monitoring will enable institutions to assess the effectiveness of different DERs, review student satisfaction with DERs, and engage in evidence-informed decision making regarding future digital education strategies.

SECTION 2: INTRODUCTION

Since the early 2000s, the use of Digital Educational Resources (DERs) has become increasingly prominent in post-secondary institutions.[13] DERs are technologies that provide students with enhanced control over the time, place, and pace of their learning.[14] DERs have the potential to improve access to post-secondary education and provide students with greater flexibility to learn at their own pace and style and with a high-quality experience that engages them in achieving career and employment goals.[15]

DERs can support either online distance learning or blended (hybrid) learning, which combines online learning and face-to-face instruction.[16] Post-secondary institutions can deliver DERs in a variety of formats and may be synchronous, where students participate at the same time as the instructor, or asynchronous, where students do not necessarily participate at the same time as the instructor. The following are examples of DERs used in post-secondary institutions, including northern Alberta institutions:

- hybrid and online programs
- college learning management systems that provide access to educational materials, resources, and online activities
- Open Educational Resources (OERs)[17]
- e-portfolios (digital e-portfolio tools for creation of course- and program-based portfolios)
- mobile education (smartphones, tablets, and laptops)
- online lectures and courses
- electronic textbooks
- electronic notes and other resources
- online practice quizzes and tests
- learning modules
- animated demonstrations of course material
- training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators)

As technology evolves at an ever-increasing rate, institutions strive to remain up-to-date, and communities and post-secondary institutions must continually adjust and prepare to meet future workforce needs. Labour Education Applied Research North (LEARN) is a joint initiative between the Northern Alberta Development Council (NADC) and four northern Alberta post-secondary institutions: Grande Prairie Regional College, Keyano College, Northern Lakes College, and Portage College. LEARN contracted R.A. Malatest & Associates Ltd. (Malatest) to research DERs for northern Alberta post-secondary education, including but not limited to: delivery, access, barriers, preferences, and best practices. The results of this project have provided LEARN with the data needed to look at improving integration of resources into northern teaching and will provide a platform for the development of a digital education strategy.

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[13] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

[14] As the term Digital Educational Resource (DER) is not commonly used in the literature, this working definition has been developed for use in this report.

[15] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928
The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

[16] Watson, J. (no date). *Blended Learning: The Convergence of Online and Face-to-Face Education*. Retrieved from https://files.eric.ed.gov/fulltext/ED509636.pdf

[17] "OERs are defined as teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others (The William and Flora Hewlett Foundation, 2012)." Weller, M. & Anderson, T. (2013). Digital resilience in higher education. *European Journal of Open, Distance and e-Learning*, 16(1). p. 53.

SECTION 3: METHODOLOGY

3.1 Research Design

Multi-method data collection, including primary and secondary data, ensured results were comprehensive and relevant to the northern Alberta experience. Primary data was collected through key informant interviews with relevant stakeholders and a survey of students attending the participating colleges. Secondary data was gathered through a literature review and an environmental scan.

3.1.1 *Literature Review*

Focusing on the topics outlined in the research matrix (see Appendix A), the literature review drew on academic articles, reports, and other documentation from multiple jurisdictions including Alberta, other Canadian provinces, Australia, and the United States.[18] Articles were sourced through an internal literature review completed by LEARN and standard keyword searches of publicly available search tools (e.g. Google Scholar) and academic literature databases (e.g. Academic Search Complete, an online repository of more than 9,000 journals to which Malatest maintains a subscription). Resulting articles were reviewed for their relevance to the current project, and where applicable, their references were mined for additional sources.

Selected articles were added to a database. To allow for the ready review of the material, the database outlined the content of each article by the research questions addressed. It also highlighted gaps in the current literature review and assisted with further targeted searches for articles.

3.1.2 *Environmental Scan*

The environmental scan complemented the literature review and utilized a similar methodology. Keyword searches of publicly available search tools (e.g. Google Scholar) and academic literature databases (e.g. Academic Search Complete) were undertaken to find resources, strategies, and policies utilized by other jurisdictions and post-secondary institutions to promote DERs. The scan included post-secondary institutions and government programs in Alberta, other Canadian provinces, Australia, and the United States. The scan looked for programs designed to address DERs and extracted their best practices.

Similar to the literature review, the initial scan was broad in scope to capture all possible programs. Resources, strategies, and policies selected for inclusion in this study were entered into a database similar to the one used for the literature review.

3.1.3 *Key Informant Interviews*

Eleven key informant interviews were conducted with individuals knowledgeable about the use and management of DERs. Each of the participating colleges nominated a representative to participate in an interview, and NADC provided contact information for other stakeholders and partner organizations.

All of the key informants had at least five years of experience working with DERs, including eight who had more than 10 years of experience. Their involvement with DERs included developing DERs (6), managing their organization's DERs (6), and promoting DERs (4) to staff and students. Eight key informants were associated with a post-secondary institution, and three were community partners who assisted with workplace training.

[18] These locations were selected as their geographical, demographic, and socio-economic characteristics are relatively similar to northern Alberta and Canada.

Interviews were conducted by telephone between November 22, 2017, and December 7, 2017. To help informants prepare for the interview, they received a copy of an interview guide (see Appendix B) prior to the conversation. Each interview took between 45 and 90 minutes to complete.

3.1.4 *Student Survey*

A survey was conducted with students at the four participating colleges (see Appendix C). The survey was hosted on Malatest's servers.

- Portage College administered the survey internally and sent regular email reminders. Malatest assisted Portage College by providing the access codes of students who completed the survey so they would not be sent further reminders.
- Malatest administered the survey at the three remaining colleges.

Similar recruitment instruments and reminder schedules were used to ensure comparability of survey methodology across the colleges. Portage College provided four reminder emails, and Malatest provided five reminder emails to students at the other colleges.

Ethics approval processes resulted in different launch dates at each of the colleges (see Table 3.1). The survey was open for four weeks at each of the four colleges.

Table 3.1: Survey Administration Dates

College	Survey Start Date	Survey End Date
Grande Prairie Regional College	October 19	November 15
Portage College	October 19	November 15
Keyano College	October 31	November 29
Northern Lakes College	October 31	November 29

A total of 666 students started the survey; of these:

- 68% completed the survey;
- 22% were not eligible to participate in the survey because they were under the age 18, had only attended one semester of college, or had not used a DER;
- 10% started the survey, but did not finish it; and
- 2% did not consent to participate.

See Chart 3.2 for additional information.

Chart 3.2: Survey Outcomes
(n=666)

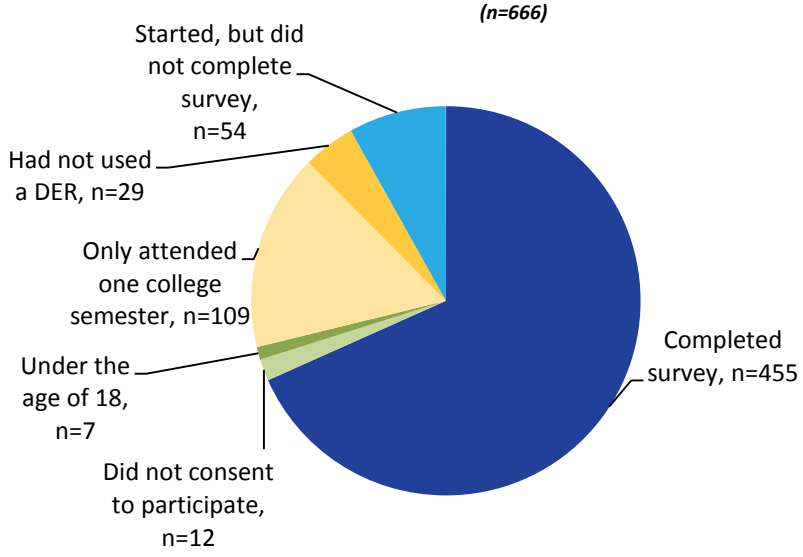


Table 3.3 shows the number of completions by college. The data was weighted to ensure the number of survey completions reflected the proportion of the total student population represented by each institution. All analyses were completed using the weighted data.

Table 3.3: College Enrollment
Question 1: Which northern college are you enrolled in? (n=455)

College	Unweighted		Weighted	
	n	%	n	%
Northern Lake College	160	35%	129	28%
Grande Prairie Regional College	147	32%	163	36%
Keyano College	82	18%	96	21%
Portage College	66	15%	67	15%

Tables 3.4 to 3.9 provide a demographic profile of the 455 students who completed the survey.

Table 3.4: Age
What is your current age? (n=455)

Age	Unweighted		Weighted	
	n	%	n	%
18 to 25 years	212	47%	218	48%
26 to 35 years	126	28%	125	28%
36 to 45 years	71	16%	69	15%
46 to 55 years	41	9%	38	8%
56 and older*	5	1%	5	1%

Note: Numbers do not add to 100% due to rounding
*Due to the small number of respondents in this age category, it was collapsed into "46 and older" for analysis.

Table 3.5: Number of Semesters Attending College *Question 2: How many semesters have you been registered with this northern college? (n=455)*				
Semesters	**Unweighted**		**Weighted**	
	n	**%**	**n**	**%**
Two semesters	155	34%	153	34%
Three to four semesters	196	43%	193	42%
More than four semesters	104	23%	109	24%

Table 3.6: Gender *Question 26: Do you identify as… (n=454)*				
Gender	**Unweighted**		**Weighted**	
	n	**%**	**n**	**%**
Male	75	17%	76	17%
Female	376	83%	375	83%
Other	3	1%	3	1%
Note: Numbers do not add to 100% due to rounding				

Table 3.7: Indigenous Status *Question 27: Do you identify as an Indigenous person? (n=453)*				
	Unweighted		**Weighted**	
	n	**%**	**n**	**%**
Yes	157	35%	142	31%
No	296	65%	311	69%

Table 3.8: First Language *Question 28: What is the first language that you learned that you still understand and speak? (n=452)*				
Language	**Unweighted**		**Weighted**	
	n	**%**	**n**	**%**
English	371	82%	372	82%
French	4	1%	4	1%
First Nation or Métis language	27	6%	24	5%
Other	50	11%	53	12%

Table 3.9: Learning Disability Status *Question 29: Do you identify as a person with a learning disability? (n=453)*				
	Unweighted		**Weighted**	
	n	**%**	**n**	**%**
Yes	46	10%	45	10%
No	407	90%	408	90%

SECTION 4: RESEARCH FINDINGS

4.1 Value of Digital Educational Resources

4.1.1 *Improving Access to Post-Secondary Education*

DERs have the potential to improve access to post-secondary education, particularly for students who are low-income, academically underprepared, located in rural areas, or have employment and childcare-related responsibilities and therefore are unable to attend traditional classes.[19]

In Canada, online and distance learning opportunities are widely available in post-secondary institutions. Of the 203 public, provincially funded universities, colleges, and Collèges d'Enseignement Général et Professionnel (CEGEPs) invited to participate in the 2017 National Survey of Online and Distance Education in Canadian Post-Secondary Education, 77% offered distance education courses or programs for credit.[20]

Between 2011 and 2016, the percentage of Canadian post-secondary institutions offering online courses grew by 11%. Smaller institutions were the source of much of this growth; of the 29 institutions with 2,000 students or less, 12 offered online courses in 2011 and 18 offered online courses in 2016.[21]

4.1.1.1 Rural Access to Post-Secondary Education

One factor influencing the accessibility of post-secondary education, particularly in rural and remote communities, is the distance students are from the institution. Across Canada, at least 89% of residents live within commuting distance (defined as an 80-kilometre straight line distance between the two points) of a university or a college, although students are more likely to live within commuting distance to a college than a university.[22] The proximity of post-secondary institutions to residents varies by province; in Alberta, 93% of residents live within commuting distance to a post-secondary institution.[23]

Students living 80 kilometres or more from a university were only 58% as likely to attend university as those living less than 40 kilometres away.[24] Living too far away from a post-secondary institution to commute can increase the cost of attendance (e.g. rent and transportation) and contribute to emotional and social challenges associated with relocation (e.g. family obligations).

All key informants suggested that DERs have the potential to level access to post-secondary education by removing distance as a barrier. They explained that DERs make it easier for post-secondary institutions to distribute materials over a larger geographic area, thereby enabling

[19] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928
[20] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf
[21] Ibid.
[22] Frenette, M. (2004). Access to College and University: Does Distance to School Matter? *Canadian Public Policy*, 30(4), 427–443. doi: 10.2307/3552523
[23] Ibid.
[24] Ibid.

them to provide their programs and courses to students in rural and remote locations. Although some interviewees recognized that traditional "books-in-a-box" distance learning was available to rural communities, they said DERs enabled institutions to provide greater outreach to underserved populations, create a more robust experience for students, and deliver distance learning environments that were similar to attending class in-person.

Key informants also indicated that DERs can help reduce the costs associated with post-secondary education, thereby increasing the likelihood that individuals will enroll in post-secondary education. By allowing students in rural and remote communities to study at home, DERs may reduce costs associated with relocation, travel, and childcare. They also noted that by enabling students to work while studying, DERs may encourage some low-income students to pursue a post-secondary education.

Finally, some interviewees noted that DERs may also benefit rural and remote communities by enabling students to study in their home communities, thereby reducing the number of students who leave for school and do not return after graduating.

4.1.2 *Enhancing Learning Experiences*

According to the 2015 Universities Canada Digital Technologies Survey, just over half of its member universities (52%) said the main drivers for adopting digital technologies were improved effectiveness in student retention, student outcomes, alumni relations, and services to faculty and staff.[25]

4.1.2.1 Enrollment

It was difficult to determine how many students enrolled in Canadian post-secondary institutions were taking online courses or what proportion of teaching was taking place online.[26] According to the 2017 National Online Learning Survey, there were significant gaps and inconsistencies in enrollment data resulting from a lack of provincial reporting requirements, the inability of institutional IT systems to extract the required data readily, the time and costs associated with collecting the data, and a lack of national definitions regarding the required data.[27] Nonetheless, almost three-quarters of the institutions responding to the survey indicated that online learning provided a means to increase enrollments.[28]

While key informants universally believed that DERs increase access to post-secondary education, they offered differing perspectives about the potential impact of DERs on enrollments.

- *DERs may help enhance enrollments.* Using DERs as a marketing tool may help institutions raise public awareness of the programs and courses they offer. Furthermore, providing students with a positive experience accessing DERs would help potential students become familiar and comfortable with the institution.

[25] Universities Canada (2015). *Canadian Universities and our Digital Future: A workshop by Universities Canada*. Retrieved from https://www.univcan.ca/wp-content/uploads/2016/05/canadian-universities-and-our-digital-future-2015-workshop-report.pdf
[26] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf
[27] Ibid.
[28] Ibid.

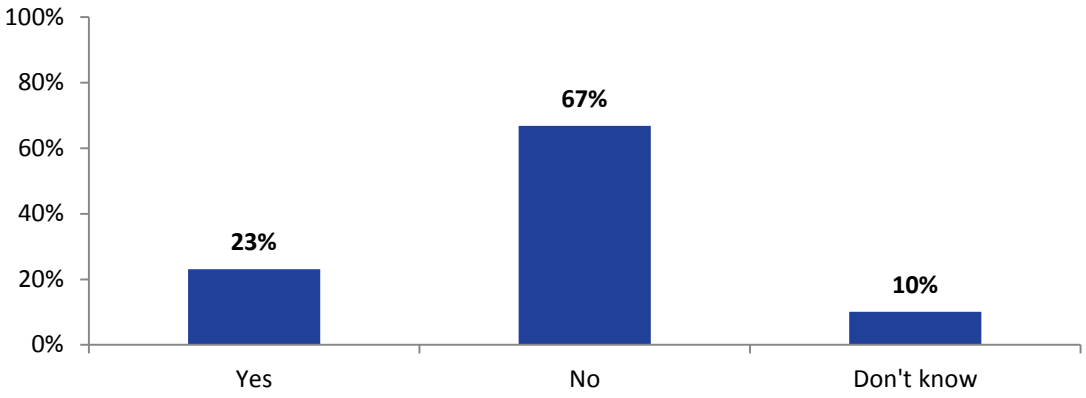
- *DERs may be a barrier to enrollment*. Students who are less knowledgeable about or comfortable with technology may choose not to enroll in institutions where they may be expected to use DERs. Key informants said older students are generally perceived as being less comfortable using computers and DERs.

Key informants cautioned that DERs are only one of the factors that potential students consider when making enrollment decisions.

- Interviewees suggested that if the program or courses that students want or need to take are available at different institutions, then the availability of DERs may influence their enrollment decisions. This perspective is corroborated by the survey finding that, for 23% of students, the availability of DERs at a specific college influenced their decision to enroll there (see Chart 4.1).
- Key informants indicated that, unless potential students have undertaken extensive research, they may not know which DERs are available at an institution. The survey findings support this position; for 67% of students, the availability of DERs did not influence their enrollment decision (see Chart 4.1).

Chart 4.1: Impact of DERs on Institution Selection

Question 21: Did the availability of DERs at this college impact your decision to enroll here? (n=454)



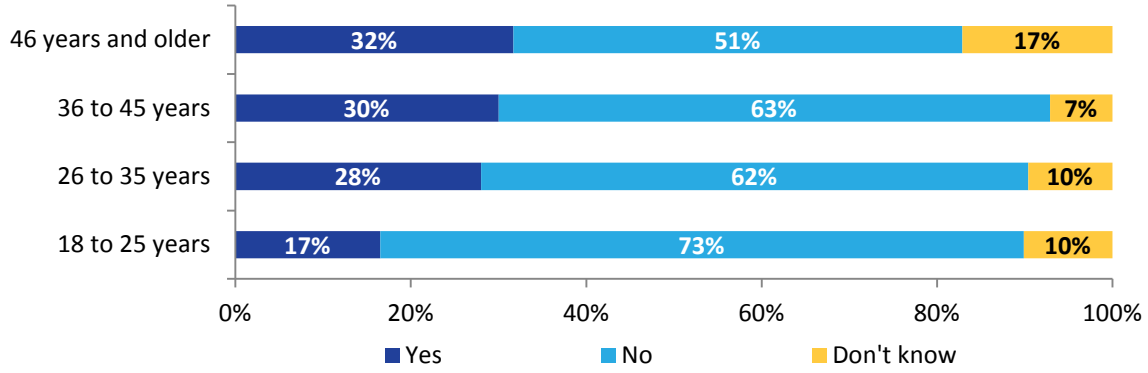
Students attending Northern Lakes College (37%) and Portage College (33%)[29] were more likely to report that the availability of DERs influenced their decision to attend that institution than students from Grande Prairie Regional College (15%) and Keyano College (11%).

