Canadian Postsecondary Performance:

IMPACT 2015

Harvey P. Weingarten, Martin Hicks, Linda Jonker, Carrie Smith and Hillary Arnold

with contributions from HEQCO interns Jeremy Henderson and Emily Michailidis

Higher Education Quality Council of Ontario

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- Educational institutions may be the most important public institutions in Canada to ensure a vibrant and robust quality of life and economy.

- In every province there's a positive link between postsecondary education and labour market success, individual earnings, citizen engagement and contributions to the economy. No province is failing to deliver but all show room for improvement in one or more areas.

- There is no correlation between the performance of the Canadian university system and the funding it receives. Some provinces perform well with lower levels of funding and some provinces perform less well even with higher funding levels.

- It's time to refocus Canada's discussion about postsecondary education from how much institutions get to what outcomes are being achieved.

- To improve Canadian postsecondary education, we must to do a better job of collecting and reporting relevant, meaningful information about the state of Canadian higher education systems and institutions, their performance and their outcomes.

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EXECUTIVE SUMMARY

Canadians invest considerable energy, resources, and personal and societal aspiration into postsecondary education. It is good public policy to assess how we are doing and what outcomes we are achieving with that investment. One of HEQCO's core mandates is to evaluate the postsecondary sector and to report the results of that assessment. To that end, in this report, we have assembled data that assess the performance of Canada's 10 provincial public postsecondary education systems.

We report on 34 quantitative indicators of performance, organized into three dimensions or themes. The first is access to postsecondary opportunities. The second is the value of postsecondary education to students, with measurements of the student experience, affordability and relevant learning outcomes that lead to good jobs and success in life generally. The third theme is the value the province's postsecondary system yields to society, with measurements of postsecondary contributions to the economy, the provision of highly skilled wealth-producing individuals, an engaged citizenry, and new discoveries and their application.

Our report then assesses, for each province, the relationship between the performance of the postsecondary systems and the funding they receive. This particular analysis is presented for universities only; there are insufficient data to examine this relationship for colleges and the trades.

Our report is not intended to be a ranking of provincial systems. Rather, it is a guide for improvement as it provides a comprehensive assessment of the impact and outcomes of the postsecondary system in each province on relevant and meaningful indicators. Our report reveals that:

1. In all provinces, postsecondary education correlates positively with labour market success, individual earnings, citizen engagement and contributions to the economy.

2. While there are differences in provincial performance, our study, and other international analyses such as the OECD's annual *Education Indicators at a Glance,* suggest that Canada's overall postsecondary education performance is pretty good. We may not hit the heights of some other countries but we also avoid the lows.

3. At the same time, provinces differ in their level of performance and all provinces show room for improvement in one or more areas. Our report illuminates these opportunities.

4. Lastly, and perhaps most significantly, our analysis indicates no correlation between the performance of a provincial system and its level of funding. Specifically, some provinces perform well with lower levels of funding and some provinces perform less well even with higher funding levels.

Overall, *Canadian Postsecondary Performance: Impact 2015* underscores the importance of refocusing the higher education conversation in Canada from one of "how much money is spent on higher education" to "how the money is spent and what outcomes are being achieved."
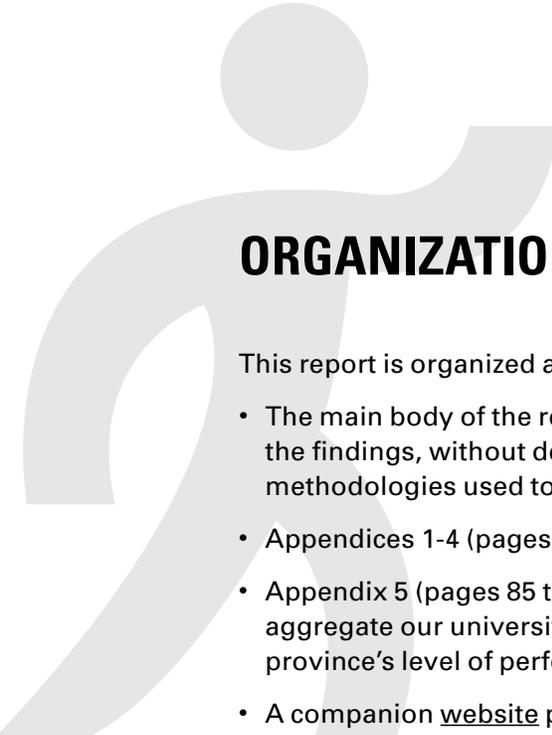
ORGANIZATION OF THE REPORT

This report is organized as follows:

- The main body of the report (pages 3 to 30) provides a high-level summary of the findings, without delving into the details of the individual indicators and methodologies used to assemble them.

- Appendices 1-4 (pages 33 to 84) provide details on each of our performance indicators.

- Appendix 5 (pages 85 to 91) provides more details on the methodology used to aggregate our university performance indicators for the purpose of comparing each province's level of performance and its overall level of funding.

- A companion website provides an interactive summary of the findings. This website gives readers access to the data we used to assemble this report and a tool for customizing the indicators presented and generating a performance versus funding analysis that they feel better suits their purposes and circumstances.
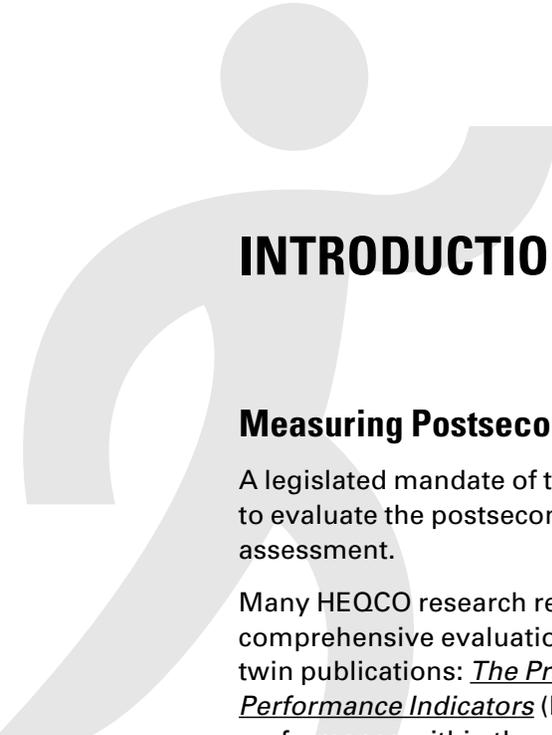
INTRODUCTION

Measuring Postsecondary Performance is Important

A legislated mandate of the Higher Education Quality Council of Ontario (HEQCO) is to evaluate the postsecondary education sector and to report on the results of that assessment.

Many HEQCO research reports contribute piecemeal to this goal and our first comprehensive evaluation of overall postsecondary performance was delivered in twin publications: _The Productivity of the Ontario Public Postsecondary System_ and _Performance Indicators_ (HEQCO, 2012, 2013). Both these reports situated Ontario's performance within the context of a mix of international and Canadian indicators across four domains: quality, access, productivity and social impact.

In asking us to produce the initial _Productivity_ report, the Ontario Ministry of Training, Colleges and Universities (MTCU) wanted to identify opportunities to improve postsecondary performance within a constrained fiscal environment. An understanding of how we are performing is foundational to system improvement, effective planning and efficient spending. What are Ontario's strengths and weaknesses? How can we evaluate the effectiveness of our efforts? What do other systems do better? What levels of performance outcomes ought we reasonably to expect from the investments society and students are making in postsecondary education?

This report, _Canadian Postsecondary Performance: Impact 2015,_ is our second comprehensive examination of performance – as an improvement on our first evaluation and in the continued fulfillment of our mandated responsibilities.

Performance in Context

It is limiting, even impossible, to assess the Ontario postsecondary system in isolation. The performance of any system is best evaluated by comparing it to the performance of other similar systems. We have a field of comparable postsecondary systems within Canada: 10 simultaneous approaches to organizing, funding and delivering postsecondary education, deployed in provinces with helpfully familiar histories, cultures and governmental traditions. Examining the 10 provinces is fertile ground for illuminating the successes, challenges and opportunities facing postsecondary education in Ontario and across the country.

Our cross-Canada evaluation is of the performance of the system, in its entirety, writ large. It is not focused just on institutions and the outputs for which they are held directly responsible and accountable. It is not focused just on governments and the strategic investments they make. It is not focused just on employees of our colleges and universities and their accomplishments in teaching, research and service. It is not focused just on the students and graduates of the system and the paths they follow in first earning and then applying their education. It is not focused just on the larger society that engages postsecondary education's graduates and leverages its research discoveries. Rather, it recognizes that all of these elements and actors work together to

make the system function and to meet its overarching objectives. Our report therefore strives, within the limitations of the data available, to benchmark the combined impacts of all of these elements.

A benchmarking exercise is not a ranking exercise, although we recognize that some will find it unavoidable to reduce our analysis to just that. Our motivation for benchmarking is to inform debate about and understanding of Ontario's and other provinces' public postsecondary systems and to reveal opportunities for improvement.

How this Report is Structured: Dimensions, Components and Indicators

The presentation of performance is organized in the following way:

1. The performance of the higher education system is organized into three overarching **dimensions:** access, value to students and value to society

2. Each of these overarching dimensions, in turn, is composed of a number of key **components** that are the significant thematic elements within that dimension

3. Finally, actual performance in each component is measured by one or more performance **indicators**

Figure 1 reveals the full listing of indicators and components cumulating to the three dimensions in this report.

Dimensions

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Components

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Indicators
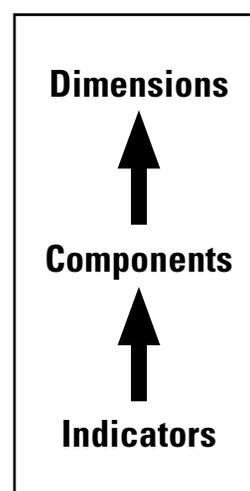
Our Choice of Dimensions

Access: From our earlier reports, we retain access as an overarching dimension of performance. Access is a primary policy goal of most public postsecondary systems. There is little point in mounting a public system at all without a focus on access. The concept is both useful and well understood. It is of primary importance to students, parents and governments.

Value to Students and **Value to Society**: These two dimensions replace the former domains of quality and social impact, which we used in our earlier reports. The choice of 'value to students' and 'value to society' simply reflects the well understood concept that public postsecondary education delivers both private and public returns (and consumes both private and public investment to do so). Ultimately, those returns are what quality is all about.

What happened to Productivity? For our 2015 report we reposition the role of what we had previously called "productivity," the investigation of how much it costs to underwrite and sustain the system. To know whether a system is cost effective – uses resources efficiently or not – says nothing about its actual performance outcomes. But it does speak to whether the system is appropriately resourced to perform. This year, we bring funding (cost) in at the end of the analysis to assess the relationship between resource inputs available to the system and the performance outcomes of the system.

Figure 1: Overview of the Canadian Postsecondary Performance Index

Access	Value to Students	Value to Society
Access to Higher Education • Participation Rates **Success in Higher Education** • Attainment Rates **Equity of Access** • Gender Balance • First-Generation Student Participation Rates • Aboriginal Attainment Rates	**Student Experience** • Student Engagement • Student-to-Faculty Ratio • Teaching Awards **Learning Outcomes** • Adult Literacy Skills • Adult Numeracy Skills **Student Finances** • Tuition Fees • Average Graduate Debt • Repayment Assistance Plan Participation • Student Loan Default Rates **Jobs for Graduates** • Employment Rates after Graduation • Unemployment Rates • Earnings Premium **Health and Happiness** • Life Satisfaction • Physical Health • Mental Health • Smoking Status	**Job Creation** • Labour Market Participation • Related Employment • Overqualification Rates • % of Population with an Advanced Degree **New Discoveries** • Research Funding • Research Impact • Highly Cited Researchers **Magnet for Talent** • University Rankings • International Enrolment • Prestigious Graduate Scholarships **Engaged Citizens** • Voting • Volunteering • Donating

Our Choice of Components

Our selection of components asks the logical questions one would pose about performance on each of the three dimensions. To illustrate, the components under the dimension of Value to Students address the following series of questions that might come to the mind of a prospective student: If I do this – go to college, learn a trade, attend university – what will my student experience be like? What will I be learning, and what will I know and be able to do when a graduate? Is the investment I am expected to make to experience this learning manageable? Will I get a good job or career as a result? What other personal benefits will I get from my postsecondary education investment? Similarly, with respect to the dimension of Value to Society, we ask: does the postsecondary system help to create jobs? Does it produce new discoveries, serve as a magnet to recruit talent to the province and result in a more engaged citizenry?

Dimensions

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Components

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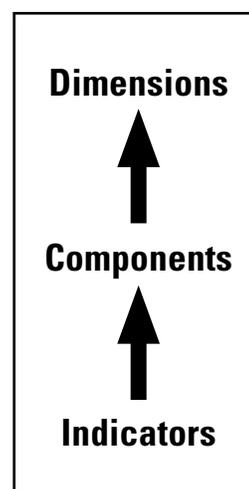
Indicators

Our Choice of Performance Indicators

If our components set out the questions to be asked, then our collection of performance indicators provide the answers. In selecting indicators to be included, we were guided by the following considerations:

Inputs, outputs and outcomes: Inputs are the resources that go into postsecondary education, like dollars, faculty and students. Outputs are the things produced by the system, like graduates and research publications. Outcomes are the benefits that result from postsecondary education, like great jobs for graduates, economic uplift, and new discoveries and their application. In our selection of indicators, we try as much as possible to measure outcomes, settle where necessary for outputs and avoid inputs as much as possible. The exception is when we turn to cost: cost by definition takes measure of the inputs into the postsecondary education system – the funding it receives through its various sources – which in turn sustain all dimensions of performance outputs and outcomes.

Causal chain: In favouring outcomes to analyze performance, we recognize that we are at times reaching for measures driven by factors that are partially external to the business and control of postsecondary education. For example, we all believe that postsecondary education contributes to economic performance but also understand that the performance of the economy is the result of many factors, most of which are beyond the control of the postsecondary education system. One could attempt the most complex but also impenetrable of statistical modelling approaches in order to isolate just the postsecondary economic impact. Few will follow the methodology, fewer will agree with it, and we choose not to do this.

Our approach is simply to present these stretch connections, like that between postsecondary education and measures of economic performance, but with an admission of the limitations of causality. We are testing and illuminating the relationship. We are not holding any element of the system directly accountable for

these outcomes in a specific sense. To shy away completely from exploring these connections, at the other extreme, also demands shying away from making assertions like 'postsecondary education contributes to economic growth' in the first place.

Value judgments: One can never just present facts. The very choice of facts to present (and not to) is a value judgment. The approach to presentation is even more so. For example, we include an indicator of the proportion of each province's enrolment that is made up of international students. But what is the goal, what proportion is optimal? You might say a low number is best, to maximize spaces for domestic students. You might say a high number is best, to maximize revenues and enrich campus culture. You might aim for some middle ground. Our value judgments are revealed in our selection of indicators and in the methodologies we apply to their construction. We rely on you the reader to unearth those to which we were blind and to substitute your own where you disagree. We even provide a useful tool to allow you to do just that – our companion website where one can custom select a subset of indicators and view the impact of that selection on the results. www.postsecondaryperformance.ca.

Data limitations: The limitations on data availability we documented in our first reports are unchanged in the intervening two years. We have culled our list of indicators to those that are available for all provinces, are at least reasonably reliable and are at least reasonably current. As with our earlier publications, this means that indicators for colleges are sparser than indicators for universities, owing primarily to the sad state of repair in the college side of the national Postsecondary Student Information System (PSIS). We were also challenged to find reliable cross-provincial indicators of performance in the trades and apprenticeship. We will not belabour the point here about the necessity to do better in Canada (but see the Conclusions). We simply present the best data available to us.
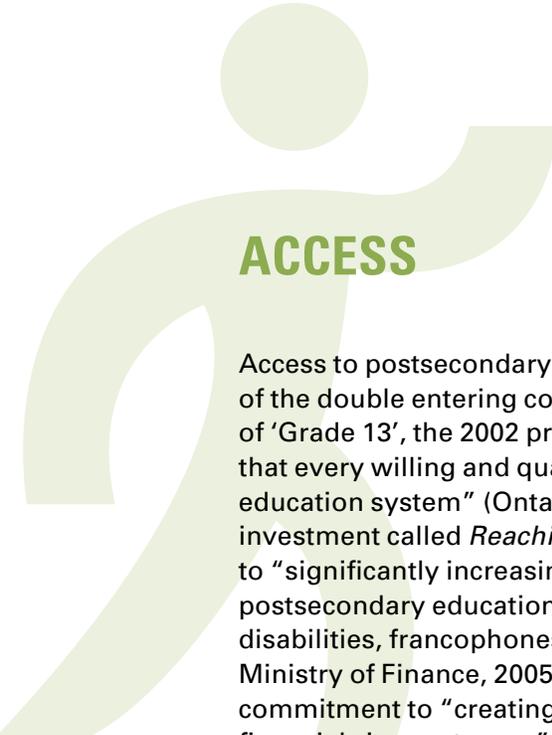
ACCESS

Access to postsecondary education is a long-standing priority in Ontario. On the eve of the double entering cohort of high school graduates, triggered by the elimination of 'Grade 13', the 2002 provincial Budget provided new funding towards "ensuring that every willing and qualified Ontario student will have a place in the post-secondary education system" (Ontario Ministry of Finance, 2002). A major government investment called *Reaching Higher* in 2005 included a multi-year budget commitment to "significantly increasing the number of college and university students enrolled in postsecondary education, including enhanced access for aboriginals, persons with disabilities, francophones, new Canadians and first-generation students" (Ontario Ministry of Finance, 2005). Budget 2014, Ontario's most recent, maintained the commitment to "creating a space to learn for every eligible student regardless of their financial circumstances" and to "closing achievement gaps for underrepresented groups" (Ontario Ministry of Finance, 2014).

These commitments have been supported by funding formulae that reward enrolment growth, and considerable additional base operating dollars for initiatives targeted to underrepresented groups.

The other nine provinces each have their own access story to tell and to till – access is a universal preoccupation of contemporary postsecondary education policy in Canada.

We organize our **Access** indicators into three components:

Access to Higher Education: Measures of postsecondary attendance

Success in Higher Education: Resultant levels of educational attainment in society

Equity of Access: Measures of access for underrepresented groups

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Table 1 provides a summary overview of provincial results for each of our access indicators, organized into these three components. Shading has been applied to illustrate the rank ordering for each individual indicator from lowest provincial score (no shading) to highest provincial score (maximum shading). A detailed presentation and explanation of each of the indicators is included in Appendix 1 to the paper.

Table 1: Access Indicators

	Indicator	Sector	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Access to Higher Education	**Participation Rates** (percentage of 18 to 24 year olds enrolled in PSE)	University	25%	21%	29%	21%	18%	26%	23%	16%	18%	21%
Success in Higher Education	**Attainment Rates** (percentage of 25 to 34 year olds that have completed PSE)	University	28%	29%	35%	27%	31%	36%	29%	30%	30%	35%
		College	25%	30%	26%	30%	25%	29%	19%	17%	20%	20%
		Trades	20%	6%	7%	7%	19%	4%	9%	16%	14%	11%
	Gender Balance (aggregate score of discipline by discipline student gender balance)	University	0.63	0.60	0.70	0.65	0.67	0.71	0.74	0.69	0.71	0.74
Equity of Access	**First-Generation Student Participation Rates** (percentage of 18 to 24 year old first-generation students that were ever enrolled in PSE)	University	26%	36%	30%	38%	18%	28%	42%	26%	24%	40%
		College	48%	46%	48%	37%	77%	45%	34%	41%	47%	48%
	Aboriginal Attainment Rates (percentage of 25 to 64 year old Aboriginals that have completed PSE)	University	7%	12%	12%	8%	8%	9%	8%	8%	7%	7%
		College	26%	31%	24%	23%	18%	26%	19%	18%	23%	23%
		Trades	16%	12%	17%	18%	21%	13%	12%	13%	15%	15%
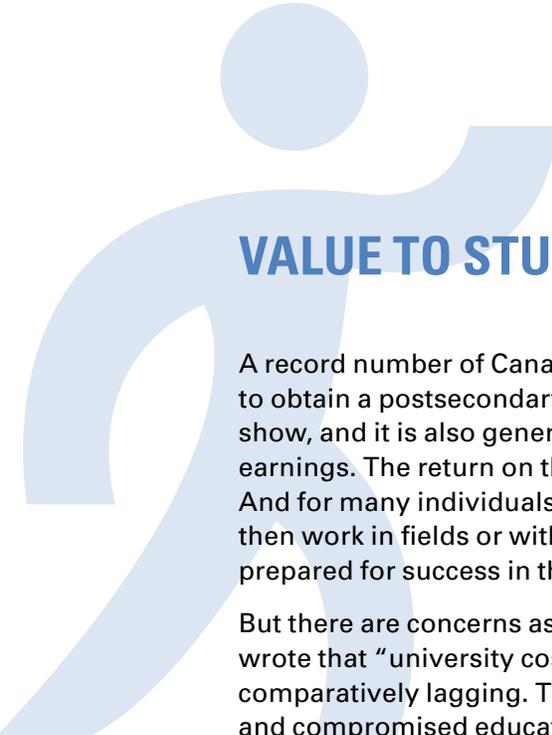
VALUE TO STUDENTS

A record number of Canadians pay tuition and commit one to many years of their lives to obtain a postsecondary education because they believe it to be of value. The data show, and it is also generally accepted, that postsecondary education results in higher earnings. The return on the individual's financial investment is typically a positive one. And for many individuals, that benefit is bolstered by the opportunity to learn about and then work in fields or with skills that they enjoy and to be generally well equipped and prepared for success in their lives.

But there are concerns as well. The Ontario Undergraduate Student Alliance recently wrote that "university costs have risen while provincial funding has continued to be comparatively lagging. This has led to increased tuition and ancillary fees, cut services and compromised educational quality" (OUSA, 2014). The [Ontario] College Student Alliance has noted that "Consumers look for the highest quality in the goods and services they purchase, and students are no different. As consumers and clients of postsecondary education, students want assurances that they will be receiving the highest quality education possible" (CSA, 2009).

Government agrees. In an address to the Canadian Club entitled Putting Students First, then-MTCU Minister John Milloy said, "It is not simply about getting more students through the door. Once there, we have to ensure that they receive a high quality education that leads to meaningful employment" (Milloy, 2011).

We organize our **Value to Students** indicators into five components:

Student Experience: Student engagement and the quality of the learning experience

Learning Outcomes: Measures of what students learn

Student Finances: The cost of attaining a postsecondary education

Jobs for Graduates: Graduate success in the labour market

Health and Happiness: Other benefits of a postsecondary education

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Table 2 provides a summary overview of provincial results for each of our value to students indicators, organized into these five components. Shading has been applied to illustrate the rank ordering for each individual indicator from lowest provincial score (no shading) to highest (maximum shading). For some value to students indicators, the largest measurement number is the high score (e.g., employment rates after graduation). For others, the lowest measurement number is the high score (e.g.,: student-to-faculty ratio). A detailed presentation and explanation of each of the indicators is included in Appendix 2.

Table 2: Value to Students Indicators

	Indicator	Sector	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Student Experience	Student Engagement (NSSE benchmark average)	University	44	47	46	47	43	45	43	43	44	45
	Student-to-Faculty Ratio (FTEs to full-time faculty)	University	16	15	17	16	21	26	19	16	20	19
	Teaching Awards (difference in the % of 3M awards received and the % of full-time faculty)	University	2%	1%	1%	4%	-13%	1%	-4%	1%	8%	-1%
Learning Outcomes	Adult Literacy Skills (average PIAAC literacy scores for 25 to 34 year old PSE graduates, excluding recent immigrants)	University	312	318	317	312	316	315	320	302	312	305
		College	276	296	284	286	286	285	282	278	296	290
	Adult Numeracy Skills (average PIAAC numeracy scores for 25 to 34 year old PSE graduates, excluding recent immigrants)	University	306	308	312	305	310	307	313	298	307	295
		College	264	280	267	272	283	275	276	272	288	278
Student Finances	Tuition Fees (average undergrad tuition and compulsory fees)	University	$2,853	$6,300	$6,889	$6,572	$3,428	$8,130	$4,346	$6,746	$6,690	$5,734
	Average Graduate Debt (average government student loan debt three years after graduation)	University	$13,000	$16,600	$18,100	$21,200	$6,300	$8,800	$9,300	$13,600	$12,300	$16,700
		College	$8,100	$8,900	$9,300	$10,900	$5,100	$8,700	$3,800	$5,800	$7,100	$9,800
	Repayment Assistance Plan Participation (Canada Student Loans Program RAP uptake rates)	University	20%	29%	33%	33%		28%	15%	14%	17%	26%
		College	18%	21%	28%	27%		29%	15%	10%	15%	23%
	Student Loan Default Rates (Canada Student Loans default rates)	University	5%	8%	10%	10%		9%	10%	8%	6%	9%
		College	11%	19%	15%	16%		17%	14%	14%	12%	12%

Table 2: Value to Students Indicators

Category	Indicator	Sector	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Jobs for Graduates	**Employment Rates after Graduation** (employment rates three years after graduation)	University	91%	94%	91%	93%	93%	91%	94%	92%	93%	90%
		College	82%		86%	81%	92%	90%	92%	92%	92%	91%
	Unemployment Rates (difference in unemployment rates for 25 to 34 year old PSE graduates and high school graduates)	University	9%	15%	5%	8%	3%	4%	3%	4%	2%	3%
		College	5%	14%	2%	6%	4%	3%	1%	3%	1%	3%
		Trades	4%		2%	-3%	2%	0%	-2%	4%	1%	3%
	Earnings Premium (difference in the median employment income for 25 to 34 year old PSE graduates and high school graduates)	University	$25,110	$15,690	$11,643	$19,462	$12,498	$16,088	$11,386	$14,412	$13,678	$9,921
		College	$11,142	$8,219	$4,936	$6,832	$6,448	$6,305	$5,094	$2,446	$4,959	$3,729
		Trades	$7,660	$13,727	$5,373	$3,297	$3,818	$6,081	$5,860	$9,696	$16,282	$7,179
Health and Happiness	**Life Satisfaction** (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates who are satisfied with life)	University	17%	9%	0%	8%	-6%	2%	5%	14%	0%	6%
		College	10%	0%	1%	-3%	-6%	0%	-4%	3%	-15%	7%
		Trades	6%	-3%	-5%	-5%	-7%	4%	0%	8%	-11%	-1%
	Physical Health (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates reporting very good or excellent health)	University	15%	11%	11%	29%	7%	4%	6%	15%	10%	2%
		College	8%	7%	10%	18%	-2%	1%	3%	4%	-2%	-2%
		Trades	4%	-1%	1%	8%	-5%	3%	-4%	1%	-11%	-3%
	Mental Health (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates reporting very good or excellent mental health)	University	10%	12%	3%	20%	-4%	6%	-8%	12%	2%	10%
		College	5%	13%	3%	13%	-7%	-2%	-8%	4%	-5%	-1%
		Trades	3%	0%	-12%	10%	-14%	7%	-3%	2%	-4%	1%
	Smoking Status (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates who have never smoked)	University	23%	31%	28%	31%	28%	21%	29%	22%	23%	18%
		College	4%	15%	29%	10%	14%	12%	12%	11%	3%	-2%
		Trades	0%	15%	10%	-9%	8%	-11%	5%	4%	0%	18%

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VALUE TO SOCIETY

The substantial public investment in postsecondary education is sustained by a widely shared belief that it delivers significant returns to society. Don Drummond, in his 2012 report on the reform of Ontario's public services, wrote, "The province's economic growth and competitiveness will need to rely considerably on the ability of the post-secondary system to continue offering high-quality education, while accommodating significant enrolment increases" (Drummond, 2012). The Ontario Ministry of Training, Colleges and Universities, in launching its Differentiation Strategy, the foundation policy statement underpinning recently concluded Strategic Mandate Agreements with colleges and universities, stated, "Postsecondary education is an important driver of social and economic development. The government recognizes the valuable contributions that colleges and universities make towards job creation, enhanced productivity, and the vitality of communities and regions throughout the province" (MTCU, 2013).

