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Education Matters: Insights on Education, Learning and Training in Canada

Doctoral graduates in Canada 2004/2005



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- ^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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Doctoral graduates in Canada 2004/2005

Highly-qualified personnel are an important component of Canada's labour market. Doctoral graduates form the new generation of professors that teach advanced courses at colleges and universities, playing a key role in the transmission of up-to-date knowledge to students. They contribute to research and development in the public and private sectors, generating new knowledge and innovations that contribute to international competitiveness and economic growth. Doctoral graduates also contribute to the social and political spheres of life by offering insights into the functioning of individuals and societies.

Given the importance of this segment of postsecondary graduates, it is important to have information about their characteristics, fields of study and plans following graduation. Such information is collected by the [Survey of Earned Doctorates](#) (SED). A recent report published by Statistics Canada provides detailed information on doctoral graduates in 2004/2005.¹ This article summarizes the key findings of that report.

**Box 1:
The Survey of Earned Doctorates**

The [Survey of Earned Doctorates](#) (SED) is an annual survey of PhD graduates, which was conducted for the first time in Canada in the 2003/2004 academic year. It captures data on field of study, the length of time it took to complete the degree, how the students financed their education, and demographic characteristics of the graduates, including the proportion of international students. The survey also provides information regarding the future plans of doctoral graduates, including their employment prospects and plans for further studies.

The Survey of Earned Doctorates (SED) consists of a questionnaire given to all graduates completing a doctorate degree from each of the doctorate-granting institutions in Canada; thus, SED intends to be a census of doctoral graduates. The 2004/2005 survey results represent 3979 graduates who received a questionnaire. Of those who received a questionnaire, 54% responded to the survey, which compares to a response rate of 60% in 2003/2004. Survey responses in SED have been weighted to adjust for non-response in order to better reflect the characteristics of doctoral graduates in 2004/2005.

One limitation of SED is that it does not cover Canadians who graduate from a PhD program in a foreign country. Therefore, while the survey does represent graduates from Canadian programs, it does not represent all Canadians who earned a doctoral degree in 2004/2005.

Trends in numbers of doctoral graduates and fields of study

According to data from the [Postsecondary Student Information System](#), the number of doctoral students graduating from Canadian universities has remained steady in recent years, including in 2004/2005, at around 4,000 graduates. However, between 2000 and 2004, enrolment in doctoral programs increased steadily, growing at a rate of almost 7% per year. In the 2004/2005 academic year, over 34,000 students were enrolled in all years of doctoral programs. These increases in enrolment suggest that the number of graduates of PhD programs should rise in the coming years.

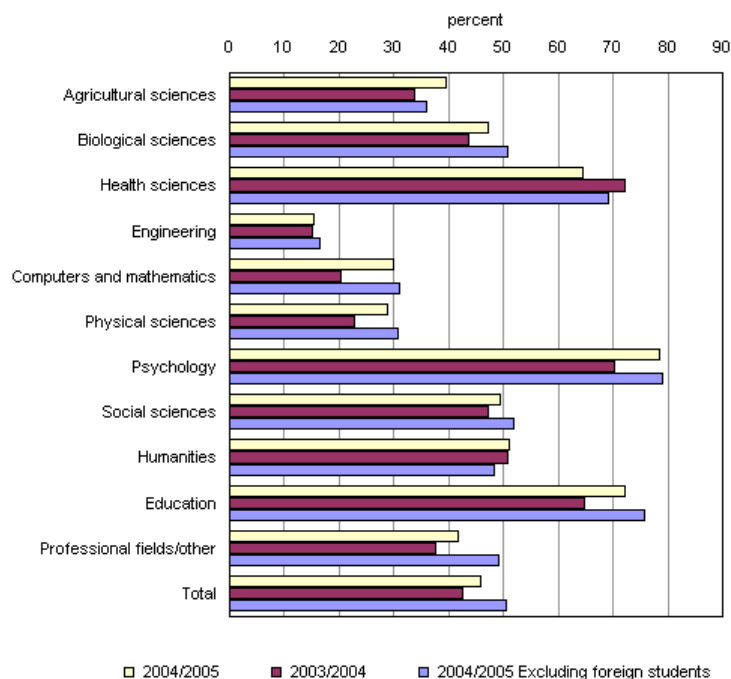
Physical sciences, life sciences, social sciences and engineering, which together constitute the broad category of "science and engineering," accounted for over 75% of graduates in 2004/2005. About one fifth all graduates had completed their doctorates in the biological sciences.

Engineering and humanities each accounted for over 10% of graduates. As was the case in 2003/2004, similar proportions graduated from psychology (9%), education (9%) and social sciences (8%).

In 2004/2005, almost 46% of graduates were women compared to almost 43% the year before. While gender differences were less pronounced overall, there remained large differences across fields of study. Engineering remained the most male-dominated field, while psychology had become the most female-dominated field of study.

