
MINING EXISTING SURVEYS TO DEVELOP BETTER PERFORMANCE METRICS FOR ONTARIO COLLEGES AND UNIVERSITIES

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SUMMARY OF FINDINGS

The research question for this project is: Can Ontario's existing surveys of college and university graduates be used to develop better performance metrics for Ontario colleges and universities? Using the raw data files from the 2015 Ontario University Graduate Survey and Ontario Colleges Graduate Outcomes/Graduate Satisfaction Survey, we tested whether data from the existing surveys can be used to develop better metrics and assessed whether better use can be made of the data.

The survey results are statistically accurate (margin of error < 5% at the 95% confidence level) for analysis at these levels:

- Sector (i.e. college or university)
- Credential (i.e. certificates, diplomas, advanced diplomas, degrees)
- Institution.

The survey results are statistically generally accurate for analysis at the level of sector-wide programs, with some exceptions. More specifically, the survey results are generally accurate (ME < 10%) at the sector-wide program level for programs accounting for 86.1 per cent of university graduates and 84.7 per cent of college graduates.

At the above levels of analysis, the data are useful for answering questions that are primarily of interest to system managers. For example, they can be used to demonstrate whether graduates from every institution achieve reasonably high employment rates, and whether students who take longer credentials generally earn more than those who take shorter credentials. The data can be tracked over time to detect trends, such as whether a postsecondary education is becoming more or less valuable in the labour market. The data may also be useful for other audiences. For example, some prospective students may find value in knowing the province-wide employment outcomes by program. The data may also be used for public communications by universities, colleges and their associations.

The largest barrier to making better use of the surveys is that the response rates allow very limited analysis by institution-specific program. At 22 of the 24 colleges, more than half of the graduates attended programs whose ME \geq 10% in the 2015 survey. The same is true for 9 of the 22 university campuses reporting. This means the data are not well-aligned with the needs of

prospective students, who need to choose a specific program at a specific institution. The data are also not well-aligned with the needs of universities and colleges that wish to identify areas of strength and weakness and make targeted improvements.

The datasets include a rich set of labour market indicators, yet the metric that receives the most attention – in news releases and in the government’s performance-based funding – is the graduate employment rate. This indicator provides a limited perspective on how students fare after graduation, and it is not an especially challenging metric. In our view, there would be value in drawing attention to several capstone labour market indicators, rather than a single indicator. The capstone indicators might be:

- Employment rate, among those who sought employment
- Full-time employment rate, among those who sought employment
- The proportion of graduates whose jobs make use of skills and abilities learned in postsecondary education, among those who found employment
- The proportion of graduates whose jobs are closely or somewhat related to the graduate’s program of study, among those who found employment
- Median earnings among graduates employed.

Our analysis shows that these five indicators do not all point in the same direction. Many programs that perform well on the employment rate do not perform well on some of the other four indicators. Only 3 per cent of the institution-specific college programs and 12 per cent of the of institution-specific university programs for which valid data are available score in the top quartile on all five indicators. A set of capstone indicators will give better information than a single indicator.

An additional capstone indicator – the share of graduates from an institution-specific program who are attending further postsecondary education full-time at the time of the survey – would provide useful information, especially for programs where large numbers of graduates pursue further education.

The timing of the college survey should be reconsidered. The notion that a college education is only valuable if the graduate finds work within six months of graduation has become less true given the rise in precarious employment. Administering the college survey two years after graduation would put university and college data on the same footing. As well, there would be value in aligning the wording of questions on the two surveys, notably the questions on whether

graduates' jobs are related to their programs of study and skills acquired. There would also be value in calculating the employment rate the same way for both surveys.

Given the challenges in increasing survey response rates beyond current levels, close consideration should be given to the merits of supplementing the graduate surveys with methodologies that make use of administrative data. The approach of matching student records with graduates' income tax files, developed by Ross Finnie and his colleagues, would have significant benefits, although it could not fully replace some valuable data now collected through the surveys. Finnie's approach has produced useable data for almost 100 per cent of graduates at participating institutions and so could potentially provide accurate data on post-graduation incomes at the institution-specific program level for all programs. Data would be available for graduates from graduate and professional programs who are not covered by the current surveys (although, alternatively, such students could be covered by new surveys). There would still be a need to maintain the current surveys to collect data on graduates' labour market experience, whether employment is related to program of study or skills attained, and graduates' satisfaction with their academic experience, and also to gather the employer names and consents that are the basis for the college survey of employers.

An important opportunity exists to develop a website that communicates useful data at an institution-specific program level to prospective students at the time of application. The U.K.'s Unistats website and Australia's Quality Indicators for Learning and Teaching (QILT) are examples of sophisticated user-friendly sites that allow students to find institution-specific program data and compare data across programs. Any new website should be tested to ensure it is useful to students from a wide range of backgrounds.

This discussion suggests how the Ministry of Advanced Education and Skills Development (MAESD) might develop its data collection and publication strategy in future:

- A reasonable goal would be to generate a robust set of data that is available (as much as possible) at the institution-specific program level.
- The data could come from multiple sources, including the surveys of graduates and administrative data. As administrative data become available, the questionnaires for the graduate surveys could be pared back to reduce unnecessary duplication.
- These data could be made available in two ways:

- A student-friendly selection of these data could be available at the institution-specific program level to prospective students at time of application, so they can make informed choices.
- A more extensive set of these data could be available at the institution-specific program level to colleges and universities for purposes of improvement. These data could provide an input in defining issues to be addressed in Strategic Mandate Agreements or other accountability arrangements.

A strategy for gathering data at the institution-specific program level and making it available to prospective students and to colleges and universities would promote student choice and encourage evidence-based improvement and accountability.

INTRODUCTION

The core challenge in higher education in Ontario is to provide a highly accessible system with a high level of quality at a cost that the government and students are prepared to pay. Historically, the Ontario government (like many others) has entrusted universities and colleges to self-monitor the quality of the education they are providing, directly or through agencies created by the universities and colleges. Increasingly students, parents, employers and elected leaders are seeking independent validation of educational quality.

The use of performance metrics for publicly-supported institutions has become widespread in the United States, the U.K., New Zealand and to a lesser extent Canada and other OECD countries. This trend arises from the New Public Management movement and its attempts to resolve principal-agent problems in the public sector by giving managers greater flexibility and holding them accountable for measurable outcomes.

Initial efforts at introducing performance metrics for higher education in Ontario and elsewhere have been only partially successful. Some jurisdictions have emphasized outputs (such as graduation rates) that favour well-prepared students and so discourage accessibility. Some have emphasized easily understood metrics (such as employment rates) that are not closely linked to whether the student benefited from his or her educational experience. Many U.S. states have discarded their initial efforts at performance metrics and are introducing new metrics that reflect a more nuanced perspective of what higher education institutions do and the value they can offer.¹

Better metrics have the potential to build trust between higher education institutions and those who fund them, including governments, students, parents and future employers. At their best, strong metrics can reduce the mistrust that

¹ See, for example, Mary B. Ziskin, Don Hossler, Karyn Rabourn, Osman Cekic, and Youngsik Hwang, *Outcomes-based funding: Current status, promising practices and emerging trends* (Toronto: Higher Education Quality Council of Ontario, 2014), and Kevin J. Dougherty, Sosanya M. Jones, Hana Lahr, Rebecca S. Natow, Lara Pheatt, and Vikash Reddy, *Performance funding for higher education* (Baltimore: Johns Hopkins University Press, 2016.)

has made funders reluctant to provide increased support to higher education institutions. Metrics may also cause higher education institutions to reflect on their own performance and to re-align priorities so that the quality of students' education is improved.

Proposals for more performance metrics typically founder because of the challenges of introducing new surveys or other measurement devices. Yet Ontario has a rich data-set from existing surveys of graduates that were initiated in 1999 as part of the Key Performance Indicators (KPIs) project. Only a few top-line metrics are published and used for funding purposes. After 17 years, it is timely to examine whether better use could be made of these data.

RESEARCH QUESTION AND METHODOLOGY

The research question for this project is: Can Ontario's existing surveys of graduates be used to develop better performance metrics for Ontario colleges and universities? We want to test whether data from the existing surveys can be used to develop better metrics and whether better use can be made of the data.

To do so, we examined the representativeness and statistical accuracy of the 2015 College Graduate Survey dataset and the 2015 University Graduate Survey dataset. Based on this analysis, we assessed the alignment between the government's stated purposes for these surveys and the actual data available. We also assessed the potential use of the data for answering policy-relevant questions about higher education.

We shared our initial findings with a panel of experts from Ontario universities, colleges, associations, agencies and government who are familiar with the surveys. Their feedback provided valuable qualitative data.

Actual assessment of the postsecondary education system is out-of-scope for this project. We do not publish data or draw conclusions about the postsecondary system as a whole or about individual institutions or programs.

