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Is field of study a factor in the earnings of young bachelor's degree holders?

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.. not available for a specific reference period
... not applicable
0 true zero or a value rounded to zero
0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Is field of study a factor in the earnings of young bachelor's degree holders?

Highlights

- Overall, young graduates with a bachelor's degree in science, technology, engineering and mathematics (STEM) fields of study had higher earnings in 2015 than those in business, humanities, health, arts, social science and education (BHASE) fields of study. Young men with a STEM degree earned 23.9% more than young men with a BHASE degree, whereas young women with a STEM degree earned 11.5% more than young women with a BHASE degree.
- 'Engineering' graduates earned the most among young men and women with a bachelor's degree in STEM. However, not all STEM fields had high earnings. 'Biological sciences' was the field with the lowest earnings among STEM graduates, below the median for graduates overall.
- 'Nursing' graduates earned the most among young people with a bachelor's degree in BHASE. Young 'nursing' graduates had median earnings of $75,027 for women and $77,698 for men.
- Men were more likely to have a degree in high-paying STEM fields such as 'engineering,' while women were more likely to have a degree in high-paying BHASE fields such as 'nursing.'

Introduction

Young graduates from many different fields of study help ensure a prosperous future for Canada. They are those who will build and maintain a strong social infrastructure in areas such as education, communications, justice and health, alongside graduates in science, technology, engineering and mathematics (STEM), who will advance the frontiers of science and technology and increase the competitiveness of the Canadian economy globally.

Understanding how these graduates fare in the labour market is not only important for policy makers, but also for young people themselves in making their education decisions. The 2016 Census in Brief article entitled *Are young bachelor's degree holders finding jobs that match their studies?* (http://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016025/98-200-x2016025-eng.cfm) looks at whether young graduates from different fields of study are finding jobs that require their level of education, and whether their job matches their field of study. The analysis in the current article complements that publication by looking at the earnings of young bachelor's degree holders by their field of study.

This article will focus on the earnings[1] of young people aged 25 to 34 who completed their education in Canada,[2] and are bachelor's degree holders[3] from STEM and BHASE (business, humanities, health, arts, social science and education) fields of study.[4] To make earnings more comparable, it includes only graduates who were paid employees working full time and full year in 2015.

1. This paper's main focus is on median earnings; however, not all graduates from a given field of study have earnings near the median. The two fields of study that had the smallest variance in earnings were 'nursing' and 'education and teaching' while the two fields with the biggest variance in earnings were 'engineering' and 'physical and chemical sciences.'
2. The universe for this study includes the Canadian-born population who obtained their bachelor's degree (as their highest level of education completed) in Canada, as well as immigrants who obtained their bachelor's degree (as their highest level of education completed) in Canada. The immigrant group includes those who immigrated to Canada at a young age. According to the 2016 Census, Canadian-educated immigrant men and women aged 25 to 64 with a bachelor's degree (as their highest level of education completed) generally had lower earnings (7% for men and 6% for women) than the Canadian-born and Canadian-educated. Despite this difference, the patterns by field of study reported here do not change when Canadian-educated immigrants are included.
3. Note that this analysis only considers the labour market outcomes of those whose highest level of education completed was a bachelor's degree. Students in some fields of study may be more likely to pursue further education, and those who do so may have different labour market outcomes than what is presented in this analysis. See the Data sources, methods and definitions section for more information.
4. The term 'business, humanities, health, arts, social science and education (BHASE) fields' includes all of the BHASE (non-STEM) fields from the classification of science, technology, engineering and mathematics (STEM) and BHASE (non-STEM) groupings of the Classification of Instructional Programs (CIP) Canada 2016 (http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=299355).

Is field of study a factor in the earnings of young bachelor's degree holders?

Overall, young graduates with a degree in STEM fields had higher earnings than those from BHASE fields

STEM graduates are well compensated in the labour market for their skills, especially young men. The median earnings for young men with a STEM degree at the bachelor's level were $72,443 annually in 2015, 23.9% higher than the median earnings of $58,488 for young men with a BHASE degree. For young women, the difference is smaller: those with a STEM degree earned 11.5% more than those with a BHASE degree.