Across the country, the recent economic downturn sharpened debate about the sector's success in delivering these returns. Is there a growing skills gap? Are students entering the right programs and learning the right content to contribute to the economy? Do institutions know and deliver what employers need? And how does one really measure the economic and social returns of postsecondary education in order to assess these concerns or celebrate the sector's achievements?

We organize our **Value to Society** indicators into four components:

Job Creation: Higher education and jobs for the economy

New Discoveries: Research and its application

Magnet for Talent: International reach and reputation

Engaged Citizens: Correlations between education and citizen engagement
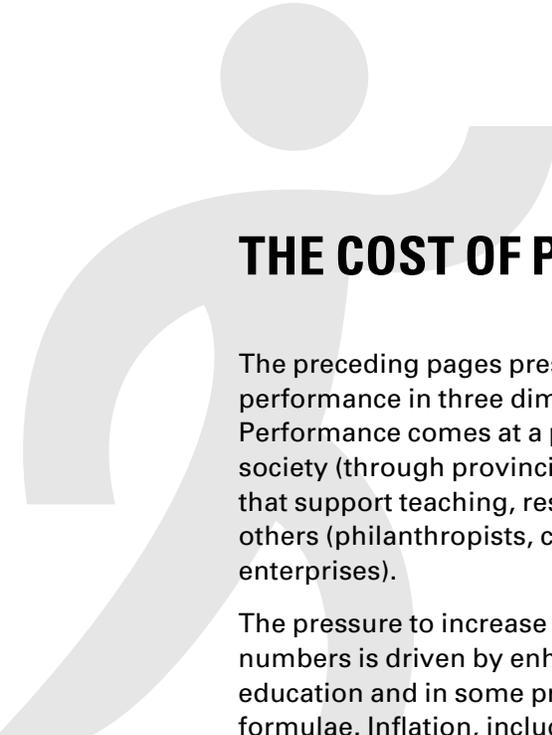
Table 3 provides a summary overview of provincial results for each of our Value to Society indicators, organized into these four components. Shading has been applied to illustrate the rank ordering for each individual indicator from lowest provincial score (no shading) to highest (maximum shading). For one Value to Society indicator (overqualification rates) the lowest measurement number is the high score; for all others the highest measurement number is the high score. A detailed presentation and explanation of each of the indicators is included in Appendix 3.

Table 3: Value to Society Indicators

	Indicator	Sector	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Job Creation	**Labour Market Participation** (difference in labour market participation for 25 to 34 year old PSE graduates and high school graduates)	University	24%	17%	9%	17%	8%	10%	11%	10%	7%	8%
		College	19%	21%	8%	17%	11%	10%	6%	7%	6%	8%
		Trades	18%	13%	6%	7%	11%	9%	7%	9%	12%	12%
	Related Employment (percentage of graduates working in a job related to studies three years after graduation)	University	92%	75%	81%	80%	88%	73%	83%	87%	87%	82%
		College	87%	80%	82%	86%	88%	79%	84%	82%	83%	79%
	Overqualification Rates (probability of bachelor's graduates aged 25 to 34 working in jobs requiring college or less)	University	34%	39%	42%	39%	34%	39%	44%	36%	40%	42%
	% of the Population with an Advanced Degree (percentage of 25 to 64 year olds with a graduate degree)	University	6%	7%	10%	5%	8%	11%	6%	6%	7%	9%
New Discoveries	**Research Funding** (sponsored research income per full-time faculty member)	University	$74,031	$73,157	$79,383	$49,549	$180,955	$154,544	$101,273	$136,838	$191,542	$132,282
	Research Impact (mean normalized H-scores)	University	0.85	0.62	0.69	0.62	1.05	1.08	0.8	0.85	0.86	1.03
	Highly Cited Researchers (difference in the % of the top 1% most highly cited researchers and the % of full-time faculty)	University	1%	-1%	-3%	-3%	-11%	8%	-4%	-4%	4%	12%

Table 3: Value to Society Indicators

	Indicator	Sector	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC
Magnet for Talent	**University Rankings** (average number of "points" per province)	University	2	0	0	0	9	19	1	0	6	8
	International Enrolment (proportion of enrolment made up of international students)	University	9%	10%	13%	14%	11%	8%	8%	10%	9%	15%
	Prestigious Graduate Scholarships (difference in the % of prestigious doctoral scholarships received and the % of doctoral students)	University	-1%	0%	0%	-1%	-6%	3%	-1%	-1%	1%	5%
Engaged Citizens	**Voting** (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates who voted)	University	1%	-4%	19%	17%	4%	15%	6%	13%	3%	5%
		College	-9%	-5%	13%	10%	5%	12%	0%	4%	-5%	8%
		Trades	-1%	4%	16%	7%	4%	2%	-7%	7%	-2%	8%
	Volunteering (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates who volunteered)	University	29%	20%	31%	36%	17%	20%	20%	22%	24%	22%
		College	11%	24%	10%	17%	8%	11%	11%	15%	21%	9%
		Trades	13%	3%	10%	20%	1%	8%	-9%	8%	2%	4%
	Donating (difference in the percentage of 25 to 64 year old PSE graduates and high school graduates who donated)	University	12%	10%	11%	18%	2%	12%	10%	25%	8%	13%
		College	12%	5%	7%	8%	1%	11%	7%	24%	4%	11%
		Trades	9%	-1%	10%	3%	-5%	9%	-2%	20%	1%	12%

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THE COST OF PERFORMANCE

The preceding pages present an assessment of Canadian postsecondary education performance in three dimensions: access, value to students and value to society. Performance comes at a price. Students invest to sustain it (through tuition), as does society (through provincial and federal government transfer payment programs that support teaching, research and student aid), and to a much smaller extent others (philanthropists, corporations, partners in various postsecondary education enterprises).

The pressure to increase those investments is relentless. Continuous growth in student numbers is driven by enhanced awareness of the advantages of a postsecondary education and in some provinces like Ontario is fueled by enrolment-based funding formulae. Inflation, including that relating to institutional employee salaries, frustrates attempts to accommodate that growth within the resources already available to the system. There is constant upward pressure both on public funding and tuition fees.

The pressure to control these investments is even greater. Governments are squeezed and operating grant increases carry a heavy price of public debt. Tuition rates and the overall affordability of postsecondary education are a perennial political agenda and fee increases are carefully controlled.

The tension is evident within the sector. Colleges Ontario wrote in its 2014 Ontario Budget submission, "The public colleges will need to continue undertaking critical reviews of the range of programs and services that they provide with a view to reducing costs. While colleges will always put as much focus as possible on administrative savings and productivity improvements, the reality is that expenditure pressures will force colleges to make changes that will negatively impact the student learning experience" (Colleges Ontario, 2014). In its budget submission, the Council of Ontario Universities wrote, "Recently, a pattern of de-investment by government has threatened to further erode our ability to be more innovative, productive and entrepreneurial – precisely the factors that will accelerate the path of recovery in the provincial economy" (COU, 2014). The Ontario government plans to balance its budget by 2017-2018.

In this section of our report, we examine the cost of sustaining the postsecondary education system. We then examine the correlation between provincial performance on our three dimensions and the relative cost, i.e., funding, of the system in each of these same provinces.

The objective is simply to observe the interplay between performance and funding. Is there a pattern? If so, what is it? A widely held hypothesis, certainly one advocated by the postsecondary institutions themselves, is that the higher the funding level (by way of government transfer payments and/or higher tuition fees) the greater the level of performance.

We can test this hypothesis by plotting our assembled performance indicators against funding. Because we have no reliable provincial cost-per-student data for colleges and the trades, we have excluded college and trades related performance indicators from our rolled up performance score. The performance – funding correlation we are examining, therefore, is focused solely on universities because of this data limitation.

To generate each province's overall university sector performance score, we standardize and aggregate each province's indicator scores. We assign an equal overall weight to each of our three dimensions (access, value to students, value to society) regardless of how many indicators are included in each. To generate the cost to students and to the public of providing these levels of performance, we calculate revenues per full-time equivalent student received by the universities in each province. The resultant X-Y plot, where the X-axis measures each province's universities' funding per student and the Y-axis each province's performance score, illuminates the relationship on a cross-Canada basis.

We acknowledge that our indicators have varied degrees of attractiveness to readers of this report. Not all will seem equally relevant, robust or reliable. Other important indicators may be missing from our analysis for lack of data or gaps in our research of sources. We mitigate these inevitable concerns in two ways. First, we have included in our analysis 34 discrete university-relevant indicators, so that a broad range of postsecondary education performance is measured and the impact of any single indicator is minimalized. We are applying an engineering principle of load distribution: no single performance indicator can on its own support the analysis but their combined strength can.

Second, for readers who would like to drop some indicators from the mix for any reason and observe the impact on the performance-funding correlation, we have published an interactive website that allows one to do exactly that. **Our interactive website, which allows the user to customize the indicators he or she would like included in the aggregation, is at www.postsecondaryperformance.ca.**

Figures 2a through 2d show the resultant X-Y plots, for overall performance and on each of the three dimensions. Appendix 5 provides the details on the methodology we used to aggregate the indicators in order to generate these plots.

Figure 2(a)

Total Performance vs Total Revenue per Student
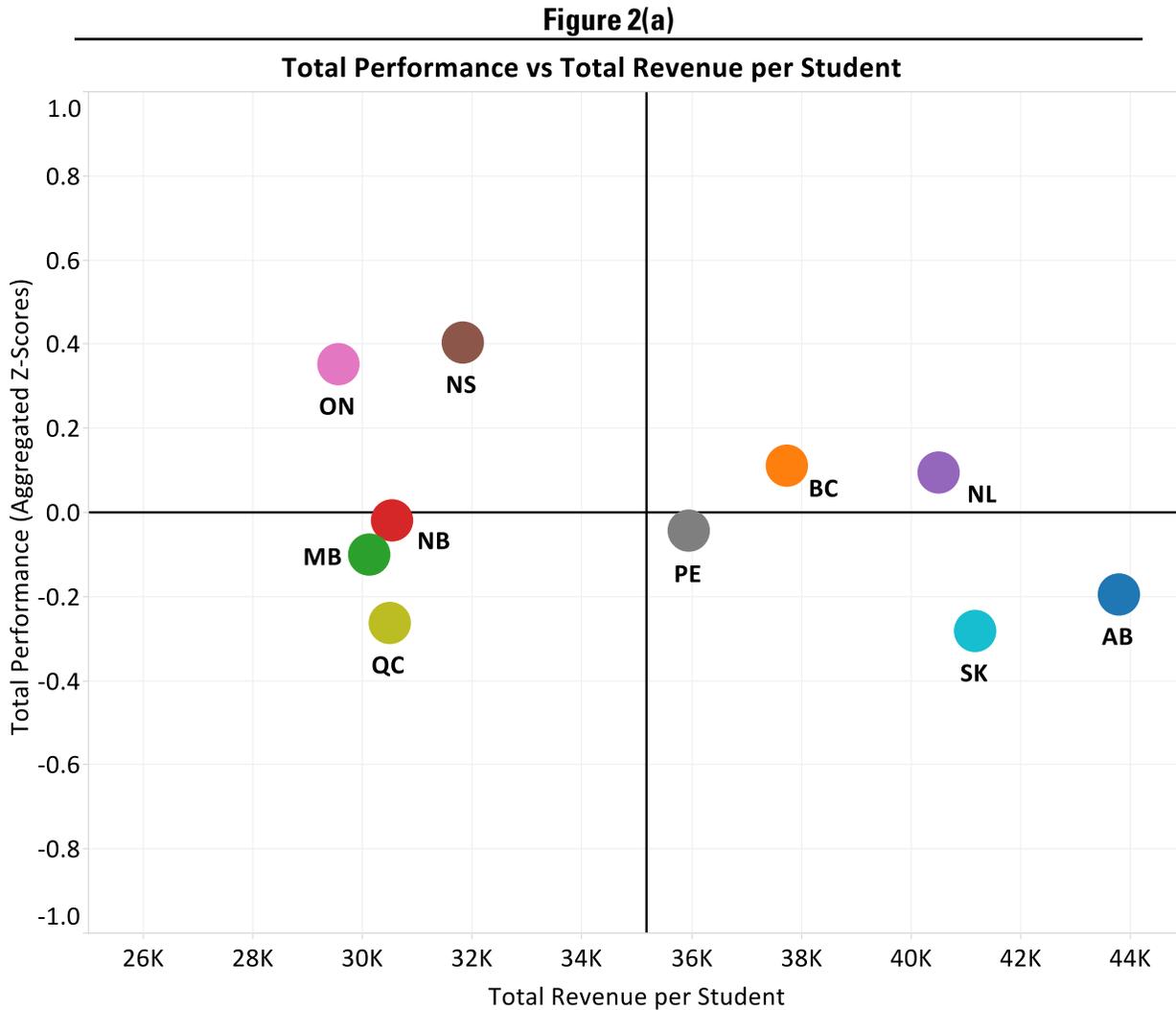
Revenue per Students (X axis): See Appendix 4 for details on how these values were calculated. The solid vertical line represents the simple Canadian average total revenue per student.

Performance scores (Y axis): See Appendix 5 for details on how these values were calculated.

Figures 2b to 2d:
Plot of Performance in each Dimension against Institutional Revenue per Student

Access vs Total Revenue per Student

Value to Students vs Total Revenue per Student

Value to Society vs Total Revenue per Student
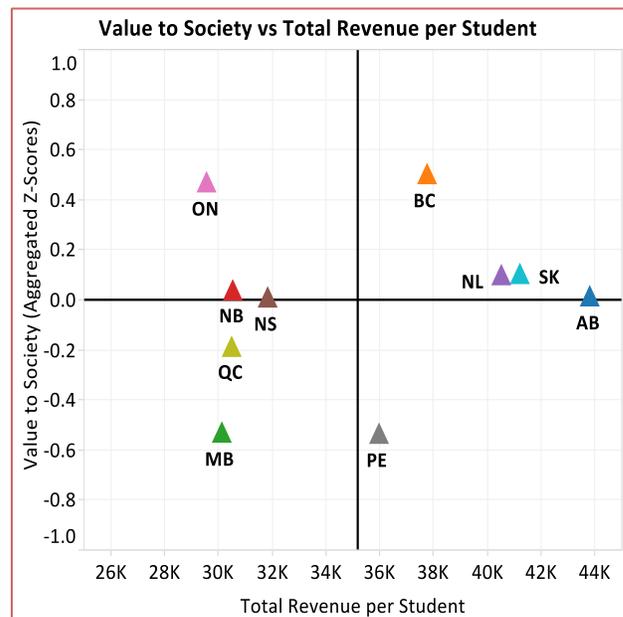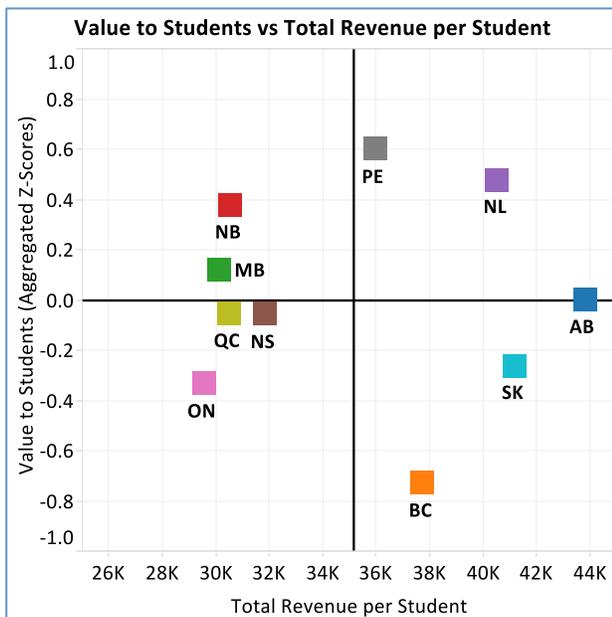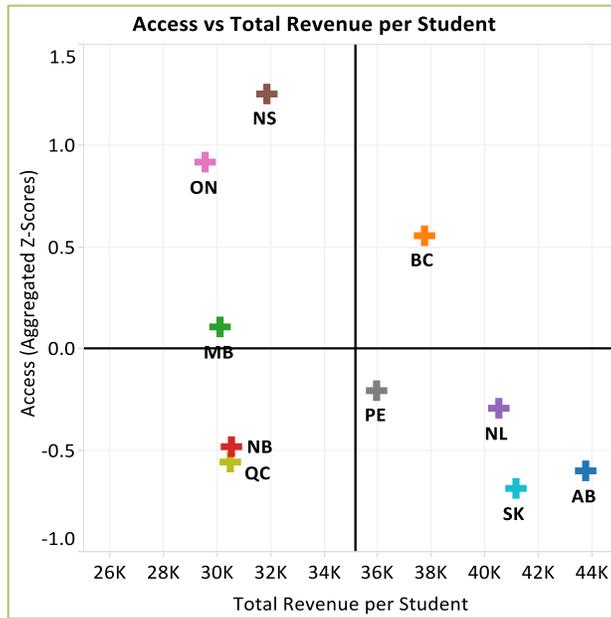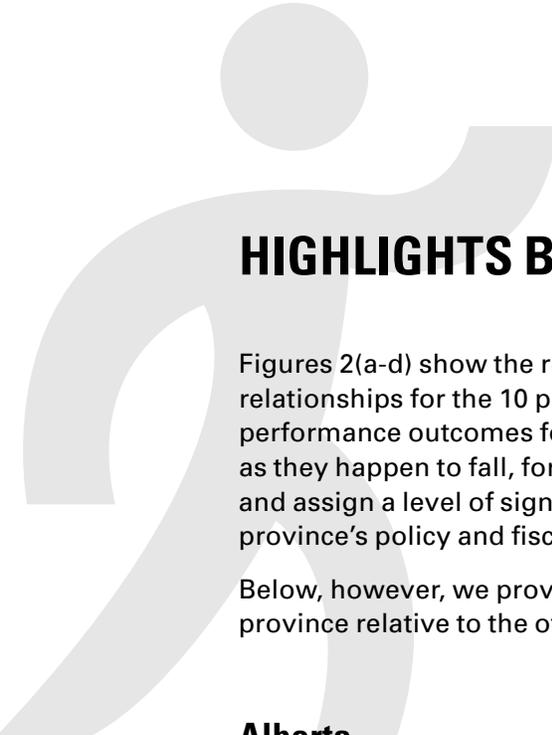
HIGHLIGHTS BY PROVINCE

Figures 2(a-d) show the relative overall university-focused performance and funding relationships for the 10 provinces. Our individual indicators also reveal provincial performance outcomes for universities, colleges and for the trades. We present the data, as they happen to fall, for each of the provinces. It is up to each province to consider and assign a level of significance, or value, or relevance to these data, according to each province's policy and fiscal priorities.

Below, however, we provide a brief summary of the most salient observations for each province relative to the other provinces.

Alberta

Alberta: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Alberta's university performance score is somewhat lower than most provinces at a relatively high cost per student.

Across the three dimensions of performance, Alberta's university system performs at the Canadian average on value to students and on value to society, and below average on access.

Alberta: Notable Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High literacy and numeracy test scores for college educated adults

- High earnings premium for Albertans with a trades credential relative to those with only a high school education

- Low federal government loan repayment default rates for both college and university borrowers

- High level of university research income per faculty member

Areas of low performance (relative to other provinces)

- Low university participation rate

- Low proportions of adults with a college or university credential

- Not much lift in the rate of labour market participation for college- and university-educated adults over those with only a high school education

- Not much advantage in unemployment rates for university and college educated adults over those with only a high school education

British Columbia

British Columbia: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, British Columbia's university system delivers slightly above average university sector performance in comparison to other provinces at a higher than average cost per student.

Across the three dimensions of performance, British Columbia's university system performs above the Canadian average on value to society and on access, but below the average on value to students.

British Columbia: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High level of gender balance at the discipline level in the university student population
- High proportion of international students in the university student population
- High proportion of adults with a university credential
- High research impact scores and a high proportion of faculty in the top 1% of highly cited global researchers
- High share of prestigious national graduate scholarships relative to the province's share of doctoral students

Areas of low performance (relative to other provinces)

- Low literacy and numeracy test scores for university educated adults
- Low proportion of college graduates working in jobs related to their studies
- Low earnings premiums for university and college educated adults relative to those with only a high school education

Manitoba

Manitoba: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Manitoba's overall university system performance is slightly below the Canadian average, at a cost per student that is lower than most provinces.

Across the three dimensions of performance, Manitoba's university system performs slightly above the Canadian average on value to students and on access and below average on value to society.

Manitoba: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High level of gender balance at the discipline level in the university student population

- High literacy and numeracy test scores for university-educated adults

- Low reported debt levels three years after graduation and low levels of recourse to federal loan repayment assistance programs, for college and university borrowers (but mitigated by high federal government loan repayment default rates for university borrowers)

- High college and university graduate employment rates

Areas of low performance (relative to other provinces)

- Low university student engagement scores

- Low proportion of international students in the university student population

- Low proportion of the adult population with an advanced (graduate) degree

- High rate of university graduates working in jobs for which they are overqualified

- Not much increase in the rate of labour market participation for adults with a postsecondary education over those with only a high school education

- Not much advantage in unemployment rates for college and trades educated adults over those with only a high school education

New Brunswick

New Brunswick: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, the overall performance of New Brunswick's university system is at the Canadian average, delivered at a lower than average cost per student.

Across the three dimensions of performance, New Brunswick's university system performs above the Canadian average on value to students, at the average on value to society and below average on access.

New Brunswick: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- Strong college system performance: High proportion of adults with a college credential, high levels of labour market participation for college graduates compared to those with only a high school education, high proportion of college graduates working in jobs related to their studies

- High university student engagement scores

- High proportion of international students in the university student population

- Low university student-to-faculty ratio

- Adults with a university education experience a high income differential compared to those with only a high school education

Areas of low performance (relative to other provinces)

- Low adult university attainment rates

- High remaining debt levels three years after graduation and high levels of recourse to federal loan repayment assistance programs, for college and university borrowers

- Low proportion of the population with an advanced (graduate) degree

- Low level of research funding per faculty member and low research impact scores

- Poor performance in international university rankings

Newfoundland and Labrador

Newfoundland and Labrador: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Newfoundland and Labrador's overall university system performance is slightly above the Canadian average and cost per student is relatively high.

Across the three dimensions of performance, Newfoundland and Labrador's university system (there is only one university: Memorial University of Newfoundland) performs above the Canadian average on value to students, slightly above average on value to society and below average on access.

Newfoundland and Labrador: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- Low sticker price tuition

- Low university student-to-faculty ratio

- Low federal government loan repayment default rates for university and college borrowers

- High earning premium for college- and university-educated adults over those with only a high school education

- High proportion of adults with a trades qualification

- For trades-educated adults, the risk of unemployment is lower than for those with only a high school education

- High levels of labour market participation and employment in fields related to study for postsecondary graduates

Areas of low performance (relative to other provinces)

- Low level of gender balance at the discipline level in the university student population

- Weak numeracy and literacy scores for adults with a college education

- Low percentage of the population with an advanced (graduate) degree

Nova Scotia

Nova Scotia: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Nova Scotia's overall university system performance is relatively high, delivered at lower than average cost per student.

Across the three dimensions of performance, Nova Scotia's university system performs above the Canadian average on access, at the average on value to society and just below average on value to students

Nova Scotia: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High proportion of international students in the university student population

- High university participation rates and a high proportion of adults with a university credential

- High numeracy and literacy test scores for university-educated adults

- High proportion of the adult population with an advanced (graduate) degree

Areas of low performance (relative to other provinces)

- High rates of recourse to federal loans repayment programs for university and college borrowers

- High rate of university graduates working in jobs for which they are overqualified

- Poor performance in university world rankings

Ontario

Ontario: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Ontario's overall university system performance is relatively high, at a low cost per student.

Across the three dimensions of performance, Ontario's university system performs above the Canadian average on access and on value to society, and below average on value to students.

Ontario: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High university participation rate

- High proportion of adults with a college or university credential (but a low proportion of adults with a trades qualification)

- High proportion of the population with an advanced degree

- Low remaining debt levels reported by university borrowers three years after graduation

- Strong university research performance: high research impact scores, a high proportion of faculty in the top 1% of highly cited global researchers, high rate of research funding per faculty

- High performance in university world rankings

Areas of low performance (relative to other provinces)

- High university student-to-faculty ratio

- High sticker price tuition

- Low proportion of college and university graduates working in jobs related to their studies

- Low proportion of international students in the university student population

Prince Edward Island

Prince Edward Island: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Prince Edward Island's overall university system performance and cost per student are at the Canadian average.

Across the three dimensions of performance, PEI's university system (there is only one institution: the University of Prince Edward Island) performs above the Canadian average on value to students, slightly below average on access and below average on value to society.

Prince Edward Island: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High proportion of adults with a college credential

- High university student engagement scores

- Low university student-to-faculty ratio

- For university- and college-educated adults, the risk of unemployment is lower than for those with only a high school education

- High employment rates for recent university graduates

Areas of low performance (relative to other provinces)

- Low level of gender balance at the discipline level in the university student population

- High federal government loan repayment default rates for college borrowers

- Low proportion of university and college graduates working in jobs related to their studies

- Low research impact scores and low levels of research income per faculty

- Poor performance on university international rankings

Quebec

Quebec: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, the overall performance of Quebec's university system is relatively low at a low cost per student.

Across the three dimensions of performance, Quebec's university system performs slightly below the Canadian average on value to students and below average on access and on value to society.

Quebec: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- High proportion of adults with a trades qualification

- Low sticker price tuition

- Low average remaining debt levels reported by university and college graduates three years after graduation

- High level of employment in fields related to studies for postsecondary graduates

- High levels of research funding per faculty and high research impact scores

Areas of low performance (relative to other provinces)

- Low university participation rates

- Low university student engagement scores

- Low proportion of faculty in the top 1% of highly cited global researchers

- Low proportion of prestigious national graduate scholarships

- Low reported levels of citizen engagement by adults with postsecondary credentials

Saskatchewan

Saskatchewan: University Performance-Cost Summary

In the aggregate on the 34 university performance indicators we assembled, Saskatchewan's overall university system performance is relatively low and is delivered at a high cost per student.