BACKGROUND AND LITERATURE REVIEW

Origins of the surveys of graduates

Ontario's publicly funded colleges have been conducting an annual survey of college graduates since at least 1971.² For almost three decades the surveys were administered by the colleges themselves, through their voluntary association, with consolidated results at the institutional and program levels made publicly available by the Ministry of Colleges and Universities. Beginning in 1998-99, the graduate survey expanded, and a neutral third party began collecting the data.³

The annual survey of university graduates began in 1998-99, after a lengthy gestation. The Provincial Auditor in the 1980s and early 1990s strongly encouraged the ministry to adopt goals and objectives for the universities. At the suggestion of the Council of Ontario Universities, the government established a Task Force on University Accountability, chaired by William Broadhurst, to explore accountability measures that would be tailored to the unique roles that universities collectively play in society. The principal theme of the task force's report in 1993 was that governing bodies at each university should approve policies and procedures and should then monitor their results. The report recommended that each governing body adopt a set of management indicators, while rejecting the option of establishing "indices whose prime purpose would be

²See Ontario Ministry of Colleges and Universities, *Annual survey of 1971 graduates of the Colleges of Applied Art and Technology* (Toronto: Queen's Printer, 1972); Ontario Ministry of Colleges and Universities, *Combined Report of The Survey of 1972 graduates of Colleges of Applied Arts and Technology - Second annual follow-up survey of 1971 graduates of Colleges of Applied Arts and Technology* (Toronto: Queen's Printer, 1973).

³ Ursula McCloy and Shuping Liu, *What are the influencers of graduate satisfaction and labour market outcomes of Ontario college graduates? An analysis of Ontario's college graduate satisfaction survey results* (Toronto: Higher Education Quality Council of Ontario, 2010), 7.

to establish norms to be applied uniformly to all universities and used to rank them.”⁴

This decentralized approach did not satisfy the Provincial Auditor, who in his 1996 report criticized the ministry for not having clear objectives for universities and recommended that measurable objectives be developed. This led the ministry to include in its 1997-98 business plan a promise to “establish a baseline, targets and options for university performance measures in consultation with stakeholders.” The ministry adopted three measures that focussed on students’ progress during and after university: graduation rates, employment rates, and student loan default rates.^{5,6}

Current status

The Ministry continues to require universities and colleges to publish on their websites the three metrics adopted in 1998.

The Ministry says it currently recognizes five KPIs for the college sector and three KPIs for the university sector. These are published on the ministry’s website annually. The college data are also published by Colleges Ontario.⁷

⁴Task Force on University Accountability, *University accountability: A strengthened framework* (Toronto: Queen’s Printer, 1993), 54, 72-76; quotation at 54.

⁵ Ministry of Education and Training news release, February 13, 1998.

⁶ One of the co-authors (Trick) was Assistant Deputy Minister for Postsecondary Education in the Ontario government from 1996 to 2001, when the college and university surveys of graduates in their current form were introduced.

⁷ The Ministry also publishes on its website five indicators for each Private Career College: Graduation Rate, Graduate Employment Rate, Graduate Employment Rate in Field of Study, Graduate Satisfaction Rate, Employer Satisfaction Rate. The graduation rate is calculated from audited data submitted by PCCs three times per year. The other four KPIs are calculated from surveys taken by graduates and their employers. The ministry also publishes Ontario Student Assistance Program (OSAP) loan default rates. Each of these metrics is published by institution-specific program. See MAESD, “Key Performance Indicators for Private Career Colleges” <http://www.tcu.gov.on.ca/pepg/audiences/pcc/kpi.html>

Table 1: Key Performance Indicators (KPIs) currently recognized by the Ministry

Public College KPIs	University Sector KPIs
Graduate Employment at Six Months after Graduation*	Graduate Employment at Six Months after Graduation*
	Graduate Employment at Two Years after Graduation*
Graduation Rate*	Graduation Rate*
Employer Satisfaction Rate*	
Student Satisfaction Rate	
Graduate Satisfaction Rate	

*Indicators used in calculating funding.

The ministry also publishes on its website over 30 data elements from the college graduate survey⁸ and a more limited selection of data for universities.⁹

Link to funding

When the first full set of indicators became available from the survey process launched in 1998-99, the government provided a 1 per cent increase in funding to the university and college sectors. Additional funds were provided beginning in 2001-02 so that performance-based funding rose to 1 1/3 per cent of total government funding for universities and colleges.^{10,11}

University sector

⁸ <https://www.app.tcu.gov.on.ca/eng/labourmarket/employmentprofiles/> accessed April 20, 2017.

⁹ <http://www.iaccess.gov.on.ca/OsapRatesWeb/enterapp/home.xhtml> accessed April 20, 2017.

¹⁰ Ministry of Training, Colleges and Universities news releases, March 14, 2000 and February 8, 2002.

¹¹ For a critique of the government's unclear and shifting directions in the introduction of these performance indicators, see Daniel W. Lang, "The political economy of performance funding," in Frank Iacobucci and Carolyn Tuohy (eds.), *Taking public universities seriously* (Toronto: University of Toronto Press, 2005), 226-250.

Since 2000-01, performance-based funding has been allocated to universities according to their performance on three indicators:

- graduate employment rate six months after graduation
- graduate employment rate two years after graduation
- graduation rates.

The calculation of the employment rate is based on the survey of graduates. The calculation of graduation rates is based on administrative data.

Since 2001-02 the allocation has been calculated as follows. A benchmark is established for each of the three indicators, set at 10 percent below the system average for the indicator. For example, if the system average is 95 percent, the benchmark level which institutions must achieve to qualify for performance funding is 85.5 percent. Institutions at or above the benchmark are allocated funding in proportion to their performance from the benchmark and their size (domestic enrolments, weighted by program). Institutions below the benchmark level do not receive funding.¹²

College sector

Performance funding in the college sector is allocated based on three components:

- graduate satisfaction
- employer satisfaction; and
- graduate employment rate 6 months after graduation.

The calculation of the employment rate and graduate satisfaction rate is based on the survey of graduates. Participating graduates are asked for permission to contact their employers for a follow-up survey, and the calculation of the employer satisfaction rate is based on this follow-up survey. The calculation of graduation rates is based on administrative data.

Each component is calculated relative to the college's enrolment base (averaged over three years, with a two-year lag).

¹²Ontario Ministry of Training, Colleges and Universities, *The Ontario operating funds distribution manual* (Toronto: October 2009), 9.

To receive Graduate Employment Rate funding, a college's score must meet or exceed a benchmark of 90 per cent of the sector's average. The percentage difference between the college's score and the benchmark is calculated and applied to the college's base enrolments. The resulting additional enrolment is added to the base enrolments. A college receives a share of the available funding equal to the college's percentage share of this adjusted base enrolment level.

This calculation has an important qualifier: Each college's graduate employment rate is adjusted to reflect its region's overall employment rate. Specifically:

- The regional employment rate for each college is calculated using data received from the Ministry of Finance from the national Labour Force Survey.
- A regionally-adjusted employment rate is calculated for each college by multiplying the college's Graduate Employment Rate by the quotient of the maximum average regional employment rate divided by the college's regional employment rate.
- The sector average adjusted employment rate is calculated and the 90% sector benchmark established. The percentage difference between the college's adjusted employment rate and the benchmark is calculated and applied to the college's activity base. The resulting additional enrolment is added to the activity base to calculate the adjusted activity base. A college's percentage share of the adjusted activity base relative to the system adjusted base is its share of the funding available for this component.
- A college whose adjusted employment rate is below the 90% benchmark is not eligible to receive funding in respect of this component.¹³

The use of performance metrics in calculating funding for colleges and universities is expected to change with the introduction of new funding models starting in 2017-18.

¹³ Ontario Ministry of Training, Colleges and Universities, *2014-15 Technical document: College operating grants allocations* (Toronto, 2014), 13.

Ontario government goals and objectives

The Ontario government's goal in publishing graduate employment rates and other Key Performance Indicators has been expressed in public documents primarily in terms of providing consumer information to students and those who may advise them.

- In announcing the initial KPI measures, the government emphasized the importance of providing consumer information for students: "Students may use this information as a guide as they consider in which schools and programs to invest their money."¹⁴
- The government's current website says about college performance indicators: "We've posted the latest feedback from college students, graduates and their employers. Future college students – along with parents, guidance counsellors, postsecondary career counsellors, and employment advisors – can decide if college is the right choice and, if so, which program."¹⁵
- The government's current website says the university indicators will "[h]elp you choose a school, a major or a future career"¹⁶

These statements suggest that the student should take an interest in the data for individual programs (or majors), as well as for the institution as a whole. The government's theory of action appears to be that, *ceteris paribus*, students will prefer institutions and programs with strong labour market outcomes, so institutions will have an incentive to increase the number of seats in those programs and/or improve other programs so their outcomes are better.