Across all age groups, more than half of the students said the availability of DERs at their institution did not influence their enrollment decision. However, students who were 18 to 25 years old (73%) were more likely than those who were 46 years and older (51%) to say that the availability of DERs did not influence their decision (see Chart 4.2).

[29] A notable number of the Portage College students who responded to the survey were enrolled in courses that were delivered entirely online or courses that had a significant online component. Therefore, this finding may not be representative of the student population at Portage College.

Chart 4.2: Impact of DERs on Institution Selection by Age

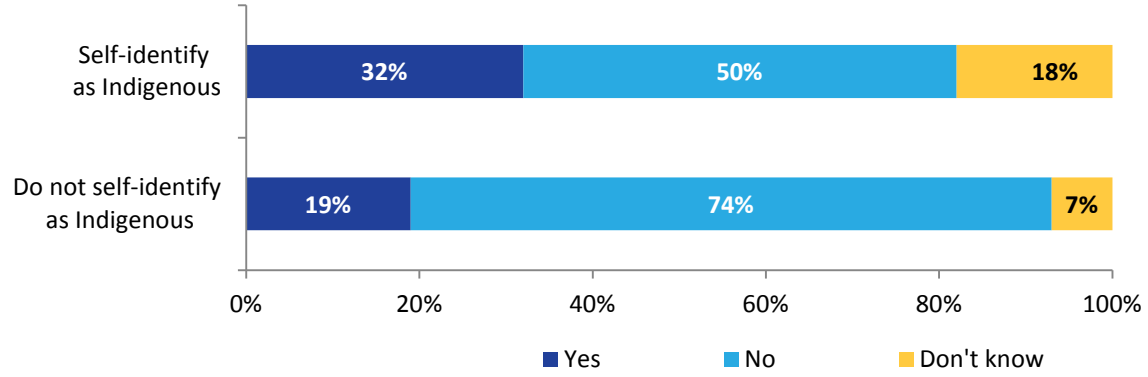
Question 21: Did the availability of DERs at this college impact your decision to enroll here? (n=454)



Students who self-identified as Indigenous (32%) were more likely than non-Indigenous students (19%) to say the availability of DERs influenced their decision to enroll at a specific college. Indigenous students (18%) were also more likely than non-Indigenous students (7%) to say they did not know if the availability of DERs influenced their decision (see Chart 4.3).

Chart 4.3: Impact of DERs on Institution Selection by Indigenous Status

Question 21: Did the availability of DERs at this college impact your decision to enroll here? (n=451)



There were no statistically significant gender-based differences related to the influence of the availability of DERs on enrollment decisions.

4.1.2.2 Retention and Program Completion

One of the benefits of DERs is flexibility for learners.[30] Key informants explained that DERs provide students with the ability to learn at their own pace, rather than at speeds based on the average learner, which may be too slow or too fast for some students. Furthermore, DERs can help students minimize the personal impact of attending post-secondary education by enabling them to study on their own schedule and, at the same time, continue to meet their pre-existing work and family obligations.

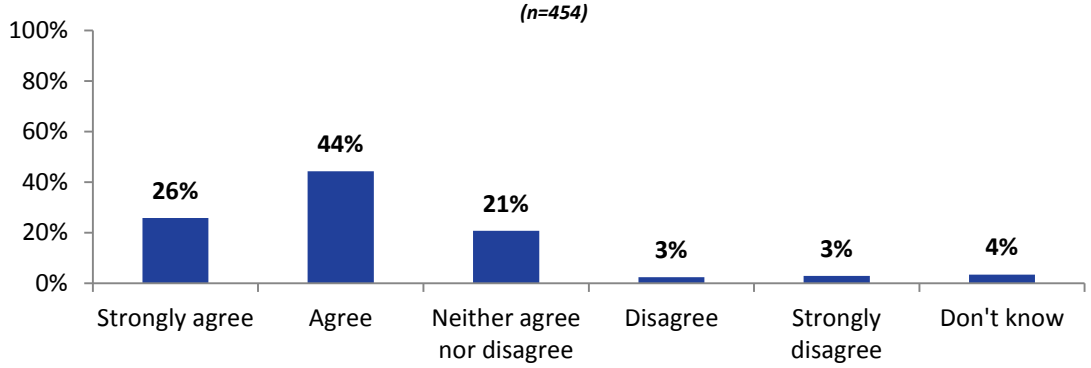
[30] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

Although DERs provide learners with increased flexibility, the literature showed that retention rates for online courses tended to be lower than those for traditional classes. One study in the literature found that retention rates for online courses were 10% to 20% lower than for face-to-face instruction, and another study found that 40% to 80% of students withdrew from online courses.[31]

Regardless of the attrition rates noted in the literature, the student survey found that 70% of students strongly agreed (26%) or agreed (44%) that DERs allowed them to complete their post-secondary education more easily. Only 6% of students disagreed (see Chart 4.4).

Chart 4.4: Impact of DERs on Students' Ability to Complete Post-Secondary Education

Question 10: To what extent do you agree that DERs allow you to more easily complete your post-secondary education? (n=454)



Note: Numbers may not add to 100% due to rounding

According to the literature, a variety of factors may contribute to increased attrition rates, including students' misconceptions about the workload associated with online courses, family commitments and social obligations, challenges using online technologies, issues of isolation and low engagement, and a lack of discipline to undertake self-directed learning and independent thinking.[32]

The literature also found that course design can influence retention rates for online courses. Specifically, it is important to ensure that the course design is compatible with the technology used to deliver the course and that faculty adapt their pedagogical approaches to teaching in online environments.[33]

To support student retention, post-secondary institutions have been striving to use DERs to improve student successes by enhancing their learning experiences and identifying at-risk students before they withdraw from a course or program. Examples of strategies that institutions can use to support student retention include:

[31] Bawa, P. (2016). Retention in Online Courses: Exploring Issues and Solutions—A Literature Review. *SAGE Open*, 1–11. doi:10.1177/2158244015621777
[32] Ibid.
[33] Ibid.

- providing students with face-to-face orientation to help them prepare for online learning by describing the demands/expectations associated with the course, introducing technology standards, and facilitating academic and social interactions;[34]
- fostering a sense of belonging to a virtual learning community by increasing interaction between faculty and students (e.g. showing videos of the instructor teaching the course, using discussion boards, and providing regular feedback to students) and providing students with the opportunity to interact and work with each other;[35]
- ensuring faculty has the technological, communication, and facilitation skills required to design and deliver online courses;[36]
- using social media or customized apps to make students aware of available services and supports and help them navigate their courses;[37] and
- using data technology to monitor student progress through their program. For example, Elon University (United States) provides a "lifelong learning record" to high-risk students, giving them a picture of their achievements to date and encouraging them to be more confident in their education. Georgia State University (United States) uses institutional data to conduct predictive analytics with its students, alerting advisors of risk factors while there is still time to get students back on track.[38]

4.1.2.3 Improving Student and Program Outcomes

Post-secondary institutions have used DERs to enhance student outcomes. For example, LaGuardia Community College (United States) used DERs to improve faculty and student communication. The College found that enhanced interactions can help improve teaching practices, especially among part-time instructors, and can increase students' pass rates.[39] Additionally, San Jose University (United States) used DERs to redesign a core course in its Electrical Engineering program. Utilizing a blended instruction format, students were able to complete their coursework online on their own time and therefore were able to focus their time on campus engaged in peer teamwork and hands-on training. The blended model contributed to increasing students' pass rate from 59% to 91%.[40]

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[34] Ibid.
Harris, B. (2013). *Distance Education Report*. Retrieved from http://californiacommunitycolleges.cccco.edu/portals/0/reportstb/report_distanceeducation2013_090313.pdf

[35] Harris, B. (2013). *Distance Education Report*. Retrieved from http://californiacommunitycolleges.cccco.edu/portals/0/reportstb/report_distanceeducation2013_090313.pdf
Bawa, P. (2016). Retention in Online Courses: Exploring Issues and Solutions—A Literature Review. *SAGE Open*, 1–11. doi:10.1177/2158244015621777
Office of Educational Technology (2017). *Reimagining the Role of Technology in Higher Education: A Supplement to the National Education Technology Plan*. Retrieved from https://tech.ed.gov/files/2017/01/Higher-Ed-NETP.pdf

[36] Harris, B. (2013). *Distance Education Report*. Retrieved from http://californiacommunitycolleges.cccco.edu/portals/0/reportstb/report_distanceeducation2013_090313.pdf
Bawa, P. (2016). Retention in Online Courses: Exploring Issues and Solutions—A Literature Review. *SAGE Open*, 1–11. doi:10.1177/2158244015621777

[37] Higher Education Marketing (2016). *5 Digital Strategies to Improve Your Student Retention*. Retrieved from http://www.higher-education-marketing.com/blog/student-retention

[38] Office of Educational Technology (2017). *Reimagining the Role of Technology in Higher Education: A Supplement to the National Education Technology Plan*. Retrieved from https://tech.ed.gov/files/2017/01/Higher-Ed-NETP.pdf

[39] Ibid.

[40] Ibid.

Although some post-secondary institutions have successfully used DERs to enhance student outcomes, there are ongoing debates about the effectiveness of these resources and their impact on higher education.[41] The literature presented varying views on the effectiveness of DERs, including the following:

- DERs are no more or less effective than other forms of instructional delivery;
- DERs offering unique learning support lead to better academic outcomes; and
- outcomes associated with DERs are inferior to those of traditional, face-to-face instruction.[42]

Results from several meta-analyses investigating the effectiveness of DERs versus traditional classroom learning found that DERs were at least as effective, and in some cases more effective, than classroom instruction.

- Bernard and colleagues' meta-analysis of 232 studies found overall student achievement did not significantly differ between courses delivered using synchronous and asynchronous electronic learning or traditional classroom instruction.[43]
- Figlio, Rush, and Yin found no significant difference in exam scores between two sections of students in a large introductory microeconomics course where one section received instruction using live lectures and the other section received instruction using online delivery of recorded lectures. However, the study noted that Hispanic students, males, and low achievers tended to perform significantly better in the live instruction section.[44]
- Bowen and co-authors found no statistically significant difference in student outcomes across various sections of students in an introductory statistics course delivered at six public universities with some sections using traditional classroom-based instruction and other sections using hybrid instruction (e.g. interactive online materials and a weekly face-to-face session). Furthermore, the study did not find any statistically significant differences across subgroups (e.g. race, ethnicity, gender, or college grade point average).[45]

Studies have found also that the format of the textbook that students used was not correlated to their grades;[46] rather, students' studying strategies were more important.[47]

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[41] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928

[42] Ibid.

[43] Bernard, R.M., Abrami, P.C., Brorokhovski, Y.L.E., Wade, A., Wonzey, L., Wallet, P.A., Fiset, M., & Huang, G. (2004). How Does Distance Education Compare with Classroom Instruction? A Meta-Analysis of the Empirical Literature. *Review of Educational Research, 74(3)*, 379-439. doi:10.3102/00346543074003379

[44] Figlio, D.N., Rush, M., & Yin, L. (2010). Is it live or is it internet? Experimental estimates of the effects of online instruction on student learning. *National Bureau of Economic Research Working Paper Series*, Cambridge, MA.

[45] Bowen, W.G., Chingos, M.M, Lack, K.A., & Nygren, T.I. (2012). Interactive Learning Online at Public Universities: Evidence from Randomized Trials. ITHAKA. http://www.sr.ithaka.org/wp-content/uploads/2015/08/sr-ithaka-interactive-learning-online-at-public-universities.pdf

Bowen, W. (2014). Higher Education in the Digital Age: Book Reviews. *Croatian Economic Survey*, 16(1), 161–185. doi:10.15179/ces.16.1.7

[46] Ainsa, P. (no date). Effects of College Students' Characteristics, Culture and Language on Using E-texts in Distance Learning. *Education*, *136*(1).

Terpend, R., Gattiker, T.F., & Loew, S.E. (2014). Electronic Textbooks: Antecedents of Students' Adoption and Learning Outcomes. *Decision Sciences Journal of Innovative Education*, *12*(2), 149–173. doi:10.1111/dsji.12031

Chulkov, D.V. & VanAlstine, J. (2013). College Student Choice Among Electronic and Printed Textbook Options. *The Journal of Education for Business*. *88*, 216–222. doi: 10.1080/08832323.2012.672936

[47] Ibid.

The literature purports that pedagogy, not delivery media, is what influences learning.[48] Almost two-thirds of the institutions responding to the 2017 National Survey of Online and Distance Education in Canadian Post-Secondary Education noted that innovative teaching was a benefit of online learning.[49] Some respondents noted that online learning was more engaging for students, helped students develop the skills they need for today's society, and helped faculty focus on best teaching practices.[50]

Some research is now focusing on studying the effects of instructional features and supports embedded in DERs rather than the technology itself. Some of the features assessed are:

- content – the level of richness of information delivered to learners;
- immersion – the extent to which the learning experience captures the psychological and physical characteristics of live instruction;
- interactivity – the characteristics that influence the degree and type of interaction between learners, between learners and instructors, and between learners and simulated characters or virtual agents; and
- communication – the students' ability to communicate verbally and nonverbally.[51]

None of the key informants provided direct evidence of the impact of DERs on student outcomes. Rather, they described the learning benefits that DERs provide and their potential affect on student outcomes. They explained that DERs help students experience a learning environment that is best suited to their needs and circumstances. By optimizing the learning experience, DERs have the potential to help students succeed in their programs. Benefits for students include the ability to:

- study at their own pace and during the times of the day when they are most alert;
- experience course material in multiple modes (e.g. online videos, animated demonstrations, written articles, and lecture recordings), which helps reinforce the material and enables students to focus on the mode most suited to their learning style (e.g. visual learners can focus on videos or animated demonstrations);
- develop a richer understanding of the course by accessing links to topics of interest and additional resources that may offer a more detailed overview, a different way of understanding, or a different perspective; and
- interact more thoroughly with the material through simulations that can help students better understand the real-world implications of theoretical concepts.

The following are a few examples of online simulations that post-secondary institutions have used to support the achievement of learning outcomes by giving students the opportunity to develop practical skills:

[48] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928
[49] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf
[50] Ibid.
[51] Bell, B.S. & Federman, J.E. (2013). E-learning in postsecondary education. *The Future of Children*, *23*(1), 165–185. Retrieved from Cornell University, School of Industrial and Labor Relations site: http://digitalcommons.ilr.cornell.edu/articles/928

- NorQuest College (Alberta, Canada) piloted three online simulation activities to enable adult English as a Second Language (ESL) learners to develop workplace-related decision-making skills. The simulation activities involved responding to leadership requests, leadership feedback, and onboarding. The pilot found that the simulations helped participants improve their understanding of some of the language and cultural intricacies associated with workplace interactions; however, it also determined that opportunities existed to enhance participants' ability to use the simulations to explore the pathways they could use to navigate communication mistakes.[52]
- Ryerson University (Ontario, Canada) has developed the Law Practice Program (LPP), which provides Law School graduates with an alternative to traditional articling. The program prepares LPP candidates for legal practice using a combination of online training, experiential learning, and a hands-on work term.[53] A key feature of the program is Virtual Law Firms (VLFs), which use web conferencing and other online platforms (e.g. video "meetings") to connect participants, their mentors, managing partners, subject matter experts, and clients (i.e. live-actor simulators). At least three-quarters of candidates, once called to the bar, are employed in law or law-related positions within one year of program completion.[54]
- Post-secondary students enrolled in a hospitality program had the opportunity to participate in the BuildYourOwnBar™ online simulation, which enabled them to act as owners of a virtual business. The simulation, accessed through a webpage, facilitated student and instructor interaction on activities related to business planning, opening, managing, and problem solving. The simulation proved to be an effective way to help students develop hospitality management skills.[55]

Results from the student survey provided further evidence that DERs have the potential to influence learning outcomes positively. About three-quarters or more of students who used a particular DER said it greatly improved or somewhat improved their learning (see Chart 4.5).