Across the three dimensions of performance, Saskatchewan's university system performs slightly above the Canadian average in value to society and below average on access and on value to students.

Saskatchewan: Highlights at the Specific Indicator Level (includes universities, colleges and trades)

Areas of high performance (relative to other provinces)

- Low university student-to-faculty ratio

- Low levels of recourse to federal loan repayment assistance programs for college and university borrowers

- For adults with a trades qualifications, the risk of unemployment is lower than for those with only a high school education

Areas of low performance (relative to other provinces)

- Low university student engagement scores

- Low university participation rates

- Low proportion of adults with a college credential

- Low literacy test scores for adults with a university education

- Low earnings premium for college educated adults relative to those with only a high school education

- Poor performance on university international rankings

IMPLICATIONS FOR ONTARIO

There are several items of note and implications of this analysis for HEQCO's home province, Ontario. As noted in several previous HEQCO reports, Ontario does very well overall in delivering access to postsecondary education. It has the highest attainment rates in the country, well balanced between college and university offerings (see Indicators 1.2.1 and 1.2.2). This is no surprise given the sustained dominance of access as a provincial policy goal over many years and the simple fact that Ontario's funding mechanisms reward enrolment growth. The one exception is in the trades, where Ontario appears to have among the lowest participation rates in all of Canada (see Indicator 1.2.3).

As first recommended in our 2013 report on Strategic Mandate Agreements (HEQCO, 2013) and consistent with stated government policy, this report reinforces the call for greater attention to the quality of the student experience in the Ontario postsecondary system. Ontario's universities perform well in securing competitive research funding (see Indicator 3.2.1), on research impacts (3.2.2) and on international rankings, which are heavily weighted toward research outcomes (3.3.1). Ontario performs less well on outcomes that students might notice more directly like faculty-to-student ratios (Indicator 2.1.2) and student engagement (2.1.1). HEQCO has recommended before that Ontario universities look at opportunities to adjust the deployment of their existing faculty complement so that the duties of faculty who are not research intensive be focused more on teaching (Jonker & Hicks, 2014).

Ontario students face the highest "sticker price" tuition fees in the country (see Indicator 2.3.1). Yet, thanks to Ontario's grants, scholarships, tax credits and discount programs, several other provinces have higher average graduate debt levels three years after graduation (Indicators 2.3.2 and 2.3.3) and higher student loan default rates (Indicators 2.3.6 and 2.3.7). As we have recommended before, Ontario may be well advised to do a better job of translating absolute tuition levels into the actual net tuition and to more front-end load student aid to ensure that no one is unnecessarily deterred.

Both of these recommendations cost no more money but may better address concerns about value to students.

Ontario has a relatively low percentage of college and university graduates who report working in a field related to their studies (Indicators 3.1.4 and 3.1.5). A strong connection between postsecondary offerings and the needs of the labour market are important both for the individual graduate and the labour market overall. HEQCO is a strong proponent of learning outcomes – ensuring that institutions are deliberate about the skills students master, making sure those skills are relevant within the connected labour market and measuring these outcomes in a systematic way. As was noted by HEQCO's 2013 report on Strategic Mandate Agreements (HEQCO, 2013), Ontario has the potential to be a world leader in this area.
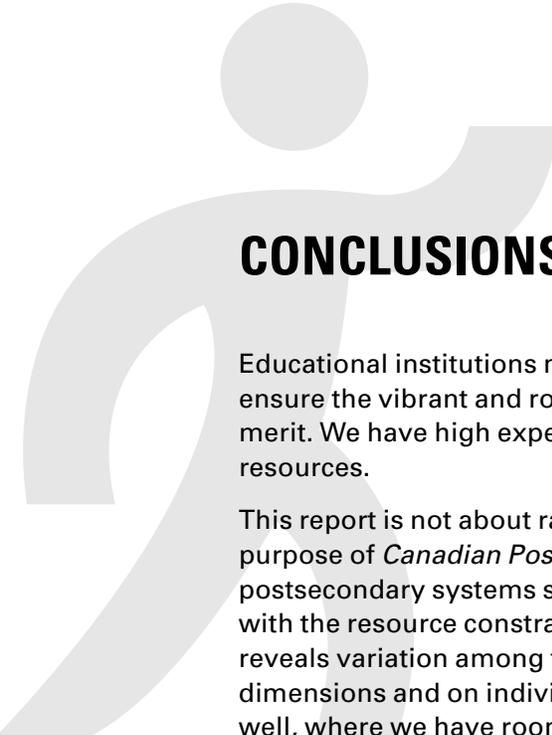
CONCLUSIONS

Educational institutions may be the most important public institutions in Canada to ensure the vibrant and robust quality of life and economy that Canadians desire and merit. We have high expectations of our postsecondary systems and we have limited resources.

This report is not about rankings or winners and losers. Rather, the central goal and purpose of *Canadian Postsecondary Performance: Impact 2015* is to improve Canada's postsecondary systems so that we can yield greater value to students and society even with the resource constraints faced by the public purse in all provinces. Our report reveals variation among the provinces on overall performance, on each of the three dimensions and on individual performance indicators. This tells us where we are doing well, where we have room for improvement and, by examining the relative performance of postsecondary systems in different provinces, clues as to where we might identify strategies or best practices that could lead to better outcomes. Overall, *Canadian Postsecondary Performance: Impact 2015* reveals two important and strong messages for improving Canada's postsecondary systems.

First, within the range of revenues per student evident in Canada, there is no correlation between the performance of a postsecondary system and the funding it receives. Some provinces demonstrate higher performance with lower levels of funding. Other provinces demonstrate lower performance with higher levels of funding. The postsecondary discussion in Canada is dominated by debates and arguments over the funding institutions do or should receive, either through government grant or tuition. It is time to refocus the discussion from how much institutions get to the outcomes being achieved with that investment.

Second, you can't manage what you don't measure – and what gets measured gets done. If we are to improve higher education in Canada we simply have to do a better job of collecting and reporting relevant, meaningful information in a standardized way across Canada about the state of our higher education systems and institutions, and their performance and outcomes. This and previous HEQCO reports reveal far too many data gaps, things we do not know, about higher education in Canada. We have created processes and agencies in Canada to collect meaningful and useful data across provinces to assess the state of health care in Canada, to reveal areas where improvements are needed and to suggest effective strategies. Education should be no less a priority.
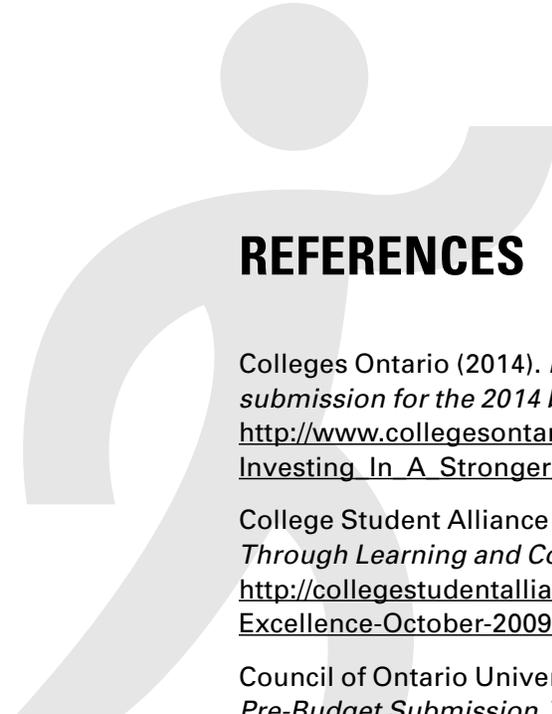
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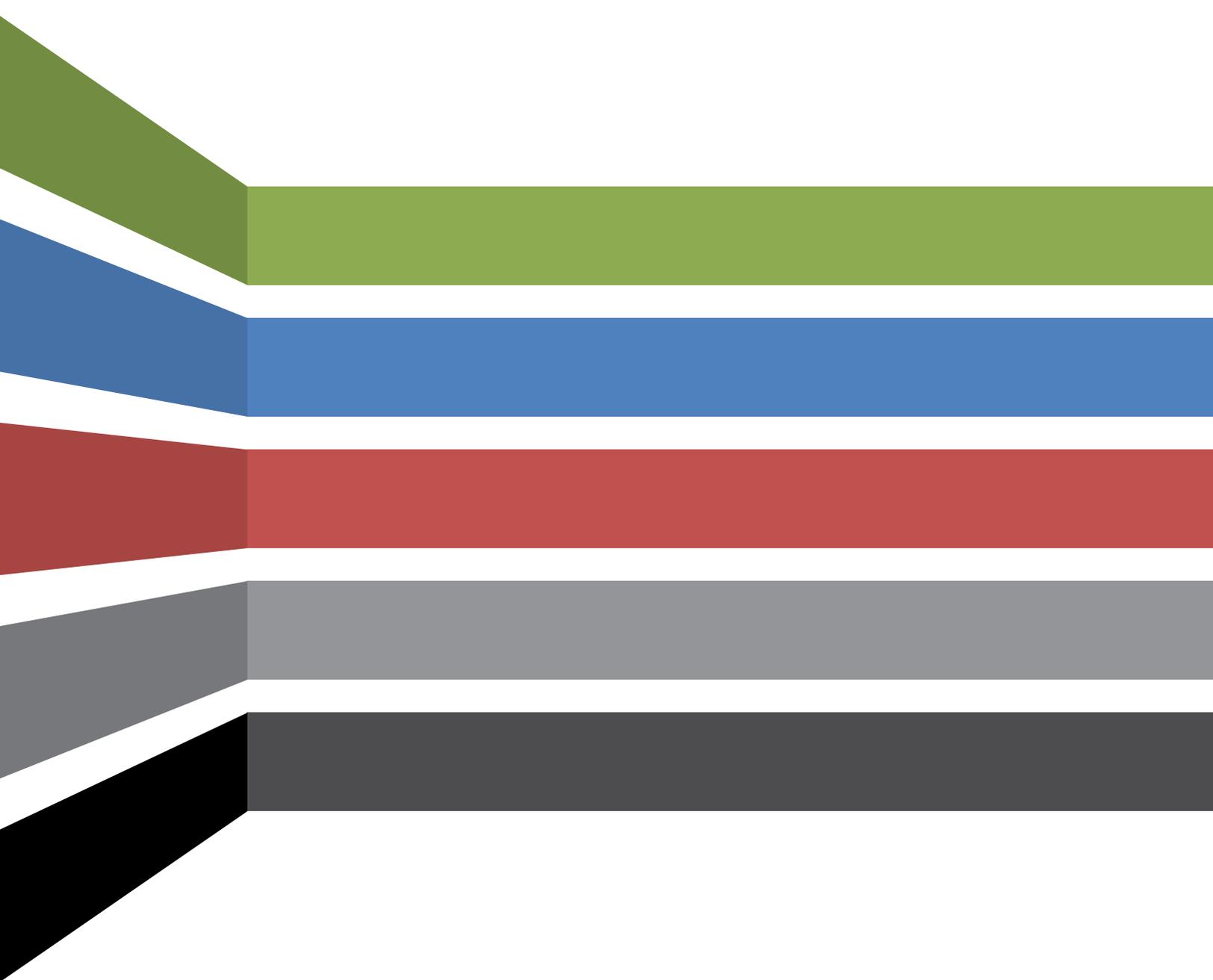
APPENDICES

APPENDIX 1 – ACCESS INDICATORS

Access is a priority across all 10 provinces. Counting people – students, graduates, populations – ought to be straightforward. And yet we have significant holes in our basic knowledge about how many Canadians are attending or have completed postsecondary education.

1.1 – Access to Higher Education

This first component examines the volume of students in the system. This is an input-focussed (how many are going) look at access.

Indicator 1.1.1: Participation Rates – Percentage of 18 to 24 year olds enrolled in university

The indicator compares the relative participation of young people in university across the provinces. Using data for the 2011-2012 school year from the Postsecondary Student Information System (PSIS), which is a national survey administered by Statistics Canada that includes detailed information on enrolments and graduates from Canadian public postsecondary institutions, we calculate the number of domestic 18 to 24 year old students attending university in each province, divided by the 18 to 24 year old population in that province.

We were unable to generate a participation rate indicator for colleges due to underreporting of college enrolments in PSIS.

1.1.1

Percentage of 18 to 24 year olds enrolled in university , 2011
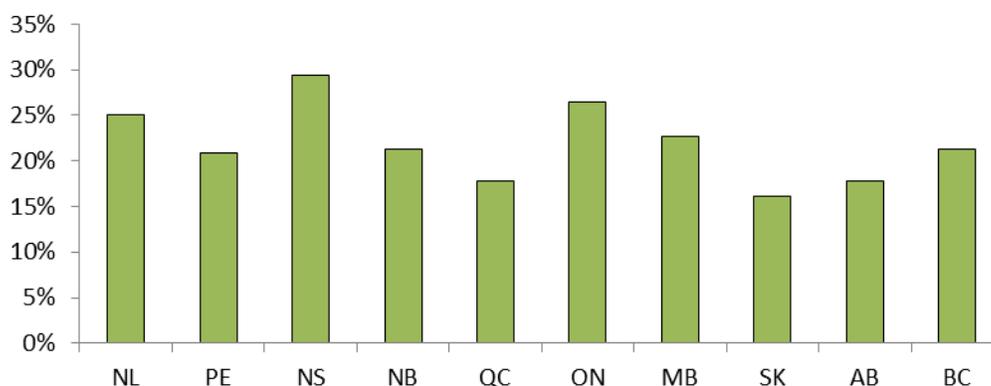
Source: Statistics Canada, Postsecondary Student Information System (PSIS) and CANSIM table 51-0001 – Estimates of population, by age group and sex for July 1, Canada, provinces and territories

Additional notes:

- Enrolments represent full-time and part-time headcounts, excluding international students.

- The enrolment counts include out-of-province domestic students, so a province with a net influx of students from other provinces will generate a higher participation rate and vice-versa.

Common PSIS notes:

- PSIS data represent program-by-program headcounts, leaving the possibility for double counting if students are enrolled in more than one program.

- The data include a number of affiliates and non-publically funded institutions. Their collective enrolments do not materially impact the analysis.

- There are a small number of Canadian institutions that did not report to PSIS for 2011. Enrolment values for these institutions were imputed.

- This paper includes custom tabulations and analyses of PSIS data that were constructed in partnership with Statistics Canada and took considerable time to produce. In the interim, while this work was underway, PSIS had already begun to report some results for 2012-13. Recreating the various custom tabulations and analyses using 2012-13 data would have delayed publication for several months. For this reason, we have used PSIS 2011-12 throughout, unless otherwise indicated.

1.2 – Success in Higher Education

Under this component, we look at the access outputs from the system (how many succeeded) by focusing on graduates in society.

Indicator 1.2.1 to 1.2.3: Attainment Rates – Percentage of 25 to 34 year olds who have attained a postsecondary education

Whereas the participation rate (Component 1.1) measures the proportion of the student-aged population attending a postsecondary institution, the attainment rate measures the proportion of the adult population that has earned a postsecondary credential. We show the percentage of 25 to 34 year old residents of each province who have completed a university credential (Indicator 1.2.1), college credential (Indicator 1.2.2) or trades credential (Indicator 1.2.3). The credential need not be from a Canadian institution – foreign credentials are included. Thus, the indicator combines the outputs of our domestic postsecondary system with those of our immigration selection decisions.

We chose our age span (25 to 34) to include a decadal flow of recent graduates. We wanted to exclude the impact of past system performance, reflected in the population aged 35 and up.

Statistics Canada's Labour Force Survey asks the respondent to identify the "highest" level of schooling completed, so individuals with any combination of trades, college and university credentials are likely not reporting their trades or college credential, and trades and college attainment overall may consequently be underreported.
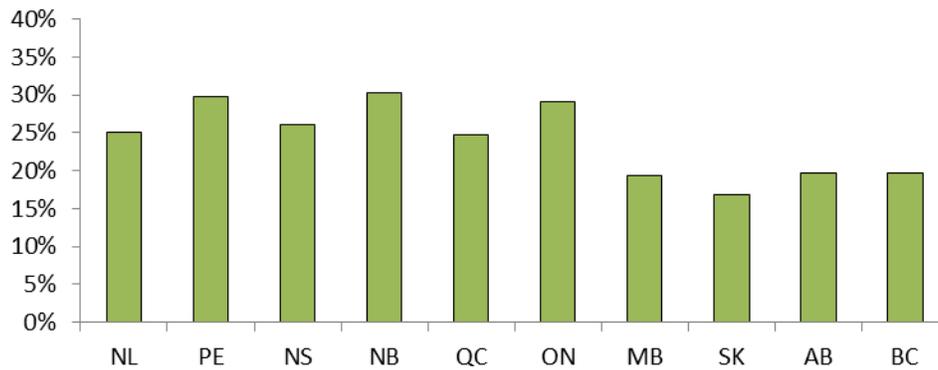
Percentage of 25 to 34 year olds who have attained a university credential, 2013

```
40%
35%
30%
25%
20%
15%
10%
 5%
 0%
     NL   PE   NS   NB   QC   ON   MB   SK   AB   BC
```
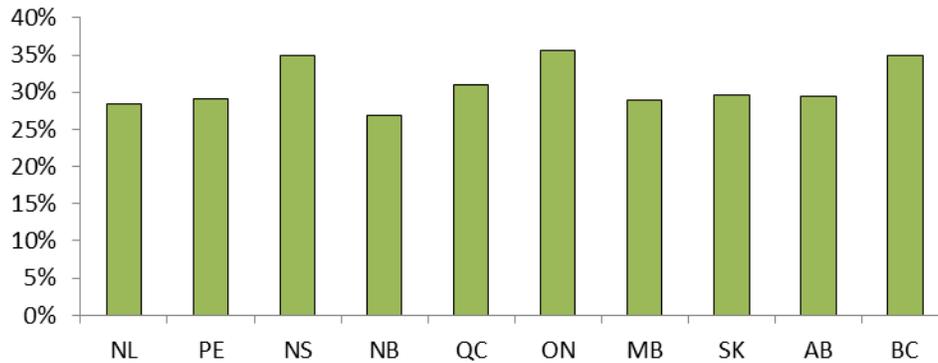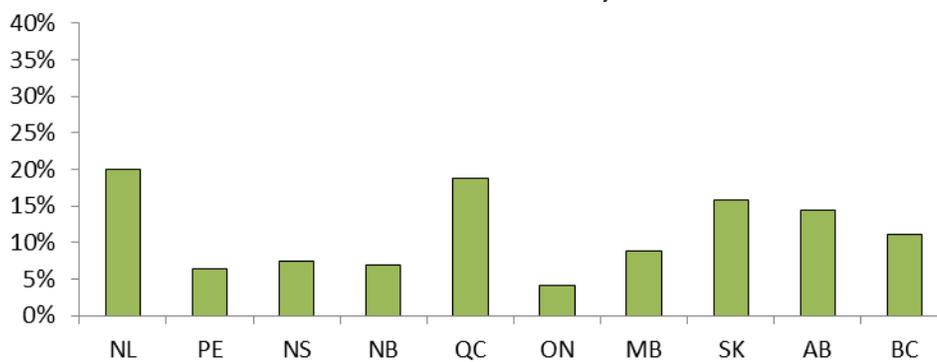
Percentage of 25 to 34 year olds who have attained a college credential, 2013

```
40%
35%
30%
25%
20%
15%
10%
 5%
 0%
     NL   PE   NS   NB   QC   ON   MB   SK   AB   BC
```

Percentage of 25 to 34 year olds who have attained a trades credential, 2013

```
40%
35%
30%
25%
20%
15%
10%
 5%
 0%
     NL   PE   NS   NB   QC   ON   MB   SK   AB   BC
```

Source: Statistics Canada, Labour Force Survey (LFS), custom tabulation

Additional notes:

- Highest level of schooling completed is organized using the International Standard Classification of Education (ISCED) levels.

- University credential includes bachelor's degree and above (ISCED level 5A and 6).

- College credential includes college or CEGEP diploma or a university certificate below a bachelor's degree (ISCED level 5B).

- Trades credential includes trades certificates or diplomas from a vocational school or from apprenticeship training (ISCED level 4).

1.3 – Equity of Access

In this component we look at available indicators of equity of access to higher education for traditionally underrepresented groups.

Indicator 1.3.1: Gender Balance – Aggregate score of discipline-by-discipline student gender balance

Concerns about gender balance have shifted both ways over the decades: not enough females; not enough males. We take the simple position that an ideal student gender balance would reflect the gender balance within the general population aged 18 to 24. Most provinces perform quite well if this is calculated on their overall student populations. We take the more granular approach of measuring and aggregating gender balance across disciplines. A province with a near perfect gender balance on its overall student population may still show considerable variation among disciplines (e.g., engineering still predominantly male; nursing still predominantly female).

An enrolment-weighted aggregate of discipline-specific gender balances is calculated to generate an overall provincial gender balance score between 1.00 (perfect balance) and 0.00 (all students of the same gender). Once again, it is possible to do this only for university student bodies, as the data for colleges and trades are deficient.

1.3.1

Aggregate score of discipline-by-discipline student gender balance in university, 2010
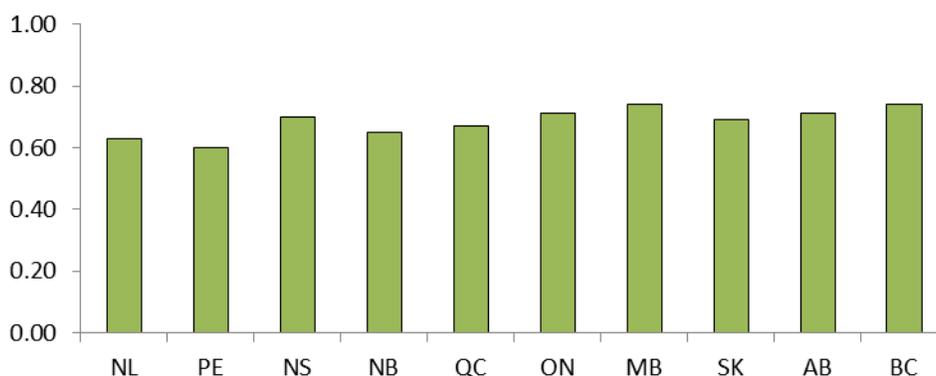
Source: Statistics Canada, CANSIM table 477-0033 – Postsecondary enrolments, by program type, credential type, age groups, registration status and sex and CANSIM table 51-0001 – Estimates of population, by age group and sex for July 1, Canada, provinces and territories

Additional notes:

- Population estimates are for 18 to 24 year olds and enrolments are for students aged 24 and younger.

- Enrolments represent full-time and part-time headcounts, including international students.

- Enrolments are based on students enrolled in the postsecondary institutions at the time of the fall snapshot date, that is, a single date chosen by the institution that falls between September 30 and December 1. Therefore students who are not enrolled during this time period are excluded and enrolment totals do not represent a full academic year.

- PSIS data represent program-by-program headcounts, leaving the possibility for double counting if students are enrolled in more than one program.

- The data include a number of affiliates and non-publically funded institutions. Their collective enrolments do not materially impact the analysis.

Indicators 1.3.2 and 1.3.3: First-Generation Student Participation Rates – Attendance at university or college by students whose parents completed high school or less

The ability of a system to attract students whose parents did not complete higher education is an important measure of equity of access and these so called "first-generation" students have been a policy priority in some provinces. These indicators measure the percentage of individuals aged 18 to 24 who are attending or have ever attended university (Indicator 1.3.2) or college (Indicator 1.3.3) and whose parents completed at most a high school diploma.

"Ever attended" is a different concept from the "snapshot in time" count used to capture the overall participation rate reported in Indicator 1.1.1 and therefore cannot be compared to that series of numbers.

1.3.2

Percentage of 18 to 24 year old first-generation students that were ever enrolled in university
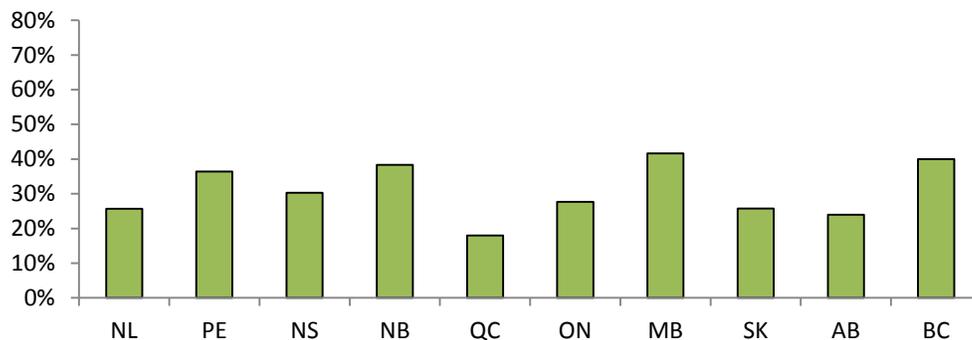
Percentage of 18 to 24 year old first-generation students that were ever enrolled in college
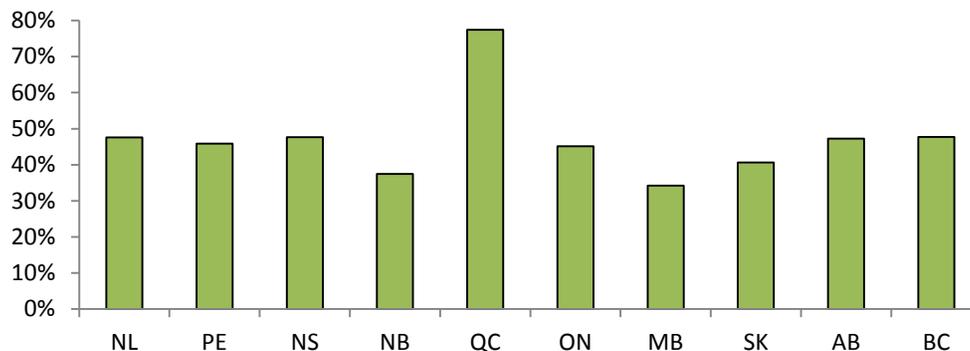
Source: Statistics Canada, Survey of Labour and Income Dynamics (SLID), custom tabulation

Additional notes:

- The rates include participants who were ever enrolled in either university or college and therefore combining college and university rates could result in double counting.

- First-generation students are those for whom both parents' highest level of educational attainment is high school or less. Respondents for whom the level of education for both parents was not reported were excluded.

- The results shown are the calculated average (using weighted sums of the numerators and denominators) of data from 2009, 2010 and 2011.

Indicators 1.3.4 to 1.3.6: Aboriginal Attainment Rate – Percentage of the 25 to 64 year old Aboriginal-identified population that has attained a postsecondary education

These indicators show the proportion of Aboriginal-identified individuals aged 25 and 64 who hold a bachelor's degree (Indicator 1.3.4), college credential (Indicator 1.3.5) or trades credential (Indicator 1.3.6). The data come from the 2006 Census and include both on- and off-reserve individuals who identified as First Nations, Métis or Inuk.