In addition to providing consumer information to students, the government uses the indicators directly. Certain outcome measures are used in the calculation of a small share of the government operating grant, giving institutions a very modest financial incentive to improve performance. Outcome measures may be used when the government decides whether to approve new academic programs for

¹⁴ Ministry of Education and Training news release, February 13, 1998.

¹⁵ <https://www.app.tcu.gov.on.ca/eng/labourmarket/employmentprofiles/index.asp>

¹⁶ <http://www.iaccess.gov.on.ca/OsapRatesWeb/enterapp/home.xhtml>

purposes of funding. Colleges that wish to charge higher tuition fees for certain programs may do so with the government's permission, based on factors that may include graduates' prospects for employment and potential to earn an above-average income.

The government may also believe that the data are useful to universities and colleges in their internal decision-making. Based on archival research, Catherine Drea concluded that one of the Ministry's purposes in requiring the first survey of college graduate employment in the 1970s was to temper the colleges' commitment to accessibility by encouraging them to limit enrolment in those programs where jobs would be scarce after graduation.¹⁷ Our direct experience in working with colleges in recent years suggests that many colleges use employment and graduation rates as factors (by no means the only factors) in making decisions about programs improvements and potential cancellations.

By contrast, Vivian Chan found that Ontario university institutional research offices said their universities had mixed views about the value of the data on graduate employment. Only five out of 11 respondents to an online survey said the employment rates have a "high impact on institutional planning," compared with 10 out of 11 who said the same about the graduation rates. Only two out of 10 respondents agreed that the employment data affected performance improvement efforts at the program level. Respondents noted that most improvements are made at the program level, yet the response rates at the program level make the data questionable, and the definition of program for purposes of the university survey may embrace several academic programs.¹⁸

VALIDATING THE GRADUATE SURVEY DATA

To explore these issues further, we investigated the degree to which the data collected through the College Graduate Survey and the University Graduate

¹⁷ Catherine Drea, *Ontario government policy on accessibility to the Colleges of Applied Arts and Technology: 1965-1995* (unpublished Ed. D. thesis, OISE/University of Toronto, 2003), 39.

¹⁸ Vivian Chan, "The efficacy of key performance indicators in Ontario universities as perceived by key informants", *Canadian journal of higher education* 45:4 (2015), 445-446.

Survey can inform decision-making. We did this by examining the representativeness and statistical accuracy of the 2015 College Graduate Survey dataset and the 2015 University Graduate Survey dataset.

We obtained the two datasets from the Ministry of Advanced Education and Skills Development (MAESD).¹⁹

The 2015-16 College Graduate Survey was administered in 2015. People who graduated from Ontario publicly-assisted colleges in August 2014, December 2014 and April 2015 were contacted 6 months after their graduation to respond to the survey. The population is $N = 98,041$ and the number of respondents is $n = 46,467$. The data file we obtained also incorporates the students' demographic and program profiles from the colleges.

The 2015 university employment data was collected through the University Graduate Survey administered in 2015. This survey targeted people who graduated with a bachelor's degree from an Ontario public university in 2013. Out of 84,548 graduates 34,011 people responded to the survey. The dataset contains respondents' employment details six months and two years after their graduation.

Data validation: methodology

Challenges

Both surveys are a census of graduates. Instead of sampling, an attempt is made to contact every graduate.

The response rate was 47% from the 2014-15 college graduates and 40% from the 2013 university graduates.²⁰ Since we do not know why some graduates

¹⁹ We report data based on the actual files we received. There are minor differences between our data and those reported publicly by MAESD, due to small differences in which students were reported and in calculation methodologies. These differences need not concern us here.

²⁰For comparison, the response rate for the Statistics Canada National Graduate Survey in 2013 was 49.1%; for the U.S. National Survey of Recent College Graduates (now discontinued), 72-84%; for the U.S. Survey of Doctorate Recipients in 2013, 76%. The Maritime Provinces Higher Education Commission in 2014 received responses from 27.3% of graduates. See Statistics Canada (*footnote continued*)

participated and others did not, some population groups are likely to be over- or underrepresented in the respondents. Therefore, nonresponses may introduce bias to the survey estimates. No recent study has been reported that inspects the representativeness of the survey data.²¹ For these reasons, we have no prior knowledge or guarantee of the survey data's representativeness and statistical accuracy.

Some respondents did not answer every question on the survey. Analyzing response rates for individual questions was outside the scope of this project.

Strategies

We used the program R to manage and analyze the data. The data validation involved two stages. The first was to examine the representativeness of the survey data, i.e. to examine the extent to which the survey responses represent the entire population. The second was to examine the general statistical accuracy of different data segments: by sector, by institution, by credential, by program at the sector level, and by program at institutional level.

Survey data representativeness

Since a series of auxiliary variables were available for respondents and non-respondents in both survey datasets, we chose to calculate R-indicator to obtain some insight in the potential bias of the survey estimates. Representativity indicator, or R-indicator, is widely used to assess representativeness of survey

<http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=5012> (accessed April 20, 2017); IPUMS Integrated Public Use Microdata Series https://higherred.ipums.org/highered/survey_designs.shtml (accessed April 20, 2017); and Maritimes Higher Education Commission, "Class of 2012: Profile of first degree holders and methodological notes", *Trends in maritime higher education* 12:3 (September 2015).

²¹Ursula McCloy and Shuping Liu compared the colleges' graduate population to the survey population for the years 2002 to 2007 and concluded: "Due to the high response rates, the survey respondents are quite representative of the graduate population." During these years, the response rate averaged 74.1%. See McCloy and Liu, 11-13.

data. It is based on Schouten, Cobben and Bethlehem's theory²² that the representativity can be measured by the standard deviation of the population response probabilities (ρ), denoted $S(\rho)$. The value of R-indicator ranges from 0 to 1, with $R(\rho) = 1$ indicating the most representative responses and 0 the least representative responses.

The computation includes two steps: to calculate the population response probabilities and then to compute their standard deviation. The logistic model was employed to compute the population response propensities. The college dataset contains a wide range of auxiliary variables. By performing forward stepwise regression, eight of them were selected to construct the most appropriate model: graduates' instruction language(English/French), graduates' age, graduation college, occupational division and graduates' funding type. The university employment data, in contrast, do not contain as many auxiliary variables as do the college data. For the university graduates' response probabilities calculation, four variables were selected: graduates' gender, program classification, graduation university and whether they were in a co-op program.

According to the theory from Schouten et al., the R-indicator was defined in terms of the $S(\rho)$ as follows

$$R(\rho) = 1 - 2S(\rho)$$

The standard deviation of the response probabilities, $S(\rho)$, of a population U can be estimated by

$$s(\rho) = \sqrt{\frac{1}{N-1} \sum_U (\rho_i - \bar{\rho}_U)^2}$$

where $\bar{\rho}_U = \sum_U \rho_i / N$

²² Barry Schouten, Fannie Cobben and Jelke Bethlehem, "Indicators for the representativeness of survey response," *Survey methodology*, Statistics Canada, Catalogue No. 12-001-X, 35:1 (2009), 101-113. See also Natalie Shlomo, Chris J. Skinner, and Barry Schouten, "Estimation of an indicator of the representativeness of survey response," *Journal of statistical planning and inference* 142:1 (2012), 201-211.

Post-stratification weights were calculated but yielded only minor differences in the results, so we do not report them here.

Survey data accuracy

We are interested in examining the statistical accuracy of the survey estimates of all respondents and of smaller data segments. In particular, we want to investigate whether small data elements can be used to obtain meaningful estimates. Informed by common practices, we chose to report the margin of error (ME) of the 50% distribution on the 95% confidence level. Distribution reflects how skewed the respondents are on a given topic. It should be noted that the 50% distribution leads to the most conservative estimates of the MEs of survey data segments. Because the data distribution is usually above or below 50%, the MEs for the real distributions are normally smaller than the estimated MEs reported in this paper.

Results

Results summary

These are the key results from our analysis:

- The graduate surveys for colleges and universities are both reasonably representative of the underlying populations that they purport to represent, at the system-wide level.
- The college data can be analyzed by credential with a very high level of general statistical accuracy ($ME \leq 2\%$). (The university data involve only one credential, the bachelor's degree, so analysis by credential is moot.)
- The data can be analyzed by institution with a very high level of general statistical accuracy ($ME < 5\%$), for both colleges and universities. Two small institutions (both universities) are exceptions.
- The data can be analyzed at the sector-wide program level with a very high level of general statistical accuracy ($ME < 5\%$) for 9% of college programs and 9% of university programs. These programs tend to be the largest, so they account for 60% of college graduates and 62% of university graduates. Programs for which the data provide a high level of

general statistical accuracy (ME < 10%) account for 85% of college graduates and 86% of university graduates.