Among STEM fields, earnings were highest for young 'engineering' graduates

Among young employed STEM graduates, 7 in 10 of those who studied 'engineering' and 'computer and information sciences' found jobs in science and technology occupations. Both young men and women with 'engineering' qualifications earned more than those who graduated from other STEM fields. The median earnings for young men with an 'engineering' degree were $78,054 while they were $75,023 for young women. Young graduates in 'mathematics and computer and information sciences' also had strong earnings, higher than the overall median for both men and women with a bachelor's degree.

Graduates from 'biological sciences' had earnings below the overall median

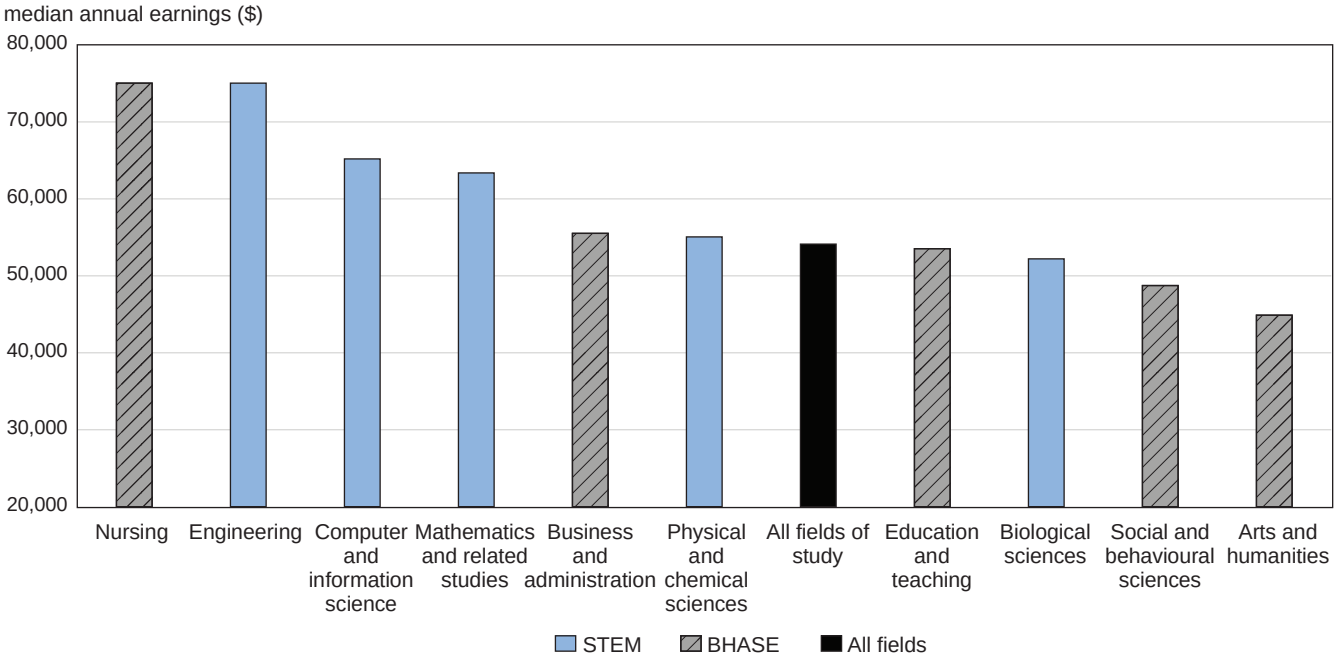
Not all STEM fields had as strong labour market outcomes as 'engineering' and 'computer and information sciences,' perhaps reflecting a less specific job market for those with undergraduate degrees in more general fields of study. The STEM field whose graduates earned the least was 'biological sciences.' Women with a degree in 'biological sciences' had earnings that were 3.5% lower than those for women overall, while men had earnings that were 12.1% less than those for men overall. Men with 'general and integrated sciences' degrees also had lower earnings than men overall.

Men more likely than women to study in high-paying STEM fields

The returns to a STEM education were different between men and women in 2015: women who graduated from a STEM field earned 82.1% of what men who graduated from a STEM field earned. This is partly because men tend to study in high-paying STEM fields: over three-quarters of men who studied in STEM programs completed their bachelor's degree in either 'engineering' or 'mathematics and computer and information sciences.' In contrast, women were more likely to complete their bachelor's degree in lower-paying STEM fields: over 4 in 10 women who studied in STEM fields completed their degree in 'biological sciences.'