Commentators have cautioned on the impacts of underreporting in generating data on aboriginal participation. We examined the trend-consistency of reported data between the 2001, 2006 and 2011 censi before proceeding (the comparative graphs are shown below). Although the more recent 2011 census results are trend-consistent with earlier censi, with the exception of the smallest provinces on the college side where counts are low and results seem unstable, we did not use the recent 2011 data due to overall concerns about the voluntary nature of the National Household Survey instrument used to collect it.

1.3.4

Percentage of the 25 to 64 year old Aboriginal-identified population that has attained a university credential
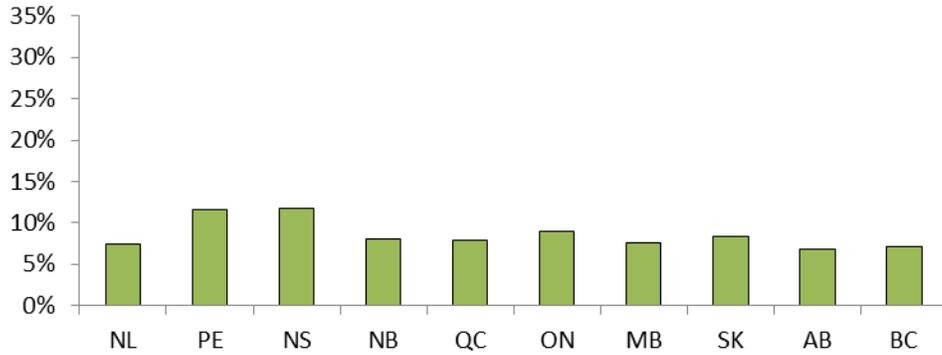
1.3.5

Percentage of the 25 to 64 year old Aboriginal-identified population that has attained a college credential
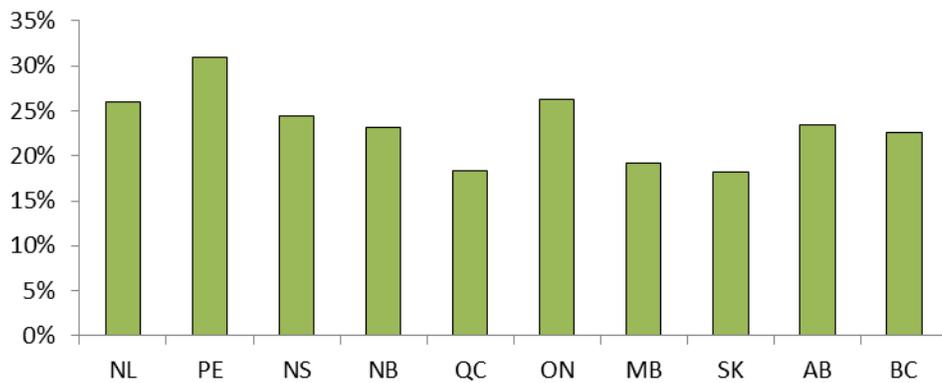
1.3.6

Percentage of the 25 to 64 year old Aboriginal-identified population that have attained a trades credential
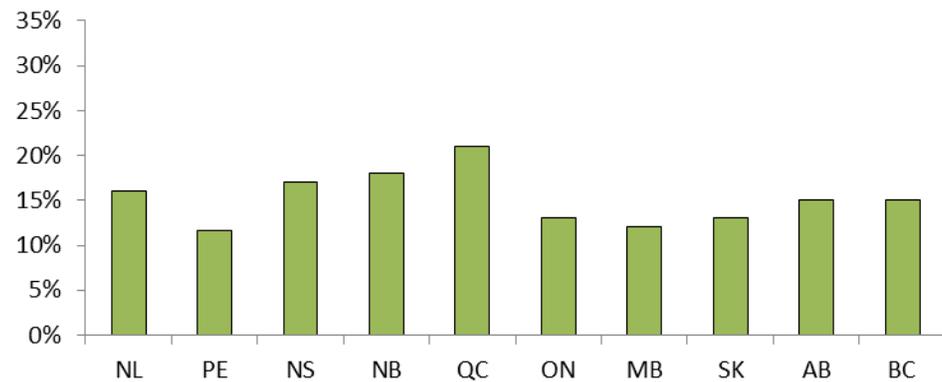
Source: Statistics Canada, 2007, Ontario (Code35) (table). Aboriginal Population Profile. 2006 Census. Statistics Canada Catalogue no. 92-594-XWE. Ottawa. Released January 15, 2008.

Additional notes:

- Aboriginal identity includes persons who reported being an Aboriginal person, that is, First Nations (North American Indian), Métis or Inuk (Inuit), and/or those who reported Registered or Treaty Indian status, that is registered under the Indian Act of Canada, and/or those who reported membership in a First Nation or Indian band. Aboriginal peoples of Canada are defined in the Constitution Act, 1982, section 35 (2) as including the Indian, Inuit and Métis peoples of Canada.

- Includes individuals living both on and off reserve

- For the 2006 Census, on some Indian reserves and Indian settlements, enumeration was not permitted or was interrupted before it could be completed. Moreover, for other Indian reserves and Indian settlements, the quality of the collected data was considered inadequate. These geographic areas (a total of 22) are called "incompletely enumerated Indian reserves and Indian settlements". Data for 2006 are therefore not available for the incompletely enumerated reserves and settlements and are not included in the above graph.

- University credential includes a university certificate or degree.

- College credential includes college, CEGEP or other non-university certificate or diploma and a university certificate or diploma below the bachelor level.

- Trades credential includes apprenticeship or trades certificate or diploma.

Comparison of the percentage of the 25 to 64 year old Aboriginal-identified population that has attained the following postsecondary credential

University credential

College credential

2011 NHS — 2006 Census
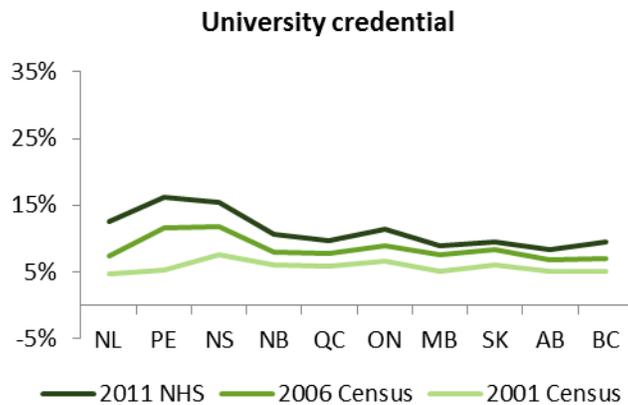
Trades credential
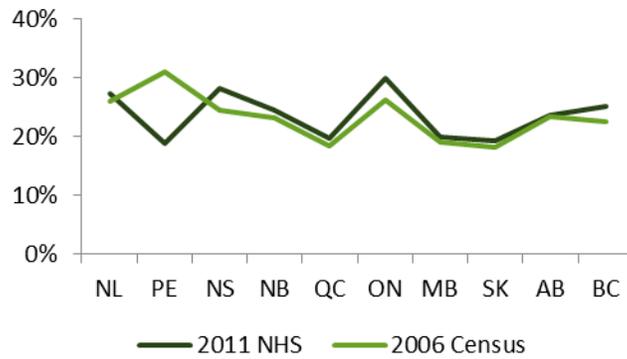
2011 NHS — 2006 Census
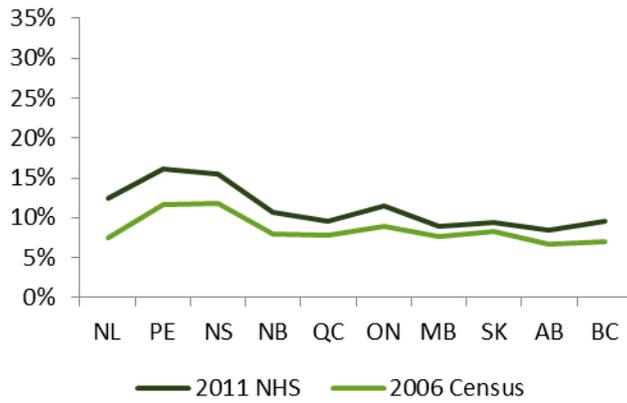
Source: Statistics Canada. 2001 and 2006 Census Aboriginal Population Profiles, Catalogue nos. 94F0043XIE and 92-594-XWE; Statistics Canada 2011 National Household Survey (NHS) Aboriginal Population Profile, Catalogue no. 99-011-X2011007.

Additional notes:

• Results from the 2001 Census for colleges and trades are excluded due to a change in the definitions used by Statistics Canada.

APPENDIX 2 – VALUE TO STUDENTS INDICATORS

Our value to student indicators tell a simple story of a student journey through higher education, with data: while learning, what is the quality of the student experience? And are students learning the right things? How affordable is that learning experience? And when it is done, are there rewards – does it make a difference in the labour market and more generally in success and health in life?

2.1 – Student Experience

Indicator 2.1.1: Student Engagement – University results from the National Survey on Student Engagement (NSSE) – benchmark average

The National Survey on Student Engagement (NSSE) is a standardized instrument used by many North American universities to measure "students' participation in programs and activities that institutions provide for their learning and personal development. The results provide an estimate of how undergraduates spend their time and what they gain from attending college" (NSSE, 2014).

We synthesized provincial NSSE scores by multiplying institutional NSSE benchmark scores from senior-year students by institutional full-time undergraduate enrolments to create a weighted average for each province. We note that not all institutions in each province publish NSSE benchmark scores; however, most institutions participated in the survey either in 2011 or in 2012. The benchmark average represents the average of the following five benchmarks: level of academic challenge; active and collaborative learning; student-faculty interaction (which we also highlight on the following graph); enriching educational experiences; and supportive campus environment.

2.1.1

University Results from the National Survey on Student Engagement (NSSE) - benchmark average

Benchmark Average   Student-Faculty Interaction
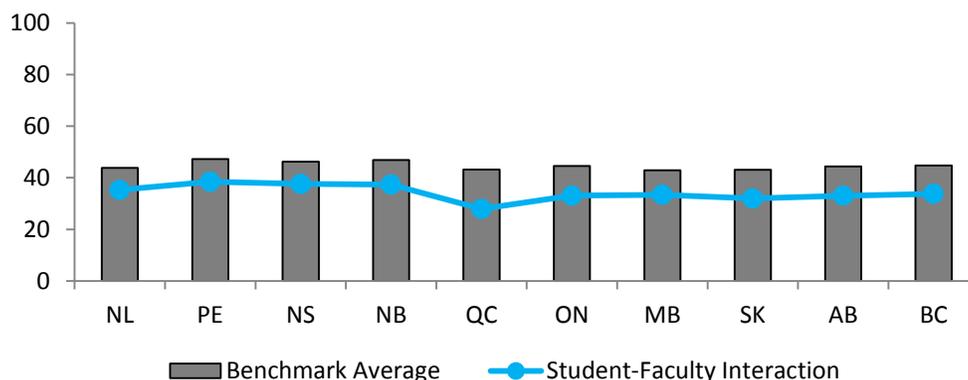
Source: Institution-specific NSSE benchmark reports and Statistics Canada, PSIS

Additional notes:

- The benchmark average represents the average of five benchmark scores on: (1) level of academic challenge; (2) active and collaborative learning; (3) student-faculty interaction; (4) enriching educational experiences; and (5) supportive campus environment.

- Each benchmark is an index of responses to several NSSE questions. Because NSSE questions have different response sets, each question's response set was rescaled from 0 to 100 and students' rescaled responses were then averaged. Thus a benchmark score of zero would mean that every student chose the lowest response option for every item and 100 would mean that every student chose the highest response to every item.

- Benchmark scores are reported on a 0 to 100 scale but are not percentages.

Indicator 2.1.2: Student-to-Faculty Ratio – Number of full-time equivalent university students to full-time faculty

The university student-to-faculty ratio shows each province's ratio of full-time equivalent students to full-time (mostly tenure and tenure-track) faculty. Part-time faculty are excluded from the calculation. The University and College Academic Staff Survey (UCASS), which reports full-time teaching staff counts across the country, has been discontinued, and therefore 2010 is and shall be the most recent year for which this ratio can be reported. There are no comparable data available for colleges.

2.1.2

Number of full-time equivalent university students to full-time faculty
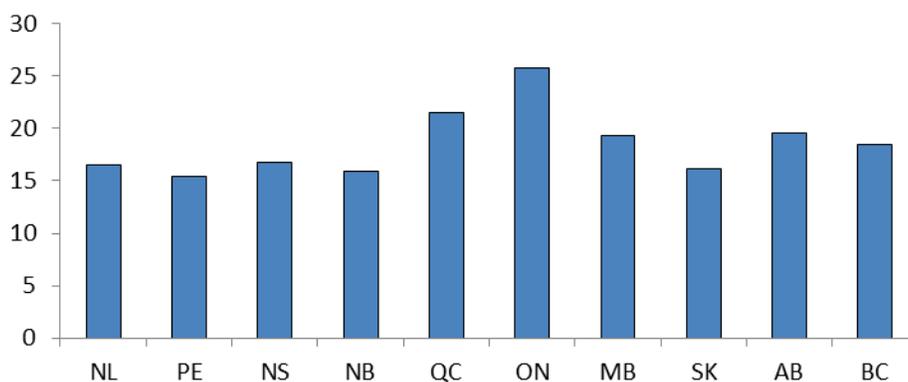
Source: Statistics Canada, PSIS and University and College Academic Staff System (UCASS)

Additional notes:

- Data are calculated for institutions included in both PSIS and UCASS.

- See common PSIS notes from Indicator 1.1.1: Participation Rates

- UCASS data include only full-time faculty (FTF) and the ratio of full- to part-time faculty varies by institution. Thus, the estimates provided for the number of students per FTF are not a comprehensive reflection of the ratio of students to total (full-time and part-time) faculty.

- Data include all full-time teaching staff regardless of rank.

Indicator 2.1.3: Teaching Awards – Difference in the share of university 3M teaching fellowship awards received from 2005 to 2014 and the share of full-time faculty

The Society for Teaching and Learning in Higher Education (STLHE) and 3M Canada partner to recognize exceptional contributions to teaching and learning at Canadian universities. Since their creation, 278 National Teaching Fellowships have been awarded, with 10 awards typically given out each year. Nominees must show excellence at the undergraduate teaching level and an independent adjudication determines winners of the award.

This indicator measures the difference between the share of 3M teaching fellowship awards received in each province over the last decade from 2005 to 2014 and the share of full-time faculty in that province. The total number of scholarships awarded over this period was 102.

2.1.3

Difference between the share of university 3M teaching fellowship awards received from 2005-2014 and the share of full-time faculty
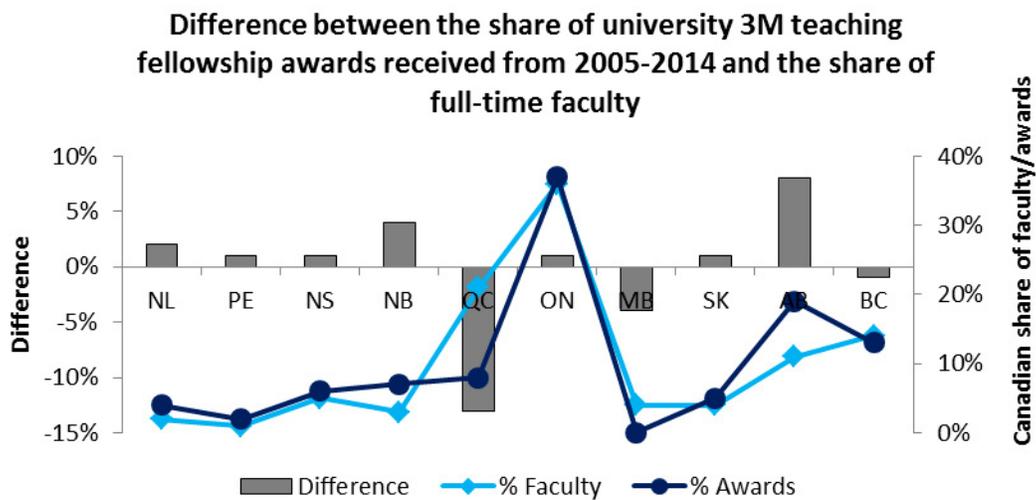
Sources: Society for Teaching and Learning in Higher Education and Statistics Canada, CANSIM Table 477-0017 – Number of full-time teaching staff at Canadian universities, by rank, sex, Canada and provinces

Additional notes:

- Ten awards were given out each year from 2005 to 2014, with the exception of 2005 when 12 awards were given out.

- The Canadian share of faculty members in each province has remained the same or has changed only slightly from 2005 to 2010. We use faculty counts from 2010 when determining the share of full-time teaching staff in each province.

- UCASS data include all full-time teaching staff regardless of rank. Part-time faculty are not included. Thus, the estimates provided for the share of full-time faculty in each province are not a comprehensive reflection of the difference between the share of university 3M teaching fellowship awards and the total (full-time and part-time) share of faculty.

2.2 – Learning Outcomes

Knowing whether postsecondary education graduates have acquired the knowledge and skills they need to succeed in life and work is central to assessing the value of that education to those graduates. The measurement of postsecondary learning outcomes is in its infancy. While some measurement instruments exist, none have been implemented in a comprehensive fashion across Canada.

As a substitute, recent HEQCO publications on literacy and numeracy in Canada have demonstrated that one can use the results of the 2013 Programme for the International Assessment of Adult Competencies (PIAAC) to measure and analyze the literacy and numeracy rates of Canadian adults by their level of education (Dion & Maldonado, 2013; Dion, 2014).

Indicators 2.2.1 and 2.2.2: Adult Literacy Skills: Average literacy scores for 25 to 34 year old postsecondary graduates

These indicators compare average literacy scores on the PIAAC assessment for 25 to 34 year old university (Indicator 2.2.1) and college (Indicator 2.2.2) graduates. Literacy is defined as "understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential" (OECD, 2012). Literacy scores, which are measured on a scale of 0 to 500, are then categorized into five levels. Average literacy scores fall within the score range of Level 3 for all ten provinces. "Texts at this level are often dense or lengthy. Understanding text and rhetorical structures is often required, as is navigating complex digital texts" (OECD, 2012).

Average literacy scores for 25 to 34 year old university graduates, excluding recent immigrants

Average literacy scores for 25 to 34 year old college graduates, excluding recent immigrants

Source: Programme for the International Assessment of Adult Competencies (PIAAC), 2012.
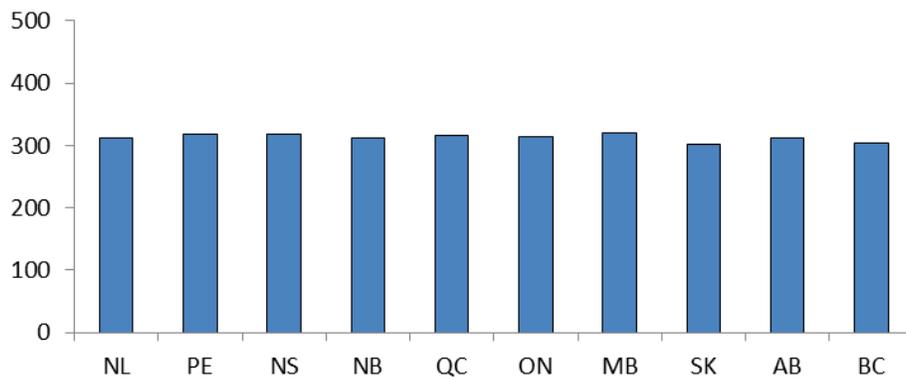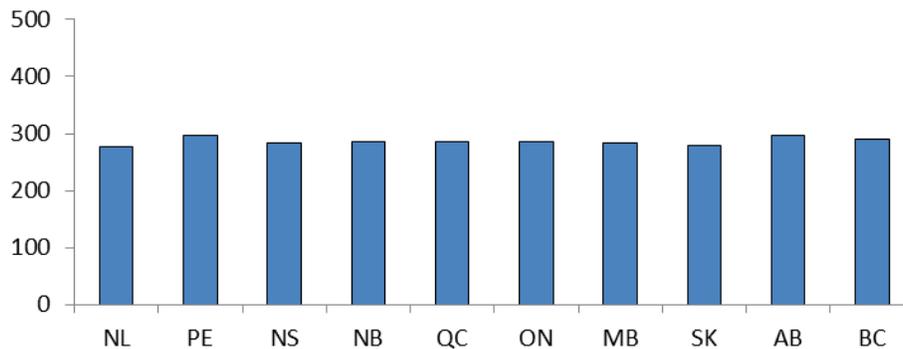
Additional notes:

- Highest level of schooling completed is organized using the International Standard Classification of Education (ISCED) levels.

- University graduates include bachelor's degree and above (ISCED level 5A and 6).

- College graduates include college or CEGEP diploma or a university certificate below a bachelor's degree (ISCED level 5B).

- Score ranges for the literacy levels are: 0-175 for Below Level 1, 176-225 for Level 1, 226-275 for Level 2, 276-325 for Level 3, 326-375 for Level 4 and 376-500 for Level 5.

- Recent immigrants are defined as those having arrived in Canada less than five years ago. These individuals have been excluded from the calculation of the indicator.

Indicators 2.2.3 and 2.2.4: Adult Numeracy Skills: Average literacy scores for 25 to 34 year old postsecondary graduates

These indicators compare average numeracy scores on the PIAAC assessment for 25 to 34 year old university (Indicator 2.2.3) and college (Indicator 2.2.4) graduates. Numeracy is defined as the "the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life" (OECD, 2012). As with literacy, PIAAC measures numeracy scores on a scale of 0 to 500, where scores are then categorized into five levels. Average numeracy scores fall within the score range of Level 3 for all ten provinces. "Tasks at this level require the application of number sense and spatial sense; recognising and working with mathematical relationships, patterns, and proportions expressed in verbal or numerical form; and interpreting data and statistics in texts, tables and graphs" (OECD, 2012).

2.2.3

Average literacy scores for 25 to 34 year old university graduates, excluding recent immigrants

2.2.4

Average literacy scores for 25 to 34 year old college graduates, excluding recent immigrants

Source: Programme for the International Assessment of Adult Competencies (PIAAC), 2012.

Additional notes:

- Highest level of schooling completed is organized using the International Standard Classification of Education (ISCED) levels.

- University graduates include bachelor's degree and above (ISCED level 5A and 6).

- College graduates include college or CEGEP diploma or a university certificate below a bachelor's degree (ISCED level 5B).

- Score ranges for the numeracy levels are: 0-175 for Below Level 1, 176-225 for Level 1, 226-275 for Level 2, 276-325 for Level 3, 326-375 for Level 4 and 376-500 for Level 5.

- Recent immigrants are defined as those having arrived in Canada less than five years ago.

2.3 – Student Finances

The financial burden of acquiring a postsecondary education is most typically measured through examination of tuition fees or graduate debt loads.

Indicator 2.3.1: Student Fees – Average undergraduate tuition and compulsory fees for full-time domestic students

Tuition is difficult to compare across Canada. Statistics Canada publishes an annual comparison of average provincial undergraduate sticker price tuition through the Survey of Tuition and Living Accommodation Costs for Full-time Students at Canadian Degree-Granting Institutions (TLAC). This does not take into account the various deductions (for scholarships, non-repayable student aid and tax credits) available to students. A more detailed comparison through case studies of net tuition after these deductions was recently published by Higher Education Strategy Associates (HESA, 2014). However, the valuable comparisons contained in that report do not avail themselves to the creation of a simple measure of comparative average net cost across the province.

Despite its flaws, we have chosen to include the 2013-2014 Statistics Canada sticker price comparison of tuition, which does at least represent the "publicly traded" price of undergraduate education in each province and reflects the price a prospective student will see when comparing program costs on institutional websites, even though the actual tuition cost he or she will ultimately pay is generally less.

The indicator includes "ancillary" or additional compulsory fees that institutions charge in addition to the posted tuition price.

This information is not available for college tuition across Canada.

Average undergraduate tuition and compulsory fees for full-time domestic students, 2013
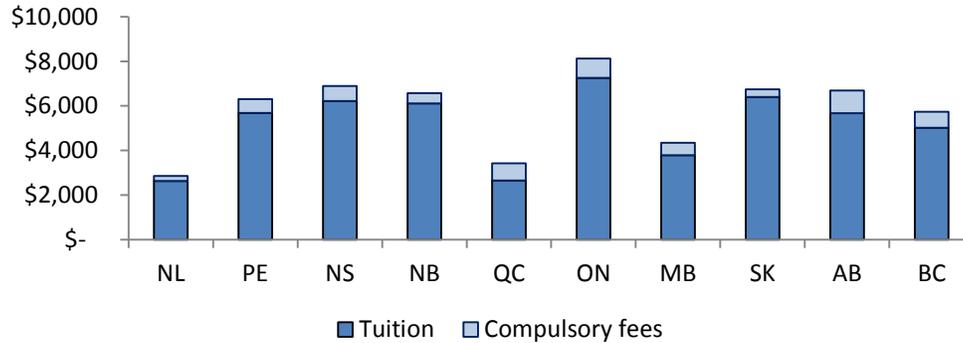
Source: Statistics Canada, Survey of Tuition and Living Accommodation Costs for Full-time Students at Canadian Degree-Granting Institutions (TLAC)
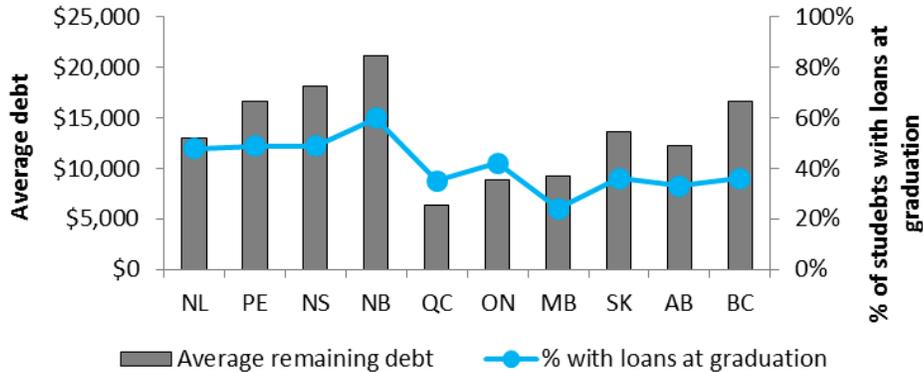
Additional notes:

- Weighted averages are calculated using the most current enrolment data available.

- Both in-province and out-of-province students are included in the calculations for Quebec and Nova Scotia.

Indicators 2.3.2 and 2.3.3: Average Graduate Debt – Average government student loan debt three years after graduation for bachelor's graduates and college graduates

In the 2013 National Graduate Survey, respondents self-reported the amount of government debt (federal and provincial combined) they were carrying three years after graduation. We show the average debt load reported by all university graduates (Indicator 2.3.2) and college graduates (Indicator 2.3.4) who reported government debt at the point of graduation. We also show the percentage of graduates in each province who reported carrying debt at the time of graduation. Graduates who pursued further education since they graduated in 2009 have been excluded.