- The data can be analyzed at the institution-specific program level with a high level of general statistical accuracy (ME < 10%) for at least half the graduates at 13 universities and 3 colleges. The statistical accuracy of the data for use at the institution-specific program level is highly variable and depends on the size of the institution's programs and the response rates from those programs. Institution-specific programs at colleges tend to be smaller than at universities. At four colleges and two universities, none of the program-level data meets the statistical accuracy threshold of ME < 10%.

These results refer to general statistical accuracy only. They do not take into account structural differences among the units being compared. For example, institutions may differ based on their missions, their program mix or the level of preparedness of their incoming students.

Representativeness

The response rates and R-indicators of both surveys are presented in Table 1. The R-indicator for the college and university survey data is .88 and .83 respectively. Although both values are lower than the ideal value of 1, they nonetheless indicate reasonable representativeness of survey response.

Table 1: Response rates and R-indicators of two survey datasets

	Response Rate	R - indicator
2015 College Graduate Survey	47%	0.87
2015 University Graduate Survey	40%	0.83

General statistical accuracy at the sector level

Tables 2 to 4 present the population sizes, response rates and general MEs of the survey datasets at the sector level, credential level and institutional level.

Overall, both survey datasets show high-level general statistical accuracy at the sector level. The general MEs of the overall datasets at the 95% confidence level are both below 1%, as shown in Table 2.

Table 2: Populations, response rates and MEs of the survey datasets at the sector level

	Population	Response rate	ME
2015 College Graduate Survey	98,041	47%	0.3%
2015 University Graduate Survey	84,548	40%	0.4%

Source variables: the 2015 College Graduate Survey variable EP_Respondent; the 2015 University Graduate Survey variable 'Status'.

General statistical accuracy at the sector-wide credential level

Because the University Graduate Survey is only administered to people who graduated with a bachelor's degree, data validation at the credential level is only conducted for the college dataset. The college credentials are derived from the variable indicating graduates' program duration. Table 3 shows that the response rates of five college credentials generally aligned with the overall College Graduate Survey response rate. The four-year credential has a larger general ME (2.0%) due to the small population ($n = 2,641$). The general MEs of the rest of the credential data segments are below 1%, which indicates very high general statistical accuracy of college data at the credential level.

Table 3: Populations, response rates and MEs of the 2015 College Graduate Survey data at the credential level

Credential	Population	Response rate	ME
1 Year certificate	18,479	48%	0.7%
2 Year diploma	49,425	47%	0.5%
3 Year advanced diploma	14,722	48%	0.8%
4 Year degree	2,641	49%	2.0%
Post-diploma	12,774	48%	0.9%

Source variable: the 2015 College Graduate Survey variable 'ProgDuration'.

General statistical accuracy at the institutional level

Table 4 shows that the data segments of public institutions all have general MEs below 5%, indicating very high general statistical accuracy, with the exception of the two smallest institutions, Algoma University ($ME = 8.3\%$) and Université de Hearst ($ME = 35.8\%$).

Table 4: Populations, response rates and MEs of the survey datasets at the institutional level

	Population	Response rate	ME
College			
Algonquin College	7,887	45%	1.2%
Cambrian College	2,530	39%	2.4%
Canadore College	1,179	43%	3.3%
Centennial College	6,742	51%	1.2%
College Boreal	759	54%	3.3%
Conestoga College	4,222	57%	1.3%
Confederation College	1,473	24%	4.6%
Durham College	4,166	51%	1.5%
Fanshawe College	6,359	48%	1.3%
George Brown College	8,356	48%	1.1%
Georgian College	4,388	48%	1.5%
Humber College	10,044	49%	1.0%
La Cite collégiale	1,839	48%	2.4%
Lambton College	1,541	40%	3.0%

	Population	Response rate	ME
Loyalist College	1,528	47%	2.7%
Mohawk College	4,850	47%	1.5%
Niagara College	4,851	46%	1.5%
Northern College	615	47%	4.2%
Sault College	869	50%	3.3%
Seneca College	7,464	49%	1.2%
Sheridan College	7,065	43%	1.3%
Sir Sandford Fleming College	3,002	49%	1.8%
St. Clair College	3,316	47%	1.8%
St. Lawrence College	2,996	47%	1.9%
University			
Algoma University	212	40%	8.3%
Brock University	3,291	39%	2.2%
Carleton University	3,827	44%	1.8%
Lakehead University	1,959	48%	2.3%
Laurentian University	2,396	34%	2.8%
McMaster University	5,232	43%	1.6%
Nipissing University	1,716	51%	2.3%
OCAD University	709	38%	4.7%
Queen's University	4,200	46%	1.6%
Ryerson University	5,577	39%	1.6%
Trent University	1,714	39%	2.9%
Université de Hearst	26	23%	35.8%
University of Guelph	4,042	31%	2.3%
University of Guelph-Humber	864	31%	5.0%
University of Ontario Institute of Technology	1,555	48%	2.6%
University of Ottawa	7,214	41%	1.4%
University of Toronto	11,546	36%	1.2%
University of Waterloo	5,235	46%	1.5%
University of Windsor	3,203	39%	2.2%
Western University	6,842	38%	1.5%
Wilfrid Laurier University	3,427	53%	1.6%
York University	9,722	37%	1.3%

Source variables: the 2015 College Graduate Survey variable 'College'; the 2015 University Graduate Survey variable 'University'.

General statistical accuracy at the sector-wide program level

Table 5 summarizes our findings on the general statistical accuracy of the data with respect to individual programs at the college or university sector. The table presents the number of programs, the number of programs with survey responses, and the number of programs with more than 10 graduates. We chose to exclude programs with fewer than 10 graduates from further analysis, leaving 558 programs for analysis. University program data were extracted based on the Classification of Instructional Programs (CIP) codes recorded by MAESD, instead of the program names reported by institutions. The CIP codes provide a greater level of disaggregation than the hybrid SPEMAJ (Specialist/ Major) classifications used in some public reporting. Out of 441 unique programs offered by public universities, 341 with more than 10 graduates received responses. Similar analysis was done for the college sector, showing 558 programs with more than 10 graduates received responses.

Table 5: Numbers of programs by sector

	Programs	Programs with responses	% of programs with responses	Programs with responses and more than 10 graduates	% of programs with responses and more than 10 graduates
College	636	629	98.9%	558	87.7%
University	441	421	95.5%	341	77.3%

Source variables: the 2015 College Graduate Survey variable 'MTCU.Program.Name'; the 2015 University Graduate Survey variable 'RCIP'.

We placed programs into 5 ME categories. Table 6 presents the number of programs in each category, along with the percentages of the population in each category. In the college sector 56 out of 636 programs have general MEs less than 5%, and their graduates account for 59.3% of the entire population. Overall

178 programs' MEs are less than 10% and these programs account for 84.7% of the entire population. Programs' MEs over 10% are mostly the result of small numbers of graduates per program.

The university sector mirrors this pattern. Only 39 programs have MEs below 5%, but their graduates account for 62.3% of the population. Of all 441 programs, 115 programs have MEs below 10%, and their graduates account for 86.1% of the entire population.

Table 6: Numbers of programs in each ME category and their percentages of the entire population, by sector

	ME 0%-5%	ME 5%- 10%	Sub- total	ME 10%- 15%	ME 15%- 20%	ME ≥ 20%	<10 grad- uates	Total
College								
Number of programs	56	122	178	133	97	150	78	636
% of college graduates	59.3%	25.4%	84.7%	8.9%	3.4%	2.5%	0.5%	100.0 %
University								
Number of programs	39	76	115	69	59	98	100	441
% of university graduates	62.3%	23.8%	86.1%	7.4%	3.5%	2.5%	0.5%	100.0 %

Source variables: the 2015 College Graduate Survey variable 'MTCU.Program.Name'; the 2015 University Graduate Survey variable 'RCIP'.

General statistical accuracy at the institution-specific program level

We validated program data segments at the institutional level in a similar manner. Table 7 is the summary of the statistical accuracy of programs in individual institutions. The institution names are followed by the number of

programs by institution, the percentages of programs receiving responses and the percentages of programs falling in each ME category. The last two columns display by institution the percentages of graduates from programs with general MEs less than 10% and 15%.

In the college sector, all colleges have over 60% of their programs with responses from graduates, with the exceptions of Collège Boréal and Northern College where less than 50% of their programs received responses. Nine colleges have over 90% of their programs with graduates responding to the survey.

The percentages of programs with general MEs less than 10% are generally low across colleges. Four colleges have no programs falling in this category. The highest is George Brown College with 23% of their programs with general MEs less than 10%. The percentages increase when we look at the number of programs with MEs less than 15%, but there is still one college (Confederation) with no programs falling in this category.