[52] NorQuest College (2018). *Diversity at Work: Web-based Simulation Activities.* Retrieved from https://www.norquest.ca/norquest-centres/centre-for-intercultural-education/projects/completed-projects/diversity-at-work-web-based-simulation-activities.aspx

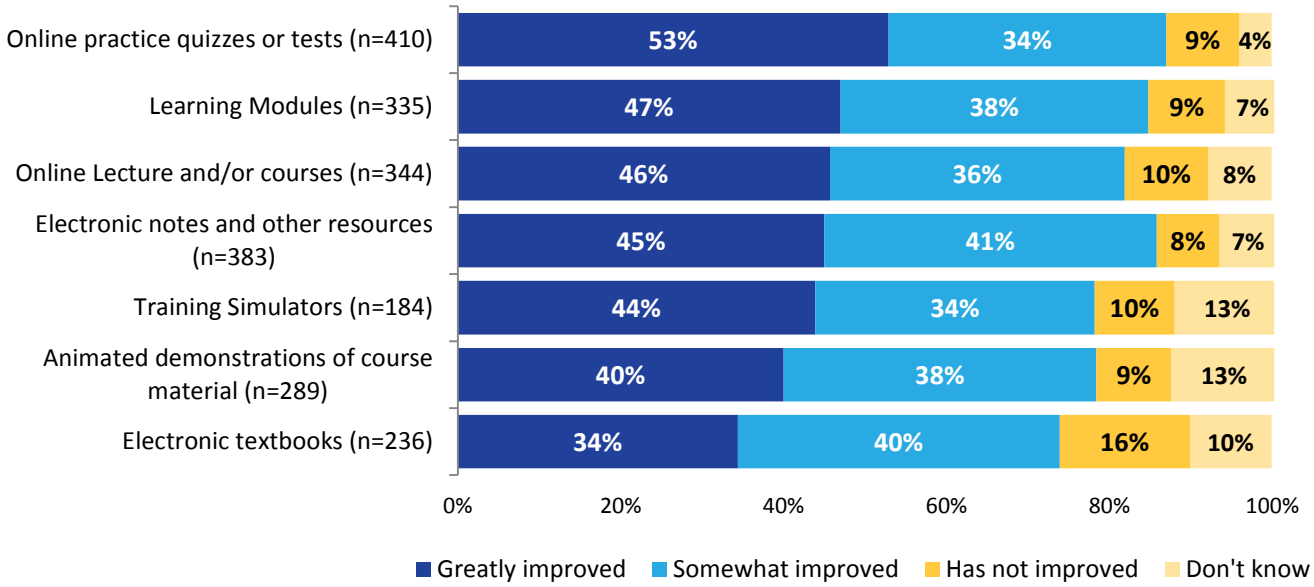
[53] Ryerson University (no date). *Ryerson's Law Practice Program*. Retrieved from http://www.lpp.ryerson.ca/wp-content/uploads/2017/03/Candidate-Package-for-Outreach-1-March-2017.pdf

[54] Ryerson University (2018). *Four Years of the LPP*. Retrieved from http://www.lpp.ryerson.ca/?p=4478

[55] Douglas, A., Miller, B., Kwanza, F. & Cummings, P. (no date). *Usefulness of a Virtual Simulation in Post-Secondary Education Students' Perceptions*. Retrieved from http://www.academia.edu/11310056/USEFULNESS_OF_A_VIRTUAL_SIMULATION_IN_POST-SECONDARY_EDUCATION_STUDENTS_PERCEPTIONS

Chart 4.5: Impact of DERs on Learning

Question 5: To what degree has your ability to use the following types of DERs improved your learning?



Note: Numbers may not add to 100% due to rounding

For the six DERs assessed as part of the student survey (online lectures and/or courses, learning modules, online practice quizzes and tests, electronic notes and other resources, electronic textbooks, and training simulators), the most commonly cited benefits were more time to review the material and the ability for students to review material on their own schedule. For animated demonstrations of course material, the most commonly reported benefit was that students had the ability to see course concepts in action (see Table 4.6).

Table 4.6: Benefits of DERs

Question 6: How have the following types of DERs improved your learning?

DER	The ability to review material on my own schedule	More time to review material	The ability to see course concept in action	More information about course concepts	The ability to use customizable learning	Other
Online lectures and/or courses (n=270)	68%	47%	28%	22%	22%	3%
Learning modules (n=267)	62%	46%	27%	28%	24%	2%
Online practice quizzes and tests (n=341)	62%	47%	28%	25%	23%	2%
Electronic notes and other resources (n=312)	64%	51%	25%	28%	24%	2%
Training simulators (n=130)	45%	35%	41%	18%	21%	1%

Table 4.6: Benefits of DERs *Question 6: How have the following types of DERs improved your learning?*						
DER	**The ability to review material on my own schedule**	**More time to review material**	**The ability to see course concept in action**	**More information about course concepts**	**The ability to use customizable learning**	**Other**
Animated demonstrations of course material (n=208)	46%	35%	52%	26%	22%	<1%
Electronic textbooks (n=167)	62%	42%	23%	27%	23%	3%
Note: Numbers do not add to 100% due to individuals choosing more than one answer						

Key informants mentioned that, in addition to providing benefits for students, DERs can also benefit instructors. Specifically, they said that DERs offer instructors the ability to customize course material to meet student needs. For example, in hybrid classes, instructors can provide course theory through DERs and use face-to-face class time to focus on the practical, hands-on aspects of the course material. Instructors can also assess which learning modalities students prefer and leverage them with the support of DERs.

4.2 Student and Faculty Experience With Digital Educational Resources

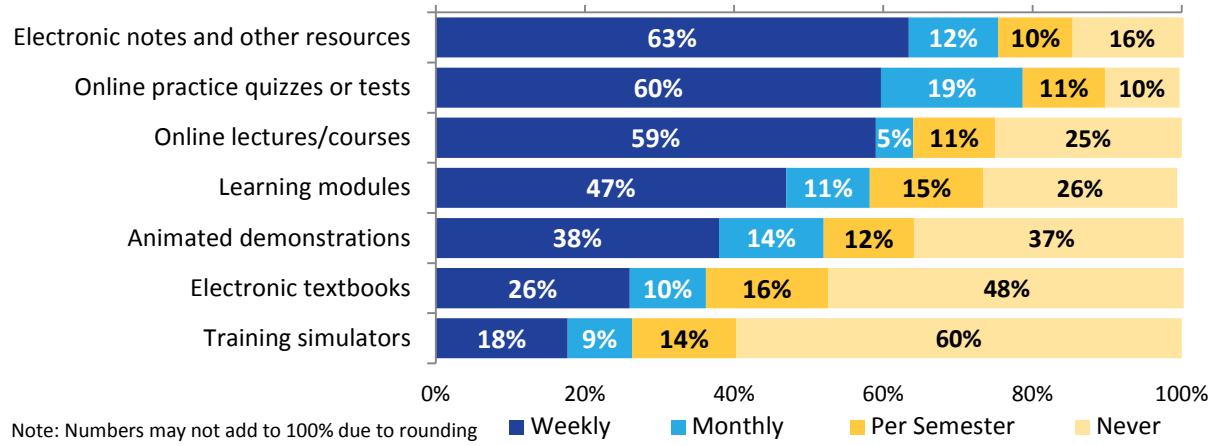
4.2.1 *Student Use of Digital Educational Resources*

Students were using a variety of DERs (see Chart 4.7):

- On a weekly basis, about six in 10 students were using electronic notes and other resources (63%), online practice quizzes or tests (60%), or online lectures/courses (59%).
- On at least a monthly basis, about half the students were using learning modules (58%) or animated demonstrations (52%).
- Just over one-third of students were using electronic textbooks on a weekly (26%) or monthly (10%) basis. However, almost half (48%) the students said they never used electronic textbooks.
- About one-quarter of students (27%) were using training simulators at least monthly.

Chart 4.7: How Often Student Use DERs

Question 4: On average, how often have you used the following types of DERs? (n=455)



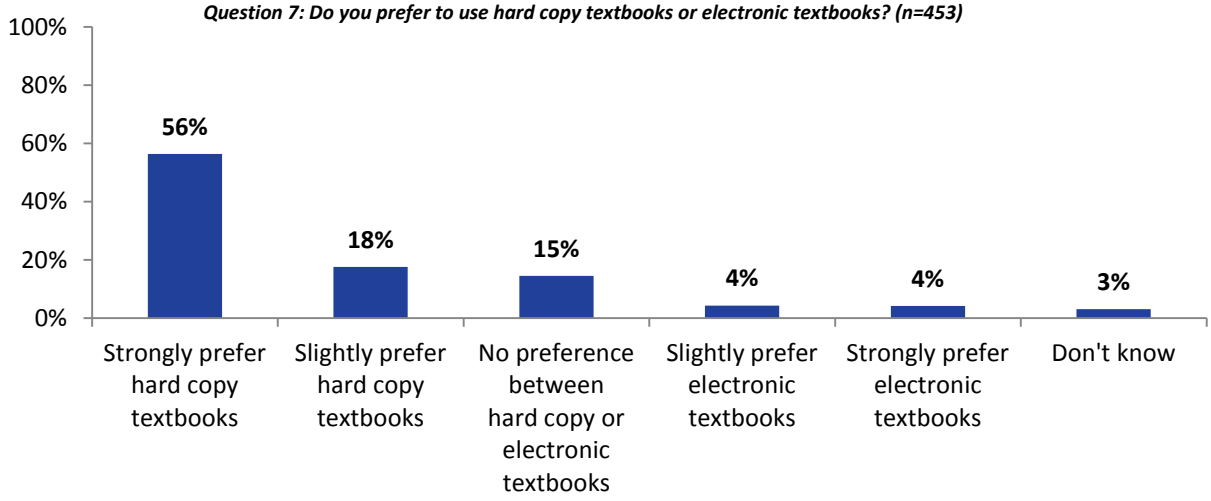
Note: Numbers may not add to 100% due to rounding

4.2.2 *Electronic Textbooks*

The results of the survey showed that students had a strong preference for hard copy textbooks rather than electronic textbooks (see Chart 4.8). Almost three-quarters of students strongly (56%) or slightly (18%) preferred hard copy textbooks. Only 8% of students preferred electronic textbooks.

Chart 4.8: Student Preference for Electronic or Hard Copy Textbooks

Question 7: Do you prefer to use hard copy textbooks or electronic textbooks? (n=453)



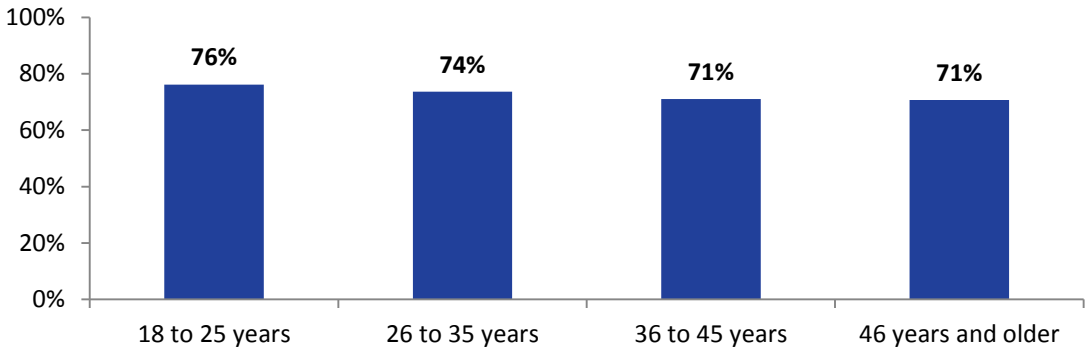
Similarly, a 2012 survey of United States students enrolled in hospitality or management classes at a small, private West Coast university and a large, public university in the Midwest found that, given the choice, 57% of students would select a hard copy textbook, 25% would choose an electronic textbook, and 18% did not have a preferred format. Those who selected a hard copy textbook did so because they simply preferred print (45%) or found hard copy textbooks more convenient (31%). Additionally, those who selected an electronic textbook did so because they could readily access their required course materials in one place (25%) or found electronic textbooks more convenient (23%).[56]

[56] Millar, M. & Schrier, T. (2015). Digital or Printed Textbooks: Which do Students Prefer and Why?, *Journal of Teaching in Travel & Tourism*, *15*(2), 166–185. doi: 10.1080/15313220.2015.1026474

Some key informants suggested generational differences may influence students' textbook preferences, with older students preferring hard copy textbooks and younger students preferring electronic textbooks. However, the survey found there were no statistically significant differences in students' preferences across age groups (see Chart 4.9).

Chart 4.9: Student Preference for Hard Copy Textbooks by Age*

Question 7: Do you prefer to use hard copy textbooks or electronic textbooks? (n=453)

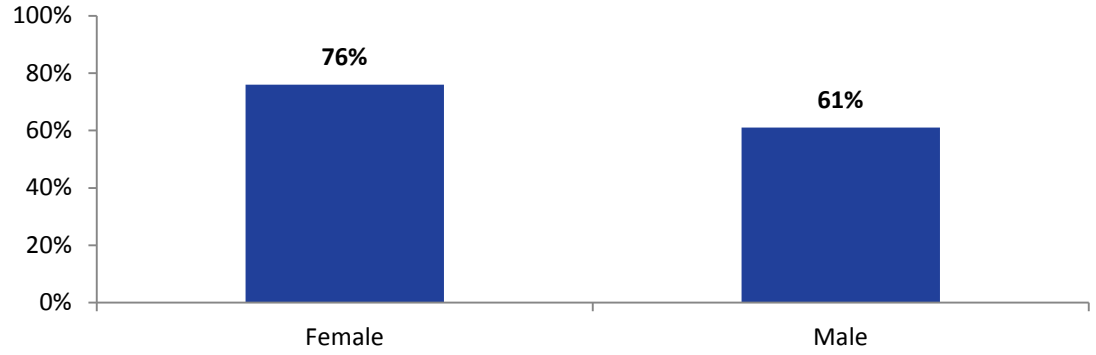


*Students who "strongly prefer"or "slightly prefer" hard copy textbooks

Female students (76%) were more likely than male students (61%) to prefer hard copy textbooks (see Chart 4.10).

Chart 4.10: Student Preference for Hard Copy Textbooks by Gender*

Question 7: Do you prefer to use hard copy textbooks or electronic textbooks? (n=451)

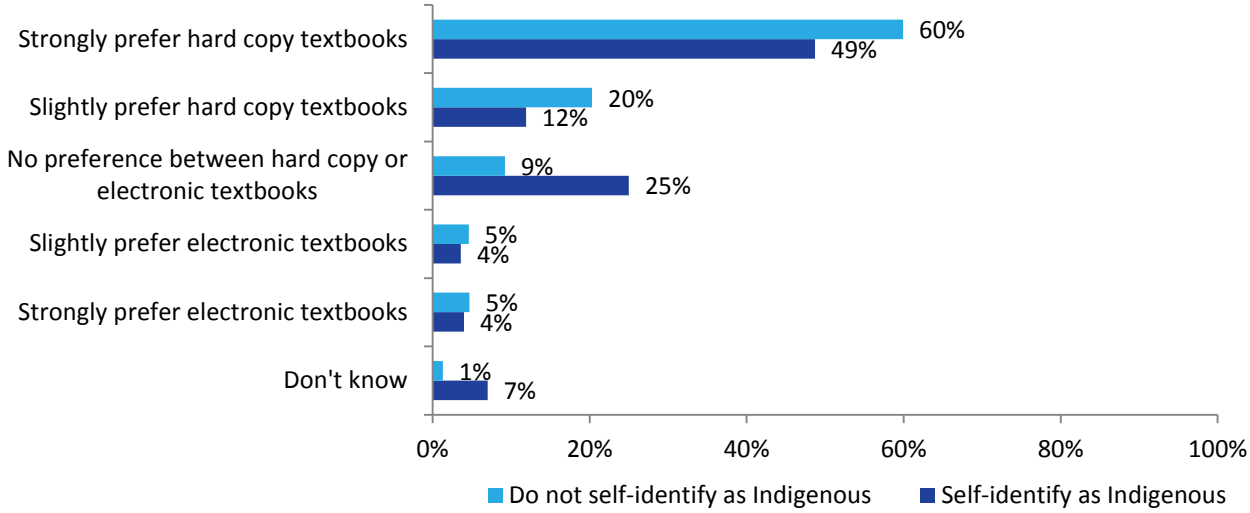


*Students who "strongly prefer"or "slightly prefer" hard copy textbooks

Students who self-identified as Indigenous (49%) were less likely than non-Indigenous students (60%) to strongly prefer hard copy textbooks. Furthermore, Indigenous students (25%) were more likely than non-Indigenous students (9%) to say they had no preference between hard copy textbooks and electronic textbooks (see Chart 4.11).

Chart 4.11: Student Preference for Electronic or Hard Copy Textbooks by Indigenous Status

Question 7: Do you prefer to use hard copy textbooks or electronic textbooks? (n=452)



Key informants did not have strong opinions regarding faculty preferences for electronic textbooks or hard copy textbooks. While some interviewees thought faculty may prefer hard copy textbooks, they said student access to a textbook is a more important consideration than the format of the textbook.

Key informants did not believe that libraries have any specific preference for the use of electronic or hard copy resources. They explained that libraries simply respond to the preferences of their clientele. This practice, known as patron-driven acquisition (PDA), can help improve the relevance and use of library collections.[57] For example, a PDA project at University College Dublin (Ireland) found that patron use of electronic PDA titles (8.45 uses per title) was significantly higher than their use of non-PDA electronic titles (3.27 uses per title).[58] While interviewees acknowledged that electronic resources facilitate easier and more equitable distribution of library collections, they indicated that students continue to request print resources. Similarly, the UCD project found that PDA resulted in the purchase of almost as many hard copy titles as electronic titles.[59]

The literature found that institutional libraries have been tracking electronic textbook usage through text analysis of users' search queries and usage reports, online surveys, focus groups, and interviews.[60]

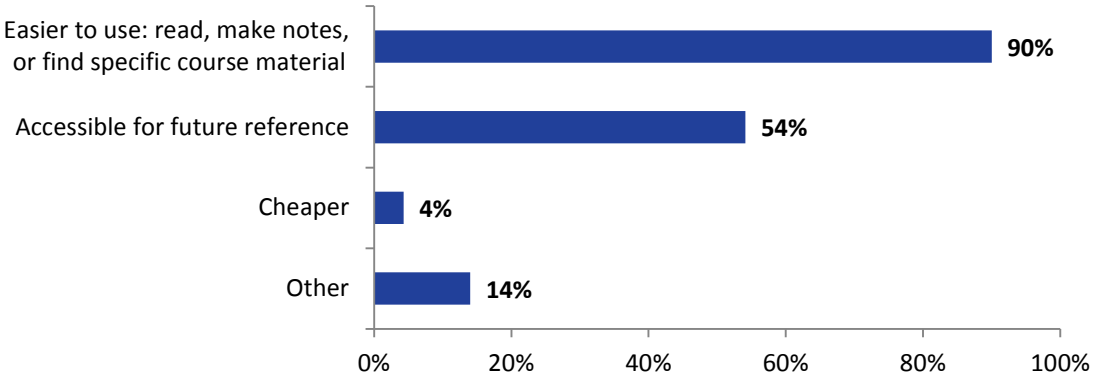
4.2.2.1 Barriers to Using Electronic Textbooks

The survey found that most students who preferred using hard copy textbooks reported that it was because of their ease of use (90%) and future accessibility (54%) (see Chart 4.12).