Average government student loan debt three years after graduation, 2009 bachelor's graduates, borrowers only

Average government loan debt three years after graduation, 2009 college graduates, borrowers only
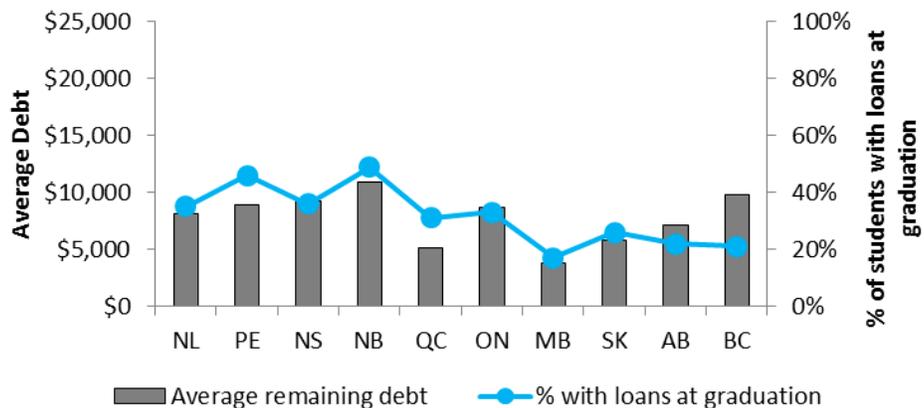
Source: Statistics Canada, National Graduate Survey (2013)

Additional notes:

- The above figure shows the average remaining debt three years after graduation for graduates who owed money on government student loans at the time of graduation. It includes students who paid off their entire debt within three years after graduation.

Common NGS notes:

- Graduates who pursued further education after their 2009-2010 graduation are excluded.

- Statistics Canada reports some under-coverage for graduates of colleges in some provinces. Data required to build the frame could not be obtained from a few institutions and therefore graduates from those institutions were not included on the frame. Consequently, they could not be selected nor represented in any tabulation. No adjustment was made at the weighting stage to compensate for this under-coverage.

Indicator 2.3.4 and Indicator 2.3.5: Repayment Assistance Plan Participation – Canada Student Loans Program Repayment Assistance Plan uptake rates

The Canada Student Loans Program (CSLP) integrates with provincial student aid programs across the country, which vary in design from province to province. As a result, measures of CSLP loan portfolio volumes and levels by province do not tell a comparable story.

However, two reported performance measures under CSLP can be used as a general bellwether of loan affordability across the country under each of the provincial aid schemes, as they indicate the degree to which graduates in each province are unable to balance their debt burden against their post-graduation incomes.

The first is the rate of borrower recourse to CSLP's Repayment Assistance Plan (RAP). RAP is available to borrowers who are having difficulty making their monthly Canada Student Loan payments. RAP is income-tested and applies first to reduce interest payments and in a second longer-term stage to help pay of a portion of the principal owed.

RAP uptake rates are defined as the ratio of the number of borrowers who entered repayment in a loan year and used RAP in the same year, to the total number of borrowers who entered repayment during the year.

Quebec does not participate in the CSLP and is not included in the indicator. For all other provinces, the indicator shows the RAP uptake rates for students who participated in the CSLP program and attended either university or college.
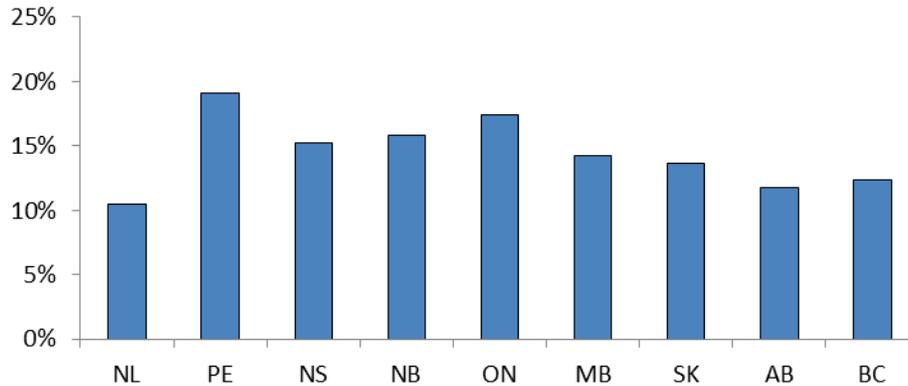
2.3.4

Canada Student Loans Program Repayment Assistance Plan (RAP) uptake rates for universities, 2012
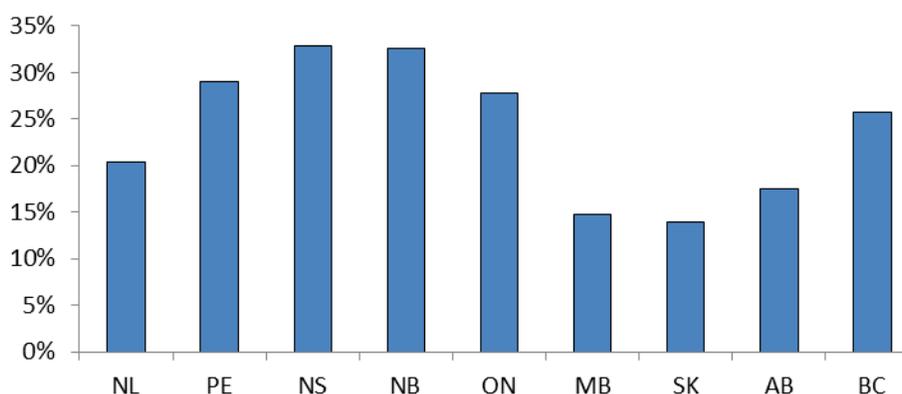
Canada Student Loans Program Repayment Assistance Plan (RAP) uptake rates for colleges, 2012

[Bar chart showing RAP uptake rates by province. Approximate values: NL 18%, PE 21%, NS 27%, NB 27%, ON 29%, MB 14.5%, SK 10.5%, AB 15%, BC 23%. Y-axis ranges from 0% to 35%.]
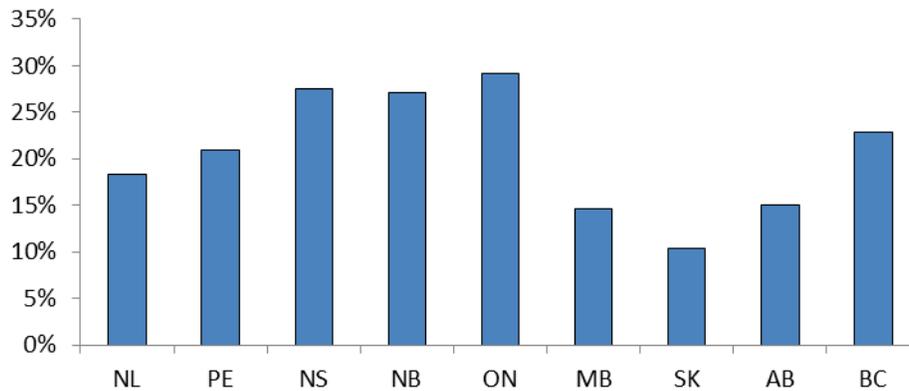
Source: Employment and Social Development Canada, custom tabulation

Indicator 2.3.6 and 2.3.7: Student Loan Default Rates – Canada Student Loans Program repayment default rates

The second CSLP bellwether is the province-by-province default rate, a measure of the percentage of federal borrowers who are unable to meet their debt obligations even after recourse to mitigation such as the Repayment Assistance Plan (Indicator 2.3.4 and Indicator 2.3.5). Again, these indicators pertain only to federal loan levels, though it is reasonable to assume that when triggering a federal default, a graduate is also generally failing to meet overall repayment obligations from all sources.

As Quebec does not participate in the CSLP, it is not included in the indicator. For all other provinces, the indicator shows the three-year cohort default rate for students who participated in the CSLP program and attended either university or college.

Canadian Student Loan Program repayment default rates for universities, 2010

[Bar chart showing repayment default rates by province. Approximate values: NL 5.5%, PE 8%, NS 9.5%, NB 10%, ON 9%, MB 10.5%, SK 8.5%, AB 5.5%, BC 9%. Y-axis ranges from 0% to 20%.]
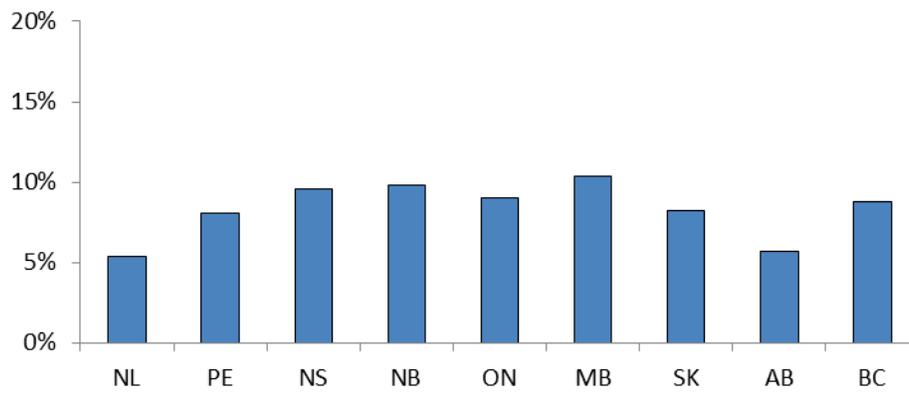
Canadian Student Loan Program repayment default rates for colleges, 2010

Source: Employment and Social Development Canada, custom tabulation

Additional notes:

• The Canada Student Loans Program measures default rates using the three-year cohort default rate. This rate shows the proportion of loan dollars that enter repayment in a given loan year (cohort) and default within three years. For example, the 2010 default rates represent the proportion of loan dollars that entered repayment in 2010 and defaulted before August 1, 2013.

2.4 – Jobs for Graduates

This component measures the important outcome of job success for postsecondary education graduates. We recognize that graduates' success in the labour market is a function of many factors, not just their postsecondary education. But jobs are important to graduates. For many, improved employability is a primary reason for investing in postsecondary education.

Indicators 2.4.1 and 2.4.2: Employment Rates after Graduation – Employment rate for bachelor's graduates and college graduates three years after graduation

How quickly do new graduates integrate into the labour market across the provinces? Three years after graduation, some graduates are still studying (adding another credential) and some are not actively looking for work for a variety of other reasons. Of the remainder – those in the labour market – these indicators report the percentage who say that they are working on a full-time or part-time basis. Provincial graduate employment rates reflect the province of study, not the province in which the graduate resided after graduation. College data for Prince Edward Island were not available for the reference period.

2.4.1

Employment rate for bachelor's graduates three years after graduation, class of 2009
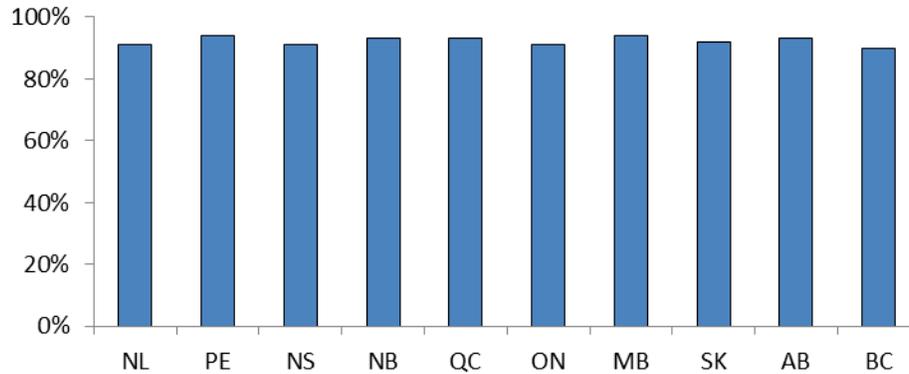
2.4.2

Employment rate for college graduates three years after graduation, class of 2009
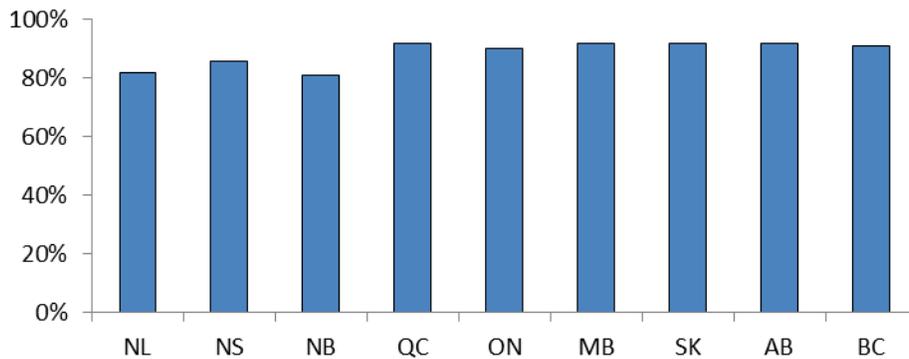
Source: Statistics Canada, NGS (2013)

Additional notes:

- Employment rates are based on province of study.
- Data for college graduates from Prince Edward Island were not available for the reference period.
- See common NGS notes from Indicator 2.3.2 and 2.3.3: Average Graduate Debt.

Indicators 2.4.3 through 2.4.5: Unemployment Rates: Difference in the unemployment rate for 25 to 34 year old postsecondary graduates and high school graduates

A second measure of labour market advantage (in addition to graduate employment) is the longer-term relationship between postsecondary education and risk of unemployment. These indicators compare the official unemployment rate for young adults aged 25 to 34 with a bachelor's degree (Indicator 2.4.3), a college credential (Indicator 2.4.4) or a trades credential (Indicator 2.4.5) to the unemployment rate for those with a high school education. The difference between the two rates is shown for each province. The age range selected focuses the examination on outcomes generated over the past decade and filters out the performance difference for older individuals.
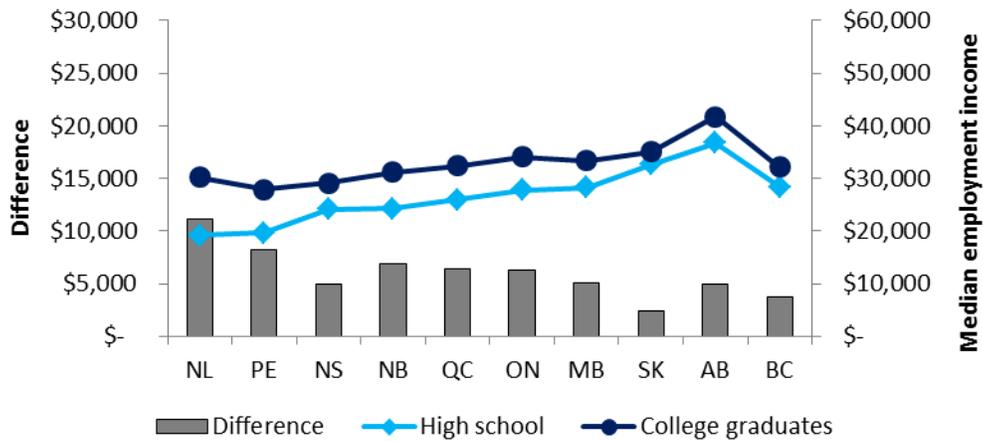
2.4.3

Difference in the unemployment rate for 25 to 34 year old bachelor's graduates and high school graduates, 2013

2.4.4

Difference in the unemployment rate for 25 to 34 year old college graduates and high school graduates, 2013
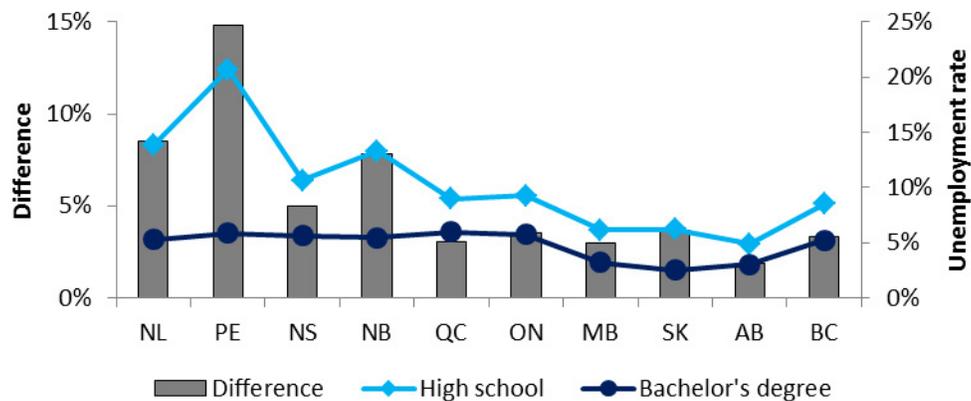
Difference in the unemployment rate for 25 to 34 year old trades graduates and high school graduates, 2013
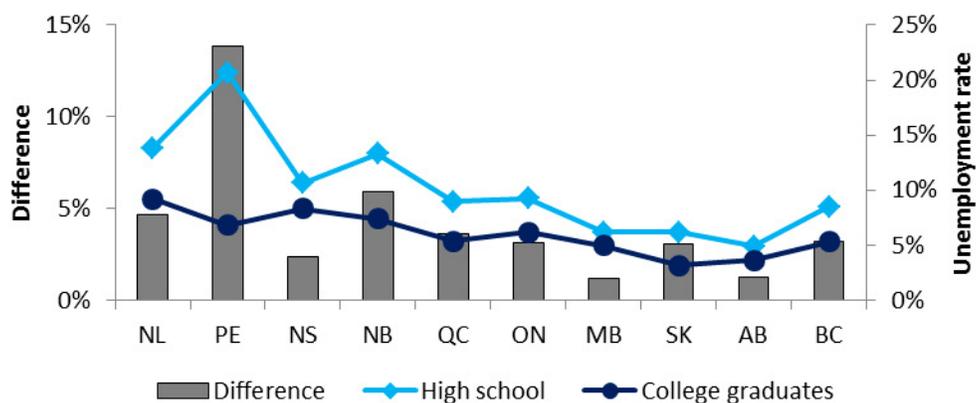
Difference | High school | Trades graduates
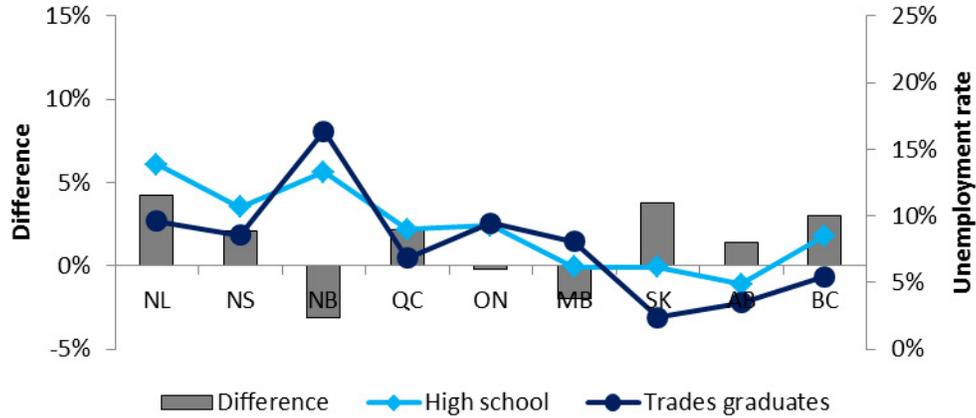
Source: Statistics Canada, LFS

Additional notes:

- The unemployment rate is the number of unemployed persons expressed as a percentage of those in the labour force.

- High school graduates are those who received a high school diploma. In Quebec, completed Secondary V. In Newfoundland and Labrador, completed fourth year of secondary.

- College graduates include a community college, CEGEP or university certificate below a bachelor's degree.

- Trades graduates include a trade certificate or diploma.

Indicators 2.4.6 through 2.4.8: Earnings Premium – Difference in median employment income for 25 to 34 year old postsecondary graduates and high school graduates

A third measure of labour market advantage (in addition to graduate employment and unemployment risk) is the differential in earnings for those with a postsecondary education against the baseline of those with high school. The three indicators following show the differential in median employment income for university (Indicator 2.4.6), college (Indicator 2.4.7) and trades (Indicator 2.4.8) respectively.

Difference in median employment income for 25 to 34 year old bachelor's graduates and high school graduates, 2010
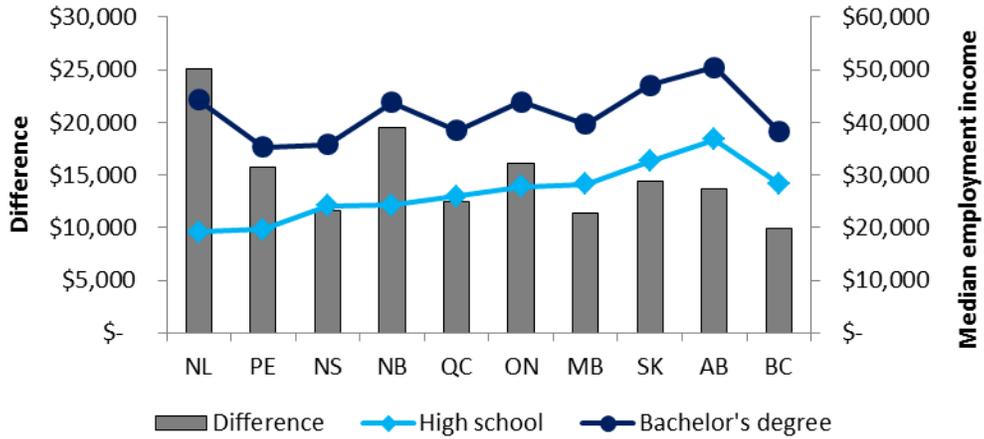
2.4.7

Difference in median employment income for 25 to 34 year old college graduates and high school graduates, 2010

Difference in median employment income for 25 to 34 year old trades graduates and high school graduates, 2010
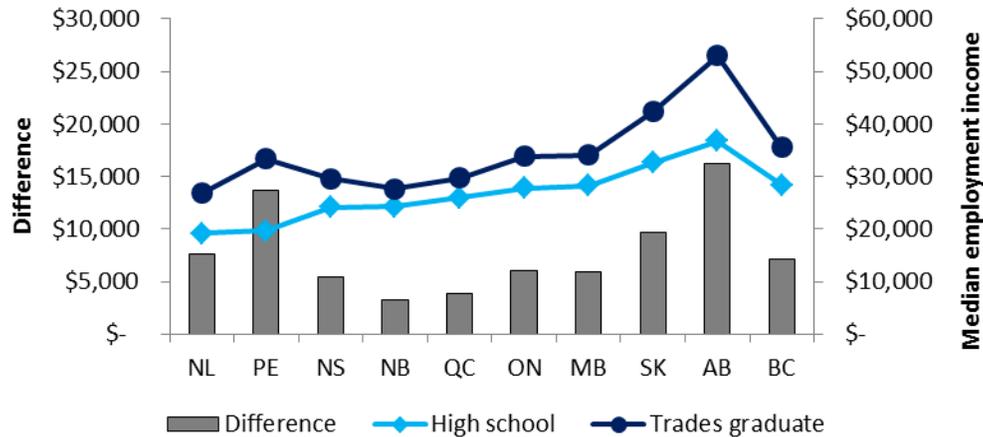
Source: Statistics Canada, NHS

Additional notes:

- Median employment income includes those who have worked since 2010.

- College graduates include graduates from college, CEGEP or other non-university certificate or diploma and university certificate or diploma below bachelor's level.

- Trades graduates include apprenticeship or trades certificate or diploma.

2.5.1 – Health and Happiness

Indicators 2.5.1 through 2.5.3: Life Satisfaction – Difference in the percentage of 25 to 64 year old postsecondary graduates and high school graduates who self-reported to be satisfied with life

These indicators measure self-reported life satisfaction by level of educational attainment based on data from the General Social Survey (GSS) in 2010, which is a survey administered through Statistics Canada and focused on time stress and well-being. Survey participants were asked to use a scale of 1 to 10, where 1 means "very dissatisfied" and 10 means "very satisfied", to describe how they feel about their life as a whole at the time the survey was filled out. We present the difference in reported life satisfaction for adults aged 25 to 64 with university, college or trades credentials against the baseline for adults with a high school education.
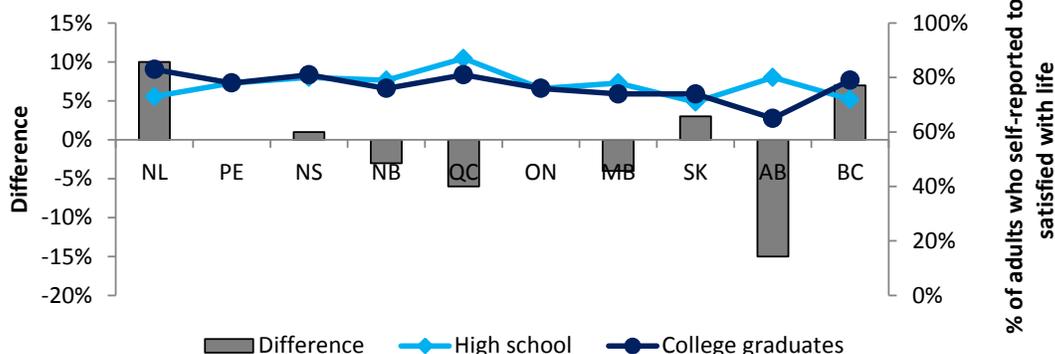
Difference in the percentage of 25 to 64 year old university graduates and high school graduates who self-reported to be satisfied with life
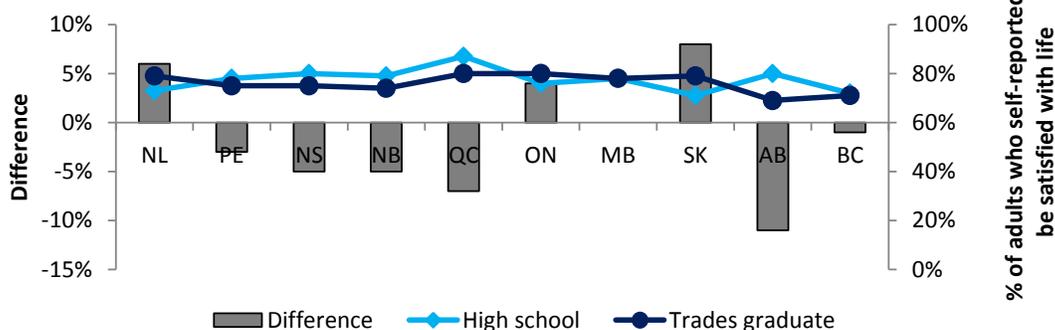

Legend: Difference — High school — University graduates

Difference in the percentage of 25 to 64 year old college graduates and high school graduates who self-reported to be satisfied with life
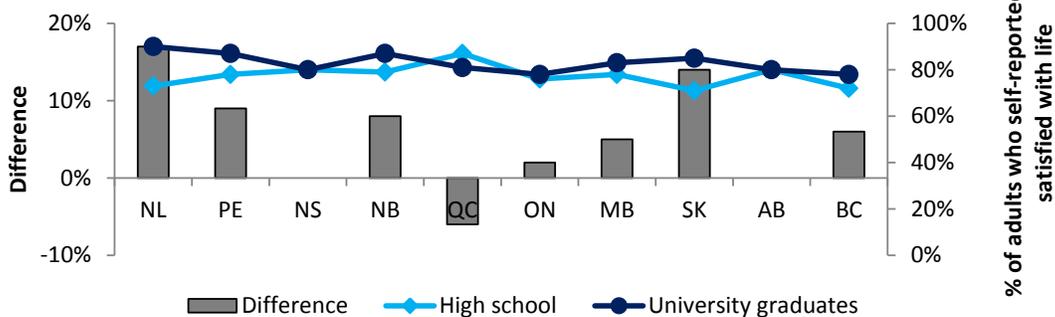
Legend: Difference — High school — College graduates

Difference in the percentage of 25 to 64 year old trades graduates and high school graduates who self-reported to be satisfied with life

Legend: Difference — High school — Trades graduate

Source: Statistics Canada, General Social Survey (GSS), 2010

Common GSS notes:

- University graduates include bachelor's and above.