The percentages of graduates from programs with MEs less than 10% vary by college, from 0% at four colleges (Canadore, Confederation, Lambton, and Northern) to slightly over 50% at two very large colleges (George Brown and Humber). If we set a lower threshold to include all programs with general MEs less than 15%, the percentages of graduates by college increase significantly, with 15 colleges having over 50% of their graduates in this category. The percentages are as high as 85%.

In the university sector, all but two universities have a high percentage of their programs reporting responses from graduates. The two exceptions are Université de Hearst and Algoma University.

The universities generally have a low percentage of programs with general MEs below 10%. Wilfrid Laurier University has the largest percentage (34%) of programs with general MEs below 10%.

There are 13 universities with over 50% of their graduates from programs with general MEs less than 10%. If we set a lower threshold to include all programs with MEs less than 15%, all universities except Hearst and Algoma have over 50% of their graduates in this category.

Table 7: General statistical accuracy for programs at institutional level

	No. of programs	General statistical accuracy by number of programs					General statistical accuracy by number of graduates	
		programs with MEs from 0 to 10%	programs with MEs from 10% to 15%	programs with MEs from 15% to 20%	programs with MEs over 20%	% of programs with responses and more than 10 graduates	graduates from programs with MEs from 0 to 10%	graduates from programs with MEs from 0 to 15%
College								
Algonquin	133	13%	26%	23%	31%	92%	43%	72%
Cambrian	71	4%	10%	20%	44%	77%	18%	41%
Canadore	50	0%	10%	20%	46%	76%	0%	29%
Centennial	130	15%	30%	21%	24%	89%	44%	80%
Boreal	54	2%	11%	6%	30%	48%	14%	45%
Conestoga	117	13%	28%	24%	21%	86%	41%	72%
Confederation	62	0%	0%	2%	79%	81%	0%	0%
Durham	117	7%	23%	26%	34%	90%	25%	58%
Fanshawe	124	10%	31%	19%	27%	87%	38%	78%
George Brown	116	23%	33%	17%	22%	95%	54%	85%
Georgian	115	5%	23%	20%	33%	82%	29%	64%
Humber	139	20%	37%	22%	16%	95%	52%	85%
La Cite Collégiale	86	3%	8%	17%	42%	71%	17%	37%
Lambton	61	0%	13%	20%	31%	64%	0%	38%
Loyalist	61	3%	7%	21%	52%	84%	16%	33%
Mohawk	84	11%	37%	29%	23%	99%	29%	75%
Niagara	102	11%	19%	24%	40%	93%	40%	66%
Northern	46	0%	2%	15%	30%	48%	0%	9%
Sault	55	2%	7%	11%	45%	65%	8%	30%
Seneca	132	17%	24%	26%	24%	91%	50%	76%
Sheridan	102	15%	29%	18%	32%	94%	42%	79%
Sir Sandford Fleming	95	4%	20%	19%	42%	85%	18%	55%
St. Clair	86	9%	13%	24%	45%	92%	38%	56%
St. Lawrence	71	11%	15%	21%	32%	80%	40%	64%
University								
Algoma	18	0%	0%	11%	28%	39%	0%	0%
Brock	77	6%	18%	9%	31%	65%	29%	71%

	No. of programs	General statistical accuracy by number of programs					General statistical accuracy by number of graduates	
		programs with MEs from 0 to 10%	programs with MEs from 10% to 15%	programs with MEs from 15% to 20%	programs with MEs over 20%	% of programs with responses and more than 10 graduates	graduates from programs with MEs from 0 to 10%	graduates from programs with MEs from 0 to 15%
Carleton	95	6%	20%	19%	23%	68%	31%	66%
Lakehead	68	6%	10%	13%	21%	50%	38%	63%
Laurentian	41	10%	10%	7%	49%	76%	56%	73%
McMaster	77	14%	19%	14%	35%	83%	58%	82%
Nipissing	29	17%	10%	21%	10%	59%	72%	83%
OCADU	12	8%	17%	33%	33%	92%	27%	57%
Queen's	71	20%	17%	13%	21%	70%	63%	83%
Ryerson	45	20%	33%	22%	20%	96%	59%	87%
Trent	30	13%	17%	17%	30%	77%	45%	75%
Hearst	5	0%	0%	0%	20%	20%	0%	0%
Guelph	88	6%	9%	10%	45%	70%	28%	53%
Guelph-Humber	8	13%	50%	25%	NA	88%	27%	84%
UOIT	27	26%	19%	11%	15%	70%	69%	88%
Ottawa	83	19%	16%	23%	19%	77%	67%	82%
Toronto	177	10%	15%	10%	31%	65%	53%	78%
Waterloo	73	29%	29%	12%	18%	88%	60%	89%
Windsor	65	12%	8%	14%	35%	69%	55%	85%
Western	92	17%	17%	10%	27%	72%	62%	68%
Wilfrid Laurier	41	34%	17%	7%	20%	78%	80%	93%
York	81	26%	15%	11%	26%	78%	77%	90%

Source variables: the 2015 College Graduate Survey variable 'College' and variable 'MTCU.Program.Name'; the 2015 University Graduate Survey variable 'University' and variable 'RCIP'.

USE OF THE SURVEYS TO SUPPORT STUDENT CHOICE

The best-known use of the survey of graduates is to communicate to prospective students and other audiences that university and college graduates experience positive labour market outcomes. The Council of Ontario Universities and Colleges Ontario both publicize the results in news releases and fact sheets. Many colleges feature their graduate employment rates in recruitment materials, although this is less common among universities.²³

The most prominently cited figure in these news releases is the employment rate for the sector or institution.²⁴ In calculating performance-based funding, the only labour force indicator used by government is the employment rate for each institution.

We would argue that the metric receiving the most attention -- whether a graduate is employed after graduation -- is not an especially valuable performance metric by itself. The graduate who has launched a full-time career in his or her chosen field is counted the same as the graduate in a part-time low-skill job. Students, academic administrators and faculty cannot learn much from this metric.

A set of capstone labour market indicators

A better use of the data might be to identify a set of capstone indicators of labour market performance. For example:

- Employment rate, among those who sought employment
- Full-time employment rate, among those who sought employment

²³Chan 2015, 445-447

²⁴See, for example: Council of Ontario Universities, "94% of Ontario university grads have secured well-paying jobs two years after graduation: government survey," news release, December 14, 2016; and Colleges Ontario, "Research reveals 83 per cent of college graduates secure employment within six months," news release, April 19, 2017.

- The proportion of graduates whose jobs make use of skills and abilities learned in postsecondary education, among those who found employment
- The proportion of graduates whose jobs are closely or somewhat related to the graduate's program of study, among those who found employment
- Median earnings among graduates employed full-time.

Using a set of capstone indicators addresses the reality that no single indicator is perfect. Any single indicator can be characterized as unfair or misleading with respect to some individual or some program.

These five indicators together would provide a broad perspective on how recent graduates are faring in the workforce. The two metrics of relatedness – whether the job makes use of skills and abilities learned, and whether the job is related to program of study – recognize that many students find a career benefit from their education even if it does not lead to a job related to their program of study. The median earnings metric provides a measure of how employers value all graduates, whether their job is related to their education or not.

An additional (non-labour market) metric might show the share of graduates who are pursuing further education, recognizing that this is a pathway for many graduates from certain programs.

These five capstone indicators provide more information than does the graduate employment rate alone. To test this proposition, we asked: Do the institution-specific programs that appear in the top quartile of the employment rate indicator also appear in the top quartile for the other four indicators? If the same programs appear in the top quartile of all five indicators, then the use of multiple capstone information may not add much information.

We computed the number of programs with a general ME less than 10% and with valid data for the calculation of all 5 indicators. Within these programs, we further calculated the number of programs in the top quartile for indicator 1, and the number of programs in the top quartile of both indicator 1 and one more from the other 4 indicators. Finally, we calculated the number of programs that appear in the top quartile of all five indicators. Table 8 shows our findings.

Table 8: Five capstone indicators of labour market performance

	College survey, 6 months after graduation	University survey, 6 months after graduation	University survey, 2 years after graduation
Number of institution-specific programs with ME < 10% and valid data for all 5 indicators	218	103	134
Number of programs in top quartile for indicator 1	55	28	37
Number of programs in top quartile for both indicators 1 and 2	17	18	19
Number of programs in top quartile for both indicators 1 and 3	31	18	20
Number of programs in top quartile for both indicators 1 and 4	29	18	23
Number of programs in top quartile for both indicators 1 and 5	17	20	25
Number of programs in top quartile for all five indicators	6	15	14

NOTE:

Indicator 1 = Employment rate, among those who sought employment

Indicator 2 = Full-time employment rate, among those who sought employment

Indicator 3 = The proportion of graduates whose jobs make use of skills and abilities learned in postsecondary education, among those who found employment

Indicator 4 = The proportion of graduates whose jobs are closely or somewhat related to the graduate's program of study, among those who found employment

Indicator 5 = Median earnings among graduates employed full-time.