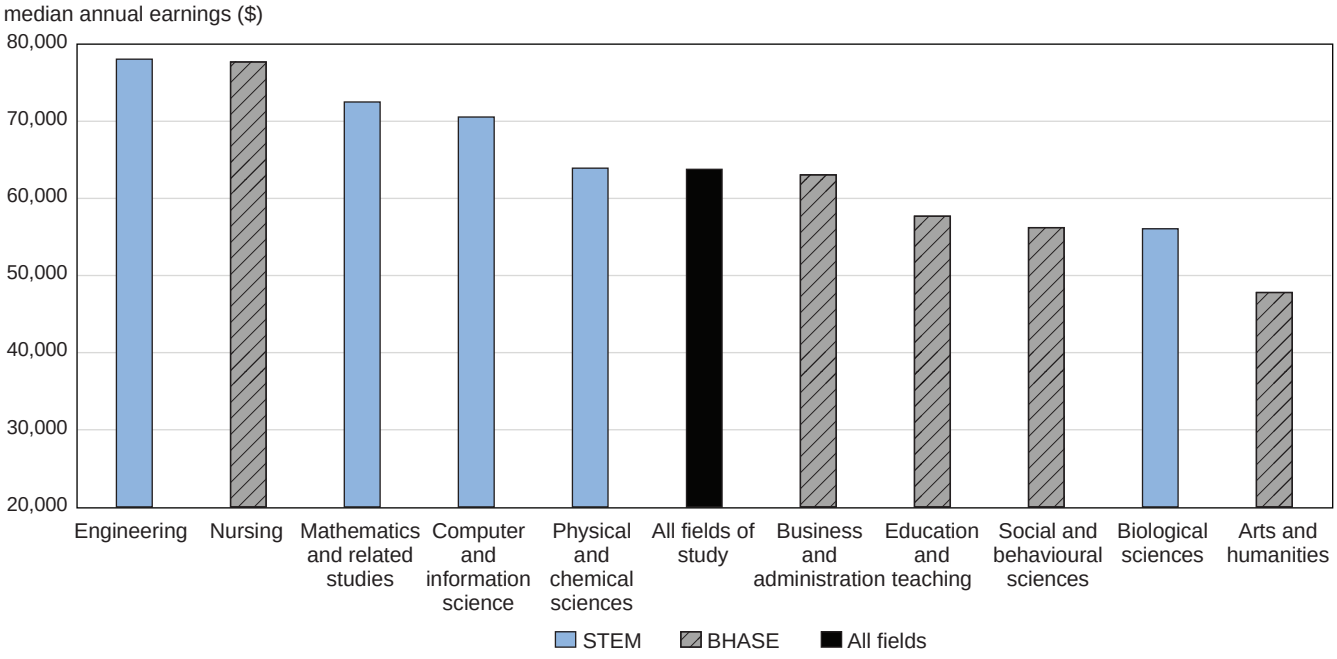
The earnings of women and men who graduated from the same STEM subfields were comparable. For example, women in 'computer and information sciences' and 'biological sciences' both earned about 93% of what men earned, although women represented a relatively small proportion of young 'computer and information sciences' graduates. Women in 'engineering' earned 96% of what men earned, up from 92% in 2006; however, as with 'computer and information sciences,' women represented a relatively small proportion of young 'engineering' graduates.

Chart 1
Median annual earnings of women aged 25 to 34 with a bachelor's degree who worked full time and full year as paid employees, by selected STEM and BHASE fields of study, Canada, 2015



Source: Statistics Canada, Census of Population, 2016.

Chart 2
Median annual earnings of men aged 25 to 34 with a bachelor's degree who worked full time and full year as paid employees, by selected STEM and BHASE fields of study, Canada, 2015



Source: Statistics Canada, Census of Population, 2016.

Among BHASE fields, earnings were highest for young 'nursing' graduates

As shown in charts 1 and 2, young 'nursing' graduates earned as much as young 'engineering' graduates and more than graduates in any other field of study. Women were much more likely than men to study 'nursing.' In fact, more than 9 in 10 young 'nursing' graduates were women. The high earnings of young 'nursing' graduates partly reflect the strong demand for their health care skills in an aging society. Nurses also often do shift work, which may be compensated at a higher rate.