- College graduates include diploma/certificate from community college.

- Trades graduates include diploma/certificate from trade/technical.

Indicators 2.5.4 through 2.5.6: Physical Health – Difference in the percentage of 25 to 64 year old postsecondary graduates and high school graduates who self-reported to be in very good or excellent health

Using the same General Social Survey on time stress and well-being, these indicators measure the difference in self-reported physical health for adults aged 25 to 64 for postsecondary graduates and high school graduates. Respondents were asked to rate their health on a five-point scale (1=excellent, 2=very good, 3=good, 4=fair, 5=poor).

2.5.4

Difference in the percentage of 25 to 64 year old university graduates who self-reported to be in very good or excellent health
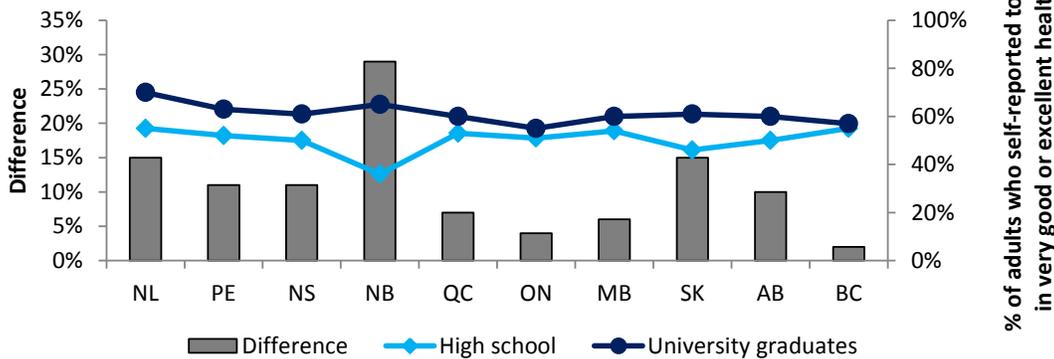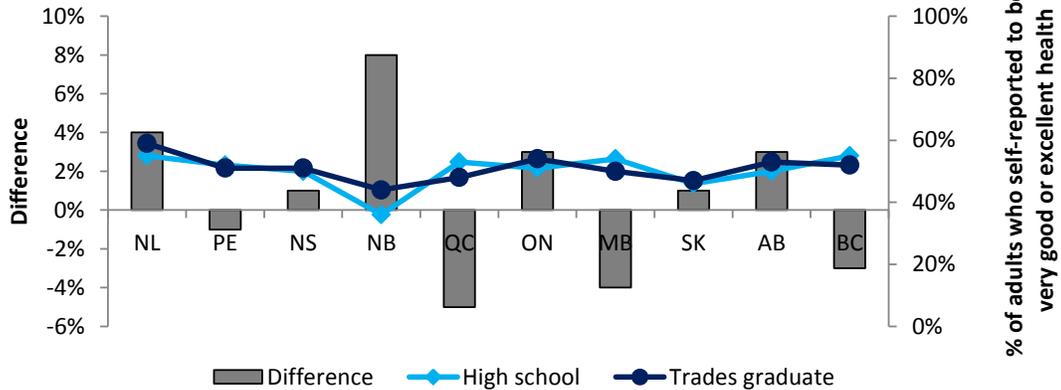
2.5.5

Difference in the percentage of 25 to 64 year old college graduates who self-reported to be in very good or excellent health
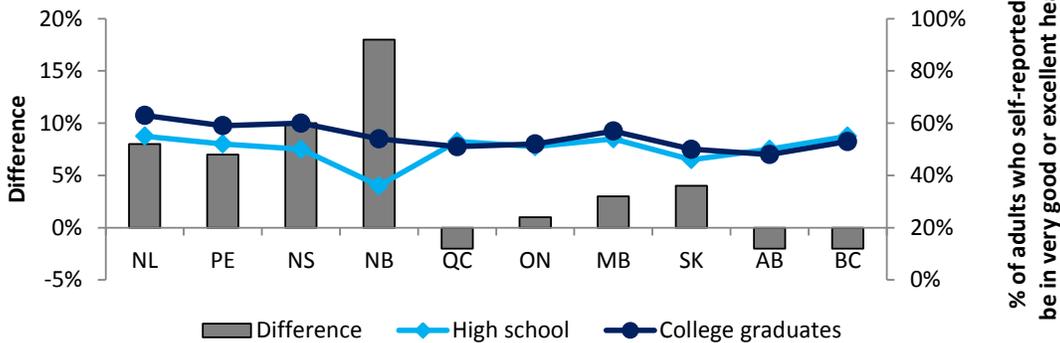
Difference in the percentage of 25 to 64 year old trades graduates who self-reported to be in very good or excellent health

Source: Statistics Canada, General Social Survey (GSS), 2010
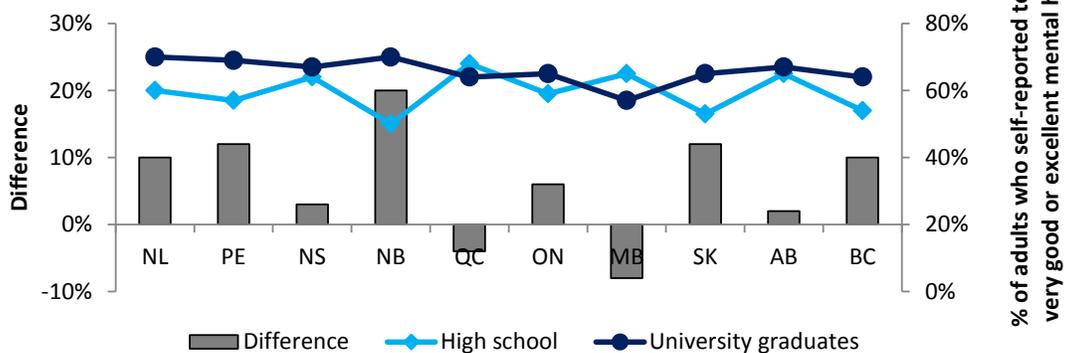
Additional notes:

• See common GSS notes from Indicators 2.5.1 to 2.5.3: Life Satisfaction.

Indicators 2.5.7 through 2.5.9: Mental Health – Difference in the percentage of 25 to 64 year old postsecondary graduates and high school graduates who self-reported to be in very good or excellent mental health

These indicators measure self-reported mental health or adults aged 25 to 64, gathered from the same General Social Survey on time stress and well-being. We present the difference in reported mental health for adults with university, college or trades credentials, against the baseline for adults with a high school education. Respondents were asked to rate their health on a five-point scale (1=excellent, 2=very good, 3=good, 4=fair, 5=poor). The following graphs show the percentage of adults who reported to be in very good or excellent mental health.
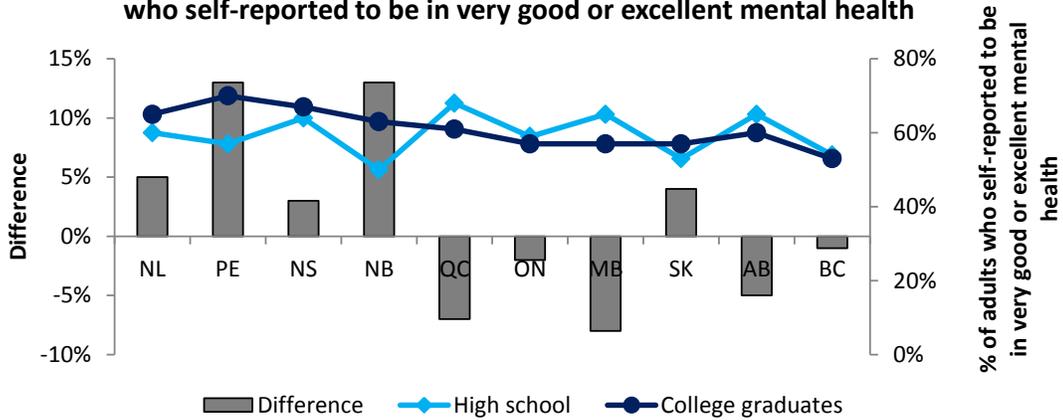
Difference in the percentage of 25 to 64 year old university graduates who self-reported to be in very good or excellent mental health
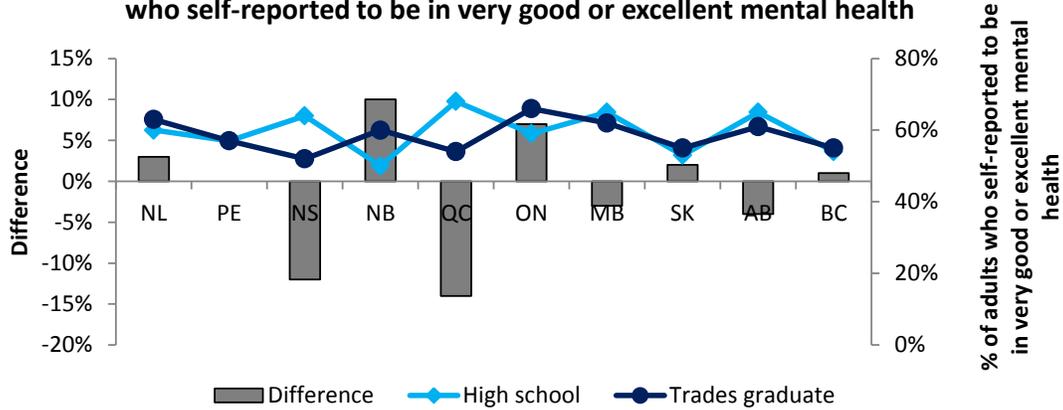
**Difference in the percentage of 25 to 64 year old college graduates
who self-reported to be in very good or excellent mental health**

**Difference in the percentage of 25 to 64 year old trades graduates
who self-reported to be in very good or excellent mental health**

Source: Statistics Canada, General Social Survey (GSS), 2010

Additional notes:

• See common GSS notes from Indicators 2.5.1 to 2.5.3: Life Satisfaction.

Indicators 2.5.10 through 2.5.12: Smoking Status – Difference in the percentage of 25 to 64 year old postsecondary graduates and high school graduates who self-reported to have never smoked

Using the Canadian Alcohol and Drug Use Monitoring Survey (CADUMS), these indicators measure the proportion of the adult population who self-reported to have never smoked. We present the difference in reported non-smoking status for adults with university, college or trades credentials against the baseline for adults with a high school education.
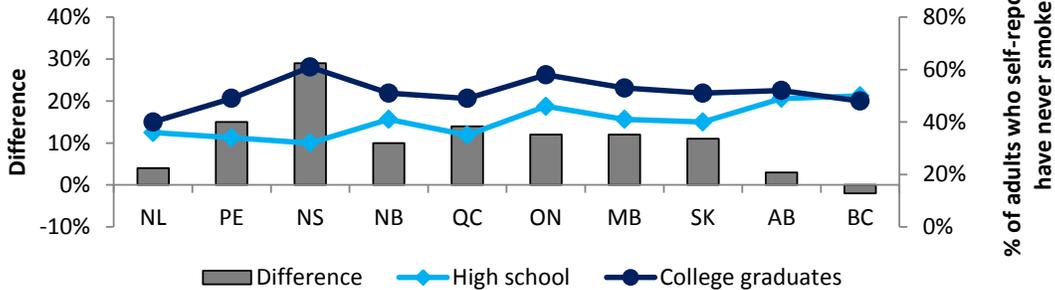
2.5.10

Percentage of 25 to 64 year old university and high school graduates who self-reported to have never smoked and the difference in these proportions


Legend: Difference | High school | University graduates
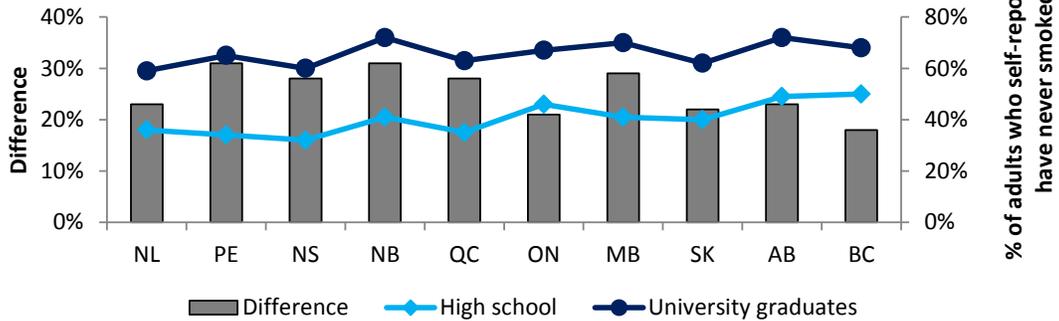
2.5.11

Percentage of 25 to 64 year old college and high school graduates who self-reported to have never smoked and the difference in these proportions

Legend: Difference | High school | College graduates

Percentage of 25 to 64 year old trades and high school graduates who self-reported to have never smoked and the difference in these proportions
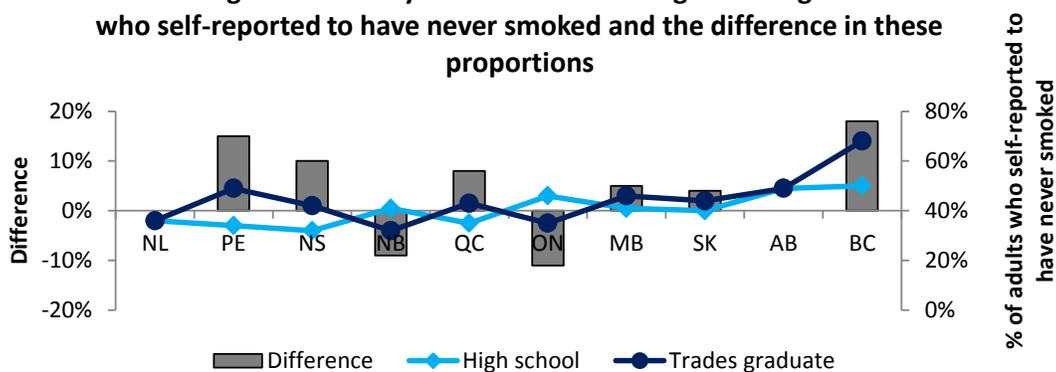
Source: Statistics Canada, Canadian Alcohol and Drug Use Monitoring Survey (CADUMS), 2012

Additional notes:

- A "never smoker" is defined as a person who is a lifetime abstainer or who was an experimental smoker (smoked fewer than 100 cigarettes).

- University graduates include bachelor's and above.

- College graduates include community college.

- Trades graduates include technical school.

APPENDIX 3 – VALUE TO SOCIETY INDICATORS

This set of indicators changes the focus from returns to the individual to returns to society. What are the correlations between postsecondary education and job creation, knowledge creation and citizen engagement across the provinces?
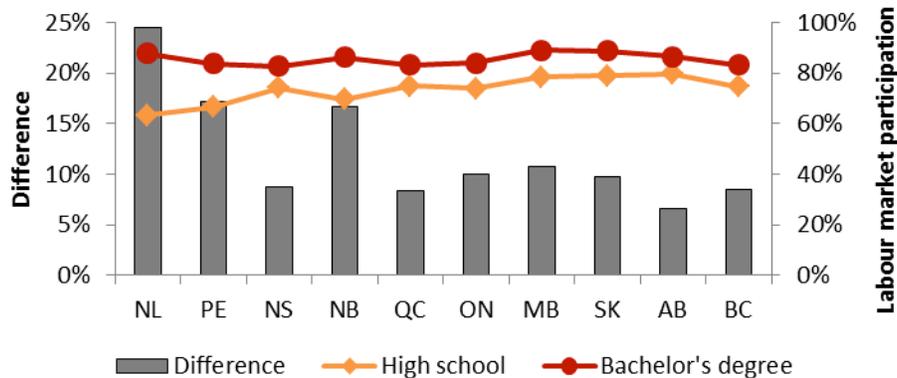
3.1 – Job Creation

Indicators 3.1.1 to 3.1.3: Labour Market Participation – Difference in the labour market participation rate for 25 to 34 year old postsecondary graduates and high school graduates

These indicators look at the correlation between level of education and the rate of adult participation in the labour market. It compares the percentage of participating adults with university bachelor's degrees (Indicator 3.1.1), college credentials (Indicator 3.1.2) or trades credentials (Indicator 3.1.3) against the baseline of those with a high school education. The difference between the two rates is shown for each province.
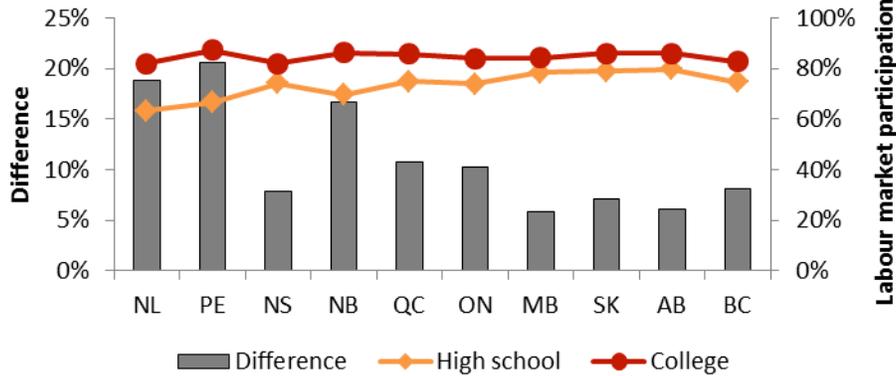
3.1.1

Labour market participation for 25 to 34 year old high school and bachelor's graduates and the difference in these rates
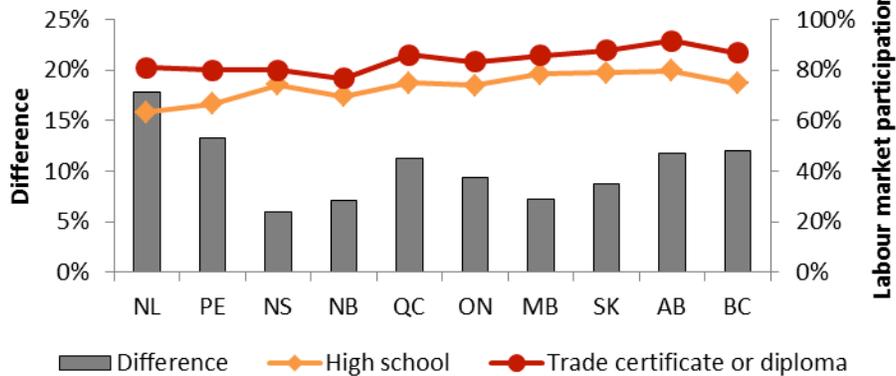
Labour market participation rate for 25 to 34 year old high school and college graduates and the difference in these rates

Difference — High school — College

Labour market participation rate for 25 to 34 year old high school and trades graduates and the difference in these rates

Difference — High school — Trade certificate or diploma
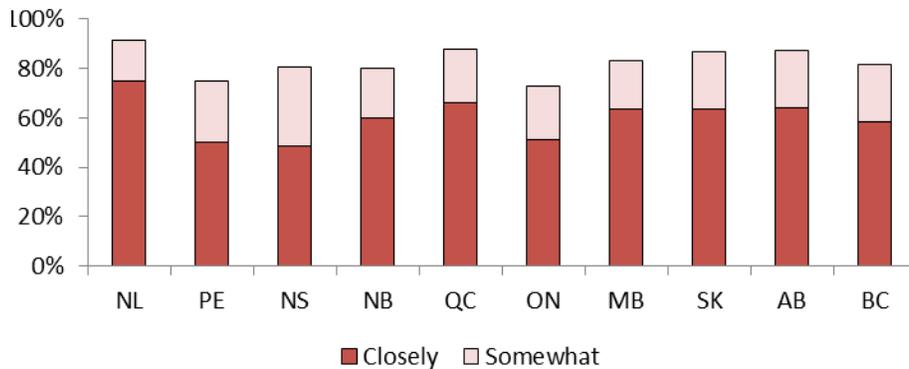
Source: Statistics Canada, LFS

Additional notes:

- The labour force participation rate is the number of persons employed expressed as a percentage of the population. Statistics Canada calls this the "employment rate", but we avoid that label as it has been elsewise used in this report to refer to graduate employment rates from Statistics Canada's National Graduate Survey.

- High school graduates are those who received a high school diploma; in Quebec, completed Secondary V; in Newfoundland and Labrador, completed fourth year of secondary.

- College graduates include community college, CEGEP or university certificate below bachelor's.

Indicators 3.1.4 and 3.1.5: Related Employment – Percentage of postsecondary graduates working in a related job three years after graduation

The indicators reveal the fit between the supply of postsecondary education graduates and the needs of the provincial job market by showing the percentage of 2009 university (Indicator 3.1.4) and college (Indicator 3.1.5) graduates in each province who reported that their job three years after graduation was related to their studies.
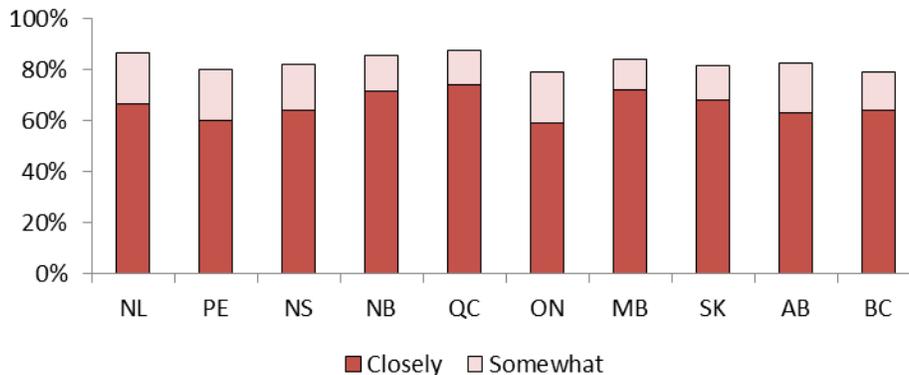
3.1.4

Percentage of bachelor's graduates working in a related job three years after graduation, class of 2009

■ Closely □ Somewhat

3.1.5

Percentage of college graduates working in a related job three years after graduation, class of 2009

■ Closely □ Somewhat

Source: Statistics Canada, NGS (2013)

Additional notes:

- See common NGS notes from Indicator 2.3.2 and 2.3.3: Average Graduate Debt.

- Statistics Canada advises that the percentage of university graduates working in a job not related to field of study should be used with caution for Quebec.

- Statistics Canada advises that the percentage of college graduates working in a job not related to field of study should be used with caution for Newfoundland

and Saskatchewan, and that the percentage of college graduates working in a job somewhat related to field of study should be used with caution for Newfoundland, Prince Edward Island, Quebec, Saskatchewan and British Columbia.

Indicator 3.1.6: Overqualification Rates – Probability of bachelor's graduates aged 25 to 34 working in jobs usually requiring college education or less

Using data from the National Household Survey (NHS), Uppal and LaRochelle-Côté (2014) examined overqualification rates among recent university graduates in Canada. This indicator reveals the fit between the supply of university graduates and the needs of the job market by calculating the probability that the job in which a recent university graduate is working requires a college education (or less).

3.1.6

Probability of bachelor's graduates aged 25 to 34 working in jobs usually requiring college education or less
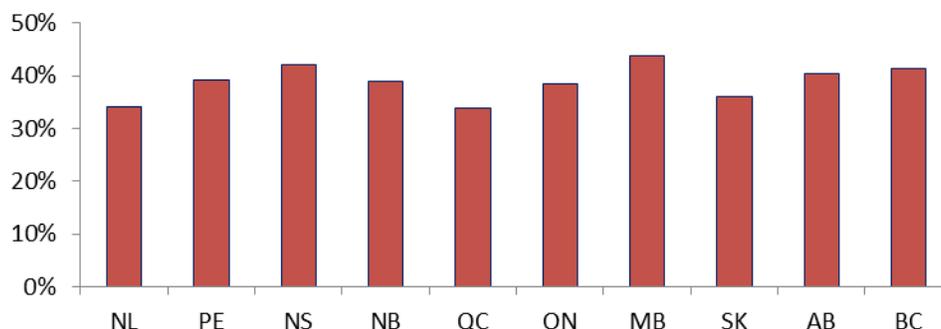
Source: Uppal & LaRochelle-Côté (2014)

Additional notes:

- Bachelor's graduates are classified as overqualified if they are working in jobs that do not require a bachelor's degree based on the National Occupational Classification (NOC). The education-occupation matching process is based on the education-occupation matrix developed by Employment and Social Development Canada (ESDC).

- The authors estimate the factors associated with overqualification by running a multivariate (probit) model. Measures such as age, gender, province of residence, immigration status and field of study were included. The above graphs show the predicted probabilities from these models. Ontario is the reference group.

Indicator 3.1.7: Percentage of the Population with an Advanced Degree – Percentage of 25 to 64 year olds with an advanced degree

A subset of the overall adult attainment rate (Access Indicators 1.2.1 to 1.2.3) is the proportion of the adult population that has attained an advanced degree at the graduate level. This is included as a value to society measure as many provinces have articulated and supported growth in graduate enrolment as an important contributor to the creation of a highly skilled workforce.

3.1.7

Percentage of 25 to 64 year olds with an advanced degree, 2013
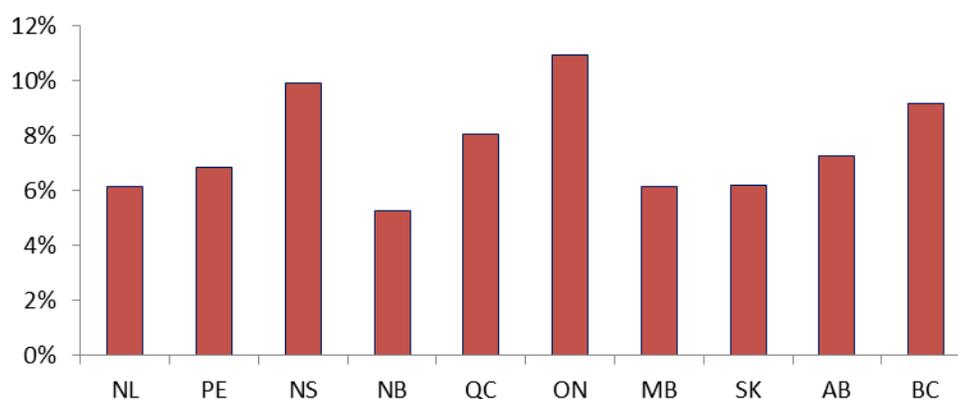
Source: Statistics Canada, LFS

Additional notes:

• Advanced degree includes any credential above a bachelor's degree.