[57] Tynan, M. & McCarney, E. (2014). A Case Study of Print and Electronic Patron-Driven Acquisition in University College Dublin. *New Review of Academic Librarianship*, *20*(2), 233–250 2014. Doi:10.1080/13614533.2014.906352
[58] Ibid.
[59] Ibid.
[60] Goertzen,M. & Bakkalbasi, N. (2016). Exploring Academic E-Book Use: Part II through Focus Groups and Interviews. *Performance Measurement and Metrics*, *17*(1), 83 – 92. Doi:10.1108/PMM-09-2015-0025

Chart 4.12: Reasons Students Like Hard Copy Textbooks

Question 8: Why do you like using hard copy textbooks? (n=395)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

Key informants described several barriers that may limit students' use of electronic textbooks:

- *Restrictions on use.* Students who rent or are provided electronic textbooks for a limited time period are unable to keep the textbook after course completion. Consequently, students lose any notes they may have made in the textbook, and they cannot use their textbooks from previous courses as references.

  Furthermore, given that electronic textbooks are licensed for individual use, students have a limited ability to share the textbook with others and are unable to sell it when it is no longer needed. Positioning students as the licencee of an electronic textbook, rather than the owner of a hard copy textbook, may limit the attractiveness of electronic textbooks.

  Moreover, a few informants explained that publishers may place additional limitations on students' ability to use an electronic textbook. For example, some electronic textbooks limit the number of devices students can use to access the resource or the number of pages that students can print. In cases where publishers believe a student has violated a licence agreement, they can delete the resource from the student's device. Concerns about losing access to textbooks mid-course have impacted students' desire to use electronic textbooks.
- *Lack of familiarity with electronic textbooks.* Electronic textbooks can incorporate a wide variety of features, which may vary across different publishers. Therefore, in order to maximize their use of electronic textbooks, students need to be aware of the features that various publishers provide and know how to use them. However, students may lack the time or interest required to learn how to use the features that different publishers offer.
- *Lack of comfort with computers.* Students who are not knowledgeable about or comfortable with computers may not be attracted to electronic textbooks. Given that these students are already familiar with using hard copy textbooks, they may be less inclined to switch to electronic textbooks.
- *Lack of access to devices to use electronic textbooks.* The platforms used to house and provide access to electronic textbooks are not always available on all devices. Therefore, students with access to a specific device, such as an Apple or an Android, may not be able to use some electronic textbooks on their personal devices. Furthermore, some instructors ban devices from their classrooms, thereby preventing access to electronic textbooks in class.

Interviewees also identified several barriers related to instructors' use of electronic textbooks:

- *Habit or tradition.* Many instructors were trained using hard copy textbooks and therefore continue to use them in their courses. Furthermore, since instructors are more familiar with hard copy textbooks, they can more readily develop courses with them.
- *Lack of familiarity with, or support for, electronic textbooks.* Many instructors who are not familiar with electronic textbooks and the benefits they can offer learning environments do not consider using them in their classes. Without the appropriate training and support, instructors' adoption of electronic textbooks is reliant on their personal initiatives.
- *Varying publisher platforms and software requirements for different electronic textbooks.* Given that various publishers may use different platforms and software for their electronic textbooks, instructors need to learn continually how to set up, configure, and use them.

Finally, key informants said the main barrier to libraries' development of electronic resources is meeting the various licensing, software, and hardware requirements of different publishers. For each publisher platform, libraries need time to set up and learn its various features and develop tutorials and supporting materials for users. Furthermore, interviewees cautioned that the loss of a publisher also results in the loss of all of the electronic resources and materials associated with that publisher.

4.2.2.2 Facilitating the Use of Electronic Textbooks

The literature indicated that the two main motivations for students to use electronic textbooks rather than hard copy textbooks were the perceived ease-of-use of electronic textbooks and the price of electronic textbooks.[61] Additional advantages identified were that electronic textbooks:

- are interactive and provide multimedia;
- enable printing on-demand;
- cater to individual learning styles; and
- have increased visual appeal.[62]

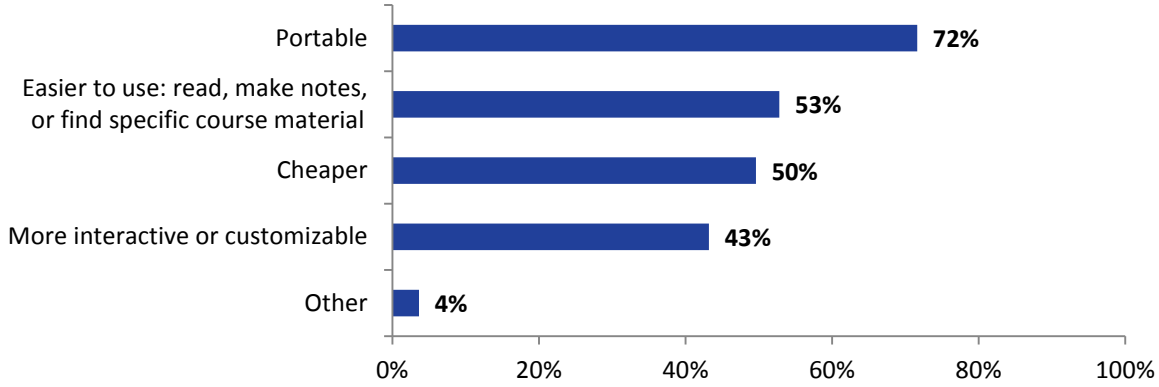
Reflecting the literature, the results of the survey showed that students who preferred electronic textbooks did so because of their portability (72%), ease of use (53%), and price (50%). Less than half of the students who preferred electronic textbooks (43%) indicated that it was because of their interactive features (see Chart 4.13).

[61] Terpend, R., Gattiker, T.F., & Loew, S.E. (2014). Electronic Textbooks: Antecedents of Students' Adoption and Learning Outcomes. *Decision Sciences Journal of Innovative Education*, *12*(2), 149–173. doi:10.1111/dsji.12031

[62] Millar, M. & Schrier. T. (2015). Digital or Printed Textbooks: Which do Students Prefer and Why?, *Journal of Teaching in Travel & Tourism*, *15*(2), 166–185. doi: 10.1080/15313220.2015.1026474

Chart 4.13: Reasons Students Like Electronic Textbooks

Question 9: Why do you like using electronic textbooks? (n=98)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

Aligning with the above-mentioned findings, key informants described a wide variety of factors that may influence students' decision to use electronic textbooks:

- *Price.* While pricing of electronic textbooks can be one of the best ways to encourage their use among students, key informants cautioned that, at this time, electronic textbooks only offer students minimal cost savings compared to hard copy textbooks.
- *Availability.* Electronic textbooks are readily available for all students to purchase and download. Conversely, hard copy textbooks may sell out prior to the start of a course, resulting in some students having to borrow the textbook or wait for the next shipment to arrive.
- *Portability.* Students can easily load the textbooks for all their courses on a portable device (e.g. smartphone) and access them as needed throughout the day.
- *Text format.* Although early versions of e-readers could cause eye strain and resulted in poor user experience, newer e-readers have more natural-looking text that is similar in appearance to hard copy books.
- *Interactive features.* E-readers with interactive features, such as the ability to mark up and highlight text, may enhance students' learning experience and increase their willingness to use electronic textbooks. A few key informants emphasized that interactive features should be simple to use and intuitive, as students enrolled in multiple courses may not have time to familiarize themselves with the specialized features associated with various electronic textbooks.
- *Instructor use.* Instructors who use electronic textbooks can not only demonstrate the value these resources provide students, but can also offer students practical support in using them by introducing students to the features included in the electronic textbook and acting as a resource for students experiencing difficulties using the textbook.
- *Integration into course.* Utilizing the interactive features of an electronic textbook, such as problem sets and simulations, to enhance course instruction provides additional benefits to students. Showing students how to take advantage of these benefits improves their learning experience.

Some additional factors thought to influence whether students prefer electronic or hard copy textbooks include:

- accessibility of internet connections;[63]
- degree of comfort students have reading from a computer screen and using technology;[64]
- student learning styles;[65] and
- types of devices that students have available to them for using the electronic textbook.[66]

One example of an institution's efforts to use electronic textbooks was Algonquin College's (Ontario, Canada) initiative to integrate electronic textbooks into its courses. As part of this initiative, and in support of its strategy to become a digital post-secondary institution, the college required all incoming students to have a mobile device that was compatible with course resources. Furthermore, in collaboration with publishers, the college priced the electronic textbooks at 63% of the cost of hard copy textbooks, gave students unrestricted access to electronic textbooks downloaded to a personal device, and ensured students could print electronic textbooks on-demand.[67]

Key informants explained that the following factors may influence faculty use of electronic textbooks:

- *Interactivity.* Some electronic textbooks offer instructors the ability to re-order, remove, and possibly add material to the electronic textbook to better align it with the course curriculum, lectures, and other supplementary material. Key informants indicated that if electronic textbooks incorporated robust and easy-to-use editing features, instructors would use them more instructors.
- *Comfort and familiarity.* Instructors who are comfortable with the technology associated with electronic textbooks are more likely to use them in their courses. Instructors for college programs who have been actively using electronic textbooks (e.g. computer and nursing programs) are more willing to incorporate electronic textbooks into their courses.
- *Training and support.* Key informants indicated that instructors' comfort with and ability to use electronic textbooks could be improved through the provision of appropriate training and support. Examples may include a basic orientation to the use and benefits of electronic textbooks, tutorials on the interactive features of electronic textbooks, and support to assist instructors in troubleshooting any challenges they may encounter when using electronic textbooks.

[63] Chulkov, D.V. & VanAlstine, J. (2013). College Student Choice Among Electronic and Printed Textbook Options. *The Journal of Education for Business*. *88*, 216–222. doi: 10.1080/08832323.2012.672936

[64] Ainsa, P. (no date). Effects of College Students' Characteristics, Culture and Language on Using E-texts in Distance Learning. *Education*, *136*(1).Millar, M. & Schrier. T. (2015). Digital or Printed Textbooks: Which do Students Prefer and Why?, *Journal of Teaching in Travel & Tourism*, *15*(2), 166–185. doi: 10.1080/15313220.2015.1026474

[65] Chulkov, D.V. & VanAlstine, J. (2013). College Student Choice Among Electronic and Printed Textbook Options. *The Journal of Education for Business*. *88*, 216–222. doi: 10.1080/08832323.2012.672936

[66] Waller, D. (2013). Current Advantages and Disadvantages of Using E-Textbooks in Texas Higher Education. *Focus on Colleges, Universities, and Schools*, *7*(1). Retrieved from http://www.nationalforum.com/Electronic%20Journal%20Volumes/Waller,%20Darlene%20Waller%20Current%20Advantages%20and%20Disadvantages%20of%20using%20E-textbooks%20in%20Higher%20Education%20FOCUS%20V7%20N1%202013.pdf

[67] *e-Textbooks at Algonquin College* (2013). Retrieved from https://teachonline.ca/pockets-innovation/e-textbooks-algonquin-college

Key informants did not identify any factors that may increase libraries' use of electronic resources. Rather, they reiterated that libraries respond to client preferences; therefore, when demand for electronic resources increases, libraries' use of electronic resources also increases. To assess demand for electronic resources, libraries survey their patrons, track requests for materials, and calculate average checkout numbers for different types of material. Nonetheless, key informants emphasized that, in order for libraries to increase their use of electronic resources, they require appropriate infrastructure to store, use, and distribute resources. As demand for electronic resources increases, libraries are actively developing the infrastructure required to meet the demand.

4.2.3 *Open Educational Resources*

Open Educational Resources (OERs), one of the most prominent types of DERs, are making data and resources more widely available.[68] Almost all key informants said OERs can provide post-secondary institutions with a variety of benefits and enhance student learning experiences. However, given that there are no national policies or guidelines for the evaluation and licensing of OERs,[69] key informants highlighted the importance of ensuring that institutions properly implement OERs. Their perspectives can be categorized as follows:

- *Accessibility.* OERs are generally free for instructors and students to access. Furthermore, incorporating OERs in courses may reduce or eliminate some of the licensing fees associated with course materials, and courses built around OERs may remove textbook or other material costs for students.

  However, a general lack of awareness of OERs can hinder their use in courses. Given that a central repository for OERs is not available, it can be challenging for instructors to find appropriate OERs for specific courses. For example, some OERs are buried within institutional websites and can be challenging to access without prior knowledge of their location.
- *Learning experience and student outcomes.* OERs can improve the learning experience for students and provide them with a richer understanding of the course material. Through OERs, students can access enhanced resources, alternative perspectives, and materials facilitating different modes of learning. Furthermore, encouraging students to search for and incorporate OERs into their assignments may increase their interaction with the course material and encourage them to think beyond the information presented in class.
- *Customization.* OERs can help instructors better meet their course objectives by enabling them to customize the material they present in class. Rather than being driven by outside resources, such as textbooks, instructors can select the material that most closely aligns to course objectives. However, instructors need training and support to increase their understanding of, and comfort with, OERs.
- *Quality of information.* OERs may provide instructors with more recent and accurate information than other sources of materials. Given that OERs are digital, they are easier to update to reflect recent discoveries or changes in a field of study than hard copy resources. This is especially true for popular resources that multiple institutions use and verify.

[68] Universities Canada (2015). *Canadian Universities and our Digital Future: A workshop by Universities Canada*. Retrieved from https://www.univcan.ca/wp-content/uploads/2016/05/canadian-universities-and-our-digital-future-2015-workshop-report.pdf

[69] Howell, S. & O'Donnell, B. (2017). *Digital Trends and Initiatives in Education: The Changing Landscape for Canadian Content*. Retrieved from http://www.omdc.on.ca/Assets/Research/Research+Reports/Digital+Trends+and+Initiatives+in+Education/Digital+Trends+and+Initiatives+in+Education.pdf

Nevertheless, prior to using OERs, instructors need to review them to ensure they are accurate, up-to-date, and relevant to the course. OERs are generally not peer reviewed, and there are minimal incentives to update them regularly. Depending on the importance of the OER to the course, the instructor's review may be as a simple as reading the available materials or as complex as comparing the material to other sources to determine accuracy. In either case, instructor time is required to provide quality control of OERs.

- *Attribution of works.* It is important for instructors using OERs to be aware of the permissions associated with specific OERs and ensure copyright requirements are met. For some OERs, this may only require simple attribution, while others may have specifications regarding when and how they can be used.

  Additionally, while students are taught the importance of including citations in their work, some instructors lack discipline in this area. OERs generally come with referencing instructions, and therefore provide instructors with clear guidance on how to attribute the works used in the course.
- *Marketing.* Post-secondary institutions may use OERs for marketing. For example, high-quality OERs can help highlight the knowledge and resources of the institution that developed them. Furthermore, frequent use of OERs related to a particular topic can position an institution as a leader in that field.

Post-secondary institutions recognize that a lack of awareness of OERs hinders their use. As such, many institutions have developed strategies to promote and encourage their use by faculty. Some institutions, such as Maskwacis Cultural College (Alberta, Canada) and Mount Royal University (Alberta, Canada), host open education events to discuss their benefits.[70] Other institutions recognize the role that instructors play in the use of OERs and provide materials to support faculty in adopting and using them. Institutions can improve faculty awareness by providing an overview of institutional OERs in orientation materials or a link to a toolkit for e-learning.[71] Both methods work to ensure that instructors know what services and supports are available to them.

4.3 Challenges With Digital Educational Resources

4.3.1 *Broadband and Internet Access*

The internet is the most widely used technology for delivering distance education (98%).[72] Digital divides between individuals and communities impact the degree to which DERs, including OERs, can be used to improve student outcomes. Digital divides may involve access to digital technologies, access to broadband, and the intensity and types of internet use by individuals.

[70] *Upcoming Education in Action Conference at Maskwacis College* (2016). Retrieved from https://lssap.wordpress.com/2016/11/29/upcoming-open-education-in-action-conference-at-maskwacis-cultural-college/
Open Access Week Events at Mount Royal College (no date). Retrieved from http://blogs.mtroyal.ca/library/2014/10/16/presentation-on-open-textbooks-october-20/
[71] McMaster University (2014). *The New Faculty Guide to Teaching and Learning at McMaster*. Retrieved from https://mi.mcmaster.ca/site/wp-content/uploads/2017/04/New-Faculty-Guide-to-Teaching-and-Learning-at-McMaster_04_19_2017.pdf
University of Western Ontario (no date). *eLearning Toolkit*. Retrieved from http://elearningtoolkit.uwo.ca/
[72] The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

Digital divides pose a continuing challenge for individuals living in rural and remote communities. In 2015, the Canadian Radio-television and Telecommunications Commission (CRTC) found "a clear and persistent access gap exists between northern and southern Canada ... roughly 18,000 households in the three territories and the northern regions of the provinces lack access to broadband Internet service at the Commission's target speeds."[73] In 2012, 6% of Albertans did not have access to a high-speed internet connection.[74] While the Government of Alberta's Final Mile Rural Connectivity Initiative set a target to reduce this to 2%, some rural and remote communities will still not have access to high-speed internet.[75]

In December 2016, the CTRC proclaimed that broadband internet is a basic telecommunications service. It set a universal service objective for broadband internet accessibility for urban and rural residents and businesses of at least 50 Mbps download and 10 Mbps upload.[76] However, in 2017, the Northern Alberta Broadband Preparedness Project found that many municipalities (including hamlets, First Nations and Métis settlements) in northern Alberta still did not have broadband internet services levels that met the CTRC's service objectives (see Table 4.14).