Table 8 suggests why the current focus on a program's employment rate is inadequate and potentially misleading. Programs that appear in the top quartile based on employment rates may not appear in the top quartile based on full-time employment, or relatedness to skills or program of study, or median earnings. Only a small share of programs appear in the top quartile for all five indicators. The share of such programs is higher for universities than for colleges.

A set of readily-available capstone indicators such as this, available at the institution-specific program level, would be more valuable than any single indicator. We believe that the institution-specific program level is the most pertinent level for most students, because a student is required to choose an institution and a program. It is also the most pertinent level for academic administrators and faculty, since it relates most closely to their potential span of control.

Challenges

Creating such a set of capstone indicators would present these challenges.

General statistical accuracy of programs at the institutional level

The data can be analyzed at the institution-specific program level with a high level of general statistical accuracy (ME < 10%) for at least half the graduates at 13 universities and 3 colleges. However, this means that valid data are not available at the institution-specific program level for many programs based on a 50% normal distribution.

Improving response rates would be an ideal solution but may not be possible. Financial incentives are the most promising way to increase response rates, but the incentives required to achieve high levels of statistical accuracy are probably not affordable for a census-type survey.

In the short term, the most practical solution will be to publish indicators at the institution-specific program level wherever the response rate meets the required level of statistical accuracy. In general, this means a full range of indicators will be available for the larger programs. For smaller programs, the accuracy of providing two-year or three-year averages could be tested, as could the clustering of multiple small related programs.

In the medium term, some of the required indicators could come from administrative data – an option we discuss below.

Relationship to mission

It is sometimes argued that the different missions of colleges and universities should be reflected in any metrics related to post-graduation outcomes. The *Colleges of Applied Arts and Technology Act, 2002* explicitly states that colleges are to “offer a comprehensive career-oriented postsecondary education to individuals in finding and keeping employment.” By contrast, some (not all) university representatives argue that their programs teach critical thinking, communication and analytical skills to students, and that there is not necessarily a direct link between university education and the labour market.

While the statutory missions of colleges and universities differ, we do not see this as requiring major differences between the sectors in the metrics used to assess post-graduation outcomes. The advent of near-universal higher education and the move towards a knowledge-based economy mean that every jurisdiction needs to be concerned with how graduates perform in the workforce. Prospective students and their parents routinely ask about the careers that will be available to new graduates. Every Ontario college and university claims in its recruitment materials to prepare graduates for rewarding careers. The line between college programs and university programs has never been sharp (e.g. Business), and new university programs increasingly focus on career-oriented fields that might once have been thought to be the domain of the colleges. Under these circumstances, there is good reason to gather and make available data that are comparable between the two sectors.

Survey design

The survey questions regarding salaries and relatedness of employment to field of study require some revision.

The survey of university graduates asks respondents to declare their annual salaries within \$10,000 bands (e.g. \$30,000-40,000). Most university graduates occupy one of four bands, i.e. most earn between \$20,000 and \$60,000 two years after graduation. This means the data give a very weak signal about salaries. The salary information is not easy to communicate to students, and analysts cannot calculate salary trends over time with accuracy. The survey of college graduates

asks for the specific salary amount, which provides more precise information. This approach might be adopted in the university survey.

The questions about whether a graduate's job relates to his or her field of study are more challenging to design. The survey of university graduates asks:

- "How closely was your work related to the skills you developed at university? Closely related / Somewhat related / Not related at all / Do not know"; and
- "How closely was your work related to the subject matter of the program of study? Closely related / Somewhat related / Not related at all / Do not know"

The survey of college graduates asks:

- "Was this job related to the (PROGRAM NAME) program that you graduated from?" Acceptable answers are: Yes / yes, partially / no.
- "To what extent did the skills you developed during college help you get your job? Would you say the skills were: Extremely helpful / Helpful / Neither helpful or unhelpful / Not helpful / Not at all helpful / Don't know/Not applicable, had job before college"

Each survey asks two questions. The college questions are similar to the university questions, but they are not the same. Three of the four questions require the graduate to choose among three responses (two of which could reasonably be interpreted as indicators of a successful student experience). One question requires the graduate to choose among six responses (two of which could reasonably be interpreted as indicators of a successful student experience). Two of the questions refer to "work," one refers to a "job", and one refers to the point in time when the graduate got the job. It would be highly desirable for both surveys to ask the same questions and offer the same responses, so that students considering programs in both sectors could make valid comparisons.

It would also be highly desirable for the calculation of graduates' employment rates to be the same for both surveys. This would assist prospective students seeking to compare programs from both sectors.

Timing of survey

The college survey is administered 6 months after graduation, and respondents are asked to report on their labour force status at the six-month mark. The university survey is administered two years after graduation, and respondents are asked to report on their labour force status at the two-year mark and (based on memory) at the six-month mark.

When the surveys in their current form were designed in 1998, Ministry staff believed that the six-month mark was reasonable for college programs, which were usually 1 or 2 years in length and did not at that time include any degree programs. The rationale was that a student taking a short program might reasonably expect to see a workforce benefit within six months after graduation. Ministry staff accepted the argument from universities that the benefit of a university education might be better measured over a longer period.

Since that time, the labour market has changed substantially. Employers are more cautious about hiring for permanent full-time jobs. Temporary and part-time jobs account for a larger share of the labour force.²⁵ The university survey shows a significant improvement in graduates' workforce status between the 6-month and two-year marks. We believe there is a strong rationale for changing the timing of the college survey so that it mirrors the university survey. This means there would be data on all postsecondary programs at the 6-month and two-year marks.

Making this change would introduce a discontinuity in the college data. It would make the college data at the six-month mark dependent on graduates' memories, as is currently true for the university data. It might reduce the college response rate, which at present is higher than the university rate.

²⁵ For a review of the data on changes in the workforce, see Colin Busby and Ramya Muthukumar, *Precarious positions: Policy options to mitigate risks in non-standard employment*, Commentary no. 462 (Toronto: C.D. Howe Institute, 2016), 4-10; and Changing Workplaces Review, *Special advisors' interim report* (Toronto: Ministry of Labour, 2016), 35-42. For analysis of the increased concentration of job creation in lower-paying jobs, see Benjamin Tal, "On the quality of employment in Canada," *In Focus* (Toronto: CIBC Economics, November 28, 2016).

A pilot project to administer the college survey at the two-year mark is in progress.

Communications to students

The Ministry has made a significant effort to make the results of the graduate survey publicly available on its website, but it has done so within a very limited budget. Even regular users report difficulty in finding the data within the Ministry's large and complex website.²⁶ Colleges and universities are required to publish certain survey results by program on their websites, but the data are usually found on a webpage devoted to accountability reports, where prospective students are unlikely to find them.

Behavioural psychology suggests that data are most likely to affect behaviour if they are easily available at the time that the user is making decisions, in a format that the user can readily understand.

- This suggests that the data should be closely associated with websites that students frequently use – for example, the sites of the Ontario University Application Centre, the Ontario Colleges Application Service, and/or the Ontario Student Assistance Program.
- The presentation should be attractive and straightforward.
- The search feature should be capable of addressing many types of questions that students ask. For example, the current search feature for colleges allows the user to compare up to five specific programs. An improved search feature might allow other types of questions such as “which health-related programs are most likely to lead to a job related to the field of study?”

²⁶ The data can be found at <http://www.tcu.gov.on.ca/pepg/audiences/colleges/colindicator.html> (college data sector-wide and by institution), <https://www.app.tcu.gov.on.ca/eng/labourmarket/employmentprofiles/compare.asp> (college data searchable by sector-wide program), <http://www.iaccess.gov.on.ca/OsapRatesWeb/enterapp/overview.xhtml> (university sector-wide data, and links to university data by institution), <http://www.iaccess.gov.on.ca/OsapRatesWeb/enterapp/home.xhtml> (university data searchable by institution, sector-wide program, and institution-specific program where available). (Accessed February 22, 2017.)

- In addition to the capstone metrics suggested above, the data should include a metric of how many graduates from a program proceeded to further education at the time of the survey. This is not a metric of performance, but it provides context about post-graduation pathways.

Questions are sometimes raised about whether students would make use of this data if available. Making this data available can best be seen as a “nudge”²⁷: a way of encouraging students to make evidence-based decisions that take into account their long-term goals, while at the same time honouring their freedom to make their own decisions based on whatever factors they choose.

The U.K.’s Unistats website and Australia’s Quality Indicators for Teaching and Learning (QILT) are examples of sophisticated sites that allow students to find institution-specific program data and compare data across programs. Data are provided with respect to student satisfaction and post-graduation employment, for first-entry and graduate programs. The United States Department of Education has also initiated plans to link student financial aid applications and institutional performance metrics.²⁸

This project could be initiated immediately for programs for which statistically valid data are available, and could be expanded as response rates are improved for other programs. Any new website should be tested to ensure it is useful to students from a wide range of backgrounds.