3.2 – New Discoveries

Indicators 3.2.1: Research Funding – Sponsored research income per full-time university faculty member

This indicator shows total reported sponsored research funding per faculty member for each province. The value of all sponsored research reported by universities to the Canadian Association of University Business Officers annual report on financial information of universities is used. Federal tri-council funding, a subset of this total, is shown separately to provide additional information. 2010 was selected for the reporting year as this matches the latest available count of full-time university faculty across the provinces.

Sponsored research income per full-time university faculty member, 2010
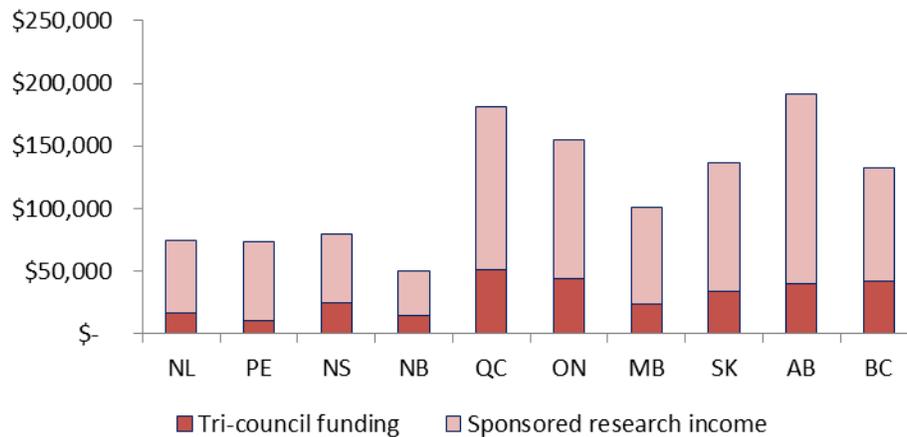
Source: Statistics Canada, Canadian Association of University Business Officers (CAUBO) and UCASS
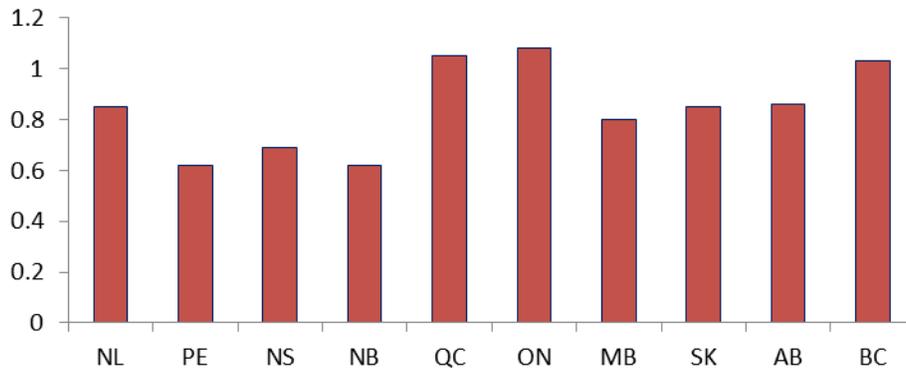
Additional notes:

- Data are calculated for institutions included in both UCASS and CAUBO.

- The data include a number of affiliates and non-publically funded institutions. Their collective faculty counts and sponsored research income do not materially impact the analysis.

- Sponsored research income includes funds to support research paid either in the form of a grant or by means of a contract from a source external to the institution. Income sources include government, private industry and donors.

- UCASS data includes all full-time teaching staff regardless of rank.

Indicators 3.2.2: Research Impact – Mean normalized H-scores of faculty members in universities

The Hirsh or "H" index is designed to measure both the quantity of faculty research publications and their impact as measured by the number of times these publications are cited in the Google Scholarship database. The indicator presents a provincial comparison of H-scores for faculty in each province across the country. A score of 1.0 would represent the Canadian average score.

Mean normalized H-scores of faculty members in universities

Source: Higher Education Strategy Associates (HESA)
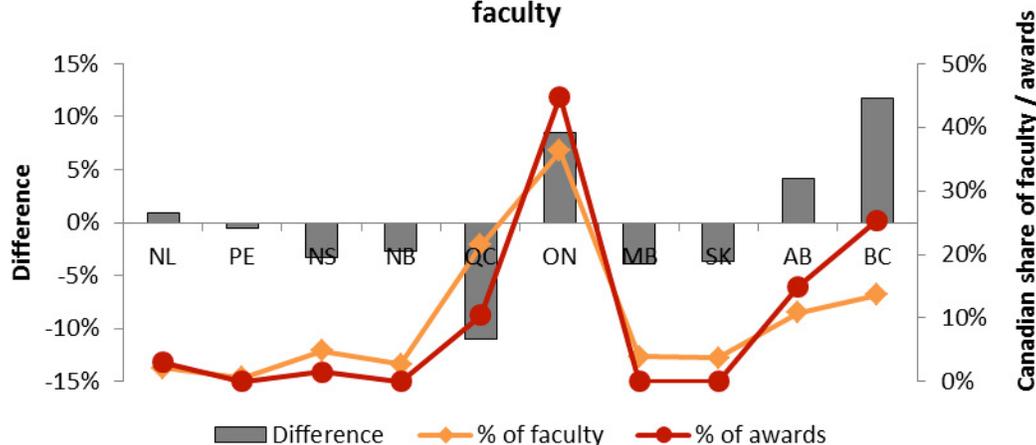
Additional notes:

- H-indexes were calculated for faculty with both a teaching and research role, including full, associate and assistant professors, deans, associate deans, chairs, associate chairs, research chairs, lecturers and instructors.

- H-index includes peer-reviewed articles, conference proceedings, books and scholarly articles.

- Scores are standardized to account for disciplinary differences.

Indicator 3.2.3: Highly Cited Researchers – Difference between the share of the top 1% most cited university researchers in Canada and the share of full-time faculty

The measure reflects each province's share of a global ranking of the top 1% most cited researchers. Thomson Reuters created a list of the most highly cited researchers in the sciences and social sciences from 2002 to 2012 using citations, which were standardized to account for disciplinary differences, from articles and reviews in science and social sciences journals indexed in the Web of Science Core Collection. Only Highly Cited Papers – papers that rank in the top 1% by citations for field and year – were considered. To normalize for variations in size, we present the difference in the proportion of the top 1% most cited researchers and the proportion of overall faculty for each province.

Difference between the share of the top 1% most cited university reserachers in Canada and the share of full-time faculty

Source: Thomson Reuters and Statistics Canada, CANSIM Table 477-0017 – Number of full-time teaching staff at Canadian universities, by rank, sex, Canada and Provinces

Additional notes:

• Data are based off the Essential Science Indicators (2002-2012).

• Citations are based on publications between 2002 and 2012. Research items include papers defined as regular scientific articles, review articles, proceedings papers and research notes. Letters to the editor, correction notes and abstracts are not counted. Only Thomson Scientific-indexed journal articles or papers are counted.

• Citation volumes are standardized to account for disciplinary differences. There are 22 broad fields. The determination of how many researchers to include in the list for each field was based on the population of each field, as represented by the number of author names appearing on all Highly Cited Papers in that field.

• The data set includes 3,215 researchers, of which 67 have a primary affiliation with a Canadian university and were included in the indicator.

• The share of faculty members are based on 2010 UCASS data and include full-time teaching staff.

3.3 – Magnet for Talent

Indicator 3.3.1: University Rankings – World University Rankings – average number of "points" per province

Using the Times Higher Education World University Rankings, QS World University Rankings and the Academic Ranking of World Universities, we aggregate a score for each province based on universities ranked in the top 400 of these world rankings. Four points were assigned to universities within the top 100, three points if they were in the top 101-200, two points if they were in the top 201-300 and one point if they were

in the top 301-400. Points are then summed up by province for each of the three world university rankings and the average of these points is presented below.

World University Rankings - average number of "points" per province
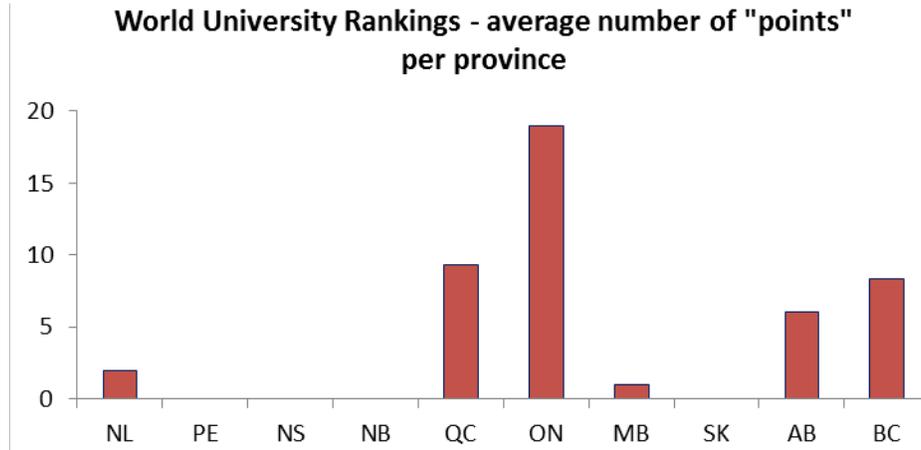
Source: Times Higher Education World University Rankings (2014), QS World University Rankings (2014) and Academic Ranking of World Universities (2014)
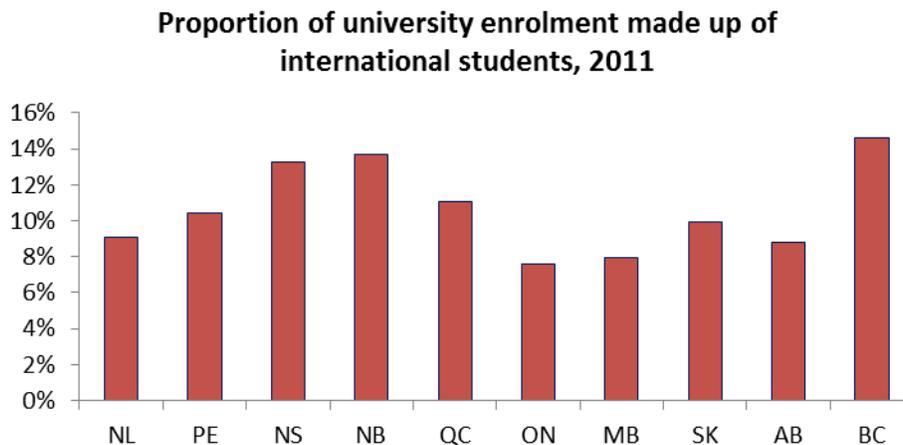
Additional notes:

- The Times Higher Education rankings provides a list of the top 400 universities, QS World Rankings a list of the top 700 universities, and Academic Rankings (Shanghai) a list of the top 500 universities. For consistency, we only look at Canadian institutions in the top 400 for all three world university rankings.

Indicator 3.3.2: International Enrolment – Proportion of university enrolment made up of international students

Growth in international enrolment is an endorsed policy objective of the federal government and several provinces. The indicator shows the proportion of university enrolment in each province that is comprised of international students.

3.3.2

Proportion of university enrolment made up of international students, 2011
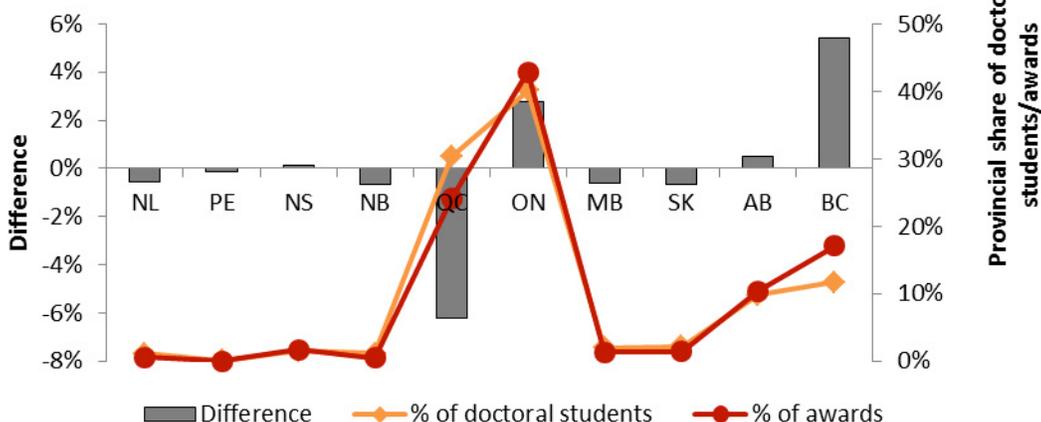

Source: Statistics Canada, PSIS

Additional notes:

- Enrolments are reported in full-time equivalent (FTE) students.

- See common PSIS notes from Indicator 1.1.1: Participation Rates.

Indicator 3.3.3: Prestigious Graduate Scholarships – Difference between the provincial share of prestigious doctoral scholarships received from 2009 to 2013 and the provincial share of doctoral students

The indicator shows the opportunities in each province for students at the doctoral level to participate in the most prestigious of awards available across Canada. It uses an amalgam of the following prestigious graduate scholarships: Vanier Canada Graduate Scholarship, NSERC André Hamer Prize, SSHRC William E. Taylor Fellowship and Pierre Elliott Trudeau Foundation Doctoral Scholarships. For each province, it measures the difference between the province's share of these scholarships over the five-year period from 2009 to 2013, divided by the province's share of Canadian doctoral students.

3.3.3

Difference between the provincial share of prestigious doctoral scholarships recieved from 2009 to 2013 and the provincial share of doctoral students

Source: Statistics Canada, PSIS; The Pierre Elliott Trudeau Foundation, Natural Sciences and Engineering Research Council (NSERC) and Social Sciences and Humanities Research Council (SSHRC) websites

Additional notes:

- Doctoral enrolments include full-time and part-time headcounts, including international students.

- The Vanier Canada Graduate Scholarships award $50,000 annually for up to three years to 167 eligible students each year. The scholarships are distributed equally among the three tri-council agencies.

- The NSERC André Hamer Prize awards $10,000 to the most outstanding candidates in NSERC's master's and doctoral scholarship competitions. Only one prize is awarded to

doctoral students each year.

- The SSHRC William E. Taylor Fellowship awards $5,000 to the most outstanding SSHRC doctoral award recipient.

- The Pierre Elliott Trudeau Foundation awards up to $60,000 annually for a maximum of three years for 15 eligible doctoral students enrolled in the social sciences and humanities at a Canadian or foreign university.
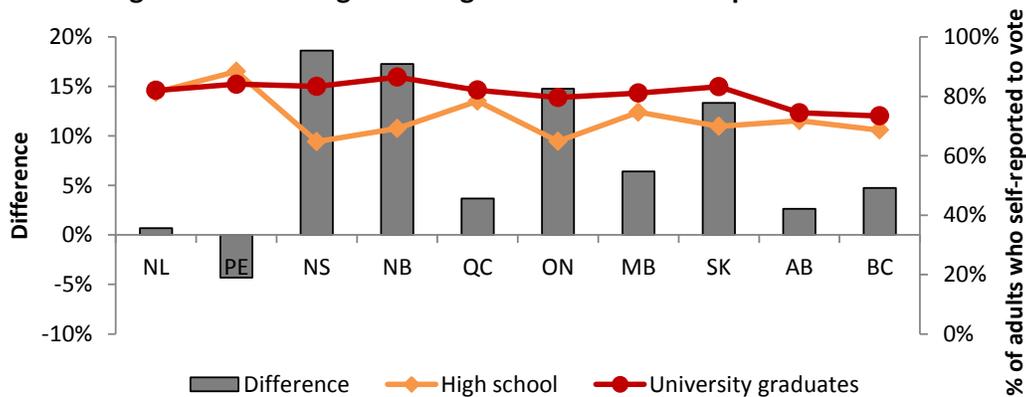
3.4 – Engaged Citizens

Indicators 3.4.1 through 3.4.3: Voting – Difference between the percentage of 25 to 64 year old postsecondary graduates and high school graduates who voted
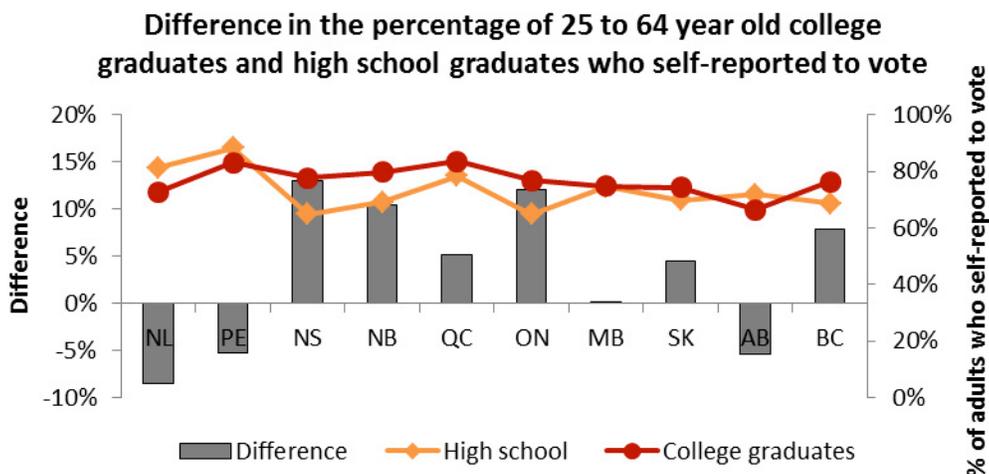
These three indicators report responses from the 2008 General Social Survey for adults aged 25 to 64 that asked whether the respondent voted in the 2006 federal election. We present the difference in the reported voting rate for adults with university, college or trades credentials, against the baseline voting rate for adults with high school education. We note that, overall, a higher percentage of survey respondents indicated that they had voted (75%) than the official voter turnout rate for that election reported by Elections Canada (65%).
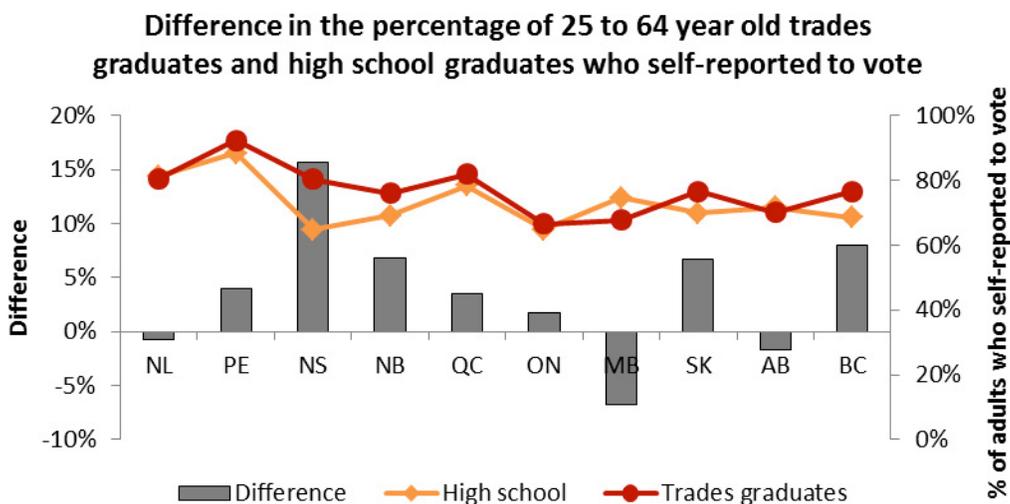
3.4.1

Difference in the percentage of 25 to 64 year old university graduates and high school graduates who self-reported to vote

Difference in the percentage of 25 to 64 year old college graduates and high school graduates who self-reported to vote

Difference in the percentage of 25 to 64 year old trades graduates and high school graduates who self-reported to vote

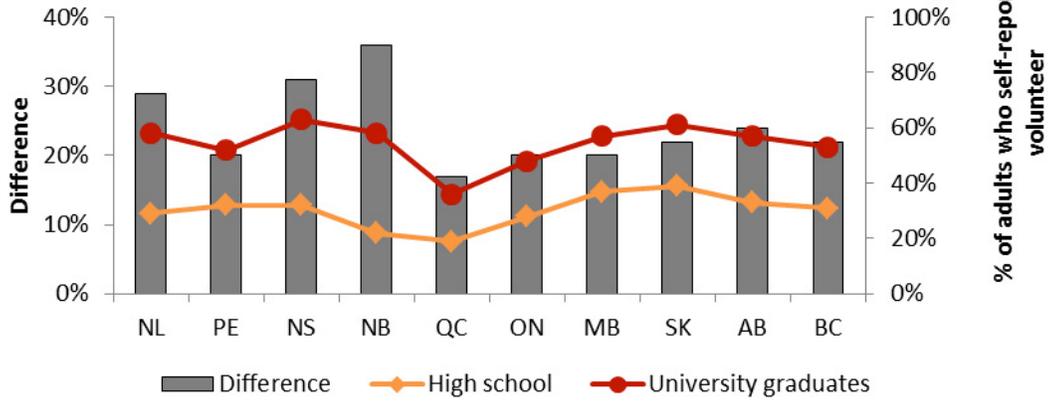Source: Statistics Canada, GSS, 2008

Additional notes:

• See common GSS notes from Indicators 2.5.1 to 2.5.3: Life Satisfaction.

Indicators 3.4.4 through 3.4.6: Volunteering – Difference between the percentage of 25 to 64 year old postsecondary graduates and high school graduates who volunteered

These three indicators report responses from the 2010 General Social Survey for adults aged 25 to 64 that asked whether the respondent volunteered. We present the difference in the reported percentage who volunteer for adults with university, college or trades credentials against the baseline for adults with high school education.

Difference in the percentage of 25 to 64 year old university graduates and high school graduates who self-reported to volunteer

Difference in the percentage of 25 to 64 year old college graduates and high school graduates who self-reported to volunteer

Difference in the percentage of 25 to 64 year old trades graduates and high school graduates who self-reported to volunteer

Source: Statistics Canada, GSS, 2010

Additional notes:

- See common GSS notes from Indicators 2.5.1 to 2.5.3: Life Satisfaction.

Indicators 3.4.7 through 3.4.9: Donating – Difference between the percentage of 25 to 64 year old postsecondary graduates and high school graduates who donated

These three indicators report responses from the General Social Survey of adults aged 25 to 64 that asked whether the respondent donated to charity. We present the difference in the reported percentage who donate for adults with university, college or trades credentials against the baseline for adults with high school education.
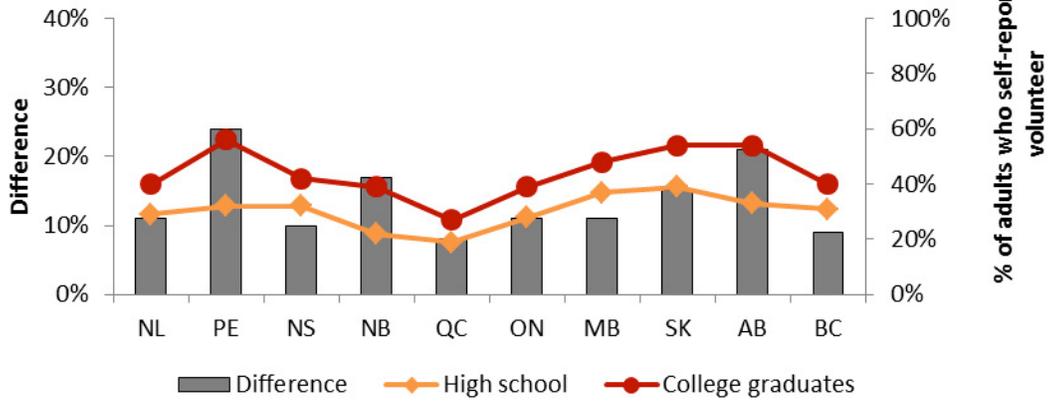
Difference in the percentage of 25 to 64 year old university graduates and high school graduates who self-reported to donate
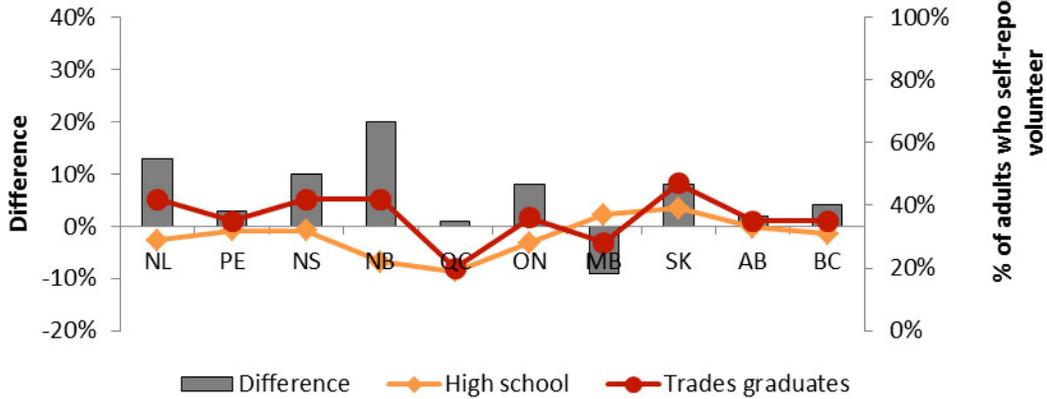
Difference in the percentage of 25 to 64 year old college graduates and high school graduates who self-reported to donate

Difference in the percentage of 25 to 64 year old trades graduates and high school graduates who self-reported to donate

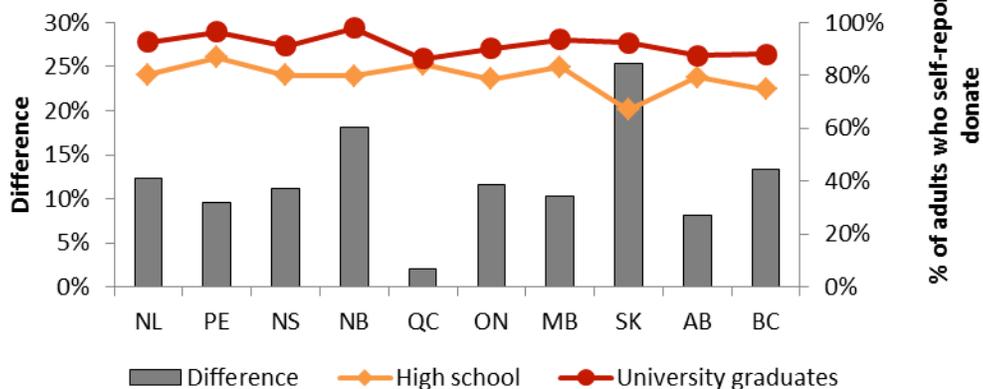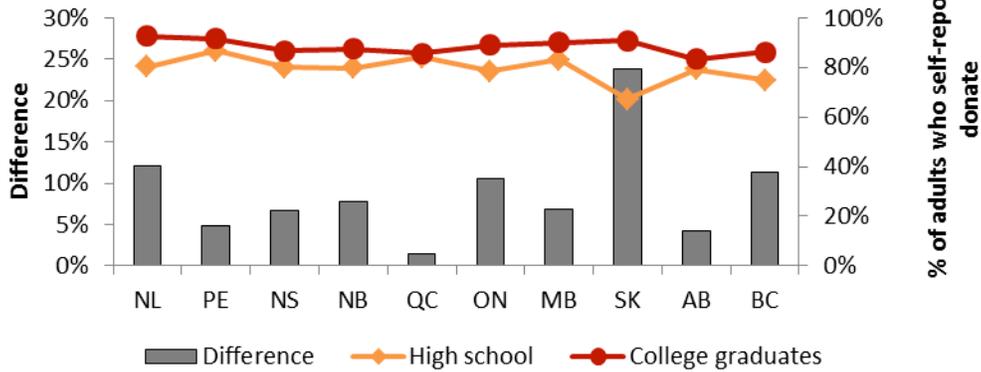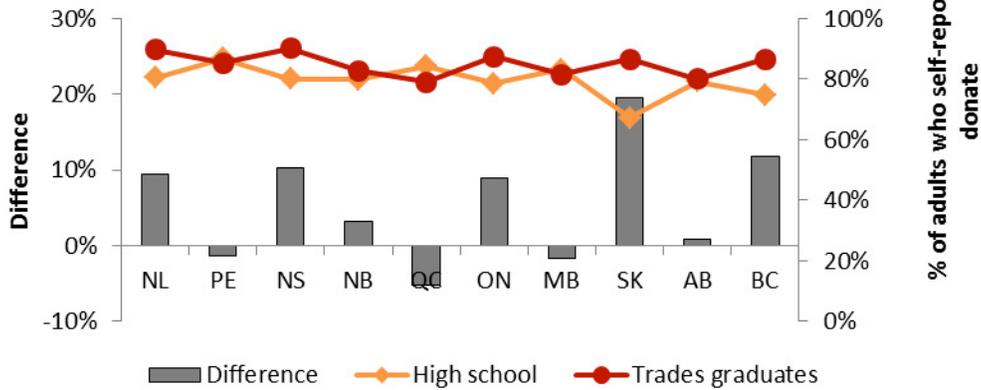Source: Statistics Canada, GSS, 2008

Additional notes:

• See common GSS notes from Indicators 2.5.1 to 2.5.3: Life Satisfaction.