Table 4.14: Broadband Internet Accessibility in Northern Alberta[77]

Region	Population	Number of municipalities with broadband internet service levels meeting CTRC objectives
Northern Alberta Development Council*	164,501	5 of 25
Northern Alberta Information HUB Limited	135,000	7 of 102
Grizzly Regional Economic Alliance Society (GROWTH Alberta)	57,000	4 of 50
Lesser Slave Lake Economic Alliance (LSLEA)	30,000	1 of 34
Peace Region Economic Development Alliance (PREDA)	162,000	11 of 91
Regional Economic Development Initiative for Northwest Alberta (REDI)	23,000	0 of 11

* Refers only to Northern Alberta non-Regional Economic Development Alliances communities (e.g. Athabasca County; Regional Municipality of Wood Buffalo; ID No. 24 Wood Buffalo National Park; Improvement District No. 349; and other municipalities).

Nonetheless, the survey found that 87% of students had access to a high-speed internet connection (see Chart 4.15).[78]

- There were no statistically significant differences in students' access to high-speed internet by age. Over 80% of students from each age group had access to a high-speed internet connection.
- Similarly, there were no statistically significant differences in students' access to high-speed internet by gender. More than 85% of students in each group had high-speed internet access.

[73] O'Donnell, S., Beaton, B., McMahon, R., Hudson, H.E., Williams, D., & Whiteduck, T. (2016). *Digital Technology Adoption in Remote and Northern Indigenous Communities in Canada*. Canadian Sociological Association 2016 Annual Conference. University of Calgary, Calgary, Alberta, June. Retrieved from http://firstmile.ca/wp-content/uploads/2016-CSA-Digital-Technology-Adoption.pdf

[74] Service Alberta (2017). *Final Mile Rural Connectivity Initiative*. Retrieved from http://www.servicealberta.ca/FMRCI.cfm

[75] Alberta Agriculture and Rural Development. January 2012.

[76] Canadian Radio-television and Telecommunications Commission (2016). *Telecom Regulatory Policy CRTC 2016-496*. Retrieved from https://www.crtc.gc.ca/eng/archive/2016/2016-496.htm

[77] Taylor Warwick Consulting Ltd. (2017). *Northern Alberta Broadband Preparedness Project*. Retrieved from http://www.nadc.ca/our-actions/initiatives/broadband-preparedness-project/

[78] It is important to note that only students who had used DERs were eligible to participate in the survey. Furthermore, students who did not have high-speed internet access were less likely to have used DERs. Therefore, these findings may not be representative of the general student population in northern Alberta.

- Students who self-identified as Indigenous students (82%) were less likely than non-Indigenous students (89%) to have high-speed internet access. They were also more likely to say they did not know if they had access to high-speed internet (see Chart 4.16).

Chart 4.15: Percentage of Students With Access to a High-Speed Internet Connection

Question 15: Do you have access to a high-speed internet connection? (n=452)

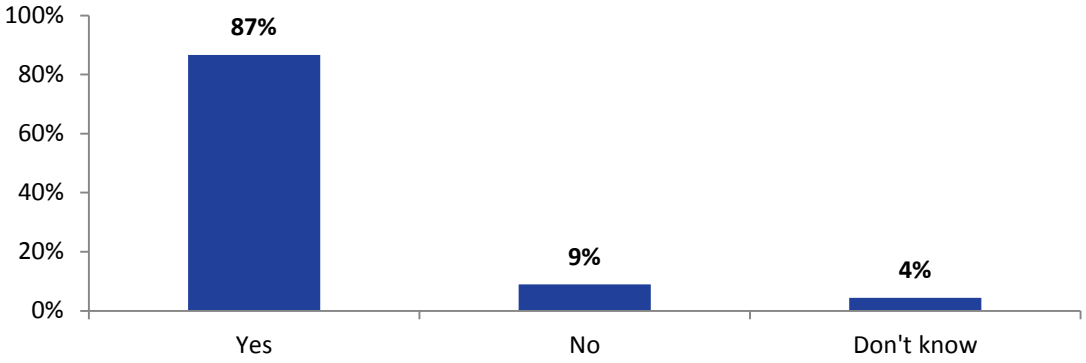
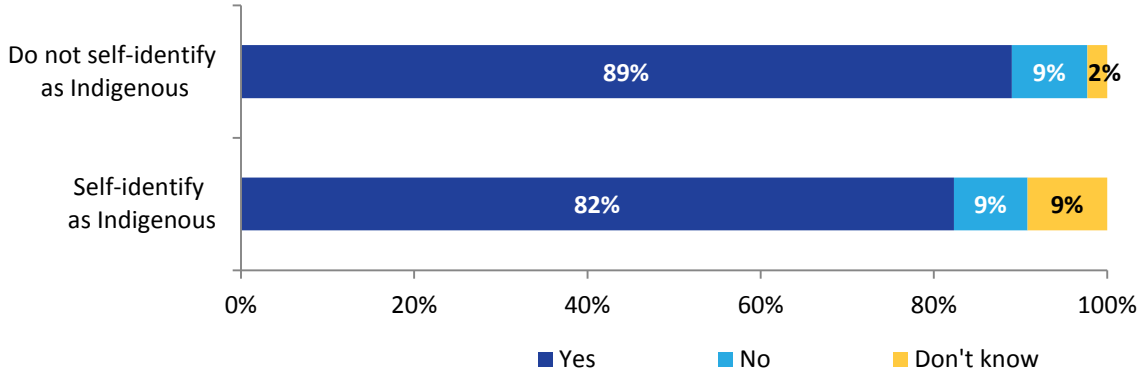


Chart 4.16: Percentage of Students With Access to a High-Speed Internet Connection by Indigenous Status

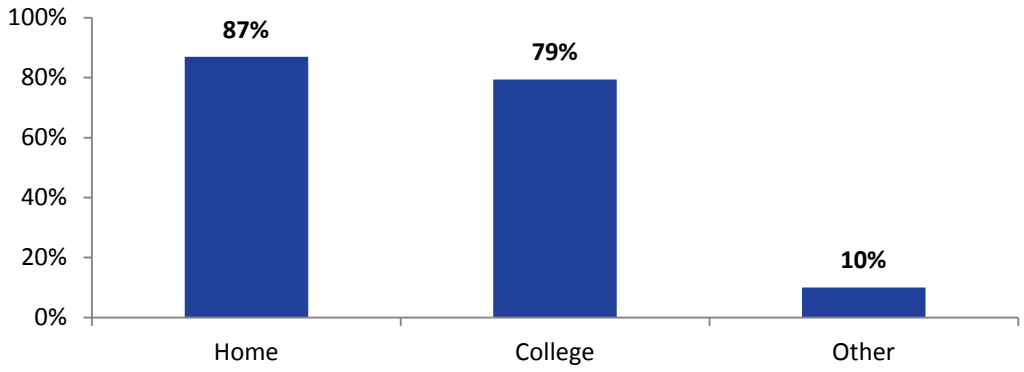
Question 15: Do you have access to a high-speed internet connection? (n=450)



The majority of students with access to high-speed internet (87%) could access it from home (see Chart 4.17).

Chart 4.17: Where Students Access High-Speed Internet Service

Question 16: Where do you access high-speed internet service? (n=391)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

All key informants noted that a lack of internet access is a major barrier to the use of DERs. They indicated that the use of DERs requires access to a broadband connection and that high-speed internet connections enhance the users' experience.

The survey found that almost all students with access to a high-speed connection (91%) said it improved their ability to use DERs (see Chart 4.18). Similarly, most students without access to high-speed internet (80%) said it limited their ability to use DERs (see Chart 4.19).

Chart 4.18: Percentage of Students Who Feel That High-Speed Internet Access Improves Their Ability to Use DERs

Question 18: Does high-speed internet access improve your ability to use DERs? (n=392)

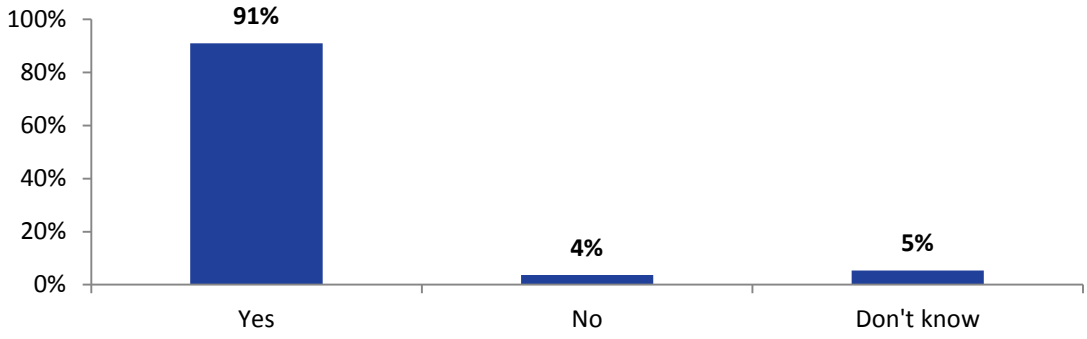
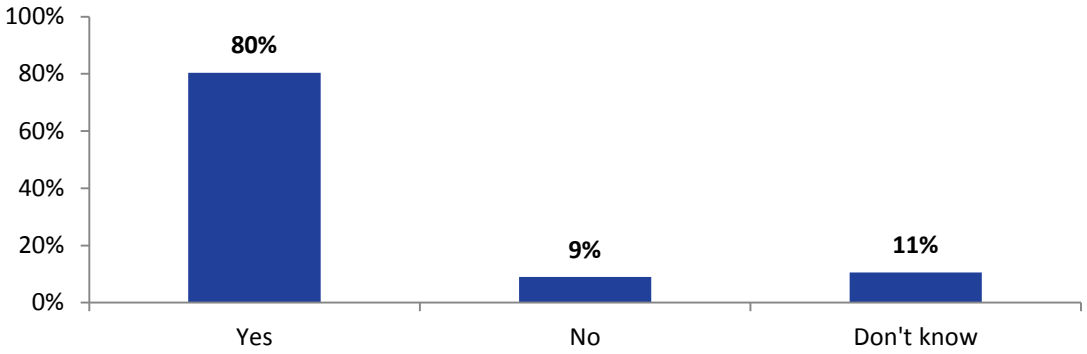


Chart 4.19: Percentage of Students Without High-Speed Internet Access Who Feel It Limits Their Use of DERs

Question 17: Does your lack of access to high-speed internet limit your use of DERs? (n=40)



Key informants offered the following insights into how limited access to broadband and high-speed internet can negatively influence the use of DERs:

- Slow or unreliable internet connection hinders the ability of programs to ensure all students are provided with an appropriate learning experience. Students with poor internet connections may experience lags and delays accessing and downloading materials, which can slow their progress through a course.
- Some courses require synchronous coursework, where students either attend lectures or participate in group work together; these aspects of the course may require students to be able to stream data and/or share data in real time. Students lacking high-speed internet may be limited in their ability to interact with their classmates and, depending on course requirements, may not be able to participate in courses at all.
- Virtual desktops providing access to course software must be accessed through an online server. Students with an unreliable or slow connection may not have the capacity to work in real time on the institution's computer server and therefore may need to acquire and install a copy of course software on their computers in order to complete assignments, potentially adding costs to their post-secondary education.

Key informants noted that challenges accessing course materials can negatively affect students' perceptions of a course, their decisions about whether to continue in a course, or their learning outcomes. Interviewees identified several mitigation strategies that instructors may use to help students overcome poor internet connections:

- keeping limited internet access in mind when designing courses (e.g. selected materials, teaching methods, and modes of student interaction) to ensure that, to the extent possible, all students receive a similar learning experience;
- using media other than the internet (e.g. flash drives and text descriptions of videos) to provide students with the required course materials; and
- minimizing the use of live streaming and providing students the opportunity to download materials when they are able.

Key informants did not believe that there were any other significant challenges to using DERs aside from internet access. They reported that computers have fallen significantly in price and most have the

resources required to run DERs. Furthermore, the software needed to run DERs is readily available (e.g. Adobe Flash) or is provided on virtual desktops or servers. Nevertheless, a few key informants cautioned that the cost of a computer may still be a barrier for some low-income students. Additionally, some interviewees noted that students in rural areas may need to travel to the city to purchase a computer. However, key informants suggested that these challenges are relatively minor and can be readily overcome on a case-by-case basis, possibly using computer loans.

4.3.2 *Training and Support Needs*

The survey found that 60% of students did not require training or support to use DERs throughout their program (see Chart 4.20). However, one-quarter of students indicated that they required training or supports. In particular, students who were 46 years or older (47%) were more likely to report requiring training and support to use DERs (see Chart 4.21).

Chart 4.20: Percentage of Students Stating That They Required Training or Support to Use DERs Throughout Their Program

Question 23: Do you require training or support to use DERs throughout your program? (n=452)

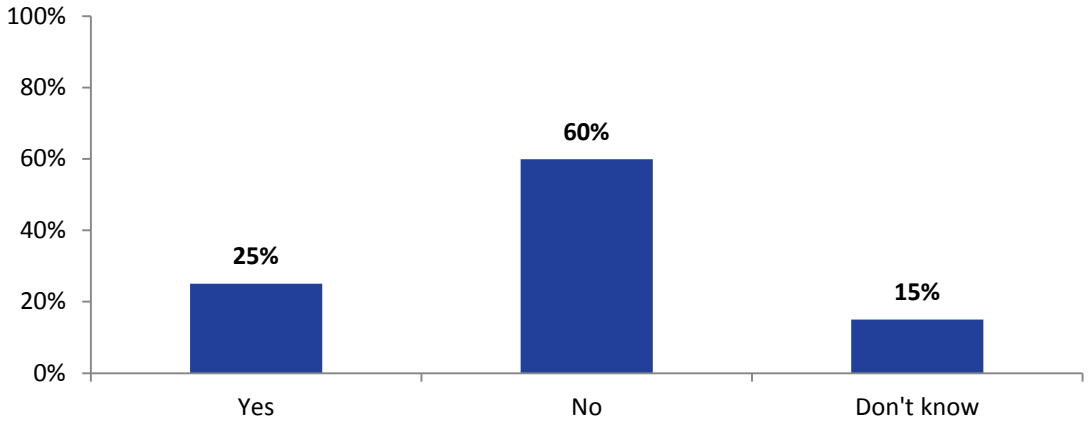
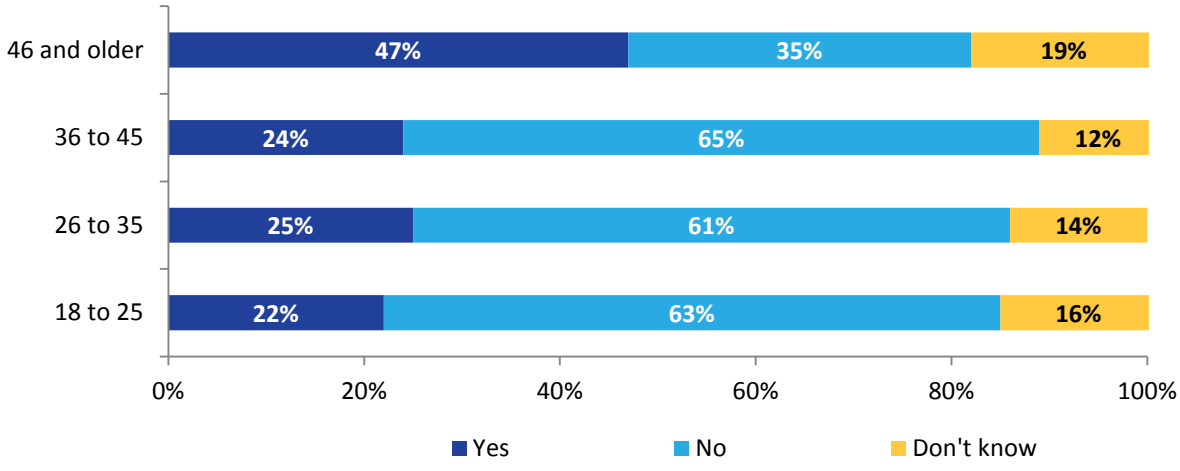


Chart 4.21: Percentage of Students Stating That They Required Training or Support to Use DERs Throughout Their Program by Age

Question 23: Do you require training or support to use DERs throughout your program? (n=452)

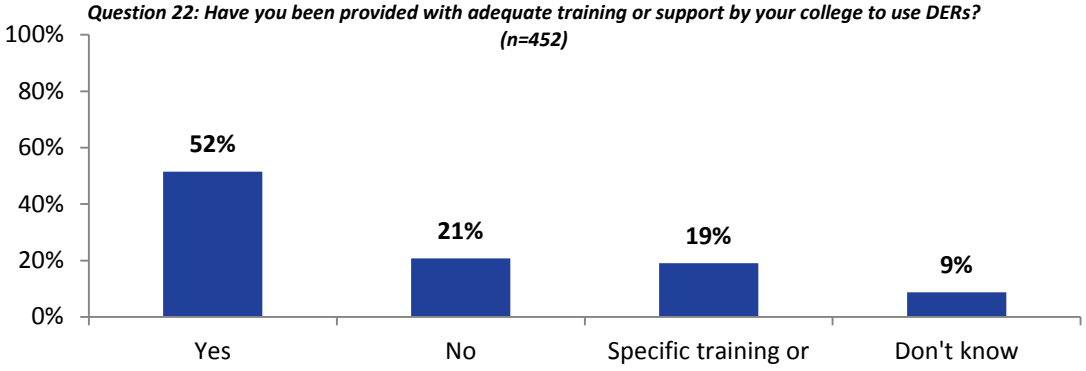


Note: Numbers may not add to 100% due to rounding

More than two-thirds of students said they either received adequate training or support (52%) or did not need the training or support (19%) to use DERs (see Chart 4.22).