'Education and teaching' graduates were similar to 'nursing' graduates in being able to find work that matches their level of education, with nearly 19 in 20 working in jobs that require a postsecondary education. However, other Statistics Canada education data have shown that recent 'education' graduates were more likely than other recent graduates to work in non-permanent jobs such as contract work.[5] Furthermore, unlike the top earnings of young 'nursing' graduates, the earnings of young 'education and teaching' graduates were closer to the median for all BHASE graduates. Their earnings were lower than 'nursing' and 'business and administration' graduates.

'Arts and humanities' studies a stepping stone for young graduates

'Arts and humanities' was the field where graduates had the smallest remuneration in the labour market. Many who study in these fields see them as a stepping stone. For example, after having developed important critical thinking and writing skills, 'arts and humanities' bachelor's degree holders often pursue further studies at either the university or college level. Other Statistics Canada education and labour data[6] have shown that, in 2014, about one-third of those with a bachelor's degree or higher in 'humanities' had completed another program at either the university, college or trades level.

Young STEM graduates had the highest earnings in resource-rich provinces

STEM graduates had higher earnings than BHASE graduates overall in the country, and this is particularly true in resource-rich provinces where STEM graduates were in high demand. For example, in Newfoundland and Labrador, young men with a STEM degree earned 47% more than young men with a BHASE degree. The provinces with the highest earnings for both young men and women with a STEM degree were the resource-rich provinces of Alberta, Newfoundland and Labrador and Saskatchewan.

Young men with an 'engineering' degree living in Calgary earned $108,566 in 2015, the highest earnings of any large urban centre. Also in Alberta, young men with an 'engineering' degree earned $149,237 in the regional municipality of Wood Buffalo, where Fort McMurray is located. These were the highest earnings among all municipalities in Canada, reflecting the oil boom and strong demand for such graduates in Alberta in the decade preceding the 2016 Census. Other Statistics Canada labour data show that, in 2016, the labour market in Alberta was showing signs of the after-effects of the decreased price of oil, with employment and earnings declines across most sectors in the province.[7]

5. Ferguson, Sarah Jane and Shunji Wang. 2014. *Graduating in Canada: Profile, Labour Market Outcomes and Student Debt of the Class of 2009-2010* (http://www.statcan.gc.ca/pub/81-595-m/81-595-m2014101-eng.htm). Statistics Canada Catalogue no. 81-595-M – No. 2014101. Ottawa.
6. Gilmore, Jason. "Further postsecondary education and labour market outcomes, March 2014" (http://www.statcan.gc.ca/daily-quotidien/150911/dq150911b-eng.htm) *The Daily*. September 11, 2015.
7. Bourbeau, Emmanuelle and Andrew Fields. "Annual review of the labour market, 2016" (http://www.statcan.gc.ca/daily-quotidien/170428/dq170428d-eng.htm) *The Daily*. April 28, 2017.

The large urban centres with the top-paid women in BHASE fields were all in the oil-producing provinces

The oil boom of the decade preceding the census did not benefit only those with a STEM education in the oil-producing provinces. Young women with BHASE bachelor's degrees in the same resource-rich provinces also had higher earnings than those in other provinces. Calgary, Regina, Edmonton, Saskatoon, Lethbridge and St. John's were the large urban centres where young women from BHASE fields earned the most. These urban centres are all located in the three resource-rich provinces of Alberta, Saskatchewan, and Newfoundland and Labrador. In all of these large urban centres, young women with a BHASE bachelor's degree had median annual earnings above $56,000. In Calgary, they earned $66,408.

