RESEARCH REPORT

Learning Analytics in Ontario Post-Secondary Institutions:

An Environmental Scan

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About eCampusOntario

eCampusOntario, a not-for-profit corporation, is funded by the Government of Ontario to be a centre of excellence in online and technology-enabled learning for all publicly-funded colleges and universities in Ontario.

About this Report

This report was commissioned by eCampusOntario to determine the scope of learning analytics activity at public post-secondary institutions.

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Table of Contents

Executive Summary

The University of Toronto and Fanshawe College conducted an environmental scan on the scope of learning analytics (LA) activities at Ontario public post-secondary institutions. The project was carried out in January and February of 2020. Data sources included an online survey, two online focus groups, and digital resources identified on the websites of Ontario public post-secondary institutions. We received 63 responses to the online survey from 18 of the 21 Ontario universities and 16 of the 24 Ontario colleges. Twelve participants from colleges and universities joined the online focus groups. We identified 152 webpages or online documents across all Ontario public post-secondary institutions' websites. Here, we present highlights of the findings.

1) **Reasons for Adopting LA or Reasons for Interest in LA:** More than half of the respondents thought LA to be of interest to their institution, but not a priority. Only 8% of the respondents selected LA as a major institutional priority. The two most cited current uses of LA among all respondents were "improving student retention" (22.5%) and "identifying opportunities to improve course and/or program design and delivery" (21.4%). "Curriculum planning" had the highest percentage as a desired use of LA for both colleges and universities.
2) **Positions within Institution with LA-related Interests or Responsibilities:** Survey responses suggest that research and instruction-related positions, followed by curriculum/technology support staff, are the positions most engaged in use of LA in colleges and universities, with each making up at least 26% of the responses. Yet, a wide range of positions were identified as having key responsibilities related to LA initiatives.
3) **Types of Data Used for LA Activities:** Student learning engagement data had the highest percentage (30%) of reported applications, especially applications aimed at informing teaching and learning. Data from "student demographics," "course/program enrolment, withdrawals, and graduation," "student course / program evaluations," "academic success indicators," and "use of student services" informed both institutional and instructional purposes.
4) **LA Tools Currently in Use or in Consideration:** "Learning Management Systems" was the most widely reported tool to support LA activities, accounting for more than 35% of responses. The second most frequently reported LA tool was "Student Information System" (18.7%).
5) **Resources Allocated to LA Activities: "**Administrative staff time" (28.1%) and "IT infrastructure and resources" (30.3%) constitute the largest share of allocated resources. Conversely, "new specialist positions" (13.5%) represent one of the smallest shares of allocated resources.
6) **Guidelines and Policies to Direct LA Activities:** Almost half of the respondents reported lack of a strategic framework to guide LA activities. We observed split opinions for institutions' "public commitment to support LA-based data driven decision making" and for "cultural acceptance of LA use in decision makings." The majority of the respondents reported that institutional information security and ethics policies can guide the use of data in LA activities at their institution.

The findings of this project related to respondents' current LA activities and their capacity to support development in this area surfaced three key areas of opportunity: (1)Increase capacity of analytical expertise to extend LA initiatives; (2) Support development of institutional strategic frameworks to guide LA activities; and (3) Strengthen shared knowledge of LA initiatives within institutions.

Introduction

In January and February of 2020, the University of Toronto (U of T) and Fanshawe College collaboratively conducted an environmental scan on the scope and nature of learning analytics activity at Ontario public post-secondary institutions. The Learning Analytics Environmental Scan project (LA-ES) was carried out in response to eCampusOntario's call for an examination of the landscape of learning analytics (LA) activity across higher education in Ontario.

eCampusOntario's motivation for pursuing an environmental scan was founded on the results of an earlier Educational Technology Shared Services Survey that they had funded (Frossman & Wolf, 2018). In the resulting survey report, LA was identified as one of the top priorities and the number one area of interest among responding institutions, yet only 21% of said institutions had deployed LA in any capacity (Frossman & Wolf, 2018). To lead successful LA initiatives and collaboration across Ontario post-secondary institutions, eCampusOntario requires a deeper understanding of existing LA perspectives, policies, and initiatives. Such knowledge would enable eCampusOntario to assess the readiness and capacity of Ontario post-secondary institutions to engage in further LA activities. Therefore, these project outputs will inform eCampusOntario's future engagement with member institutions, helping eCampusOntario understand provincial interest and capacity to engage with learning analytics technologies and services.

With the overall goal of gaining insight into the current status of LA activities and conversations within Ontario post-secondary institutions, a multi-disciplinary team from U of T and Fanshawe College designed and conducted an environmental scan. This report presents the purposes of the LA-ES, its project design and data sources, thematic findings, and insights gained.

Goals of LA-ES Project

Guided by the goals outlined by eCampusOntario, the LA-ES project sought to understand the following with regard to LA activity at Ontario post-secondary institutions:

- Reasons for adopting LA or reasons for interest in LA
- Positions within institutions that hold LA-related interests or responsibilities
- Types of data used for LA activities
- LA tools currently in use or under consideration
- Resources allocated to LA activities
- Guidelines and policies to direct LA activities.

Definitions of LA

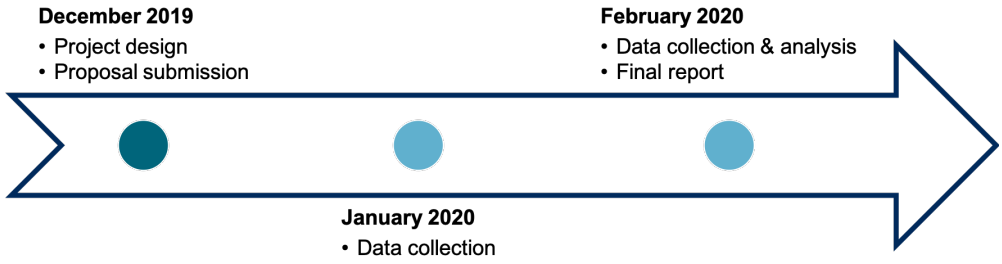
In this project, we used the definition of LA put forth by the Society for Learning Analytic Research which describes LA as "the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs" (https://www.solaresearch.org/about/what-is-learning-analytics/). We differentiate between learning and institutional analytics, with institutional analytics focusing on the "business side of education" (Brooks & Thayer, 2016, p. 3).

Methodology

The project was initiated in December 2019 and we conducted the environmental scan between January and February 2020. Figure 1 illustrates the timeline of the project along with broad project goals in each stage. We explain each of the stages and actions in more detail later in this section.

Figure 1

LA-ES project timeline



A collaborative team from the University of Toronto and Fanshawe College led the LA-ES project. Appendix A presents project team members' institutional affiliation, position, and responsibilities in the project. The team worked closely with an eCampusOntario representative to ensure alignment with the organization's goals and anticipated outcomes for the project.

Participants and Scope

The participant pool for the LA-ES project included all Ontario public post-secondary institutions, consisting of 24 colleges and 21 universities. The project team leveraged their existing professional networks as well as publicly available contact information to invite key personnel in Ontario post-secondary institutions to participate in the LA-ES project. Our goal was to reach out to individuals who could contribute insights regarding their respective institutions' policies, practices, and future plans regarding LA use.

Quality Assurance/Quality Improvement Approval

We conducted the LA-ES project under the framework of Quality Assurance/Quality Improvement (QA/QI). Our QI/QA application was approved by U of T's Research Ethics Manager in December 2019. Data collected for the project was stored in a secure folder at U of T that was accessible only to team members.

Data Sources

We collected data for the LA-ES project from three sources: An online survey, online focus groups, and online public documentation available from the websites of public Ontario post-secondary institutions. We drew on Greller and Drachsler's (2012) LA framework that recognizes six critical dimensions in LA application in education: stakeholders, objectives, internal and external limitations, instruments, and data. In developing data collection tools, we considered these critical elements to capture a comprehensive picture of LA activities in Ontario post-secondary institutions.

Online Survey

We collected data for the LA-ES project from three sources: An online survey, online focus groups, and online public documentation available from the websites of public Ontario post-secondary institutions. We drew on Greller and Drachsler's (2012) LA framework that recognizes six critical dimensions in LA application in education: stakeholders, objectives, internal and external limitations, instruments, and data. In developing data collection tools, we considered these critical elements to capture a comprehensive picture of LA activities in Ontario post-secondary institutions.

Table 1

Recipients of the "LA Survey 2020:Ontario Public Post-Secondary Institutions"

	Recipient Groups	Approx. No. of Recipients
Colleges		
	Curriculum Developers' Affinity Group	100
	Heads of Quality Management	24
	Educational Technology Committee	200
Universities		
	The Ontario Universities' Council on e-Learning	100
	The Council of Ontario Educational Developers	250
	The Canadian University Council of Chief information officers-Ontario	21
Colleges and Universities		
	Institutional researchers; educational technology specialists; curriculum teaching, and learning centre staff (publicly available contacts)	36
	Faculty members with LA research interest	25
	eCampusOntario-provided list-serve	23
	eCampusOntario Faculty Advisory Group	10

Online Focus Groups

The survey invited respondents to indicate their willingness to participate in an online focus group by providing contact information. The goal of online focus group discussions was to gain further insight into LA activities and existing LA practices in Ontario public post-secondary institutions. Specifically, the focus group discussion questions attended to: Reasons for adopting LA; Data sources considered in LA activities; LA stakeholders in terms of data selection, access, and interpretation; and Opportunities and concerns regarding LA activities.

