

Study: Persistence and representation of women in STEM programs

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The underrepresentation of women in certain science, technology, engineering and mathematics and computer science (STEM) fields of study has attracted considerable attention over the last several decades.

Women's representation in STEM fields can be affected by choices and barriers at different stages of their education, including their initial field of study and whether or not they complete the degree. Once they enroll in a STEM program at university, are women less likely than men to persist in the same program until graduation?

This question is answered in a new study, which examined a cohort of first-year undergraduate students in 2010 aged 19 and younger, and tracked them until 2015. In this cohort, women accounted for 44% of first-year STEM students.

The study found that women who enrolled in a STEM program in 2010 were less likely than men to remain in a STEM program over the course of their studies, largely because women were twice as likely as men to switch to non-STEM programs, also referred to as BHASE (which include business, humanities, health, arts, social sciences and education, among others). Women were particularly more likely than men to switch to a non-STEM program in the first two years of their studies.

Despite these departures, after five years, women still accounted for more than 4 in 10 (43%) of those who had graduated from a STEM program or were continuing in a sixth year of STEM studies. This was because many women who started out in BHASE programs later switched to a STEM program.

The study, "Persistence and representation of women in STEM programs," is now available in Statistics Canada's *Insights on Canadian Society*. It uses data connected by the Educational and Labour Market Longitudinal Platform to examine the pathways and outcomes of students over time.

The study was produced in partnership with Statistics Canada's Centre for Gender, Diversity and Inclusion Statistics. Additional information about the Centre and other gender-related studies and statistics can be found in the "[Gender, diversity and inclusion statistics](#)" hub.

STEM fields lose women to non-STEM (BHASE) programs, but also gain women from other programs

Women accounted for 44% of first-year students aged 19 and younger in undergraduate STEM degree programs in 2010. In comparison, they accounted for 64% of students in non-STEM (BHASE) programs.

Over the period during which they were followed, STEM students could either remain in a STEM program, switch into a BHASE program, or drop out of undergraduate degree studies altogether.

Among those who were first-year students in a STEM undergraduate program in 2010, 66% of women and 72% of men were still in a STEM program in 2015, as students or graduates.

Overall, 23% of women and 12% of men transferred from a STEM to a BHASE program, and 11% of women and 16% of men left undergraduate degree studies altogether.

Although women were more likely than men to switch to a BHASE program, a larger number of women than men came to STEM programs from BHASE programs, because there are more women than men in BHASE. This is why women still accounted for 43% of STEM graduates or students at the end of the period.



Furthermore, women who switched from a STEM to a BHASE program most often chose a BHASE field of study that was related to their original STEM field. For example, women who switched from general and integrated sciences or biological sciences to a BHASE field mainly entered health care or psychology. Similarly, women who switched from mathematics and related studies to a BHASE field tended to move into the field of business and related studies.

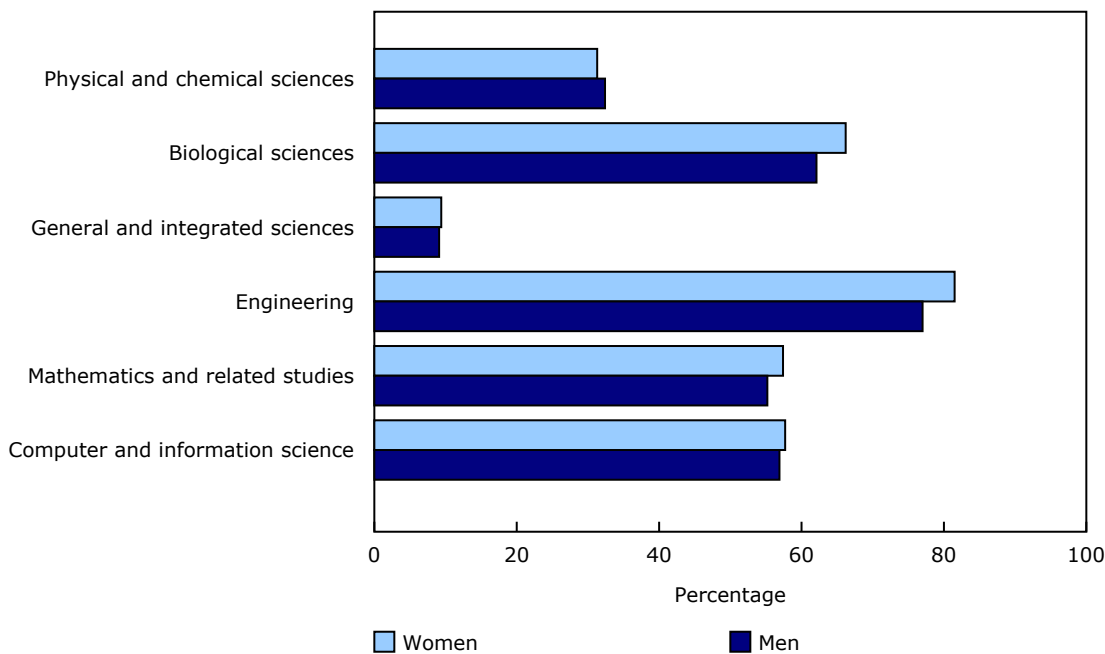
In male-dominated STEM programs, women are as likely as men to persist in their studies