Table 1
Distribution of women and men aged 25 to 34 with a bachelor's degree who worked full time and full year as paid employees, by STEM and BHASE fields of study, Canada, 2016

	Women	Men	Total
		percent	
STEM	**13.8**	**37.3**	**24.3**
Science and science technology	**8.7**	**8.7**	**8.7**
Physical and chemical sciences	0.9	2.0	1.4
Biological sciences	5.8	4.8	5.4
General and integrated sciences	2.1	1.8	2.0
Engineering and engineering technology	**3.1**	**20.1**	**10.8**
Engineering	3.1	20.1	10.7
Mathematics and computer and information science	**1.9**	**8.4**	**4.8**
Mathematics and related studies	1.0	2.0	1.5
Computer and information science	0.9	6.5	3.4
BHASE (non-STEM)[1]	**86.2**	**62.7**	**75.7**
Business and administration	**19.6**	**26.9**	**22.9**
Arts and humanities	**13.2**	**9.6**	**11.6**
Arts	4.2	2.7	3.5
Humanities	9.0	7.0	8.1
Social and behavioural sciences	**22.7**	**15.6**	**19.5**
Health care	**11.7**	**2.0**	**7.3**
Nursing	9.5	1.2	5.8
Health care, n.e.c.	2.2	0.8	1.5
Education and teaching	**14.0**	**4.9**	**9.9**
Trades, services, natural resources and conservation[2]	**4.8**	**3.6**	**4.3**
All fields of study[1]	**100.0**	**100.0**	**100.0**

1. This table and the analysis in the paper exclude bachelor's degree holders who studied 'law' or 'pharmacy' because these programs normally require previous university education prior to entry.
2. This category includes 'agriculture and natural resources operation and management,' 'mechanics and repair, architecture, construction and precision production,' 'personal, security and transport services,' 'social work and related programs' and 'BHASE (non-STEM) programs, n.e.c.' At the bachelor's level, the most common fields of study in this category are 'social work,' 'health and physical education/fitness' and the 'architecture' fields of study that are not included in the STEM grouping. While the title of this category begins with trades, qualifications in the trades are primarily held by those at the trades and college level and thus are not included in this analysis.
Source: Statistics Canada, Census of Population, 2016.

Table 2
Median annual earnings of women and men aged 25 to 34 with a bachelor's degree who worked full time and full year as paid employees, by STEM and BHASE fields of study, Canada, 2015

	Women	Men	Total	Women's earnings as percentage of men's earnings
		dollars		percent
STEM	**59,492**	**72,443**	**68,450**	**82.1**
Science and science technology	**52,875**	**58,342**	**55,336**	**90.6**
Physical and chemical sciences	55,046	63,923	61,200	86.1
Biological sciences	52,193	56,065	53,481	93.1
General and integrated sciences	54,327	60,884	56,937	89.2
Engineering and engineering technology	**75,014**	**78,041**	**77,627**	**96.1**
Engineering	75,023	78,054	77,641	96.1
Mathematics and computer and information science	**64,314**	**71,056**	**69,743**	**90.5**
Mathematics and related studies	63,373	72,513	68,897	87.4
Computer and information science	65,194	70,563	69,912	92.4
BHASE (non-STEM)[1]	**53,345**	**58,488**	**55,118**	**91.2**
Business and administration	**55,513**	**63,057**	**59,057**	**88.0**
Arts and humanities	**44,892**	**47,795**	**45,859**	**93.9**
Arts	41,238	44,327	42,119	93.0
Humanities	46,690	48,886	47,586	95.5
Social and behavioural sciences	**48,734**	**56,213**	**51,015**	**86.7**
Health care	**72,919**	**73,890**	**73,042**	**98.7**
Nursing	75,027	77,698	75,245	96.6
Health care, n.e.c.	59,064	63,995	59,887	92.3
Education and teaching	**53,518**	**57,695**	**54,390**	**92.8**
Trades, services, natural resources and conservation[2]	**51,517**	**58,504**	**53,828**	**88.1**
All fields of study[1]	**54,112**	**63,770**	**58,144**	**84.9**

1. This table and the analysis in the paper exclude bachelor's degree holders who studied 'law' or 'pharmacy' because these programs normally require previous university education prior to entry.
2. This category includes 'agriculture and natural resources operation and management,' 'mechanics and repair, architecture, construction and precision production,' 'personal, security and transport services,' 'social work and related programs' and 'BHASE (non-STEM) programs, n.e.c.' At the bachelor's level, the most common fields of study in this category are 'social work,' 'health and physical education/fitness' and the 'architecture' fields of study that are not included in the STEM grouping. While the title of this category begins with trades, qualifications in the trades are primarily held by those at the trades and college level, and thus are not included in this analysis.
Source: Statistics Canada, Census of Population, 2016.