We conducted two online focus group sessions: one with a majority of college representatives and one with a majority of university representatives. We emphasized to participants that their identity will be kept strictly confidential. Given that the LA-ES was a Quality Assurance/Quality Improvement project, the focus group transcript was completely de-identified and reformatted around discussion themes.

Document Search

In parallel to survey distribution, we conducted a search for public web resources in all public Ontario post-secondary institution websites, using "learning analytics" as a search term. The document search complemented the online survey results, as we identified a diverse range of institutions' LA activities.

Data Interpretation

We took an exploratory approach to interpret online survey data with regards to the main objectives of the LA-ES project and to understand various dimensions of current LA activities in Ontario post-secondary institutions. Focus group data was synthesized into thematic summaries. For each document that we retrieved from college and university websites during our search, we created a record that included name of the institution, document URL, purpose of the document, and date published. We identified overarching themes and cross-references across the three main sources of data and structured our findings accordingly.

Confidentiality
We make no reference to participants' names, institution, or other identifying information in this report or in any other form of dissemination that results from this initiative. In our communications with participants, we provided the contact information of one of the project team members so that the participants could share their questions or concerns if needed. At the conclusion of the project work, the data will be purged.

Findings

Findings of the project are organized under the following themes: Overview of Respondents' Characteristics; Reasons for Adopting LA; Types of LA Data; Learning Analytics Tools; Key LA Employment/Positions or Departments; Resource Allocation; LA Guidelines and Policies; Key Issues or Concerns; Current and In-Progress LA Activities.

Overview of Respondents' Characteristics

Representation

We received 63 responses to the "Learning Analytics Survey 2020 for Ontario Public Post-Secondary Institutions," of which 29 respondents were affiliated with a college and 34 with a university. In total, we received responses from 18 of the 21 Ontario universities and 16 of the 24 Ontario colleges. Survey respondents represented small, large, and medium institutions in terms of the number of enrolled students (Table 2).

Multiple respondents from a single institution were allowed to respond to the survey. The number of respondents ranged from 1 to 5 per institution, with a higher frequency of multiple responses from universities. One college had an exceptionally broad response, with 12 respondents participating. In interpreting the survey findings, we paid attention to whether over-representation from some institutions may have impacted the results.

Table 2
Size of institutions represented by the survey respondents

Respondents' Institution Type	Enrolled Students (k)		
	Small <10k	10k< Medium<25k	Large>25k
College	5	11	13
University	4	11	19

In our first focus group, we had four participants from colleges and one participant from a university. All seven participants at the second focus group were from universities.

Respondents' Employment/Position

In the survey, respondents could indicate their job title in an open-response text field, from which 31 different position types were identified. Faculty member/Professor position had the highest frequency for university respondents (n=6) and for college respondents (n=7), followed by e-Learning Specialist from universities (n=10) and Educational Developers from colleges (n=6). We categorized survey respondents' job titles into seven categories (Table 3). For a complete list of job titles under each category, please see Appendix C.

Table 3
Categories of positions held by survey participants

Position Category	No. of Respondents	
	Colleges	Universities
Faculty member/professor	7	6
Academic leader	7	3
Educational developer	9	4
Administrator - student success/experience	2	4
Administrative leader – online learning	2	3
e-Learning specialist/coordinator	6	10
IT specialist	0	2

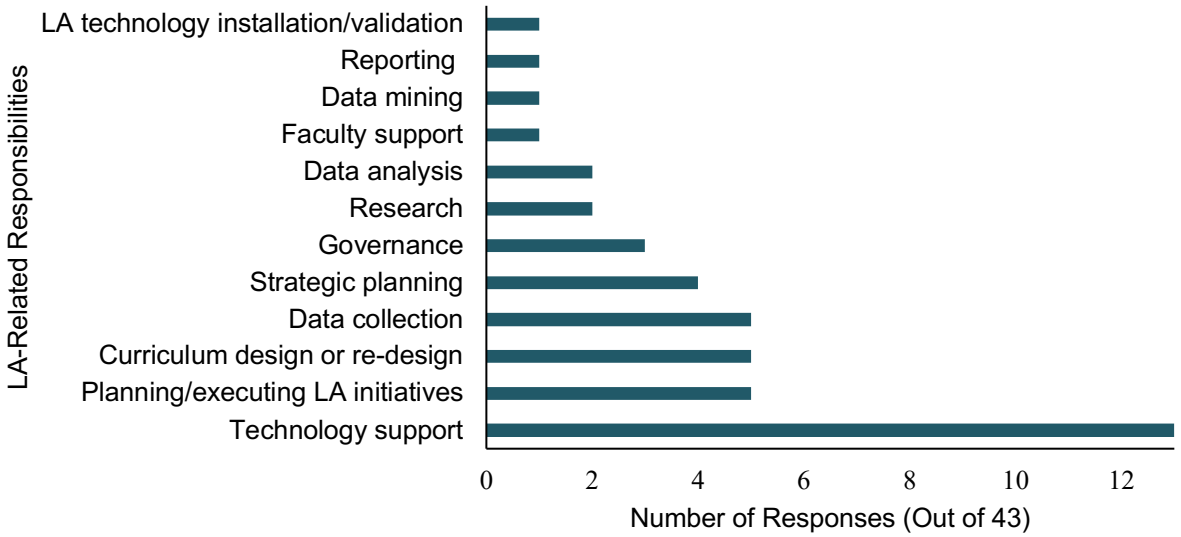
Respondents' Responsibilities in LA Initiatives

Survey respondents could identify their specific role or contribution to LA initiative(s) within their institution in an open-response survey item. Out of 63 total responses, 18 respondents provided an "n/a" or equivalent answer, thus indicating that they did not have an active role in LA initiatives at the time of completing the survey. The rest of the respondents either had a single LA-related responsibility or were involved in LA initiatives in multiple capacities.

We examined the frequency of different types of LA-related responsibilities in Ontario public colleges and universities. As illustrated in Figure 2 and Figure 3, many LA-related responsibilities are common across colleges and universities. A group of five university respondents indicated that they were involved in all of the LA-related responsibilities listed in survey question 5. In Figure 3, we have grouped these all-encompassing responses under the "planning/executing LA initiatives."

Figure 2
Frequency of respondents' LA-related roles in colleges

Figure 3
Frequency of respondents' LA-related roles in universities



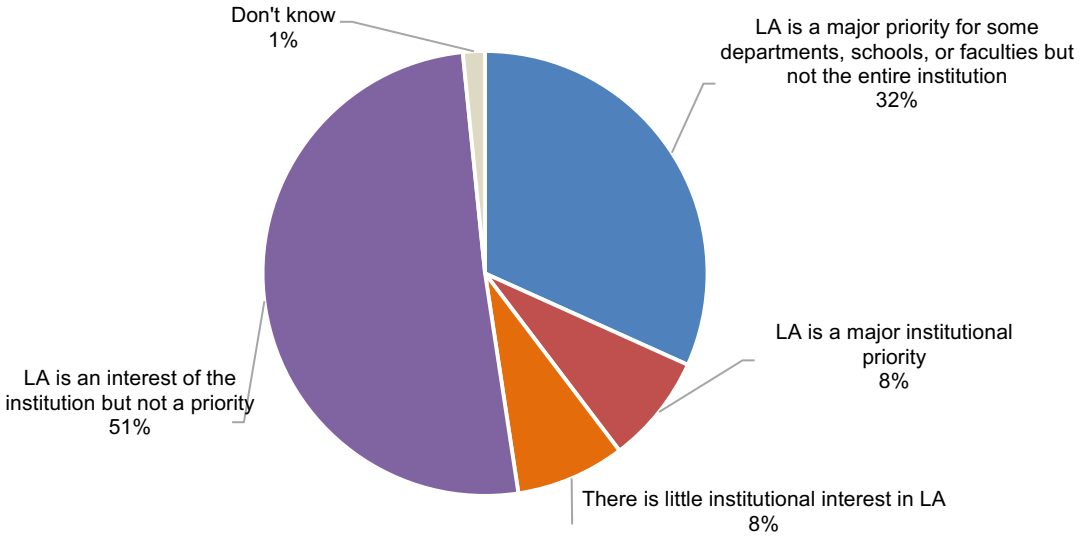
Among college respondents, roles related to curriculum design/redesign in colleges were the most recurring LA-related responsibilities, reported by 12 out of 36 respondents. For universities, the most recurring LA-related responsibility was technology support, with this role captured by 13 out of 43 respondents.

Reasons for Adopting LA

Current State of LA

When considered together, responses to survey question 6 about LA being an institutional priority show that 51% of the respondents thought LA to be of interest to their institution, but not a priority (Figure 4). Only 8% of the respondents selected LA as a major institutional priority. Another 8% of the responses indicated minimal institutional interest in LA.

Figure 4
Level of LA as an overall priority for Ontario colleges and universities (63 Reponses)



We observed a difference between college and university respondents with regard to their perception of institutional interest and prioritization of LA. For universities, both of these items received 41% of the responses. The results were less symmetrical for colleges, with 62% of the respondents specifying LA as an interest rather than a priority and another 21% of the respondents indicating little interest in LA. We infer that LA is more an interest than a priority in Ontario colleges.