The proportion of women varied across STEM programs. Women were the majority of first-year students in biological sciences (60%) and general and integrated sciences (58%), but accounted for less than one in five students in engineering (19%) and computer and information sciences (16%).

Even in programs that have relatively high proportions of men, such as engineering and computer science, women were no more likely than men to leave their program.

Specifically, 82% of women and 77% of men who started an engineering degree in 2010 remained in engineering in 2015 (either as students or graduates). In computer and information sciences, 58% of women and 57% of men remained in the same program.

Chart 1
Proportion of students in undergraduate studies who remained or graduated in the same field of study after five years, by sex, 2010 cohort



Source(s): Statistics Canada, Postsecondary Student Information System (PSIS), longitudinal data, 2010/11 to 2015/16.

The proportion remaining in the same program was lower in some other programs, such as general and integrated sciences. This field was mainly made up of general science majors, and more than 9 in 10 students switched to more specific fields of study, either in STEM (such as physical and chemical sciences) or in BHASE (such as psychology or health care).

Women graduate earlier than men from STEM programs

The study also examined how quickly STEM students graduated from their program, and found that women consistently graduated from STEM programs more rapidly than men.

Among those who started a STEM program in 2010, over one-third (36%) of women had completed their STEM degree by the end of the fourth year, compared with 25% of men.

After five years, 58% of women and 54% of men who started out in STEM had graduated; 9% of women and 18% of men were continuing their studies in STEM for a sixth year; while the remainder had switched to BHASE fields or had left undergraduate studies.

Women completed their degrees more quickly than men in every STEM field of study, as well as in BHASE fields, but the size of the difference varied between fields.

One of the largest differences was among students who started out in computer and information sciences: after four years, 27% of women and 16% of men had completed a STEM degree.

Similarly, in engineering, 27% of women and 20% of men graduated within the first four years of their program.

Note to readers

This study uses data from the Postsecondary Student Information System within the Educational and Labour Market Longitudinal Platform. It provides longitudinal data on all students at Canadian public colleges and universities. The study covers students who began full-time undergraduate degree studies at Canadian public colleges and universities in 2010/2011 at the age of 19 or younger; it tracks this group longitudinally over a six-year period, until 2015/2016.

Definitions, data sources and methods: survey number [5017](#).

The article "[Persistence and representation of women in STEM programs](#)" is now available in *Insights on Canadian Society* (Catalogue number [75-006-X](#)).

For more information, contact us (toll-free 1-800-263-1136; 514-283-8300; STATCAN.infostats-infostats.STATCAN@canada.ca).

To enquire about the concepts, methods or data quality of this release, contact Katherine Wall (613-291-7494; katherine.wall@canada.ca).

For more information on *Insights on Canadian Society*, contact Sébastien LaRochelle-Côté (613-951-0803; sebastien.larochelle-cote@canada.ca).