Chart 4.22: Percentage of Students Stating That They Received Adequate Training or Support to Use DERs

Question 22: Have you been provided with adequate training or support by your college to use DERs? (n=452)

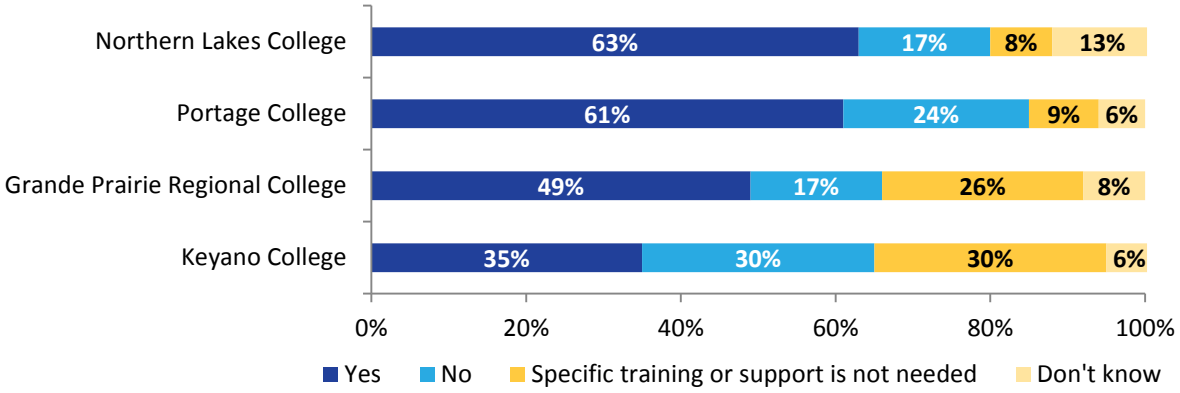


Note: Numbers may not add to 100% due to rounding

Students' perceptions of whether they received adequate training or support to use DERs varied by college. Almost two-thirds of students from Northern Lakes College (63%) and Portage College (61%) stated that they received adequate training and support. Less than half of the students at Grande Prairie Regional College (49%) and Keyano College (35%) said they received adequate training and support; however, more than one-quarter of students at these colleges reported that they did not require any training or support to use DERs (see Chart 4.23).

Chart 4.23: Percentage of Students Stating That They Received Adequate Training or Support to Use DERs by College

Question 22: Have you been provided with adequate training or support by your college to use DERs? (n=453)



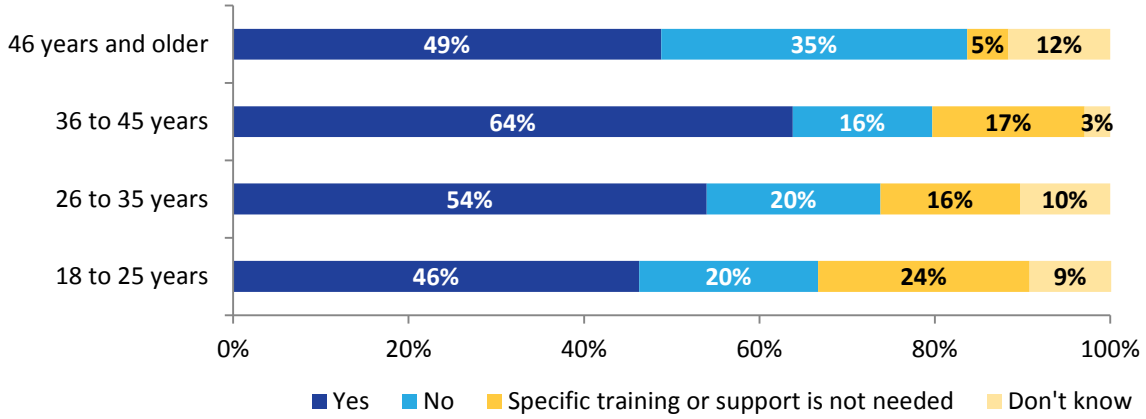
Note: Numbers may not add to 100% due to rounding

Students' perceptions of whether they received adequate training or support to use DERs varied by age.

- Students aged 18 to 25 years (24%) were most likely to say that they did not need any specific training or supports.
- Students aged 46 years or older (35%) were most likely to report that they had not received adequate training or supports (see Chart 4.24).

Chart 4.24: Percentage of Students Stating That They Received Adequate Training or Support to Use DERs by Age

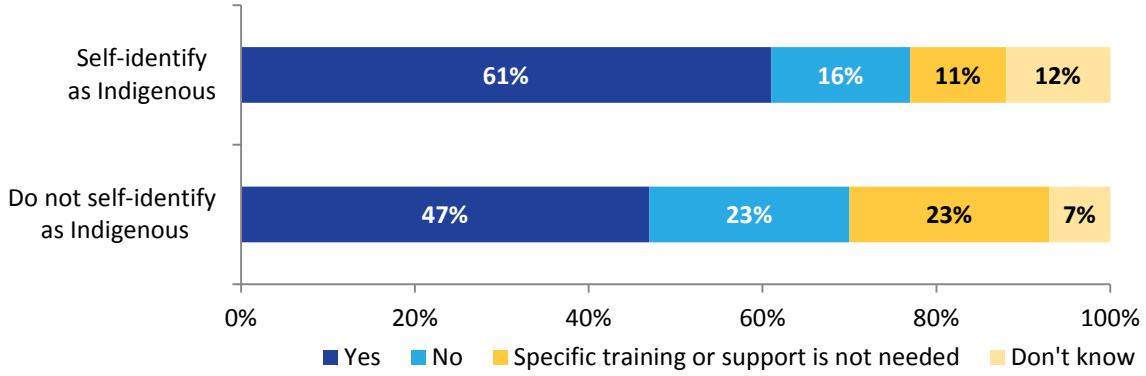
Question 22: Have you been provided with adequate training or support by your college to use DERs? (n=454)



Students who self-identified as Indigenous (61%) were more likely than non-Indigenous students (47%) to indicate that they received adequate training and support. Furthermore, Indigenous students (11%) were also less likely than non-Indigenous students (23%) to report not needing specific training or support (see Chart 4.25).

Chart 4.25: Percentage of Students Stating That They Received Adequate Training or Support to Use DERs by Indigenous Status

Question 22: Have you been provided with adequate training or support by your college to use DERs? (n=450)

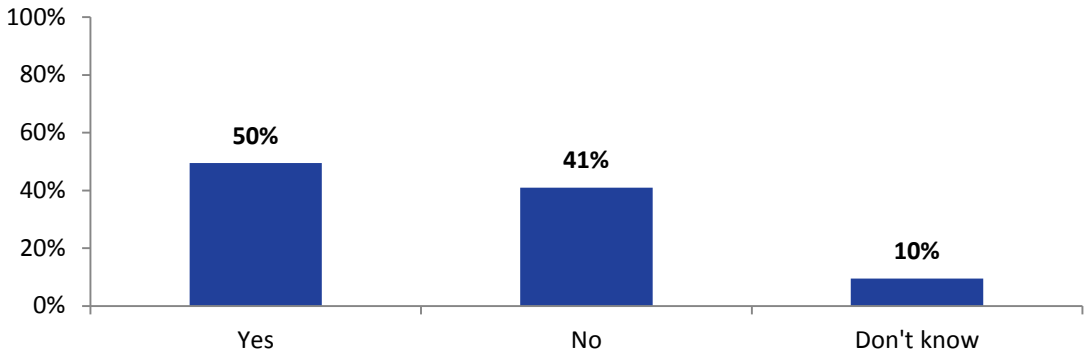


Key informants regularly mentioned the need to ensure that faculty and students have access to regular training and support in order to make the best use of DERs. As previously described, not all individuals are equally comfortable with, or have knowledge of, computers and electronic resources. Therefore, training and support can help ensure all individuals have an equal ability to access, use, and develop DERs.

Although half of the students surveyed reported experiencing challenges using DERs (see Chart 4.26), most of the difficulties were associated with the resource itself, rather than access to the necessary technology. About half of the students reported that the resource they were trying to access was unavailable or offline (55%) or the resource did not work as expected (49%) (see Chart 4.27). In comparison, 88% of students reported that they had the necessary technical resources needed to access DERs (see Chart 4.28).

Chart 4.26: Pecentage of Students Who Experience Challenges When Using DERs

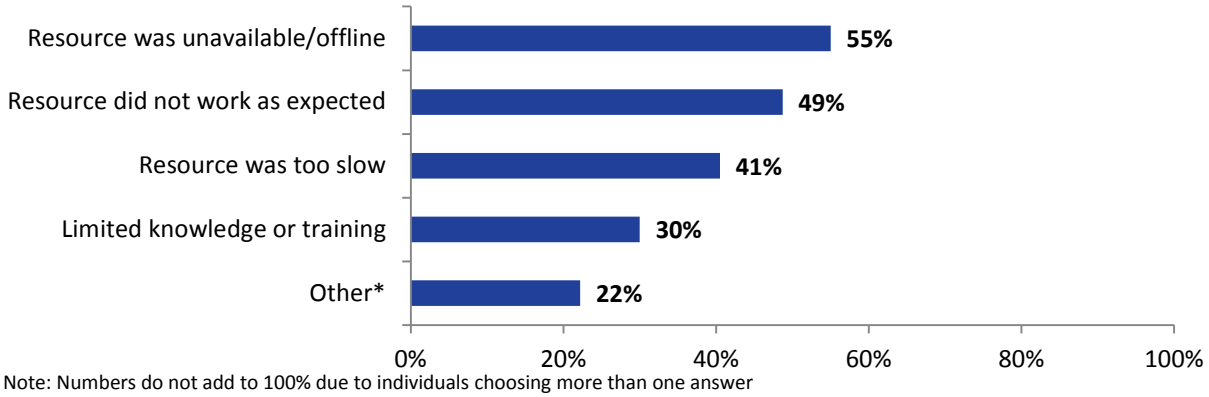
Question 11: Do you experience any challenges, excluding internet speed or reliability, when trying to use DERs? (n=454)



Note: Numbers may not add to 100% due to rounding

Chart 4.27: Type of Challenges Students Experience When Using DERs

Question 12: What challenges, excluding internet speed or reliability, have you experienced when trying to use DERs? (n=213)

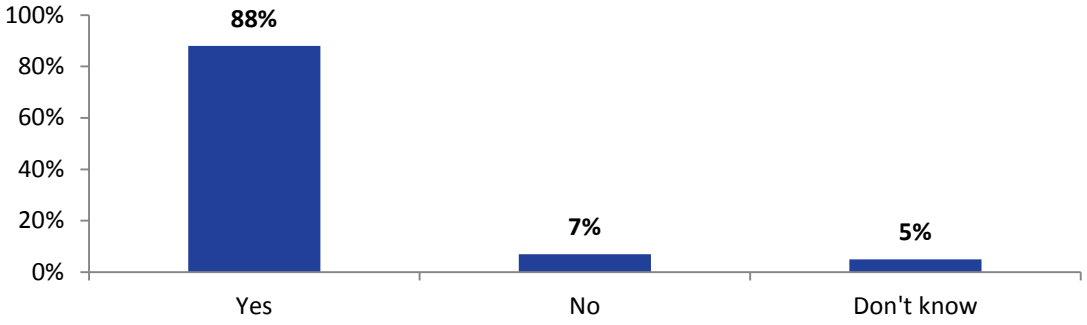


Note: Numbers do not add to 100% due to individuals choosing more than one answer

* The most common "Other" responses were: eyestrain from reading material digitally (4%); challenges navigating material, including finding DERs and finding specific material within a DER (3%); poor quality DERs (2%); poor support for using DERs (2%), and a preference for face-to-face instruction (2%).

Chart 4.28: Percentage of Students With the Necessary Technical Resources to Access DERs

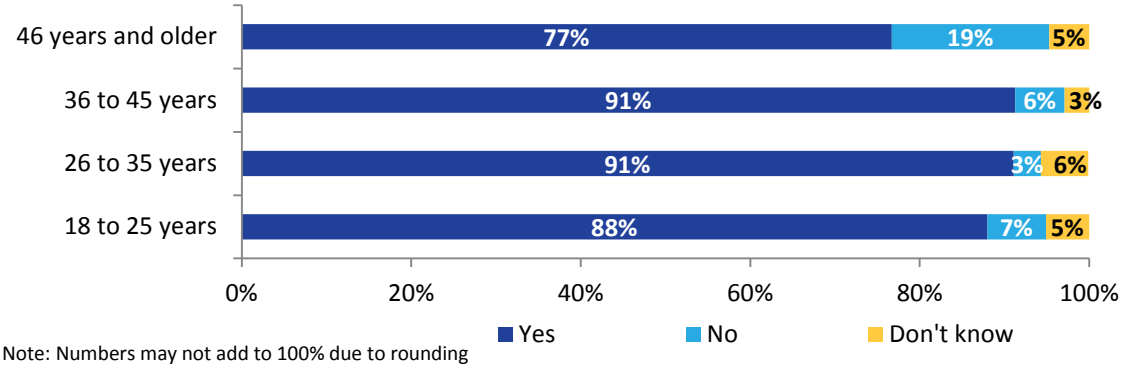
Question 13: Do you have the necessary technical resources, excluding internet speed or reliability (i.e., appropriate computer, device or hardware), to access DERs? (n=454)



While the majority of students across all age groups indicated that they had the necessary technical resources to access the college's DERs, students aged 46 years and older (19%) were more likely than younger students (3% to 7%) to state that they did not have the necessary resources (see Chart 4.29).

Chart 4.29: Percentage of Students With the Necessary Technical Resources to Access DERs by Age

Question 13: Do you have the necessary technical resources, excluding internet speed or reliability (i.e., appropriate computer, device or hardware), to access DERs? (n=453)

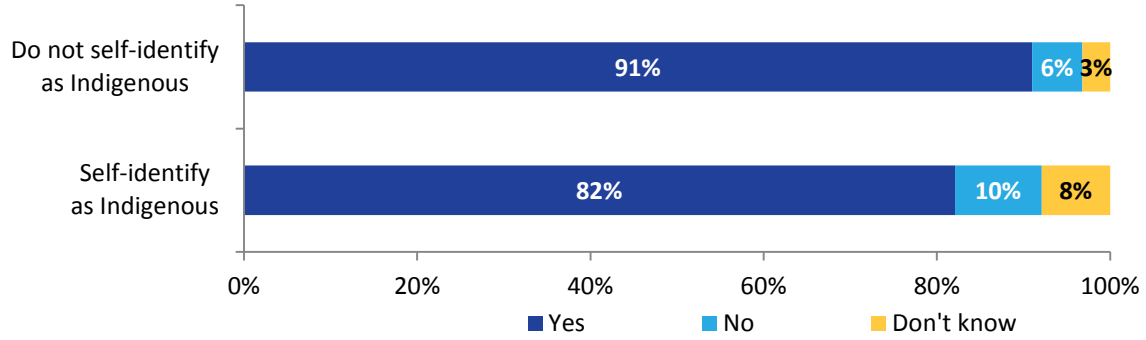


Note: Numbers may not add to 100% due to rounding

Although most students reported having access to necessary technical resources to use DERs, students who self-identified as Indigenous (82%) were less likely than non-Indigenous students (91%) to say they had access to required resources. Indigenous students were also more likely to say they did not know if they had access to the resources they needed (see Chart 4.30).

Chart 4.30: Percentage of Students With the Necessary Technical Resources to Access DERs by Indigenous Status

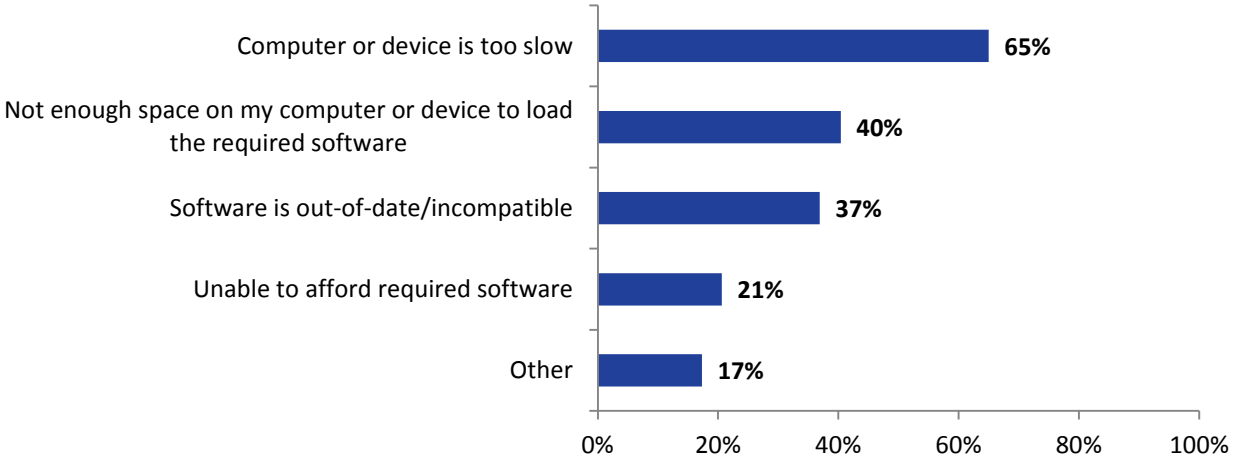
Question 13: Do you have the necessary technical resources, excluding internet speed or reliability (i.e., appropriate computer, device or hardware), to access DERs? (n=451)



For students who lacked the necessary technical resources to access DERs, the most common problem was the slow speed of their computer or device (65%) (see Chart 4.31).[79]

Chart 4.31: Types of Technical Challenges That Limit Student Use of DERs

Question 14: What technical challenges, excluding internet speed or reliability, limit your use of DERs? (n=27)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

Both the 2017 National Survey of Online and Distance Education in Canadian Post-Secondary Education and the Universities Canada 2015 survey of member institutions found that institutions were facing resource challenges in using DERs. These challenges included:

- governance mechanisms to manage digital issues;
- data management and storage systems;

[79] Examples of "other" technical challenges that students identified included: lack of consistent internet access across campus; difficulty finding the resources required for courses; and use of "community" laptops, which necessitated having to reload the required software each time it was used.