Focus group discussion echoed survey findings in that participants from colleges and universities both observed institutional awareness of and interest in LA. However, they stated that LA conversations are not top priority at this time.

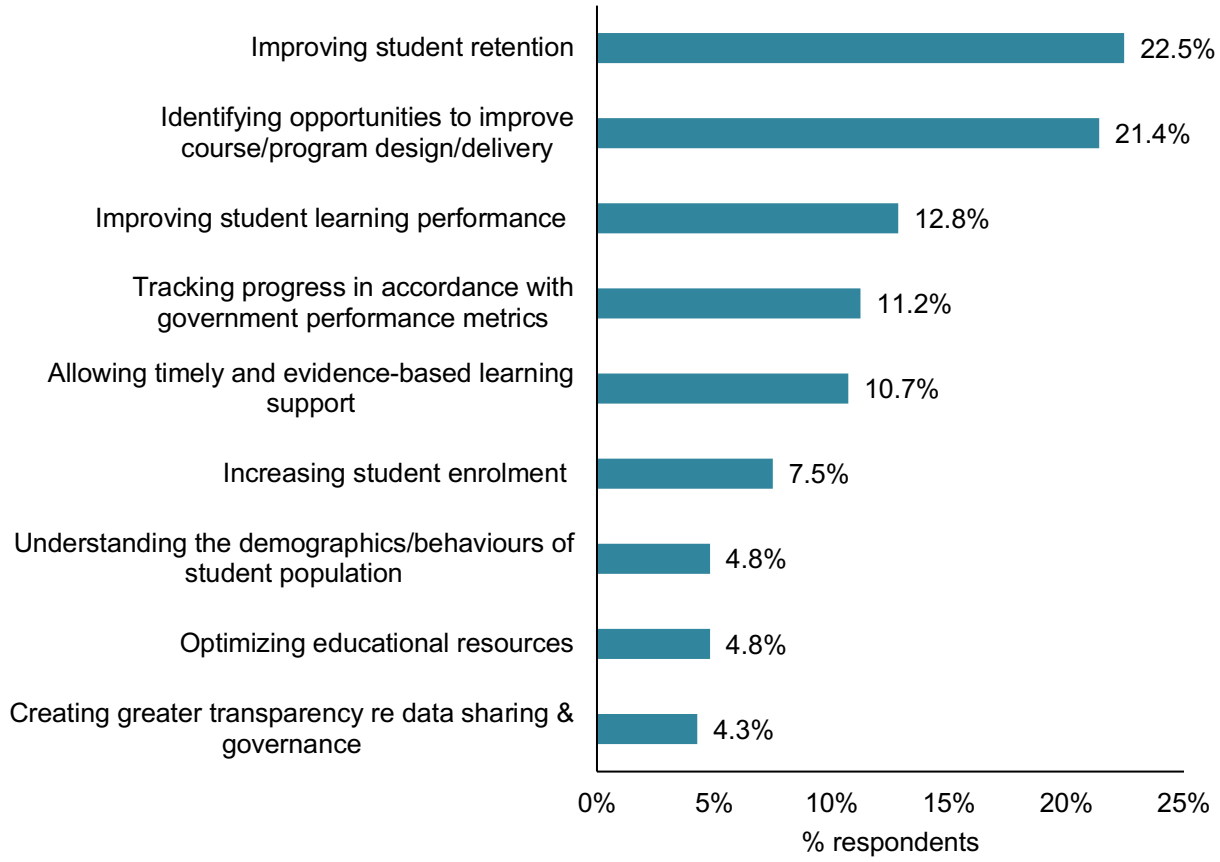
Reasons for Using LA

In the survey, we provided a list of possible LA uses that the institutions might be currently employing. We asked the respondents to choose the top three reasons for LA use within their institution. In total, this question had 61 respondents. We have summarized the responses in Figure 5.

The most cited reasons for LA use were "improving student retention," at 20% for colleges and 24.7% for universities, and "identifying opportunities to improve course and/or program design and delivery," at 23.3% for colleges and 19.6% for universities. "Creating greater transparency re data sharing & governance" was the least selected use of LA from both colleges and university respondents, accounting for less than 5% of the total responses (Figure 5).

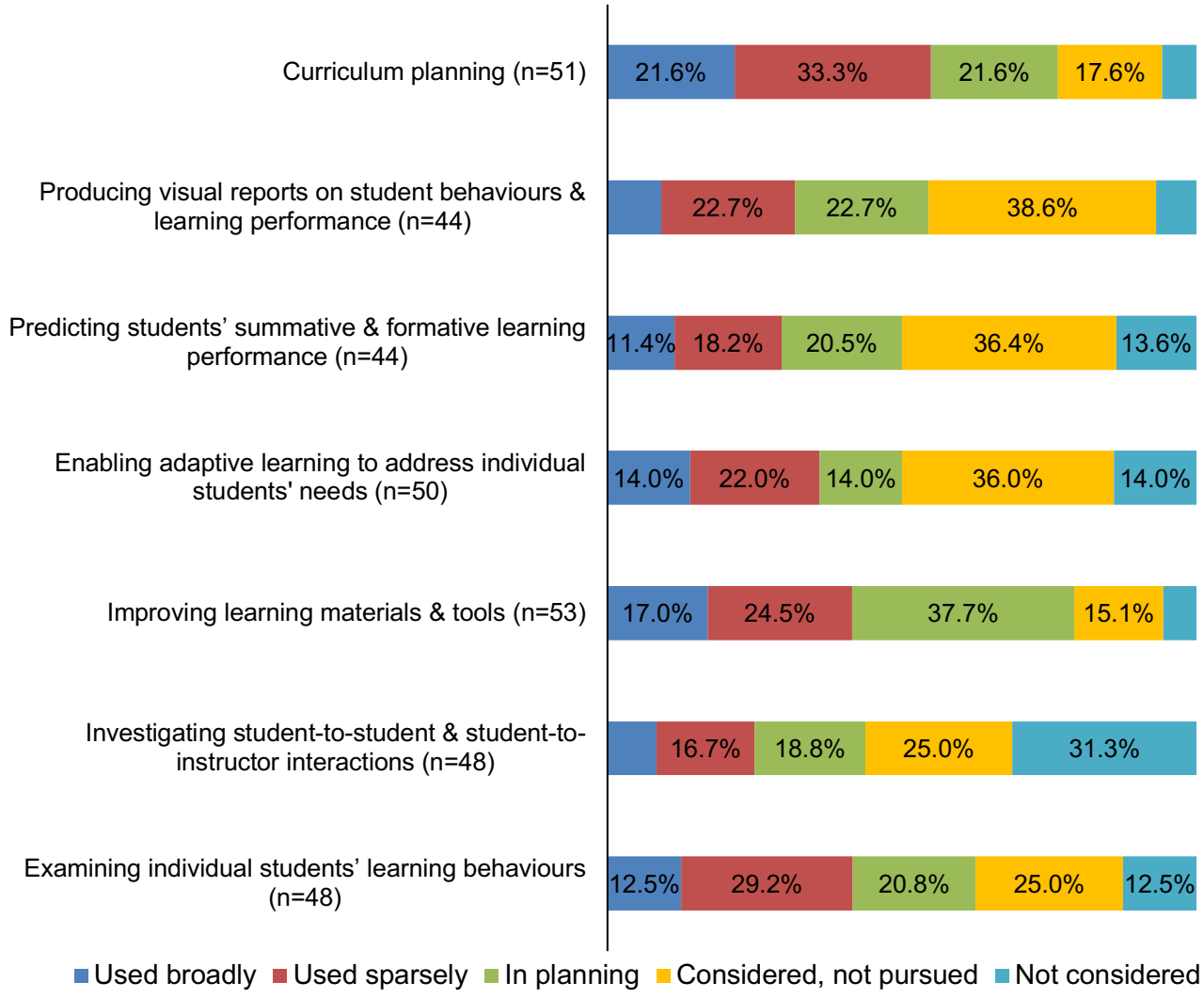
Figure 5

Top reasons for using LA in Ontario post-secondary institutions (187 reasons provided)



A complementary question (question 11) inquired about the extent to which seven desired uses of LA were implemented in the institutions. As shown in Figure 6, across all institutions “curriculum planning” is broadly or sparsely used as compared to other types of LA applications. According to at least 36% of survey respondents, using LA to predict students’ performance and to enable adaptive learning were considered but not pursued. In Figure 6 we have removed labels that showed percentages under or equal to 10%.

Figure 6
The extent to which desired uses of LA are currently operationalized



In their discussions, focus group participants highlighted that exploring the landscape of LA usage was one reason for their interest in LA activities. An exploratory approach, participants indicated, would enable them to identify available sources of data, determine who can have access to data, probe how data is currently used for LA, and examine what can potentially be achieved through LA activities. Examples of desired uses among focus group participants included improving students’ learning experience, curriculum redesign, identifying at-risk students to implement early interventions, resource allocation planning, and understanding students’ learning paths.

Focus group participants also brainstormed potential uses of LA within their institution. The results of LA initiatives, the participants suggested, could inform institutional planning, faculty development, course design, student support systems, and student retention strategies.