USE OF THE SURVEYS TO DEMONSTRATE THE ECONOMIC VALUE-ADDED OF POSTSECONDARY EDUCATION

Data from the surveys of college and university graduates are normally presented without reference to any points of comparison (e.g. “the vast majority of graduates of Ontario’s undergraduate university programs are getting well-paying jobs in their fields soon after graduation”), or with reference to other institutions (e.g. “we have the highest post-graduation employment rates in

²⁷Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving decisions about health, wealth, and happiness* (New York: Penguin, 2009).

²⁸ Linda Jonker and Martin Hicks, *Approaches to net tuition: An environmental scan* (Toronto: Higher Education Quality Council of Ontario, 2016), 41.

Ontario after 6 months at 93% and 95% after two years"). These are valid uses, and they give prospective students an idea of what their future chances might be. But with no benchmarks or points of comparison, the survey results record outcomes without providing any basis for judgements about what is a successful or unsuccessful outcome.

Data on how postsecondary education graduates fare in the labour market compared to those who do not pursue education past secondary school could be valuable for several purposes, but its most important value would be to assist those (inside and outside government) who wish to argue for larger investments in higher education. In making this case to elected decision-makers, a pertinent aphorism is that "all politics is local." Province-wide averages are useful, but data are more persuasive if they can demonstrate a high level of performance at every institution and in most or all major programs.

A large positive gap between postsecondary graduates and non-postsecondary students suggests that the government's investments in postsecondary education are paying off, and perhaps that additional investments would also have a positive return. A shrinking gap, or a negative gap, raises questions about whether there is an oversupply of graduates relative to labour market demand and/or whether new investments or other changes are needed to improve program quality.

Similar analysis at the program level might assist postsecondary administrators in refining their program mix or updating programs.²⁹

The Higher Education Quality Council of Ontario and the Council of Ontario Universities publish certain data comparing postsecondary graduates with secondary school graduates.³⁰ The published data do not show changes in salary over time and do not compare secondary school graduates with graduates from individual postsecondary programs.

²⁹ We are of course aware that postsecondary education serves purposes other than preparing students for the workforce. We do not advocate using labour market indicators as the sole decision-making tool for investments in higher education.

³⁰ See HEQCO, "Quick Stats", http://www.heqco.ca/en-ca/Research/quickstats/Pages/qs_5_6.aspx, and Council of Ontario Universities, *University works: 2015 employment report* (Toronto, 2015).

The surveys of college and university graduates do not, of course, provide information on those who do not attend college or university. To construct a benchmark of labour market performance among those who do not pursue education past secondary school, we used data from Statistics Canada's Labour Force Survey Public Use Microdata File (PUMF) for 2015. Since 66 per cent of the respondents to the 2015 College Graduate Survey are between 20 and 26 years old, we selected from the 2015 LFS 20- to 26-year-old people in Ontario who have not attended postsecondary education institutions as the college graduates' comparable group. Although the 2015 University Graduate Survey did not collect the respondents' age information, based on the available data from the 2015 LFS, we set the university graduates' comparable group as age 22 to 26 people in Ontario who have not received any postsecondary education. We used average data from the March, July and November LFS data files. The methodology for calculating employment rates is provided in the Appendix.

Table 9 shows the comparisons for three of the five capstone indicators of labour market performance we have proposed: employment rates, full-time employment rates, and median annual salary from employment (including self-employment). There is no basis of comparison for the two other proposed capstone indicators: job relatedness to program of study, and job relatedness to skills and abilities acquired in postsecondary education.

Table 9: Labour market indicators for college graduates, university graduates and comparable age groups who completed secondary school but have no postsecondary education

	College Graduate Survey (after 6 months)	College comparator: Non-PSE group age 20 to 26 (from the 2015 LFS)	University Graduate Survey (after 6 months)	University Graduate Survey (after 2 years)	University comparator: Non-PSE group, age 22 to 26 (from the 2015 LFS)
Employment rate	83.6%	85.3%	83.1%	91.3%	86.3%
Full-time employment rate	65.5%	62.5%	64.6%	75.8%	68.8%
Annual salary median from all employment or self-employment	\$30,000	\$23,313	\$30,001-\$40,000	\$40,001-\$50,000	\$26,034

Note: For methodology and source variables, see text and appendix.

The table confirms that in 2015 there was a positive gap in median incomes between colleges and university graduates and their respective comparator groups. There is also a positive gap in the employment rate and full-time employment rate between university graduates two years after graduation and their comparator group.

The data for college and university graduate employment rates and full-time employment rates 6 months after graduation require careful interpretation. The rates are similar to (and in some cases slightly lower than) those for the comparator non-PSE groups. An important dissimilarity is that recent graduates have only had six months to integrate themselves into the workforce, while the comparator groups may have had several years to do so. The full-time employment rate of university graduates two years after graduation (75.8%) is much higher than their comparable group (68.8%). This finding supports our earlier argument that, with recent changes in the labour market, the 2-year data provide a better measure of graduate outcomes.

The results we present here could be developed further, in two ways. First, developing a time series of these data would allow analysis of trends and would provide a base of evidence for assessing (for example) claims that Ontario is admitting too many students to university.³¹ Second, the comparator groups could be refined so they more closely match the postsecondary graduates in all respects except level of education. For example, the data on postsecondary graduates reported in Table 9 is limited to graduates who completed their postsecondary education in Ontario, while the comparator groups in Table 9 may include newcomers to Canada who face specific challenges in integrating into the Canadian labour market. Data from the 2011 National Household Survey or forthcoming 2016 Census data could be used to develop a more closely matched comparator group.

USE OF THE SURVEYS FOR EVALUATION AND IMPROVEMENT

We noted above that representatives of Ontario postsecondary institutions have mixed views on whether the surveys of graduates have value for improving academic programs. Many university representatives have said the surveys have limited value for program improvement. Colleges appear to make more use of the surveys, but this may be because the college questionnaire has many questions about graduates' satisfaction with their college experience. The university survey asks questions about the student's overall satisfaction (e.g. whether the student would recommend his/her program and university to someone else; whether the student would choose the same program of study again) but not about specific aspects of satisfaction.³²

Making the surveys more useful as tools for program improvement requires, in the first instance, providing reliable data for more programs at each institution.

³¹ See, for example, Ken Coates, *Career ready: Towards a national strategy for the mobilization of Canadian potential* (Ottawa: Canadian Council of Chief Executives, March 2015), and George Fallis, *Rethinking higher education: Participation, research and differentiation* (Kingston and Montreal: McGill-Queen's University Press, 2013), chapter 4.

³² Universities may use the National Survey of Student Engagement for program-level metrics of student satisfaction and engagement at the fourth-year level.

An institution can do little with institution-wide data on employment outcomes (apart from using the data for communications purposes). Improvement needs to take place at the level of individual programs or clusters of programs. As we have shown, the surveys produce accurate data at the institution-specific program level for about half of the graduates. Raising this proportion needs to be a priority.

Improving the quality of the data will also be of value for system managers. For example, from time to time the government provides new funding for various types of quality improvement. A robust set of data on graduate employment outcomes would permit an evaluation of whether new investments are achieving their objectives. For example, if new investments are made in work-integrated learning, the data could be used to evaluate whether students from programs with work-integrated learning experiences fare better in the workforce than those from other programs.

Improving the quality of the data could also be a way to address the government's accountability concerns in an evidence-based way. At present the Ministry engages in intensive scrutiny of new program proposals but has little information about established programs, which of course enroll far more students.³³ From a risk management perspective, the focus on proposed new programs is arguably misplaced.

A robust set of data on outcomes at the institution-specific program level could provide a foundation for a better accountability framework between the government and higher education institutions. Institutions that demonstrate generally positive outcomes and an ability to address areas of weakness could be given a lighter accountability framework, including wide latitude to introduce new programs. The government's attentions could be devoted to addressing areas of genuine weakness.

³³The Ontario Universities Council on Quality Assurance audits the application of quality assurance processes at each university on an eight-year cycle, including how the processes were applied to a small number of selected academic programs. The Ontario College Quality Assessment Service undertakes similar audits of each college on a five-year cycle. These audits do not, and are not intended to, provide assessments of the quality of every academic program.

Link to funding

The government's move towards new funding models will be an opportunity to revisit the current link between employment outcomes and funding.

The argument for moving to a set of capstone questions about labour market outcomes is that a single indicator is a poor metric of whether graduates are well prepared for the labour market. The same logic should apply in the new funding models. The single labour market indicator currently tied to funding – the share of students in the labour market after graduation who hold a job of any sort – should be replaced by a broader and more meaningful set of indicators.