- long-term approaches to fund networking, high-performance computing, and software tools;
- adequate resources for online learning;
- access to specialist learning technology support staff;
- lack of suitable training/pedagogical knowledge;
- resistance from instructors; and
- lack of support from government.[80]

Key informants described the following training and support that may help students and faculty access and use DERs:

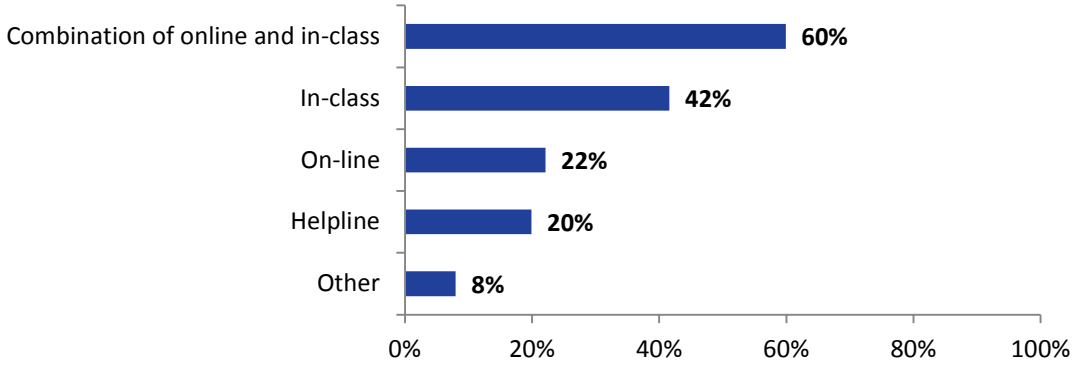
- *Orientation sessions* providing a general overview of the DERs available at the institution and a description of the platform used (e.g. Moodle). Typically, orientations are geared toward students; however, faculty are welcome to attend. Although orientation session tend to focus on increasing awareness of DERs rather than developing specific skills, the sessions often let participants know where they can access additional information.
- *Classes and presentations* providing individuals with information on the benefits of DERs, a detailed introduction to a specific DER, or instructions on how to complete common tasks using DERs.
- *Online tutorials* providing a general introduction to a specific DER, an overview of how to use the resource, and detailed instructions about using advanced features of the resource. A few informants noted that while tutorials are good resources for teaching individuals how to use DERs, they tend to provide only pre-packaged responses to general questions and therefore may not meet the specific requirements of individual users.
- *Help desk or IT support staff* to answer specific questions that students and faculty may have with a particular DER or to provide troubleshooting support when the resource does not act as expected. Support staff tend to be knowledgeable about DERs and may even specialize with specific resources.
- *Course instructors* who regularly use DERs can provide basic supporting materials to students concerning their use. When students' questions are beyond the instructor's abilities, the instructor can direct students to appropriate assistance elsewhere at the institution.

[80] Universities Canada (2015). *Canadian Universities and our Digital Future: A workshop by Universities Canada*. Retrieved from https://www.univcan.ca/wp-content/uploads/2016/05/canadian-universities-and-our-digital-future-2015-workshop-report.pdf
The National Survey of Online and Distance Education in Canadian Post-Secondary Education (2017). *Tracking Online and Distance Education in Canadian Universities and Colleges: 2017.* Retrieved from https://www.newswire.com/files/e8/b0/f52d2613bf54ec6b35a454a344a0.pdf

Students who responded to the survey preferred to receive training and support for DERs through a combination of in-class and online supports (see Chart 4.32).

Chart 4.32: Ways Students Prefer to Receive Training and Support for DERs

Question 25: What would be the best way to provide this training or support? (n=111)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

4.4 Promotion of Digital Educational Resources and Open Educational Resources

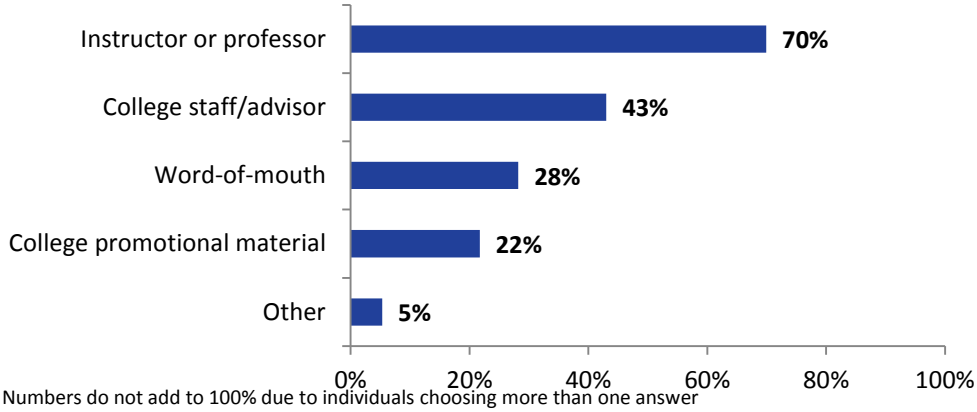
4.4.1 *Increasing Awareness of Digital Educational Resources and Open Educational Resources*

Both the environmental scan and key informants emphasized that in order for institutions to promote DERs, including OERs, they first need to raise institutional, student, and public awareness of them. Most key informants described general awareness of the role of DERs as filtering down from deans and program coordinators to instructors, and from instructors to students. For this reason, they believed that promotional efforts should come from the top down. However, they emphasized the importance of involving faculty and students in the development of promotional strategies to ensure their concerns are addressed and to garner their support for implementation efforts.

The survey found that 70% of students learned about DERs from their instructors (see Chart 4.33). When asked how they would like to learn about DERs, 68% stated that the course material should incorporate them (see Chart 4.34).

Chart 4.33: Ways Students Became Aware of DERs

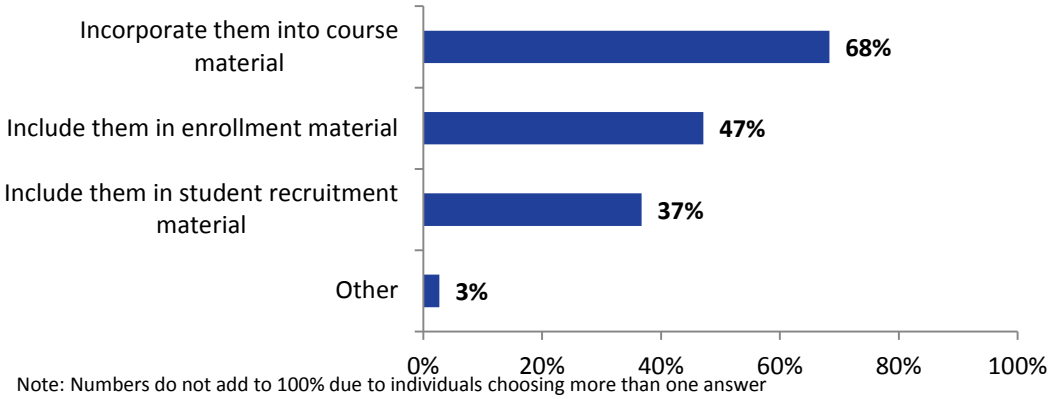
Question 19: How did you become aware of DERs? (n=341)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

Chart 4.34: Ways Students Would Like to Learn About DERs

Question 20: How would you like to learn about DERs? (n=381)



Note: Numbers do not add to 100% due to individuals choosing more than one answer

Some universities and colleges have used institutional champions (e.g. instructors, faculty, or students) to raise awareness of and promote OERs:

- Individual instructors who are passionate about OERs and digital technologies have encouraged a multiplier effect, where their adoption of the technologies has led other instructors to follow suit.[81]
- Faculty champions have addressed deficits in their programs by designing courses and programs that use only OERs.[82]
- Student champions at the University of Calgary (Alberta, Canada) and the University of Victoria (British Columbia, Canada) started a "#textbookbroke" campaign to highlight the impact of textbook costs on their education.[83] They hoped that the campaign would increase access to and use of OERs, thereby helping to reduce course costs.

Some informants reported that their institutions use a variety of mechanisms to raise student and instructor awareness of DERs, including posters, social media, in-class presentations, and student orientations. A few informants mentioned that Student Association support for the use of DERs can help increase outreach and awareness efforts. Although interviewees recognized that most outreach efforts target students, they said the programs can also reach instructors, particularly when instructors provide class time to discuss DERs.

4.4.2 *Encouraging Use of Digital Educational Resources and Open Educational Resources*

Post-secondary institutions need to promote DERs, including OERs, to ensure their adequate and appropriate use. Informants indicated that, without an overall program or strategy for DERs, their development and use is sporadic and restricted to individual instructors.

[81] Coalition for Networked Information (2016). *Institutional Strategies for Open Educational Resources (OERs): Report of a CNI Executive Roundtable*. Retrieved from https://digitalcommons.unl.edu/scholcom/28/

[82] Community College Consortium for Open Educational Resources (no date). *Pathways to Success with OER Degrees*. Retrieved from https://www.cccoer.org/casestudy/pathways-to-success-with-oer-degrees/
Community College Consortium for Open Educational Resources (no date). *OER Degree Pilot: Increasing Access & Completion*. Retrieved from https://www.cccoer.org/casestudy/san-jacinto-college-oer-degree-pilot/

[83] Thomas, M. (2016). *B.C. students say they are #textbookbroke*. Retrieved from http://www.cbc.ca/news/canada/british-columbia/b-c-students-say-they-are-textbookbroke-1.3751573
Pike, H. (2016). *University of Calgary Students' Union launches Open Educational Resources campaign*. Retrieved from http://www.metronews.ca/news/calgary/2016/08/09/university-calgary-students-union-open-educational-resources.html

Key informants noted that, to increase the use of DERs at post-secondary institutions, it is necessary to demonstrate their efficacy (e.g. cost savings for institutions and students and improved student and program outcomes) and make them easier to access and use. Furthermore, having policies related to DERs can provide instructors with direction regarding the role and use of DERs in coursework. Pairing this with appropriate support and training will help position instructors to integrate DERs effectively into their programs and courses and use them to enhance learning environments and student outcomes.

Key informants suggested that institutional use of OERs can be promoted by:

- *Positioning OERs as a marketing tool.* Post-secondary institutions can use OERs to market their programs and resources. Given that high-quality OERs can be expensive to create and are free to use, informants noted that the marketing benefits of OERs may help underwrite the cost of their development.
- *Using OERs to reduce program costs.* Since instructors can integrate OERs into existing programs and customize them as needed, using external OERs in course development can help reduce costs.
- *Establishing clear policies concerning the use and development of OERs.* Development and use of OERs tends to be sporadic, as their incorporation into courses relies largely on individual faculty members who have an interest in them. Clear policies related to OERs would help demonstrate institutions' awareness of and commitment to OERs and would also help guide faculty and instructors in their use.
- *Providing incentives to encourage the development and use of OERs*. Although OERs are free to access, they have costs associated with them in the form of instructor time. Institutions could provide instructors with incentives (e.g. grant money, time, and recognition) to integrate OERs into their courses.

  Some libraries have incentivized the development of OERs. For example, the library at Temple University (United States) provided faculty with grants to develop digital learning materials, and the library at the State University of New York (United States) funded the development of 15 free online textbooks.[84]
- *Encouraging collaboration between institutions to develop OERs*. Cross-institution partnerships and collaborations can help reduce the cost, resource, and expertise requirements to develop OERs. This can be particularly important for smaller institutions that may not have the financial or technical resources needed to develop OERs.

  Various consortia of universities and colleges, such as the Open Education Consortium and the Community College Consortium for Open Educational Resources, are promoting the use of OERs, sharing best practices, facilitating networking, and providing opportunities for collaboration.[85]

[84] Okamoto, K. (2013). *Making Higher Education More Affordable, One Course Reading at a Time: Academic Libraries as Key Advocates for Open Access Textbooks and Educational Resources*. Retrieved from http://academicworks.cuny.edu/jj_pubs/103

[85] *About the Open Education Consortium.* Retrieved from www.oeconsortium.org/about-oec
Community College Consortium for Open Educational Resources (no date). *About Us*. Retrieved from www.cccoer.org/about/about-cccoer

Key informants also identified methods of promoting the use of OERs among faculty:

- *Using OERs to enhance student outcomes.* If instructors have an increased understanding of how OERs can assist students who are struggling with a course, they may be more willing to incorporate them into their programs. To help ensure students succeed in their coursework, instructors should be shown how OERs can enhance learning environments and student outcomes. For example, instructors can provide OERs as supplementary materials, encourage students to incorporate additional material into the course, and have students incorporate or develop OERs for their assignments. Promoting the use of OERs in this manner can help increase student engagement and interactivity with the course material.
- *Training and support.* Instructors who promote the use of OERs in their courses are more likely to have students who use OERs. However, instructors are content experts who may not have the technical skills needed to use or develop OERs. Providing instructors with training and support can help them develop the skills they need to develop and implement OERs successfully.

Additionally, a study by Okamoto indicated that libraries have an important role to play in encouraging the use of OERs; this may include supporting the discovery of OERs, developing guides to OERs (e.g. providing links to repositories and providers), managing institutional repositories of OERs, providing students and faculty with OER-related training, or funding OER projects.[86]

[86] Okamoto, K. (2013). *Making Higher Education More Affordable, One Course Reading at a Time: Academic Libraries as Key Advocates for Open Access Textbooks and Educational Resources*. Retrieved from http://academicworks.cuny.edu/jj_pubs/103

SECTION 5: CONCLUSIONS AND RECOMMENDATIONS

DERs have the potential to increase access to post-secondary education and improve students' learning experiences. DERs can enable post-secondary institutions to extend their reach into, and enhance educational opportunities for, rural and remote communities. Additionally, DERs can help instructors provide a more inclusive and interactive experience to students enrolled in distance learning, thereby increasing student retention and enhancing student outcomes.

To fully realize the benefits that DERs can provide post-secondary institutions and students, institutions need to proactively and thoughtfully integrated them into courses. This involves considering the use of DERs in program or course design, ensuring students can readily access course materials (and providing alternatives to those who may experience accessibility challenges), considering faculty and student perspectives when selecting DERs, and preparing supplementary materials to support the use of DERs (e.g. orientation materials, user toolkits, and training).

One of the main benefits of DERs is that they facilitate the development of a community of learners (learner-to-learner and learner-to-instructor). Therefore, it is important for DERs to support the development of student cohorts. While the interactive nature of DERs does not necessarily require synchronous coursework, it should facilitate discussions and feedback between students and with the instructor.

When selecting DERs, it is important to ensure they are interactive, engaging, and high quality to ensure that students thoroughly review and understand the material presented. DERs that are poor quality or present information that is irrelevant to the course will distract students and detract from the learning experience. Moreover, DERs that do not meet the students' preferences or needs can negatively impact program completion and student outcomes.

Thus, while DERs have the capacity to level access to post-secondary education, planning their implementation requires thought and consideration. Recommendations to support the appropriate implementation of DERs include the following:.

Recommendation #1: Develop a Strategic Vision for Digital Educational Resources in Northern Alberta
LEARN should develop a strategic vision or guiding framework to promote and support the continued development and use of DERs in northern Alberta post-secondary institutions. By working together to achieve a shared vision and leveraging each other's knowledge and expertise, institutions can maximize the use of their resources to enhance the accessibility, affordability, and quality of educational opportunities in the north. The vision should:

- establish common goals and priorities for DERs in northern Alberta post-secondary education;
- describe the desired role of DERs in northern post-secondary institutions;
- determine the intended outcomes for institutions, faculty, and students that DERs will contribute to;
- identify strategies for addressing systemic barriers to developing and using DERs in the north;
- specify the roles and responsibilities of stakeholders; and
- determine the resources required to realize the vision.

Recommendation #2: Develop Institution-Based Toolkits to Support the Development and Use of Digital Educational Resources

Institutions should develop and tailor toolkits to meet institutional needs and support faculty and students in developing and using DERs. The toolkits may be comprised of various resources such as:

- descriptions of institutional policies, governance mechanisms, and information technology infrastructure related to DERs;
- practical guides to assist faculty in the development and use of DERs;
- a list of considerations for faculty when selecting DERs;
- a description of pedagogical practices that support the effective use of DERs;
- an inventory of resources (e.g. grants/funding, faculty time, and networks/collaborations) that are available to support faculty with the development of DERs;
- orientation materials to introduce students to DERs;
- an inventory of and centralized repository for DERs; and
- centralized resources to help faculty and students troubleshoot any technological challenges they may experience when using DERs.

To ensure they meet the needs of the intended users and to garner support for their use, faculty should be involved in the design and development of the toolkits and associated resources. Furthermore, faculty can offer the insights required to ensure the resources will support the development and use of DERs that align with program and course objectives, as well as the needs of students.

Recommendation #3: Ongoing Monitoring of Student Use of Digital Educational Resources

DERs are intended to enhance students' learning experiences and achievement of outcomes. To ensure this goal is being met, institutions need to collect and monitor data systematically regarding student preferences for DERs, students' use of DERs, and student outcomes for courses that are delivered using DERs. Institutions should review the data currently being collected by libraries, and other administrative sources, to understand student and faculty use of DERs. This review should also highlight gaps that may exist in the data and determine methods to address those gaps. Additional information from students and faculty may be needed to address identified gaps (e.g. surveys or focus groups). Additionally, linking different institutional databases (e.g. course records and library records), could address information gaps. This ongoing monitoring will enable institutions to assess the effectiveness of different DERs, review student satisfaction with DERs, and engage in evidence-informed decision making regarding future digital education strategies.