Types of LA Data

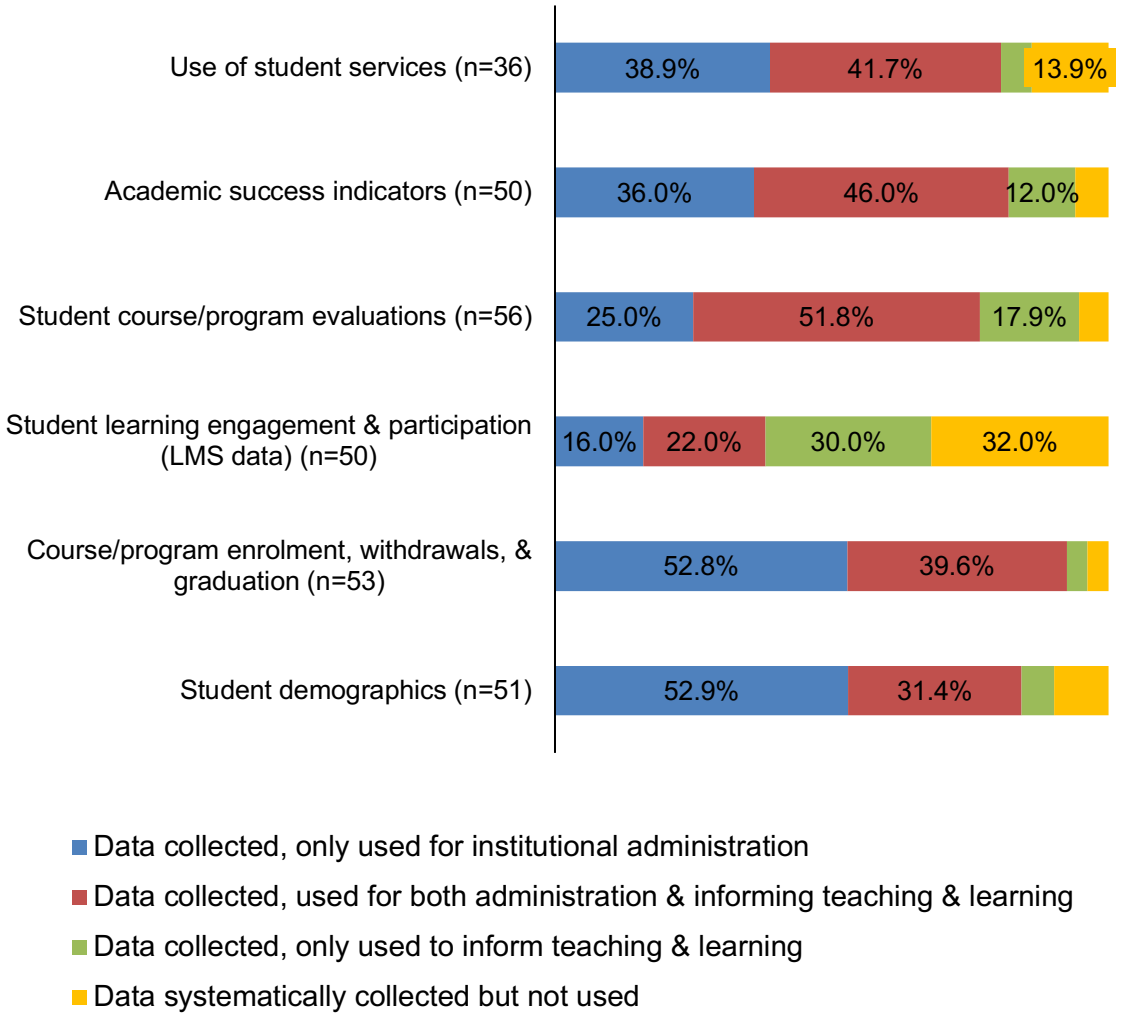
Multiple data sources or types of data can be used for LA initiatives. We asked survey respondents to indicate how specific types of data are collected and used within their institutions. For this question we received 63 responses. Types of data that we included in the survey were:

- Student demographics
- Course / program enrolment, withdrawals, and graduation
- Student learning engagement and participation / LMS data
- Student course / program evaluations
- Academic success indicators (grades, completion)
- Use of student services (library, counselling, learning support)

Survey respondents could specify if their institution collected such data and whether the collected data are used for administrative and/or instructional purposes. Upon examining the responses, we noticed that 33.3% of the respondents had selected “don’t know” for the “use of student services” data, implying that the respondent was either unaware of or unsure about whether these data are collected or used. Out of 63 respondents, six stated that their institution does not collect “student learning engagement and participation / LMS data.” The number of respondents who indicated that their institution does not collect data on “use of student services” was five out of 63.

After separating blank, “don’t know,” and “we do not collect these data” responses from the rest of the responses, we investigated how the above-mentioned data sources were used in colleges and universities. These results are illustrated in Figure 7. To increase readability, in Figure 7 we have removed labels that showed percentages under or equal to 10%.

Figure 7
Type (source) of data and their uses in colleges and universities



Regarding data only used to inform teaching and learning, “Student learning engagement data” had the highest percentage of application accounting for 30% of total responses. This data source also has the least proportion of exclusive use for institutional administrative purposes. “Student demographic” and “course/program enrolment, withdrawal, and graduation” data sources were shown to be mostly used for institutional administrative use, which made up at least 50% of total responses. Excluding LMS data, colleges and universities mostly use the rest of data sources either for administrative purposes or for both administrative purposes and to inform teaching/learning.

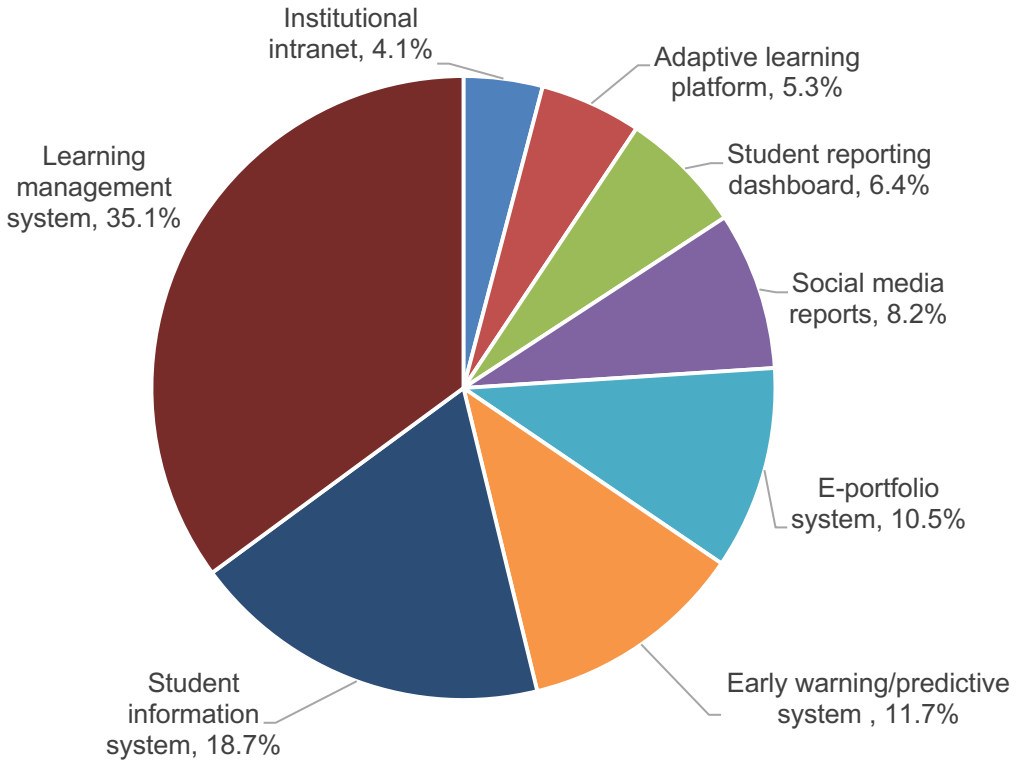
In the focus group discussions, participants identified Learning Management Systems (LMS) and Student Information Systems (SIS) as the main sources of data for LA purposes. Such data can provide information about students’ access to course components and to other learning activities, resources, or tools. One participant stated that multiple data sources need to be used in a complementary manner to allow for more meaningful analysis. Course evaluation and satisfaction survey data were noted as other potential sources. One participant explained how data from students’ access to courses via mobile devices were not captured reliably. In another case, access to certain data sources had to be turned off as the data were difficult to interpret due to the formatting of the analytical tool.

Learning Analytics Tools and Platforms

Two survey questions asked about the type of LA tools and platforms used within respondents' institutions and then asked for each respondent to list the exact products used if applicable. For survey question 8, 63 respondents provided a total of 171 responses, as each respondent could select more than one tool from the list. "Learning Management Systems" was the most widely used LA tool, accounting for more than 35% of responses. The second-most popular LA tool was "Student Information System," with 18.7% of total responses. As Figure 8 shows, "institutional intranet" and "adaptive learning platform" were the least used, accounting for 4.1% and 5.3% of all responses respectively.

Figure 8

LA tools currently used in Ontario colleges and universities (171 tools identified)



In an open-response survey question (question 9), survey respondents could add specific LA tools or specific products that are either used or are under consideration at their institution. From a total of 70 products shared, we identified 34 unique LA products in colleges and universities. For a complete list of these products see Appendix D. The most frequently used products were Learning Management Systems including Blackboard Learn and D2L Brightspace. Early warning/predictive systems were the least used products with only two specific examples provided.