COULD THE GRADUATE SURVEYS BE REPLACED BY ADMINISTRATIVE DATA?

Increasingly public-sector organizations are looking at opportunities to make innovative use of data that has been collected for administrative purposes. These data may prove to be a substitute for data collected through special surveys.

Ross Finnie and his colleagues at the University of Ottawa's Education Policy Research Initiative have demonstrated some of the potential from matching anonymized student administrative records with the anonymized income tax records of those same students after graduation. This approach follows students through their education experience and into their subsequent experience in the labour force. Statistics Canada is developing a similar approach.

Ross Finnie and his colleagues do not directly address whether their approach could replace the Ontario graduate surveys, but they note several ways in which their use of administrative data might be attractive:

- Data are available for almost 100% of graduates. This means that statistically reliable data would be available for each institution at the program level.

- Data are available for all graduates who file income tax in Canada, including those from graduate and professional programs.³⁴ (This would exclude some graduates who move to another country.)
- Income data would be more accurate than data gathered through telephone surveys.
- Data could be used to assess the effect on outcomes of distinctive learning experiences, such as work-integrated learning or college-university transfer.
- Data could be used to assess the relationship of academic performance to labour market outcomes.
- Data could be used to track graduates indefinitely after graduation, subject to privacy provisions. Research to date has found, for example, that Health graduates of bachelor's and diploma programs perform better than graduates from most other disciplines in the first few years after graduation, but that over time graduates from other disciplines tend to catch up and, in some cases, surpass them.
- Tax data on students who did not complete PSE or who never attended PSE could be used to establish comparison groups that could better identify the contribution of PSE to graduates' labour market outcomes.³⁵

³⁴ MAESD and universities have collaborated on a new Graduate Program Outcomes Survey (GPOS), which will survey graduates of graduate programs every five years (up to 7 years after graduation). The survey is expected to be piloted in 2017.

³⁵ Ross Finnie, Dejan Pavlic, Nemanja Jevtovic and Stephen Childs, *Post-schooling outcomes of university graduates: A tax data linkage approach* (Working Paper No. 2015 – 01, Education Policy Research Initiative, University of Ottawa, February 2015), 28-29; Ross Finnie, Kaveh Afshar, Eda Bozkurt, Masashi Miyairi and Dejan Pavlic, *Barista or better? New evidence on the earnings of postsecondary education graduates: A tax linkage approach* (Education Policy Research Initiative, University of Ottawa, July 26, 2016), 56-60.

The primary limitation on this data-matching approach is that it can only make use of data that are actually collected on student records or on income tax returns. Data collected through the graduate surveys that would not be available from student records or income tax returns include:

- The nature of the graduate's job (full-time, part-time etc.)
- Data on unemployment (income tax data would not capture periods of unemployment, and it would not distinguish between someone who was unemployed and someone out of the labour force)
- Any data on hourly or weekly salaries (only an annual total is reported for income tax purposes)
- Whether the job is related to the field of study
- Whether the job makes use of skills and abilities learned in the academic program
- All data related to graduates' satisfaction with their academic experience (colleges conduct a standard survey of in-school satisfaction, and universities may obtain in-school satisfaction data from the National Survey of Student Engagement; in some cases institutions conduct alumni surveys on graduate satisfaction)
- All data related to whether the graduate is pursuing further education (this might be obtained through the Ontario Education Number)
- Permission from the student to contact his or her employer, and the name of the contact person (these data are required to conduct the colleges' Survey of Employers).

This list suggests why the use of administrative data is a less-than-complete substitute for the graduate surveys. Administrative data will provide robust estimates of median salaries over long periods, and they hold strong potential for opening new areas for research. They do not provide as much information as the current graduate surveys about students' labour market experience or satisfaction with their education. They have the potential to provide statistically valid information at the institution-specific program level, which is only partly true for the graduate surveys.

This discussion suggests how the Ministry's data collection and publication might evolve in future:

- A reasonable goal would be to generate a robust set of data that is available (as much as possible) at the institution-specific program level.

- The data could come from multiple sources, including the surveys of graduates and administrative data. As administrative data become available, the questionnaires for the graduate surveys could be pared back to reduce unnecessary duplication.
- These data could be made available in two ways:
 - A student-friendly selection of these data could be available at the institution-specific program level to prospective students at time of application, so they can make informed choices.
 - A more extensive set of these data could be available at the institution-specific program level to colleges and universities for purposes of improvement. These data could provide an input in defining issues to be addressed in Strategic Mandate Agreements or other accountability arrangements.

CONCLUSION

This research project has assessed the statistical validity of the current surveys of graduates for various levels of analysis. A principal finding is that the surveys produce data that are statistically representative at the sector, sector-wide program and institutional levels, but in many cases are not statistically representative at the institution-specific program level. We have argued that the institution-specific program level would be most valuable to prospective students for purposes of making application decisions, and also to colleges and universities for purposes of improvement. A strategy for gathering data at this level and making it available to prospective students and to colleges and universities would promote student choice and encourage evidence-based improvement and accountability.

APPENDIX: METHODOLOGY FOR TABLE 9

Calculation of the employment rate

We followed Statistics Canada's method for Labour Force Survey (LFS)³⁶ to calculate college and university graduate employment rates and divided the population into employed, unemployed and not in the labour force. Specifically, the employed group includes self-employed and there is no minimum threshold for the number of hours worked. The unemployed group is deemed as people who are looking for jobs but unemployed. Unemployed people who are not looking for a job (such as full-time students) are not considered as participating in the labour force. The employment rate is correspondingly the quotient of the people employed by the people in the labour market.

Based on the responses to the college employment status question (Question 6), college graduates were classified as employed (employed or self-employed; employed or self-employed, but looking for another job), unemployed (not employed, but looking for a job) and not in the labour market (not employed, but not looking for a job). The calculation only involved the first two groups. The university employment rate was calculated in the same manner. The only difference is that in the University Graduate Survey the employment status was examined by more than one question. Besides the questions asking employment status 6 months and 2 years out (Question 1 and Question 15), the unemployed were also asked if they were looking for paid work (Question 9 and Question 25). The team extracted the employed on two time points based on graduates' responses to Question 1 and Question 15 (offered employment to start at a later date, employed in a paid job (part-time or full-time), and self-employed) and the unemployed based on Question 9 and Question 25 (unemployed but looking for paid work). A closer examination of the dataset reveals that some of the university graduates who did not report their employment status provided their salary range. The available information does not explain this inconsistency.

³⁶This methodology is described in: Statistics Canada, "Measuring employment and unemployment in Canada and the United States – a comparison" <http://www.statcan.gc.ca/pub/75-005-m/75-005-m2015002-eng.htm>

The full-time employment rate was the full-time employed expressed as the percentage of the labour force. The full-time employed are defined by Statistics Canada as people who usually work 30 hours or more per week, at their main or only job³⁷. Specifically, it is calculated for the college graduates based on the self-reported responses of the employed as either full-time or part-time worker. In the University Graduate Survey, Question 3 and Question 17 were used to secure the number of full-time workers 6 months and 2 years out (Was your combined paid employment for 30 hours a week or more?). The questions in both surveys are problematic. The College Graduate Survey relies on respondents' own understanding of "full-time employment". The University Graduate Survey avoids the ambiguity by providing a benchmark of 30 hours. However, the wording of the question allows respondents to combine the working hours of more than one job, which indicates a different definition of "full-time employment" from Statistics Canada.

Source variables of Table 9

The 2015 College Graduate Survey Q6 (During the week of July 1st - 7th, 2014 were you employed?); the 2015 University Graduate Survey Q1 (Which of the following best describes your employment situation at six months after the completion of your program of study?); Q15 (Which of the following best describes your employment situation in October 2015?); the 2015 LFS PUMF Age_6 (age of respondent 15-29) and LFSSTAT (employment status) of March, July and November.

The 2015 College Graduate Survey EP_EmploymentCategory; the 2015 University Graduate Survey Q3 (Six months after graduation, was your combined paid employment for 30 hours a week or more?); Q17 (Two years after graduation, was your combined paid employment for 30 hours a week or more?); the 2015 LFS PUMF Age_6 (age of respondent 15-29) and FTPTMAIN (full-time or part-time main or only job) of March, July and November.

AnnualSalary_Rev in the 2015 College Graduate Survey dataset; the 2015 University Graduate Survey Q19 (Including tips and commissions, what was your personal annual salary from all employment before taxes and other deductions (in Canadian dollars)?)

³⁷ Classification of full-time and part-time work hours
<http://www.statcan.gc.ca/eng/concepts/definitions/labour-class03b>

The 2015 LFS PUMF HRLYEARN (hourly rate); UTOTHR5 (usual hours per week at all jobs) of March, July, November; annual salary = HRLYEARN (hourly rate) * UTOTHR5 (usual hours per week at all jobs) * 52

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