Data sources, methods and definitions

Data sources
The data in this analysis are from the 2016 Census of Population. Further information on the census can be found in the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X.

All information on the quality and comparability of census data on education can be found in the *Education Reference Guide, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/guides/013/98-500-x2016013-eng.cfm), Catalogue no. 98-500-X2016013.

Methods
This analysis only considers the labour market outcomes of immigrants and non-immigrants (thus excluding non-permanent residents) whose highest level of education completed was a bachelor's degree. Students in some fields of study may be more likely to pursue further education, and those who do so may have different labour market outcomes than what is presented in this analysis.

Furthermore, the earnings presented in the paper are for graduates aged 25 to 34. As these graduates progress through their careers, earnings for some of them in certain fields of study may grow faster than others. In order to make earnings more comparable, the report includes graduates from entry-level bachelor's programs. The analysis therefore excludes bachelor's degree holders who studied 'law' or 'pharmacy' because these programs normally require previous university education prior to entry.

Random rounding and percentage distributions: To ensure the confidentiality of responses collected for the 2016 Census, a random rounding process is used to alter the values reported in individual cells. As a result, when these data are summed or grouped, the total value may not match the sum of the individual values since the total and subtotals are independently rounded. Similarly, percentage distributions, which are calculated on rounded data, may not necessarily add up to 100%.

Because of random rounding, counts and percentages may vary slightly between different census products such as the analytical documents, highlight tables and data tables.

Definitions
The universe for this article is those who worked full time and full year as paid employees. This refers to a person who worked 30 hours or more per week for at least 49 weeks during the reference year as a paid employee (thus excluding the self-employed) working for wages, salaries and commissions. Thus, the universe for this study excludes 44.7% of young graduates aged 25 to 34 who were not working full time or full year in 2015, as well as 2.3% of young graduates aged 25 to 34, who were working full time and full year but were self-employed.

Please refer to the *Dictionary, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm), Catalogue no. 98-301-X, for additional information on the census variables.

Additional information

Additional analyses on education can be found in *The Daily* (http://www.statcan.gc.ca/daily-quotidien/171129/dq171129a-eng.htm) of November 29, 2017, and in the Census in Brief articles entitled *Does education pay? A comparison of earnings by level of education in Canada and its provinces and territories* (http://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016024/98-200-x2016024-eng.cfm), Catalogue no. 98-200-X2016024, and *Are young bachelor's degree holders finding jobs that match their studies?* (http://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016025/98-200-x2016025-eng.cfm), Catalogue no. 98-200-X2016025.

Additional information on education can be found in the *Highlight tables* (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/edu-sco/index-eng.cfm), Catalogue no. 98-402-X2016010; the *Data tables* (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Lp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=0&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=123&VID=0&VNAMEE=&VNAMEF=), Catalogue nos. 98-400-X2016204 and 98-400-X2016240 to 98-400-X2016280; the *Census Profile* (http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E), Catalogue no. 98-316-X2016001; and the *Focus on Geography Series* (http://www12.statcan.gc.ca/census-recensement/2016/as-sa/fogs-spg/Index-eng.cfm), Catalogue no. 98-404-X2016001.

Thematic maps (http://www12.statcan.gc.ca/census-recensement/2016/geo/map-carte/ref/thematic-thematiques/edu-sco/thematic-thematiques-eng.cfm) for this topic are also available for Canada by census division.

An infographic entitled *Canada's educational portrait* (http://www.statcan.gc.ca/pub/11-627-m/11-627-m2017036-eng.htm) also illustrates some key findings on education in Canada.

For details on the concepts, definitions and variables used in the 2016 Census of Population, please consult the *Dictionary, Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/dict/index-eng.cfm), Catalogue no. 98-301-X.

In addition to response rates and other data quality information, the *Guide to the Census of Population, 2016* (http://www12.statcan.gc.ca/census-recensement/2016/ref/98-304/index-eng.cfm), Catalogue no. 98-304-X, provides an overview of the various phases of the census including content determination, sampling design, collection, data processing, data quality assessment, confidentiality guidelines and dissemination.

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