Participants in both focus groups shared various Learning Analytics tools currently in-use or in the implementation process at their institution. These tools included Blackboard Analytics for Learn, D2L, Sakai, Canvas, and Moodle and were consistent with the LA tools shared by survey participants.

Key LA Employment/Positions or Departments

Main Positions Responsible for LA

As shown previously in Table 3, survey respondents represented a variety of academic, administrative, and support positions and reported being involved in a range of LA activities within their institution. Considering the scope and timeline of this environmental scan, we expected that we could only reach a subset of the individuals at each college and university that are engaged in LA-related projects or activities. To better understand which positions in Ontario post-secondary institutions are responsible for LA use in different capacities, we asked the survey respondents to identify all such positions within their institution from a list provided to them (question 7).

To facilitate the comparison of LA use across different positions, we calculated the frequency of each position submitted in response to question 7. In Table 4 we have categorized these positions using the taxonomy shown earlier in Table 3 along with the percentages that each position was selected out of the 289 responses.

Table 4

Proportion of positions responsible for LA use in colleges and universities

Position Category	% of Total Responses (n=298)
Research and Instruction	27.0%
Curriculum/Technology Support	26.0%
Administrative Leadership –Digital strategy	20.8%
Administrators	10.0%
Academic Leadership	9.7%
IT professionals	6.6%

Survey responses suggest that with at least 26% of all answers, positions related to research and instruction (e.g. faculty members and researchers) followed by curriculum/technology support staff are known to be the two most active positions in the LA space in colleges and universities. In Appendix E we share more details about the positions responsible for LA use in colleges and universities from survey respondents' perspectives.

Focus group participants identified five main positions or stakeholders who they knew could access and use LA data: (1) academic and administrative leadership; (2) departmental leadership; (3) faculty members and instructors; (4) centres for teaching and learning; and finally, (5) students. However, across institutions represented in the focus groups we noted that access to LA data could be restricted to a subset of stakeholders.

Each stakeholder group, according to the focus group participants, has certain goals for accessing and interpreting LA data. Academic and administrative leadership, for example, could be informed about faculty members' and instructors' use of analytics. Faculty members, in turn, can use LA data

to improve course design and maximize students' access to resources. Centres for teaching and learning can design faculty development opportunities to promote student-centered pedagogical approaches and to create resources that further enable faculty members to interpret and operationalize available LA data. Student-facing LA, which has a lower priority at the moment, would inform students in navigating their learning process.

The majority of focus group participants contended that communication channels between positions responsible for LA were still underdeveloped, which is expected considering the lower priority of LA activities in institutions and given that the development of LA activities is still an in-progress phenomenon. Identifying shared goals and interests among stakeholders, the participants suggested, would facilitate the development of these communication challenges.

Resource Allocation

So far, findings suggest an interest in LA among Ontario public post-secondary institutions and a developing priority for LA conversations at least in some departments and offices across the province of Ontario. To benefit from LA activities and implement LA in desired ways, institutions may need to allot additional resources to learning analytics activities. We explored resources that are currently allocated to LA in question 13. Respondents could select all types of resources that they perceived to be allocated to LA activities. The proportion of resources allocated to LA is shown in Figure 9.

Figure 9

Proportion of resources (n=89) allocated to LA in colleges and universities

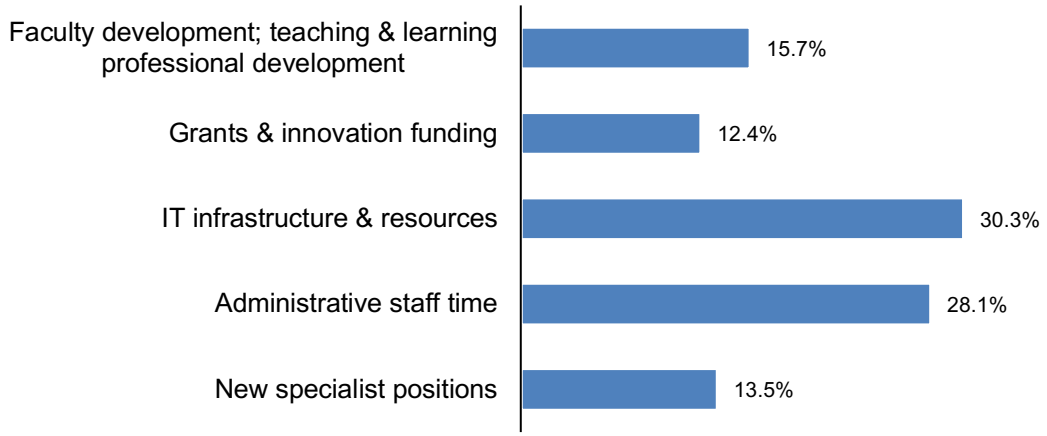


Figure 9 shows that "Administrative staff time" (28.1%) and "IT infrastructure and resources" (30.3%) constitute the largest share of allocated resources. Conversely, "new specialist positions" (13.5%) represents one of the smallest shares of allocated resources. Respondents could also provide additional comments on resource allocation for LA activities. From the eight comments provided, two referred to LA-related projects currently ongoing in collaboration with eCampusOntario, one described the institution's current activity as committee formation, and another one mentioned that the institution is considering an analytic pack to be paired with their LMS. The rest of the comments expressed perceived lack of sufficient resources allocated to LA activities.

To investigate if institutional resource allocation for LA activities varies depending on the size of institutions, we calculated the percentage of each type of resource allocated to LA activities in small, medium, and large institutions as determined by student enrolment (see Table 2). Summarized in Table 5, we observe that small-sized institutions reported lower resource allocation to LA activities in

comparison to medium-sized and large-sized institutions. “Grants and innovation funding” is shown to be significantly more prominent in larger institutions, with nearly 82% of respondents from large institutions reporting that grants and innovation funding were dedicated to LA activities.

Table 5

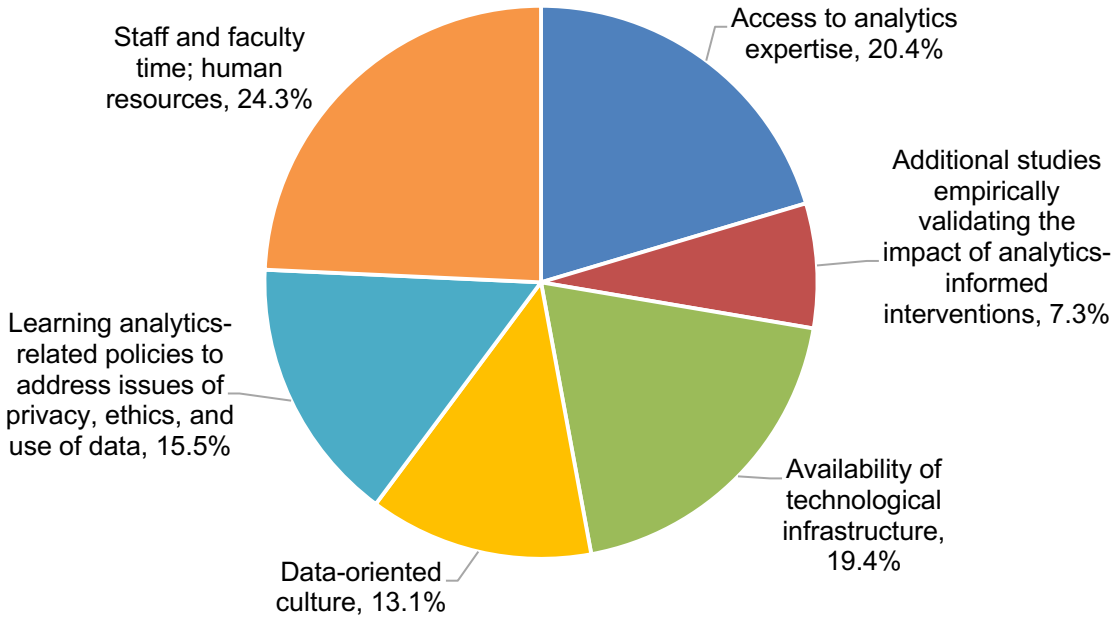
Resources allocated to LA activities in small, medium, and large institutions

Type of resource	Share of resources allocated to LA activities in institutions (%)		
	Small (< 10k students)	**Medium (10k -25k students)**	**Large (> 25k students)**
New specialist positions	8.3%	41.7%	50.0%
Administrative staff time	16.0%	44.0%	40.0%
IT infrastructure & resources	22.2%	40.7%	37.0%
Grants & innovation funding	9.1%	9.1%	81.8%
Faculty development or, teaching & learning professional development	7.1%	57.1%	35.7%

We also asked the survey respondents in question 15 to identify factors that may enable LA conversations and activities in their institutions. 60 respondents answered this question. Two enabling factors, “staff and faculty time; human resources” and “analytics expertise,” were top choices of the survey respondents (Figure 10).