APPENDIX 4 – COST INDICATORS

Our last set of indicators presents three related approaches to measuring the cost of this performance. All three draw on the same data sources: cost data from the Canadian Association of University Business Officers and enrolment/graduate data from PSIS. They represent different choices in terms of what data to include in the calculation

4.1 – Spending

Indicator 4.1.1: University Average Operating Dollars per Student

A commonly used comparative cost indicator is how much money each province's universities consume, collectively and on average, on the business of educating students. The indicator reveals the unit cost of educating one university student for one year in each of the provinces. To be precise, the indicator measures the universities' reported revenues per student that are provided in support of the teaching and learning functions of the universities. These revenues are comprised primarily of government grants (a cost to society) and student tuition (a cost to the individual).

4.1.1

University average operating dollars per FTE student, 2011
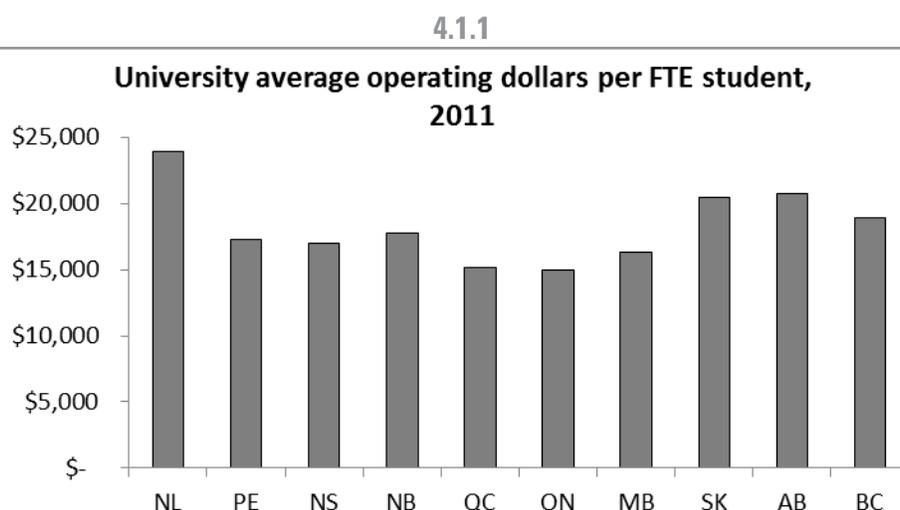
Source: PSIS and CAUBO

Additional notes:

- FTEs are calculated for institutions include in both PSIS and CAUBO.

- See common PSIS notes from Indicator 1.1.1: Participation Rates

- Operating dollars include provincial government grants plus credit tuition net of scholarship amounts. Health funding, research funding, ancillary and all other revenues are excluded.

Indicator 4.1.2: University Average Operating Dollars per Graduate

Moving more to an "output"-oriented measure of cost, the second indicator measures the unit cost per university graduate.

The measure does not attempt to compensate for levels of credential awarded or average time to completion. Provinces with a shorter time to completion, such as Quebec with its feeder CEGEP system, are correspondingly advantaged. The numerator is identical to that used in Indicator 4.1.1, cost per student.

4.1.2

University average operating dollars per graduate, 2011

Source: PSIS and CAUBO

Additional notes:

• Graduates are calculated for institutions included in both PSIS and CAUBO.

• Operating dollars include provincial government grants plus credit tuition net of scholarship amounts. Health funding, research funding, ancillary and all other revenues are excluded.
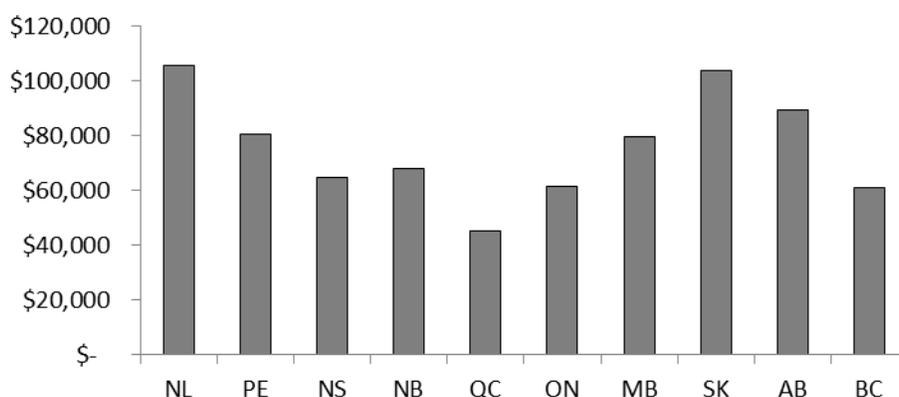
• Statistics Canada, which provided the data behind this figure, prefers an alternative method of calculation, using a four-year moving average of operating dollars to "match" the attributed time span a graduate may have spent at the institution. HEQCO has selected the simple method of matching operating dollars in the year of graduation, in recognition that time frames to graduation may vary across provinces and could not be factored into the production of this ratio.

• See common PSIS notes from Indicator 1.1.1: Participation Rates

Indicator 4.1.3: Total University Revenue per Student

Indicators 4.1.1 and 4.1.2 include only the costs (measured as funding universities receive and consume) for teaching and learning. But our collection of performance indicators speaks to outcomes not only from teaching and learning (for example, adult literacy skills, Indicator 2.2.1) but for the system broadly, capturing research outcomes (for example, research impact, Indicator 3.2.2) and outcomes in student aid (for example, loans default rates, Indicator 2.3.6). It would be appropriate to include in our calculation of costs per student not just teaching and learning costs but all of the costs associated with the broad range of performance that we measure. We are unable to isolate and aggregate provincial and federal student aid costs in respect of university borrowers. But we can include all university revenues from all sources in our calculation of university costs per student. Since universities by and large spend what they make, this would be a much closer estimate of the total cost that underwrites all of the dimensions and components of performance that we measure, government student aid excluded. In short, the X- and Y-axes of our cost to performance plot would be better matched.

4.1.3
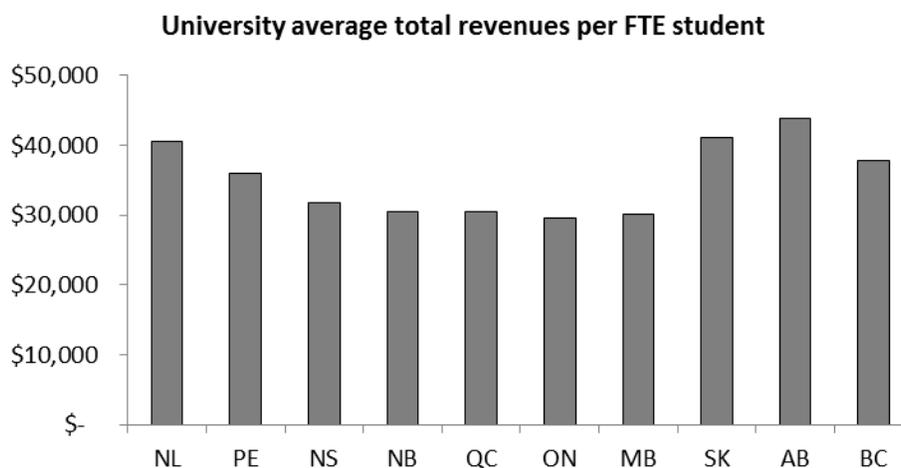
University average total revenues per FTE student

Source: PSIS and CAUBO

Additional notes:

- FTEs are calculated for institutions included in both PSIS and CAUBO.

- See common PSIS notes from Indicator 1.1.1: Participation Rates

- Total university expenditures include all revenue sources.

It is calculation 4.1.3 that we use to drive our X-Y plots in Figures 2a-2d in the main body of this report. We could have gone further and calculated total cost per graduate; we chose not to for two reasons. First, the calculation is imprecise as it does not account for differences in programmatic duration, such as those impacting Quebec due to the unique role of CEGEP. Second, we want very much to look at cost as an input, not an output, so total cost per student would seem to be the best fit.

On our companion <u>website</u> readers may substitute either of the alternate approaches to calculating revenue per student (method 4.1.1 or 4.1.2) and view the impact on the X-Y plot.

Ideally, we would be able to present the same cost data for college (including CEGEP) graduates, but the gaps in the Statistics Canada PSIS database preclude this.

APPENDIX 5 – METHODOLOGY

This appendix provides details on how the 34 performance indicators in our report were aggregated to create the provincial performance scores in each of the three dimensions of access, value to students and value to society, and overall, summarized in Tables 2(a-d) in our report.

Scaling

A cursory inspection of our collection of indicators makes clear that there is considerable variability in the scale (units) by which they are measured; for example, some are in dollars while many others are measured in percentages. In order to facilitate comparison and aggregation of these measures they needed first to be put onto a common scale. For this purpose we chose to begin analyses by converting each indicator to a z-score, a common method of standardizing variables in which the group mean ($\overline{I}$) is subtracted from the raw indicator score (I_R) and then the difference is divided by the standard deviation.

Formula 1 $I_z = \frac{I_R - \overline{I}}{\sigma}$

The effect of this operation is that each z-transformed indicator () is normalized to a mean of zero and a standard deviation of one. The relative positions of each of the provinces is preserved, as two provinces with very similar scores on a given indicator will also have z-transformed scores that are close to one another.

For a few of the measures in the collection "better performance" is suggested by a low rather than high score (e.g., student loan default rates). For these indicators the z-score was inverted by multiplying by negative one. As a result, for all indicators, a z-score of +1 indicates better than average performance, while a z-score of -1 indicates worse performance relative to other provinces.

In the process of developing the procedures for the report we explored several alternative scaling procedures:

- Rank (1 to 10)

- Grouped ranking in which the best three performers were assigned a score of 3, lowest three were assigned a score of 1 and the remaining provinces were assigned a score of 2

- Feature scaling in which the top score was assigned 1, the lowest score was assigned 0, and the rest were scaled according to their position across the range

$$\left(I_T = \frac{I_R - I_{Min}}{I_{Max} - I_{Min}}\right)$$

Rank transformations were thought to be advantageous in that they are relatively easily understood and applied. However, a negative consequence of rank transformations is that the relative position of scores is not well preserved. As an extreme example, consider a hypothetical indicator in which eight provinces had very similar raw scores

ranging between 5% to 6%, while the last two had considerably higher scores of 10% and 11%. In a simple rank transformation the eighth province, with its raw score of 6%, would be assigned a scaled score (8) far closer to the province with a raw score of 10% (assigned 9) than the province that came in first with a raw score of 5%.

For our purposes there is little difference between standardizing to z-scores and the feature scaling. Due to the familiarity of z-scores and their interpretation, preference was given to z-score standardization.

It is worth noting that, because the dimension and total performance scores are obtained by combining many indicators, the overall conclusions drawn do not change when alternative scaling techniques are applied. This is illustrated in Figure 1, which compares the X-Y plot of performance against revenue per student on each of the four approaches considered.


Aggregation

Aggregation to create summary scores at the Component, Dimension and Total Performance level was only conducted for the university sector indicators. Though we would always like to see more and better published metrics of all three sectors, at this time there is relatively little college sector data that is available for all 10 provinces, and less still with respect to trades. At this point in time computing aggregate scores for the college and trades did not seem appropriate.

A first choice for aggregation of data of this nature would be a statistical means of reducing dimensionality. For example, in the Social Progress Index report (SPI, 2012) authors employed factor analysis to aggregate indicators to the component level. However, the SPI collected indicators for over 100 countries, while we are limited to the 10 provinces, a sample too small to reliably employ factor analytic approaches without considerable instability. We therefore opted to collect indicators into components and components into dimensions substantively on the basis of subject matter expertise.

Each component is computed as an average of its underlying indicators for a given province (Formula 2). The Jobs for Graduates component score is therefore the sum of the z-transformed indicator scores for Employment rate for recent university graduates (2.4.1), Unemployment rate (2.4.3) and Earnings premium (2.4.6) divided by three. In a very small number of cases an indicator score is missing for a given province. For example, Quebec does not participate in the Canada Student Loan Program and therefore has no corresponding score for Indicator 2.3.4 Student loan default rates. In cases such as these the components score is computed as the average of the smaller number of available indicators.

Figure 1: Comparison of total performance score by total revenues per student for four alternative scaling techniques
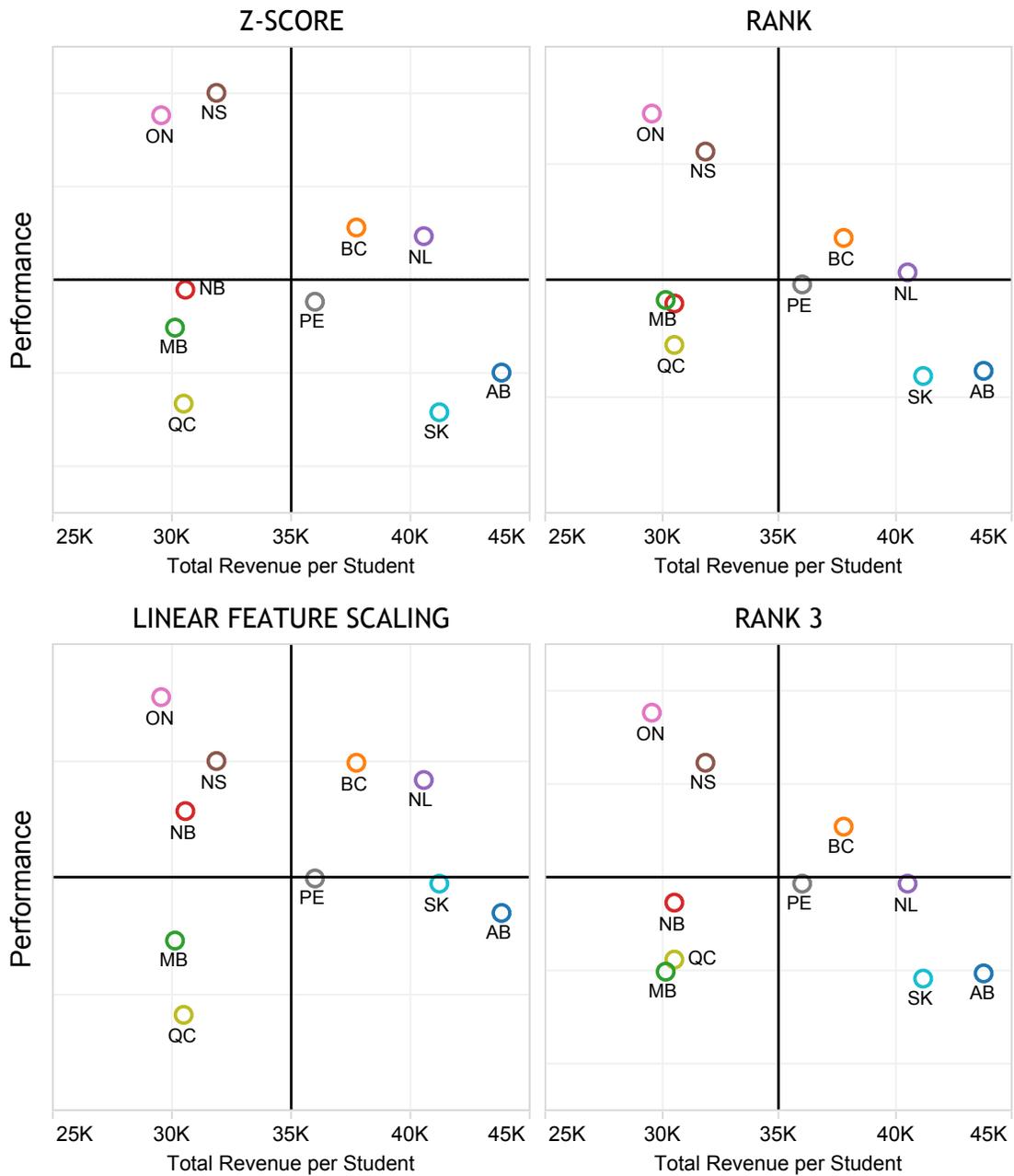
Each dimension is computed as the average of its components scores (Formula 3). The Value to Students dimension is therefore the average of five components scores: Student Experience (2.1), Learning Outcomes (2.2), Student Finances (2.3), Jobs for Graduates (2.4) and Health and Happiness (2.5).

Finally, the total performance score is the average of the province's three dimension scores (Formula 4).

For a province with a complete set of indicators the contribution (weight) of each to the Total Performance score is summarized in Table 2.

Formula 2 $\quad Component_j = \dfrac{\sum I_{zi}}{n_j}$

Formula 3 $\quad Dimension_k = \dfrac{\sum Component_j}{n_k}$

Formula 4 $\quad Total\ Performance = \dfrac{\sum Dimension_k}{3}$

Robustness of Dimension and Total Performance Scores

To assess the robustness of the data aggregation technique employed a simulation was conducted. In each iteration of the simulation, dimension and total performance scores were recalculated after randomly dropping up to two indicators per component (where possible) and up to four provinces. This process was repeated for a total of 700 different combinations of indicators and provinces. Though the effect of dropping indicators and provinces introduced a small amount of jitter to the provincial dimension and total performance scores, the high-level conclusions remained unchanged. In short, due to the large number of indicators included in the university sector aggregate scores, each individual indicator has quite limited influence on the whole.

To support the interested reader in exploring permutations of priority indicators an interactive web-based tool has been made available at www.postsecondaryperformance.ca.

Table 1 – Indicator data primary sources

	COMPONENT	INDICATOR	AGENCY	SOURCE	YEAR
ACCESS	Access to Higher Education	Participation Rates	Statistics Canada	Postsecondary Student Information System (PSIS)	2011
			Statistics Canada	2011 Census CANSIM table 51-0001	2011
	Success in Higher Education	Attainment Rates	Statistics Canada	Labour Force Survey	2013
	Equity of Access	Gender Balance	Statistics Canada	Postsecondary Student Information System (PSIS) CANSIM table 477-0033	2010
			Statistics Canada	2011 Census CANSIM table 51-0001	2011
		First-Generation Participation Rates	Statistics Canada	Survey of Labour and Income Dynamics (SLID)	2009-2011
		Aboriginal Attainment Rates	Statistics Canada	2006 Census Aboriginal Population Profile	2006
VALUE TO STUDENTS	Student Experience	Student Engagement	Indiana University School of Education	National Survey of Student Engagement	2011-2012
		Student-to-Faculty Ratio	Statistics Canada	University and College Academic Staff Survey (UCASS)	2010
			Statistics Canada	Postsecondary Student Information System (PSIS)	2011
		Teaching Awards	Society for Teaching and Learning in Higher Education	Council of 3M National Teaching Fellows	2005-2014
			Statistics Canada	University and College Academic Staff Survey (UCASS) CANSIM Table 477-0017	2010
	Learning Outcomes	Adult Literacy Skills	Organisation for Economic Co-operation and Development (OECD)	Programme for the International Assessment of Adult Competencies (PIAAC)	2012
		Adult Numeracy Skills	Organisation for Economic Co-operation and Development (OECD)	Programme for the International Assessment of Adult Competencies (PIAAC)	2012
	Student Finances	Tuition Fees	Statistics Canada	Survey of Tuition and Living Accommodation Costs for Full-Time Students at Canadian Degree-Granting Institutions (TLAC)	2013
		Average Graduate Debt	Statistics Canada	National Graduate Survey (NGS)	2013
		Repayment Assistance Plan Participation	Employment Social Development Canada (ESDC)		2012
		Student Loan Default Rate	Employment Social Development Canada (ESDC)		2012
	Jobs for Graduates	Employment Rates After Graduate	Statistics Canada	National Graduate Survey (NGS)	2013
		Unemployment Rates	Statistics Canada	Labour Force Survey	2013
		Earnings Premium	Statistics Canada	National Household Survey (NHS)	2011
	Health and Happiness	Life Satisfaction	Statistics Canada	General Social Survey (GSS)	2010
		Physical Health	Statistics Canada	General Social Survey (GSS)	2010
		Mental Health	Statistics Canada	General Social Survey (GSS)	2010
		Smoking Status	Statistics Canada	Canadian Alcohol and Drug Use Monitoring Survey (CADUMS)	2012

COMPONENT	INDICATOR	AGENCY	SOURCE	YEAR
Job Creation	Related Employment	Statistics Canada	National Graduate Survey (NGS)	2013
	Overqualification Rates	Statistics Canada	National Household Survey (NHS) Uppal, S., & LaRochelle-Côté, S. (2014)	2011
	% of the Population with Advanced Degrees	Statistics Canada	Labour Force Survey	2013
New Discoveries	Research Funding	Statistics Canada	Financial Information of Universities and Colleges	2010
		Statistics Canada	University and College Academic Staff System (UCASS)	2010
	Research Impact	Higher Education Strategy Associates		2012
	Highly Cited Researchers	Thomson Reuters	Essential Science Indicators	2002-2012
		Statistics Canada	University and College Academic Staff Survey (UCASS)	2010
Magnet for Talent	World Rankings	Times Higher Education	World University Rankings	2014
		Center for World-Class Universities of Shanghai Jiao Tong University	Academic Ranking of World Universities	2014
		QS	QS World Rankings	2014
	International Enrolment	Statistics Canada	Postsecondary Student Information System (PSIS)	2011
	Prestigious Graduate Scholarships	Statistics Canada	Postsecondary Student Information System (PSIS)	2011
		Tri-Council (NSERC, CIHR, SSHRC)	Vanier Canada Graduate Scholarships award	2009-2013
		Natural Sciences and Engineering Research Council of Canada (NSERC)	André Hamer Prize awards	2009-2013
		Social Sciences and Humanities Research Council (SSHRC)	William E. Taylor Fellowship awards	2009-2013
		The Pierre Elliott Trudeau Foundation	Pierre Elliott Trudeau Foundation awards	2009-2013
Engaged Citizens	Voting	Statistics Canada	General Social Survey (GSS)	2008
	Volunteering	Statistics Canada	General Social Survey (GSS)	2010
	Donating	Statistics Canada	General Social Survey (GSS)	2008

VALUE TO SOCIETY

Table 2: Contribution (weighting) of each university indicator to the total performance score

Access	Value to Students	Value to Society

1.1 Access to Higher Education
  1.1.1 Participation Rates   11%
 	
1.2 Success in Higher Education
  1.2.1 Attainment Rates   11%
 	
1.3 Equity of Access
  1.3.1 Gender Balance   3.4%
  1.3.2 First-Generation Students   3.4%
  1.3.4 Aboriginal Students   3.4%
 	
CONTRIBUTION TO TOTAL   33%
	2.1 Student Experience
	  2.1.1 Student Engagement 2.2%
	  2.1.2 Student-to-Faculty Ratio 2.2%
	  2.1.3 Teaching Awards 2.2%
	
	2.2 Learning Outcomes
	  2.2.1 Adult Literacy Skills 3.3%
	  2.2.3 Adult Numeracy Skills 3.3%
	
	2.3 Student Finances
	  2.3.1 Tuition Fees 1.7%
	  2.3.2 Average Graduate Debt 1.7%
	  2.3.4 Repayment Assistance 1.7%
	  2.3.6 CSLP Default Rates 1.7%
	
	2.4 Jobs for Graduates
	  2.4.1 Employment Rate for Graduates 2.2%
	  2.4.3 Unemployment Rates 2.2%
	  2.4.6 Earnings Premium 2.2%
	
	2.5 Health and Happiness
	  2.5.1 Life Satisfaction 1.7%
	  2.5.4 Physical Health 1.7%
	  2.5.7 Mental Health 1.7%
	  2.5.10 Smoking Status 1.7%
	
	CONTRIBUTION TO TOTAL 33%
		3.1 Job Creation
		  3.1.1 Labour Market Participation 2.1%
		  3.1.4 Related Employment 2.1%
		  3.1.6 Overqualification Rates 2.1%
		  3.1.7 Advanced Degrees 2.1%
		
		3.2 New Discoveries
		  3.2.1 Research Funding 2.8%
		  3.2.2 Research Impact 2.8%
		  3.2.3 Highly Cited Researchers 2.8%
		
		3.3 Magnet for Talent
		  3.3.1 University Rankings 2.8%
		  3.3.2 International Enrolment 2.8%
		  3.3.3 Prestigious Graduate Scholarships 2.8%
		
		3.4 Engaged Citizens
		  3.4.1 Voting 2.8%
		  2.4.4 Volunteering 2.8%
		  2.4.7 Donating 2.8%
		
		CONTRIBUTION TO TOTAL 33%