APPENDIX A: RESEARCH MATRIX

Research Matrix – Digital Educational Resources in Northern Alberta

Research Question	Key Indicators	Literature Review	Environmental Scan	Key Informant Interviews	Student Survey

Can DERs improve post-secondary education service delivery across the north on main campuses in urban centres, in regional campuses, or in distance education? Which resources have the largest impact?	• Improved access to post-secondary education for:
	  • Remote students
	  • Rural students
	  • Urban students
		X	X	X	6a, 6b

	• Impact on student outcomes	X		X	7, 8
	• Impact on enrollment rates	X		X	
	• Impact on retention rates	X	X	X	
	• Impact on program completion rates	X	X	X	
What are the barriers to using DERs in the north? How do they compare to barriers elsewhere?	• Accessibility challenges	X	X	X	9, 10
	• Compatibility challenges		X	X	
	• Resources challenges	X	X	X	11, 12
	• Impact of broadband on use of DERs	X	X	X	13, 14, 15, 16
What are student, faculty, and library, preferences between hard copy resources and DERs (including tertiary, distance, and experiential learning)?	• Demands of electronic versus hard copy texts	X	X	X	
	• Use of electronic versus hard copy texts	X	X		3, 4, 5
	• Licensing preferences for DERs	X	X	X	
	• Impact of OERs	X	X	X	
What resources are required to better integrate digital resources into northern post-secondary education?	• Best practices in promoting the use of DERs	X	X	X	17, 18, 19, 20
	• Available and/or needed training/supports for use of DERs by instructors	X	X	X	
	• Available and/or needed training/supports for use of DERs by students	X	X		21, 22, 23

APPENDIX B: KEY INFORMANT INTERVIEW GUIDE

Name and Position/Role:
Date and Time:
Telephone:

Introduction

Labour Education Applied Research North (LEARN) is a joint initiative created between the Northern Alberta Development Council and a group of northern post-secondary institutions. LEARN is interested in researching digital education methods and resources for northern Alberta education and delivery. The results of this project will provide recommendations to better integrate resources into northern teaching and provide a platform towards the development of a future digital education strategy project.

As part of the research, Malatest is conducting interviews with individuals who have experience with Digital Educational Resources (DERs) and their use in post-secondary education. The goal of this conversation is to learn more about the uses of DERs and the potential role they can play in enhancing post-secondary education in northern Alberta. You were invited to be interviewed based on your experience with DERs. The interview is expected to take approximately 45 to 60 minutes of your time.

Confidentiality and Privacy

Your participation in this interview is voluntary. You are not obligated to answer any questions, you may skip any question that you cannot or do not wish to answer, and you may end the interview at any point without any negative consequences.

The information collected during this interview is being collected under the authority of section 33 (c) of the Freedom of Information and Protection of Privacy Act (Alberta). All information collected will be held in the strictest confidence. Responses to the survey will only be reported in aggregate and will not be linked to any individuals or organizations.

We would like to record the interviews to ensure the accuracy of the notes taken. The audio recordings will only be used by research staff to review and amend the interview notes. These recordings will be destroyed at the completion of the project.

If you have any questions or concerns, please contact Douglas Elliott of Malatest at:

Toll free: 1-877-665-6252 (extension 224)
d.elliott@malatest.com

Do you have any questions or require additional information before we begin?

Stakeholder Groups
Community and industry partners (CIP)
Researchers and academics (RA)
Post-secondary staff involved with DERs (PSS)
Government officials (GO)

INTRODUCTION

DERs are technologies that provide students enhanced control over the time, place, and pace of their learning. DERs can improve the quality of the teaching and learning experience, and can include:

- mobile education (smartphones, tablets, laptops);
- online lectures and courses;
- electronic textbooks;
- electronics notes and other resources;
- online practice quizzes and tests;
- animated demonstrations of course material;
- training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators); and
- learning modules.

[All] Please describe your involvement in the use of DERs in post-secondary education.
Probe: How long have you been involved with DERs?

SECTION A: IMPACT OF DERS

We would like to start our discussion with talking about how DERs can impact learner outcomes in post-secondary education.

A1. [All] What impact do you feel that the use of DERs has had on increasing access to post-secondary education for hard to reach populations (students in rural and remote communities, low-income students, minority students)?

A2. [All] Do you feel that the availability of DERs increases the likelihood that individuals will enroll in post-secondary education? Why?

A3. [All] Do you feel that the availability of DERs increases the likelihood that individuals will enroll in a particular post-secondary institution? Why?

A4. [RA, PSS] What impact does the availability and use of DERs have on student and program outcomes?
Probe: Student grades?
Probe: Student retention rates?
Probe: Program completion rates?

SECTION B: DERS CHALLENGES

We would like to turn our attention to the challenges that exist with the use of DERs in post-secondary education, particularly for students who live in rural or remote communities.

B1. [All] How does the availability of internet access in rural and remote communities impact the use of DERs?

B2. [RA, PSS, GO] Do the software and technology requirements of DERs differentially impact students in rural and remote communities? If so, how?

B3. [RA, PSS, GO] How does access to a high-speed internet connection impact the use of DERs by students?
Probe: What impact does a personal, home high-speed internet connection have?

SECTION C: ELECTRONIC TEXTBOOKS

Electronic textbooks are a particularly pervasive type of digital educational resource. In this section we would like to talk about your perspectives on the use of electronic textbooks in post-secondary institutions.

C1. [RA, PSS] Is there a preference for electronic textbooks or hard copy textbooks among:
a. students?
b. faculty?
c. libraries?
Probe: What is the preference? Why?

C2. [RA, PSS] What factors facilitate the use of electronic textbooks by:
a. students?
b. faculty?
c. libraries?

C3. [RA, PSS] What factors hinder the use of electronic textbooks by:
a. students?
b. faculty?
c. libraries?

C4. [RA, PSS] How do licensing and digital rights management impact the use of electronic textbooks?
Probe: What impact do they have on library use of electronic textbooks?

SECTION E: OPEN EDUCATIONAL RESOURCES

Open Educational Resources (OERs) are educational materials that are in the public domain or are introduced with an open licence. These resources are generally freely available over the internet and have few restrictions on their use. In this section, we would like to talk about the use of OERs in post-secondary education.

D1. [All] What benefits are there concerning the use of OERs?

D2. [All] What challenges are there concerning the use of OERs?

D3. [RA, PSS] How can OERs best be used by:
- a) post-secondary institutions?
- b) faculty?
- c) students?

SECTION E: PROMOTION OF DERS

In the last section, we would like to talk about what can be done to promote the use of DERs for post-secondary education.

E1. [All] How can post-secondary institutions better promote the availability and use of DERs in their programs?

E2. [RA, PSS] What could be done to better promote the use of DERs by:
- a. post-secondary institutions?
- b. faculty?
- c. students?

E3. [RA, PSS] How can post-secondary institutions provide the support and training needed to use their DERs?
- Probe: Training and supports for instructors?
- Probe: Training and supports for students?

SECTION F: CONCLUSION

That is the last of the questions that we have for you. However, before we end we would like to give you the opportunity to provide any final thoughts you may have on the subjects we discussed.

F1. [All] Do you have any additional comments that you would like to make about the use of DERs in post-secondary education?

Thank you for taking the time to talk with us today and for sharing your thoughts and experiences.

APPENDIX C: STUDENT SURVEY INSTRUMENT

STUDENT SURVEY
DERs in Northern Alberta

Labour Education Applied Research North (LEARN), a joint initiative created in 1995 between the Northern Alberta Development Council (NADC) and a group of northern Alberta post-secondary institutions, is conducting a research project to better understand the role that Digital Educational Resources (DERs) can play in northern Alberta post-secondary education. This survey is collecting input from current students at participating northern Alberta post-secondary institutions about their perceptions of, and experiences with, DERs.

Your participation in the survey is completely voluntary, and you can choose to not participate at any time. All information collected will be held in the strictest confidence. Responses to the survey will only be reported in aggregate and will not be linked to specific individuals.

To ensure the collection of necessary, basic information, answers to the first seven questions are mandatory. That is, you will not be able to continue in the survey without providing a response. Responses to the remaining questions are optional; you can skip them if you feel they are not relevant to your experience or would prefer not to provide an answer.

Would you like to complete the survey:

1. Yes
2. No [Terminate and thank] TEXT: “Thank you for your time.”

* What is your current age?

1. Under 18 [Terminate and thank] TEXT: “Sorry, but you need to be 18 years or older to participate in this survey. Thank you for your interest.”
2. 18 to 25 years
3. 26 to 35 years
4. 36 to 45 years
5. 46 to 55 years
6. 56 and older

[PROGRAMMING – QUESTIONS PREFIXED WITH AN ASTERIX ARE MANDATORY. REMAINING QUESTIONS CAN BE SKIPPED WITHOUT PROVIDING A RESPONSE].

1) * Which northern college are you enrolled with?
    1. Northern Lakes College
    2. Portage College
    3. Keyano College
    4. Grande Prairie Regional College

1a) *[ASK IF 1=a] Which campus or learning centre are you registered with?

1. Athabasca
2. Atikameg
3. Cadotte Lake
4. Chateh
5. Driftpile
6. Fort Vermilion
7. Gift Lake
8. Grande Prairie
9. Grouard
10. High Level
11. High Prairie
12. Loon River
13. McLennan
14. Peace River
15. Peavine
16. Peerless Lake
17. Slave Lake
18. Valleyview
19. Wabasca
20. Distance: Please provide the first three digits of your postal code: _____

1b) *[ASK IF 1=b] Which campus are you registered with?

a. Boyle
b. Cold Lake
c. Frog Lake
d. Goodfish Lake
e. Lac La Biche
f. Saddle Lake
g. St. Paul
h. Distance

1c) *[ASK IF 1=c] Which campus or learning centre are you registered with?

a. Clearwater Campus (downtown Fort McMurray)
b. Suncor Energy Industrial Campus (Gregoire Industrial Park, Fort McMurray)
c. Fort Chipewyan
d. Fort McKay
e. Janvier
f. Gregoire Lake (Learning Centre)
g. Conklin
h. Distance

1d) *[ASK IF 1=d] Which campus or learning centre are you registered with?

a. Grande Prairie
b. Fairview
c. Hinton
d. Jasper
e. Edson
f. Grande Cache
g. Distance

2) *How many semesters have you been registered with this northern college?

a. One semester [Terminate and thank] TEXT: "Sorry, but you need to have completed 2 or more semesters at this college to participate in this survey. Thank you for your interest."
b. Two semesters
c. Three to four semesters
d. More than four semesters

DERs are technologies that provide students enhanced control over the time, place, and pace of their learning. DERs can improve the quality of the teaching and learning experience, and can include:

- Online lectures and courses;
- Electronic textbooks;
- Electronics notes and other resources;
- Online practice quizzes and tests;
- Animated demonstrations of course material;
- Training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators); and
- Learning modules.

3) *Have you used a DER while completing your post-secondary education?

a. Yes
b. No [Terminate and thank] TEXT: "Sorry, but you need to have used a digital educational resource to participate in this survey. Thank you for your interest."

4) *On average, how often have you used the following types of DERs?

Resource	Weekly (1)	Monthly (2)	Per Semester (3)	Never (4)
a. Online lectures and/or courses	❒	❒	❒	❒
b. Electronic textbooks	❒	❒	❒	❒
c. Electronic notes and other resources	❒	❒	❒	❒
d. Online practice quizzes or tests	❒	❒	❒	❒
e. Animated demonstrations of course material	❒	❒	❒	❒
f. Training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators)	❒	❒	❒	❒

g. Learning modules	❒	❒	❒	❒

5) * To what degree has your ability to use the following types of DERs improved your learning?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
[PROGRAMMING – RECALL ITEMS FROM QUESTION 4 – DO **NOT** RECALL ITEM IF RESPONSE TO QUESTION 4 FOR THAT ITEM EQUALS 4]

Resource	Greatly improved (1)	Somewhat improved (2)	Has not improved (3)	Don't know (9)
a. Online lectures and/or courses	❒	❒	❒	❒
b. Electronic textbooks	❒	❒	❒	❒
c. Electronic notes and other resources	❒	❒	❒	❒
d. Online practice quizzes or tests	❒	❒	❒	❒
e. Animated demonstrations of course material	❒	❒	❒	❒
f. Training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators)	❒	❒	❒	❒
g. Learning modules	❒	❒	❒	❒

6) * How have the following types of DERs improved your learning? They have given me… (check all that apply)
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
[PROGRAMMING – RECALL ITEMS FROM QUESTION 5 – DO **NOT** RECALL ITEM IF RESPONSE TO QUESTION 5 FOR THAT ITEM EQUALS 3 or 9]

Digital Educational Resource	More time to review material	The ability to review material on my own schedule	The ability to see course concepts in action	More information about course concepts	The ability to use customizable learning	Don't know	Other (please specify):
a. Online lectures and/or courses	❒	❒	❒	❒	❒	❒	❒____
b. Electronic textbooks	❒	❒	❒	❒	❒	❒	❒____
c. Electronic notes and other resources	❒	❒	❒	❒	❒	❒	❒____
d. Online practice quizzes or tests	❒	❒	❒	❒	❒	❒	❒____
e. Animated demonstrations of course material	❒	❒	❒	❒	❒	❒	❒____

f. Training simulators (e.g. driving, heavy equipment, welding, forestry, or health mannequin simulators)	❒	❒	❒	❒	❒	❒	❒____
g. Learning modules	❒	❒	❒	❒	❒	❒	❒____

7) Do you prefer to use hard copy textbooks or electronic textbooks?
   a. Strongly prefer hard copy textbooks
   b. Slightly prefer hard copy textbooks
   c. No preference between hard copy or electronic textbooks
   d. Slightly prefer electronic textbooks
   e. Strongly prefer electronic textbooks
   f. Don't know

8) [ASK IF 7=a OR b OR c] Why do you like using hard copy textbooks? (check all that apply)
   a. Easier to use: read, make notes, or find specific course material
   b. Cheaper
   c. Accessible for future reference
   d. Other (please specify): _____
   e. Don't know

9) [ASK IF 7= c OR d OR e] Why do you like using electronic textbooks? (check all that apply)
   a. Easier to use: read, make notes, or find specific course material
   b. Cheaper
   c. Portable
   d. More interactive or customizable
   e. Other (please specify): _____
   f. Don't know

10) To what extent do you agree that DERs allow you to more easily complete your post-secondary education?
    [MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
   a. Strongly agree
   b. Agree
   c. Neither agree nor disagree
   d. Disagree
   e. Strongly disagree

11) Do you experience any challenges, excluding internet speed or reliability, when trying to use DERs?
    [MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
   a. Yes

b. No
c. Don’t know

12) [ASK IF 11=a] What challenges, excluding internet speed or reliability, have you experienced when trying to use DERs? (check all that apply)
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Resource was unavailable/offline
    b. Resource did not work as expected
    c. Resource was too slow
    d. Limited knowledge or training
    e. Other (please specify): _____
    f. Don't know

13) Do you have the necessary technical resources, excluding internet speed or reliability (i.e. appropriate computer, device or hardware), to access DERs?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Yes
    b. No
    c. Don't know

14) [ASK IF 13=b] What technical challenges, excluding internet speed or reliability, limit your use of DERs? (check all that apply)
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Computer or device is too slow
    b. Software is out-of-date/incompatible
    c. Unable to afford required software
    d. Not enough space on my computer or device to load the required software
    e. Other (please specify): _____
    f. Don't know

15) Do you have access to a high-speed internet connection?
[MOUSE OVER: "High-speed internet connections are cable, DSL, or satellite connections with speeds greater than 256 kbits"]
    a. Yes
    b. No
    c. Don't know

16) [ASK IF 15=a] Where do you access high-speed internet service and is it reliable? (check all locations that apply)
[MOUSE OVER: "High-speed internet connections are cable, DSL, or satellite connections with speeds greater than 256 kbits"]

Location	Locations where you access high-speed internet connections	Is the connection reliable?		
		Yes	No	Don't Know
a. Home	❒	❒	❒	❒
b. College	❒	❒	❒	❒
c. Other (please specify):	❒	❒	❒	❒

17) [ASK IF 15=b] Does your lack of access to high-speed internet limit your use of DERs?
[MOUSE OVER 1: "High-speed internet connections are cable, DSL, or satellite connections with speeds greater than 256 kbits"]
[MOUSE OVER 2: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
a. Yes
b. No
c. Don't know

18) [ASK IF 15=a] Does high-speed internet access improve your ability to use DERs?
[MOUSE OVER 1: "High-speed internet connections are cable, DSL, or satellite connections with speeds greater than 256 kbits"]
[MOUSE OVER 2: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
a. Yes
b. No
c. Don't know

19) How did you become aware of DERs? (check all that apply)
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
a. Instructor or professor
b. College staff/advisor
c. College promotional material
d. Word-of-mouth
e. Other (please specify): _____
f. Don't know

20) How would you like to learn about DERs? (check all that apply)
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Incorporate them into course material
    b. Include them in enrollment material
    c. Include them in student recruitment material
    d. Other (please specify): _____
    e. Don't know

21) Did the availability of DERs at this college impact your decision to enroll here?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Yes
    b. No
    c. Don't know

22) Have you been provided with adequate training or support by your college to use DERs?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Yes
    b. No
    c. Specific training or support is not needed
    d. Don't know

23) Do you require training or support to use DERs throughout your program?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Yes
    b. No
    c. Don't know

24) [ASK IF 23=a] What training or support do you require to use DERs?
[MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
_____

25) [ASK IF 23=a] What would be the best way to provide this training or support? (check all that apply)
    a. In-class
    b. Online
    c. Combination of online and in-class
    d. Helpline
    e. Other (please specify): _____
    f. Don't know

26) Do you identify as:
    a. Male
    b. Female
    c. Other

27) Do you identify as an Indigenous person?
    a. Yes
    b. No

28) What is the first language that you learned that you still understand and speak?
    a. English
    b. French
    c. First Nation or Métis language (please specify): _____
    d. Other (please specify): _____

29) Do you identify as a person with a learning disability?
    a. Yes
    b. No [SKIP TO END]

30) [ASK IF 29=a] Do you receive DERs to accommodate a learning disability?
    [MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    a. Yes
    b. No, but I would like accommodations
    c. No, accommodations are not necessary

31) [ASK IF 30=a] What type of DERs are you using to accommodate a learning disability?
    [MOUSE OVER: "DERs are any technologies that provide students enhanced control over the time, place, and pace of their learning."]
    _____

Thank you for taking the time to complete this survey.