Figure 10

Proportion of identified enabling factors (n=206) in Ontario colleges and universities



Technological infrastructure is identified as the third-most enabling factor. When compared with resources already allocated to LA in colleges and universities, it appears that institutions are currently establishing their technological infrastructure and have not yet allocated substantial resources to the LA expertise necessary to make sense of LA data. Focus group discussions

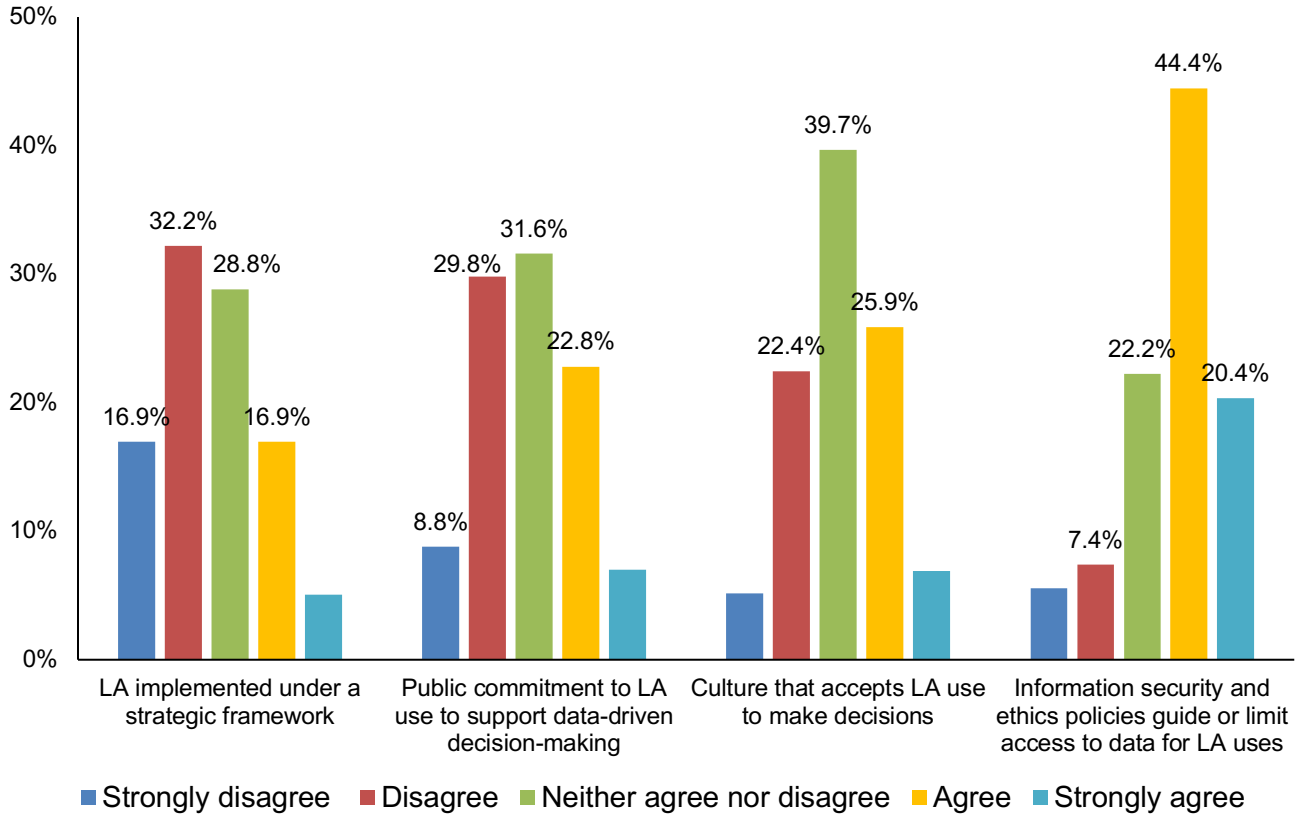
indicated that colleges and universities are mainly in the early stages of preparation and planning, with rather limited resources allocated to LA.

LA Guidelines and Policies

"LA related policies to address issues of privacy, ethics, and use of data" and "data-oriented culture" were two enabling factors for LA activities, and were highlighted by 28.8% of the survey respondents in total. In the survey, question 12 further examined the status of these contextual factors with regards to LA activities in Ontario colleges and universities (Figure 11). To increase the readability of Figure 11 we have removed labels that showed percentages under or equal to 7%.

Figure 11

Current state of LA policies and guidelines and institutional culture with respect to LA activities



The percentage of "neither agree nor disagree" responses to the items shown in Figure 11 fell between 22.2% and 39.7%. This may indicate some levels of uncertainty or lack of institution-wide awareness about policy-related aspects of LA activities. Almost half of respondents disagreed or strongly disagreed that their institution implements LA activities under a strategic framework. We observe split opinions on institutions' public commitments to support LA-based data driven decision making: 38% "strongly disagree" or "disagree" that their institution is publicly committed to using LA for data-driven decision making, while 29.7% "strongly agree" or "agree." Opinions are also split on cultural acceptance of LA use in decision making: 27.6% "Strongly disagree" or "disagree" that their institutions' culture accepts LA use for decision-making, while 32.8% "Strongly agree" or "agree." However, the majority of respondents, 64.8%, either "strongly agreed" or "agreed" that institutional information security and ethics policies guide the use of data in LA activities at their institution.

Survey respondents could provide examples of public-facing policy documents, guidelines, or privacy policies that apply to data use in LA activities at their college or university. University and college respondents shared a total of nine existing policy documents. While these policy documents do not specifically refer to Learning Analytics, they address policies on information security, access to data, educational technology, privacy, data retention, ethics, and research administration. Data governance conversation is in progress at one university. Finally, 13 respondents were uncertain about whether such policies and guidelines exist in their institution.

Institution-wide alignment with industry standards related to LA activities is another underdeveloped area. From 23 non-blank responses to survey question 18, we observed only four responses that contained more than "n/a." From these four responses, two respondents shared that their institution is either using or is considering using the IMS Global Learning Consortium's Caliper data standard (https://www.imsglobal.org/activity/caliper).

Key Issues or Concerns in LA

Misinterpretation of data was a major concern for focus group participants. They also shared their reservations about accuracy of available data, data privacy, and about the influence of proprietary software on access to data and on ownership over data. One survey respondent echoed these concerns. Accuracy and completeness of vendor-created reports was yet another concern. Other participants emphasized lack of integration among various data sources and known inaccuracies of available data that can compromise accurate interpretation.

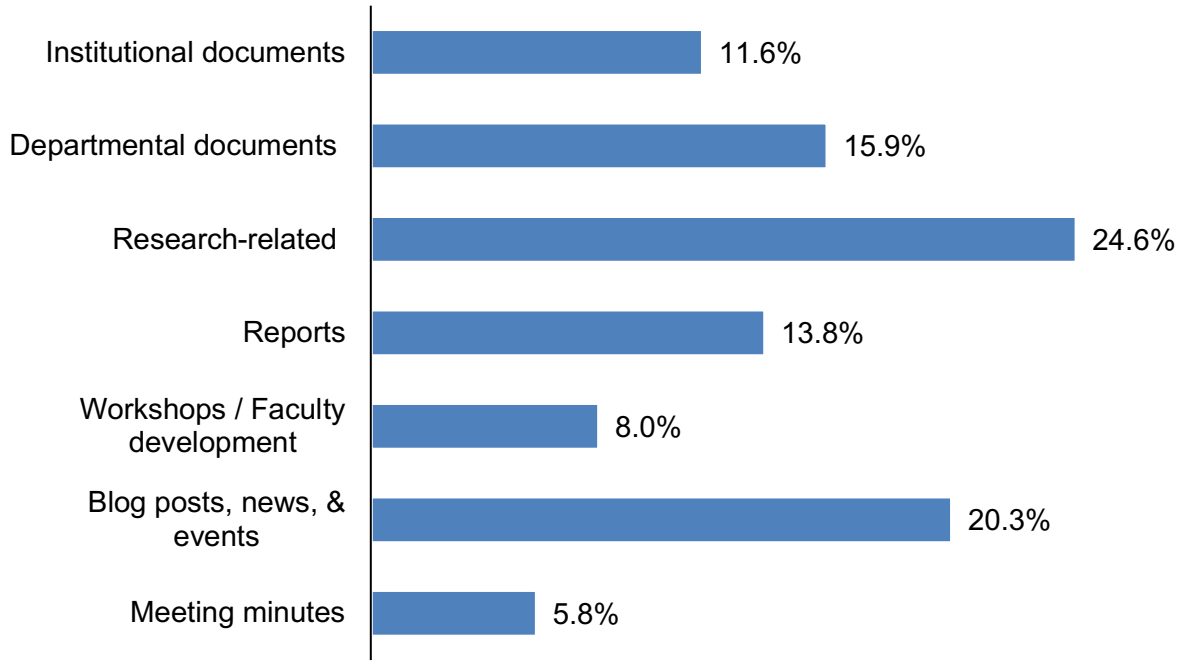
Current and In-Progress LA Activities

Two sources of data informed our findings about current and in-progress LA activities: the open-response survey question (question 16) with 25 answers; and LA-related public documents published on institutions' websites. Online documents, as we explain below, showed the level of engagement in LA research and plans for LA at institutional or departmental levels. The survey question collected information on examples of LA initiatives within each institution.

LA Activities as Portrayed in Online Documents

We used the number of identified webpages or documents as one indication of the extent of institutional engagement in LA activities. Out of 152 documents found using the search term "learning analytics," 11 belonged to colleges and the rest were from the websites of universities. Representation of LA in online documents varies considerably across Ontario post-secondary institutions, from no LA-related online documents to a maximum of 27 online documents found at one institution. Among the 20 institutions with at least one valid search result, only five had more than 10 LA-related online documents. Moreover, LA-related activities have become increasingly more prominent in the past five years (2016-2019), with fewer activities documented prior to 2015. Figure 12 shows the proportion of types of LA-related documents that we found through the website searches. Note that we did not graph the 14 documents that we categorized as being under an "other" category. The most prevalent types of LA documents are research-related documents, constituting 24.6% of all LA-related documents, followed by departmental documents at 15.9%.

Figure 12
Types of LA-related documents (n=138) from the websites of Ontario post-secondary institutions



Based on the online documents that we found, LA-related activities mainly take place at individual levels, e.g. by faculty members, and departmental levels. Institutional websites show the profiles of individual faculty members who have included LA, or analytics in general, as a research interest. These faculty members have published journal articles/conference papers or have supervised graduate students in LA-related academic work. Actively engaged departments include teaching and learning centres, IT services, and academic departments. These departments manage institutional LMS, have organized conferences or workshops addressing various aspects of LA, or lead LA-related initiatives that often have institutional impact. The institutional-level endeavors are documented in strategic planning documents.

The audience of these publicly available LA-related documents are mainly university communities—including faculty members, students, and governance bodies—and external academic communities such as eCampusOntario. In some cases, LA activities have been reported to the Ontario government for accountability purposes.

LA Activities Shared in Survey Responses

After discarding empty or N/A responses, we identified seven categories of LA activities in Ontario post-secondary institutions. Note that each survey response could include multiple LA activities. Certain types of activities, such as improving student retention and success, were more popular than others. Below we present each category along with a summary of corresponding LA activities.

Establishing LA Approaches Institutionally. Three examples of LA activities indicated institutions' efforts in establishing a local LA presence. A research institute, for example, examined students'

pathways in post-secondary education in multiple projects. One survey respondent explained that their institution is initiating activities to define, inform, and use LA. In another institution, formalizing LA and identifying LA tools was one of the recommendations in a teaching and learning action plan.

Improving Student Retention and Success. Twelve LA initiatives directly targeted student retention and student success. Data from strategic enrolment services, in two institutions, inform institutional enrolment and retention practices. Developing strategies based on students' demographic data to meet their needs was another institution-level LA Activity. The majority of LA activities in this category identified Learning Management Systems as a main source of data for LA activities. LMS data serve several purposes in LA activities including:

- detecting at risk students and providing personalized assistance;
- predicting students' success;
- informing course design or redesign in conjunction with data from Student Information Systems;
- examining online instruction practices;
- and extracting course grade and completion status.

Using LMS or custom analytical dashboards to prepare accreditation was another LA activity that targeted students' performance.

Using LA at Course Design Level. With seven examples, LA-informed course design was another distinct category of LA activities in Ontario colleges and universities. In one such activity, a competency-based approach to designing courses with high failure rates is implemented and evaluated. Alternatively, another institution is establishing the foundations of LA-informed course design by defining LA use within that context. In two other initiatives, individual instructors or a sub-group of instructors are using LMS analytics data to inform their course design. Faculty members also use LMS data to track students' performance and completion at course level.

Implementing LA Tools. Survey responses included twelve examples of LA-tools that institutions have either deployed, are implementing, or are exploring. In addition to the comprehensive list of tools that we have shared in Appendix D, survey respondents provided examples of projects to develop custom analytical dashboards. One institution is planning an LA professional development program for their educational technology staff.

Exploring Potential Impact on Teaching and Learning. Reported activities in this domain—a total of four—included exploratory studies and landscape analysis reports on LA and its broad and specific applications in higher education. One respondent provided a link to a journal club session dedicated to examining the implications of LA within disciplinary teaching and learning context.

Conclusion: Implications and Recommendations

This environmental scan provides a comprehensive picture of multiple dimensions of LA initiatives in Ontario post-secondary institutions. We drew on the findings of this project to identify three general areas of opportunities, followed by potential engagement tactics for eCampusOntario.

Opportunity 1: Increase Capacity of Analytical Expertise to Extend LA Initiatives

A key opportunity relates to skill development across a range of roles, from instructors and educational developers to business analysts and data specialists. At this time, applying LA to improve student retention and to guide course/program redesign has higher priority compared to predictive use of LA to inform intervention and to support personalized instruction. The types of LA initiatives shared with us corroborate with these priorities, as more ongoing projects focus on course redesign or improvement of student retention. While some institutions are in the early stages of

implementing and exploring various LA tools for these purposes, staff time for additional professional development and extension of analytical expertise was identified as an area of need.

Opportunity 2: Support Development of Institutional Strategic Frameworks to Guide LA Activities

Our general observation is that while institutions are interested in LA initiatives, administrative resources that enable planning and implementation initiatives are perceived to be underdeveloped. Advancing strategic frameworks that situate LA within institutional priorities is a fundamental step for increased LA engagement within institutions. Such contextualization may also facilitate decision making and resourcing. Few LA-specific strategic planning frameworks, management plans, and governance guides for use of data analytics were found during this study, reflecting the persistence of LA as an interest rather than a priority. The largest proportion of the materials surfaced in our systematic web search of Ontario universities and colleges represent the outputs of academic research publications and presentations. The availability of foundational information, guidelines, example templates, and planning frameworks aimed at accelerating capacity development could advance LA initiatives that align with strategic goals.

Opportunity 3: Strengthen Shared Knowledge of LA Initiatives Within Institutions

Establishing integrated workflows to access, share, and interpret LA data is another area that we identify as having potential for improvement. Within individual Ontario post-secondary institutions, internal communication and coordination among those with key roles relevant to supporting LA initiatives are needed in order to identify and implement viable LA informed activities. However, given the evidence that institutions have unique combinations of systems for tracking learning, student, and other institutional data, the potential for inter-institutional partnerships is limited unless they have licensed the same third-party platforms. Exceptions may include a collaborative approach to exploration of standards-based data aggregation tools, or common visualization tools that aid in the display of data in dashboards and reports. Smaller scale institutional innovation projects could act as a stepping-stone for prototyping future initiatives.

Our recommendations regarding potential eCampusOntario initiatives to further enable institutional exploration and implementation of LA initiatives are informed by the diverse levels of readiness and resourcing evident in the findings of this project report. Three broad engagement strategies and examples of potential tactics for each are suggested below.

Engagement Strategy 1: Identify sharable resources and/or services to reduce cost and/or duplication of effort among institutions. Examples include:

- Building on existing learning analytics documentation from Ontario and other sources by developing or identifying example templates for policy and guidelines, governance structures, data access requests and other related processes; and
- Including interactive data visualization and analysis software in future surveys of priority services for potential shared licensing (i.e., Tableau, PowerBI).

Engagement Strategy 2: Provide system-level support aimed at extending learning analytics capacity through professional development activities. Examples include:

- Developing communities of practice or networks among interested groups/institutions;
- Hosting community events to showcase current initiatives and share learning;
- Developing and delivering workshops focused on extending learning analytics expertise; and
- Developing re-usable professional development materials related to use of learning analytics.

Engagement Strategy 3: Encourage innovation through targeted funding programs to accelerate LA development. Examples include:

- Prototyping internal cross-department initiatives to access, share, and analyze learning data;
- Collaborative partnerships between institutions using the same third-party systems (i.e., LMS, SIS) to share practices and extend practices related to accessing, sharing and analyzing data; and
- Exploration of standards-based and open tools that aggregate data from various sources.

eCampusOntario's future engagement regarding learning analytics technologies and services will need to be sensitive to the diversity in organizational and infrastructure capacity across its member institutions.

References

Brooks, D. C., & Thayer, T. B. (2016). *Institutional analytics in higher education*. Research report. ECAR.

Forssman, V., & Wolf, P. (2018, September). *eCampusOntario educational technology shared services survey: Final report*. https://www.ecampusontario.ca/wp-content/uploads/2018/11/eCampusOntario-Educational-Technology-Shared-Services-Survey-August-20-2018.pdf

Green, K. C. (2019). Campus computing 2019: *The 30th national survey of computing and information technology in American higher education*. Campus Computing. https://static1.squarespace.com/static/5757372f8a65e295305044dc/t/5da60e02c69e0005bf93690e/1571163656824/Campus+Computing+-+2019+Report.pdf

Greller, W., & Drachsler, H. (2012). Translating learning into numbers: A generic framework for learning analytics. *Journal of Educational Technology & Society*, *15*(3), 42-57.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., and Hall, C. (2016). *NMC Horizon Report: 2016 Higher Education Edition*. The New Media Consortium. https://library.educause.edu/resources/2016/2/2016-horizon-report

Learning analytics functional taxonomy (2019, April). Retrieved December, 2019, from https://at.doit.wisc.edu/evaluation-design-analysis/learning-analytics-functional-taxonomy/

Appendix A. LA-ES Project Team Members

LA-ES project team information

Team Member	Position	Role in LA-ES
University of Toronto		
Dr. Laurie Harrison	Director, Online Learning Strategies	Project Coordinator Liaison with eCO
Dr. Hedieh Najafi	Researcher, Open UToronto	Lead Researcher
Professor Greg Evans	Director, Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP)	Faculty Consultant
Dr. Qin Liu,	Senior Research Associate, ISTEP	Researcher
James McAllister	Web services support, Academic & Collaborative Technologies	Data collection support
Fanshawe College		
Greg Yantz	Director, Centre for Academic Excellence	Admin Consultant
Cliona Geraghty	e-Learning Curriculum Consultant	Faculty Consultant

Appendix B. Learning Analytics Survey 2020: Ontario Public Post-Secondary Institutions

Learning Analytics Survey 2020:

Ontario Post-Secondary Institutions

Thank you for participating in this environmental scan survey on the current activities, motivations to use learning analytics, and challenges related to using learning analytics at Ontario public post-secondary institutions. The survey is sponsored by eCampusOntario in collaboration with researchers at the University of Toronto and Fanshawe College. This environmental scan has been approved as a Quality Assurance/Quality Improvement project by the University of Toronto Research Ethics Board, Social Sciences and Humanities. Findings of this environmental scan will be published on the eCampusOntario website. Learning analytics is defined by the Society for Learning Analytics Research (https://www.solaresearch.org/about/what-is-learning-analytics/) as "the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs." Literature shows a distinction between learning analytics and institutional analytics. Learning analytics is used to enhance student success whereas institutional analytics is used to improve services and practices across the institution. The focus of this survey is on learning analytics. This survey was designed on the basis of a literature review and existing instruments. The survey will take approximately 20 minutes to complete. We invite responses from all university and college administrators, faculty, and staff holding roles that connect with learning analytics. We would like you to answer the questionnaire to the extent that is possible based on your observations and experiences at your institution. We welcome responses from multiple representatives at your institution. Please forward this survey to colleagues who may be able to provide further insight. Please complete this survey by February 5, 2020.

Note: If you have any questions about this survey, please contact Dr. Laurie Harrison at: laurie.harrison@utoronto.ca

Section A. About You and Your Institution

1. What is the name of your institution?

2. To which sector does your institution belong?

    College

    University

3. What size is your institution?

    Small (< 10k students)

    Medium (10k -25k students)

Large (> 25k students)

4. What is your role at your institution? (e.g. Academic leader, educational developer, e-learning specialist, etc.)

5. If you are directly involved in learning analytics initiatives, what is the nature of your responsibilities (i.e., governance, strategic planning, data collection, curriculum re-design, technology support, etc.)?

Section B. Current Status of Learning Analytics at Your Institution

6. Based on your experience and observations in your role, which of the following statements best reflects the current status of using learning analytics at your institution?

Learning analytics is a major institutional priority

Learning analytics is a major priority for some departments, schools, or faculties but not the entire institution

Learning analytics is an interest of the institution but not a priority

There is little institutional interest in learning analytics

Don't know

7. Based on your experience and observations in your role with regard to learning analytics, which of the following roles are responsible for the use of learning analytics at your institution? (Check all that apply.)

Vice President/Provost Academic

Chief Information Officer (CIO) or equivalent

Chief Data Officer (CDO) or equivalent

Director/Manager - Information technology systems

Registrar

Education researcher

Individual faculty members

Educational developer / Curriculum consultant

Institutional research professional

IT professional

eLearning specialist

Student life professional

8. Based on your experience and observations in your role with regard to learning analytics, what learning analytics tools has your institution used in the past or uses currently? (Check all that apply.)

- Adaptive learning platform
- E-portfolio system
- Early warning/predictive system
- Social media reports (e.g., Facebook, Twitter, etc.)
- Institutional intranet
- Learning management system (e.g., Blackboard, Canvas, Moodle, D2L)
- Student reporting dashboard
- Student information system

9. Please list any specific platforms and/or learning analytics tools that your institutions has used in the past or uses currently.

10. Based on your experience and observations in your role with regard to learning analytics, how have the following types of data been collected and used at your institution?

	We do not collect these data	Data are systematically collected but not used	Data are collected & only used for institutional administration	Data are collected & only used to inform teaching & learning	Data are collected & used for administration & to inform teaching & learning	Don't know
Student demographics						
Course / program enrolment, withdrawals, and graduation						
Student learning engagement and participation/LMS data						

Student course / program evaluations	
Academic success indicators (grades, completion)	
Use of student services (library, counselling, learning support)	

11. Based on your experience and observations in your role with regard to learning analytics, what are the desired uses of learning analytics at your institution?

	Used broadly	Used sparsely	In planning	Considered, not pursued	Not considered	Don't know
Examining individual students' learning behaviours						
Investigating student-to-student and student-to-instructor interactions						
Improving learning materials and tools						
Enabling adaptive learning to address individual students' needs.						
Predicting students' summative and formative learning performance						

	Used broadly	Used sparsely	In planning	Considered, not pursued	Not considered	Don't know
Producing visual reports on student behaviours and learning performance						
Curriculum Planning						

12. Based on your experience and observations in your role, to what extent do you agree or disagree with the following statements about the culture and policies of your institution regarding the use of learning analytics?

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know
Our institution implements learning analytics under a strategic framework						
Our institution is publicly committed to the use of learning analytics to support data-driven decision making						
We have a culture that accepts the use of learning analytics to make decisions						
Our institution has information security and ethics policies to guide or limit access to data for analytics-related uses						

13. Based on you experience and observations in your role, what resources are being allocated to support use of learning analytics at your institution? (Check all that apply.)

New specialist positions

Administrative staff time

IT infrastructure and resources

Grants and innovation funding

Faculty development or teaching and learning professional development

Don't know

Section C. Motivations and Challenges

14. Based on your observation and experience, what are the top three reasons for the adoption of learning analytics at your institution?

Allowing timely and evidence-based learning support

Increasing student enrolment

Creating greater transparency, sharing and governance of data

Identifying opportunities to improve course/program design and delivery

Improving student learning performance (e.g., grades, ownership, time to degree or credential)

Improving student retention

Optimizing educational resources

Understanding the demographics and behaviours of a changing student population

Tracking progress in regards to government performance metrics

15. Based on your observation and experience, what may enable the use of learning analytics at your institution?

Access to analytics expertise

Staff and faculty time; human resources

Availability of technological infrastructure

Data-oriented culture

Additional studies empirically validating the impact of analytics-informed interventions

Learning analytics-related policies to address issues of privacy, ethics, and use of data

16. Please briefly describe examples of learning analytics initiatives at your institution, or provide URLs to relevant websites or documents if available:

17. Please briefly describe any public-facing policy documents or guidelines related to use of data or privacy policies for learning analytics at your institution, including URLs if available.

18. If you follow any industry standards regarding inter-institutional data sharing (e.g. IMS Caliper or xAPI), please describe your institution's practices in this regard.

19. May we contact you to obtain clarification or further insight into some of your responses? If so, please provide your name and email address.

20. We would value your participation in an hour-long online focus group about this project. Can we send you more information and an invitation to participate?

Yes

No

21. Please provide your email address for possible focus group information and invitation. (if “Yes” is selected in Q#20)

Appendix C. Survey Respondents' Positions

Position Category	Position Indicated in Survey (No. responses)	
	Colleges	**Universities**
Faculty	Faculty member/Professor	
Academic Leadership	Coordinator (program/center)	• Executive director • Director
Educational developer	Curriculum consultant	Teaching & Learning Support
Administrator: Student Success/Experience	• Academic quality • Academic Regional Delivery Agent	• Administrative Leader - Student Success, Student Learning, and Retention • Assessment and Analytics Lead • Course Evaluation Team • Academic support unit leader
Administrative leader: online learning	• Director, Digital Learning • eLearning Development Manager	• eLearning Manager • University administrators • CIO
eLearning specialist/coordinator	• Educational Technologist • Digital Design Specialist • Digital Learning Environment Strategist	• Instructional Designer • LMS admin • eLearning Technologist • LMS Analytics Team • Educational technology lead
IT Specialist		• Data Strategy, Business Intelligence and Technology • Systems administrator

Appendix D. LA Tools Used or Under Consideration for Use at Ontario Post-Secondary Institutions

Tool Category	Tools (No. of Times Mentioned)
Early warning/predictive system	
	D2L Brightspace Student Success System (1) LMS as early warning (1)
LMS	
	LMS (non-specific) (5) Moodle (1) Elentra (1) Canvas (1) D2L including Brightspace (12; 1 considering) Sakai (1) Blackboard including Log data & retention center (5)
Data & analytics	
	Blackboard Analytics 4 Learn (5, 1 considering) Cognos Analytics (2) Informer (SEM Dashboard) (1) Apereo's Open Learning Analytics Initiative (Shuhari) (1) Pyramid R (3) SQL based LRS (1) Explorance (3)
Student information system	
	Peoplesoft (2) Ellucian Banner (1) Students Information System (SOLUS) (1)
Data visualization	
	Power BI (2) Tableau Visual Analytics (2)
Other systems & databases	
	Transferable Learning Orientation tool (1) Ellucian Powercampus (1) Ellucian colleague (1) NSSE of teaching (1) Testing, assessment (1) Students access to course/learning objects (2) Domain of one's own for applied projects (1) Beacon (1) Custom built dashboarding (3) Student evaluations (1) Institutional Data mart (1) Multisite Wordpress to support students' learning (1) Custom curriculum mapping tool (2) Course Assessment Survey (CAS) (1)