Some of the increase in the proportion of women came from substantial gains in fields that have traditionally been male dominated (Chart 1). In computer and information sciences and mathematics, as well as in physical sciences, the numbers of female graduates grew much faster than the number of male graduates. Between the 2003/2004 and the 2004/2005 academic years, the proportion of women graduating from computer and information sciences and mathematics grew by almost 49%. Likewise, the proportion of women graduating from physical sciences grew by over 23%.

Chart 1
Proportion of doctoral graduates who are women, by field of study, 2003/2004 and 2004/2005



Source: "Darren King. 2008. [Doctoral Graduates in Canada: Findings from the Survey of Earned Doctorates, 2004/2005](#). Culture, Tourism and the Centre for Education Statistics – Research papers. Statistics Canada Catalogue no. 81-595-M – No. 065.

Foreign students in Canadian universities are disproportionately male. When foreign and visa students are excluded from the population, the proportion of women graduating from Canadian doctoral programs was just over 50%. This compares to 47% of Canadian graduates who were women in 2003/2004.

Foreign students

In the 2004/2005 academic year, approximately 23% of all graduates were foreign or visa students. Foreign graduates were disproportionately represented in engineering and the physical sciences. Over 42% of engineering graduates and more than 32% of physical science graduates were foreign or visa students. Conversely, less than 12% of social science graduates and less than 17% of humanities graduates were foreign or visa students.

A notable proportion of Canadians pursued their doctoral studies as foreign students at American institutions.² For example, Canada was the fifth largest country of origin for foreign doctoral graduates in American universities. Overall, Canadians accounted for 556 graduates in the 2004/2005 academic year, or 1.3% of all students who earned a doctorate degree in the United States in that year. Over 61% of Canadian students in American universities reported that they intended to stay in the United States upon completion of their degree.

In fact, the United States is a desired destination for many foreign students, particularly for students from emerging economies. Approximately 35% of all doctoral graduates in the United States (compared to 23% in Canada) in 2004/2005 were foreign or visa students.

Time to completion

The time it takes to complete a program of studies leading to a PhD varies considerably across individuals. Large differences are also evident in age at time of completion. One of the key factors in these differences is field of study. The data suggest that fields of study offer quite different pathways to a PhD.

The average age at graduation for doctoral students was 36 years and the average time for completion of a doctoral degree was 5 years, 9 months. Degrees in the social sciences took the longest time to complete, a full year longer than the overall average. Doctoral degrees in the humanities and psychology also had longer average times to completion.

On the other hand, a doctorate in engineering required an average of only five years of study. Similarly, less time was needed, on average, for completion of a doctoral degree in chemistry, computer and information sciences and mathematics, and health sciences.

Students in certain fields appeared to enrol in a program leading to a doctorate degree only after gaining work experience. The average age at enrolment was over 30 years for fields such as agriculture, education, health sciences, humanities and professional fields/other. Education students

were the oldest graduates at 45 years despite having an average-length program. Similarly, professional fields/other and agricultural sciences graduates were above the average age upon completion even though these programs were of average length.

In contrast, PhD graduates in scientific fields such as chemistry were more likely to complete doctoral degrees as part of their initial education. Graduates of doctoral programs in the biological sciences were among the youngest graduates despite having an average-length program.

Employment plans following graduation

Almost three quarters of doctoral graduates in 2004/2005 reported having firm plans for either employment or for further studies by the time of their graduation. About 20% of graduates reported that they would return to a position held prior to the completion of their degree and almost 53% of graduates had made a definite commitment to begin work or to take up further studies. The remaining graduates (27%) had no firm plans by the time of graduation, but were in negotiations with an employer or were seeking a position but did not have any specific prospects.

Graduates of social sciences, life sciences and physical sciences were the most likely to have firm plans, with about 75% of these graduates having firm plans for after graduation. Graduates of humanities were the least likely to have firm plans with less than 57% either returning to an employer or having made a definite commitment for other work or study.

Graduates with firm plans for employment were asked about their primary activities for the coming year. Nearly 38% of these graduates reported that they would be conducting research and development and one third would be employed in teaching. Over 22% of graduates were going to be employed in professional services. There were large differences in activities across fields of study with the sciences more directed to research and development and the humanities more inclined to teaching.

Graduates were also asked about the sector of the economy in which they would be employed. The service industries were reported most often as an employer of doctoral graduates with 54% of graduates employed in educational services, 16% in professional, scientific and technical services, 13% in health care and social assistance, 8% in public administration, and 6% in all other service industries. Only 4% of graduates had firm plans to be employed in a goods-producing industry. Engineering was the only exception to this pattern, with 23% of graduates having firm plans for employment in a goods-producing industry.

International flows of doctoral graduates

About 23% of doctoral graduates in 2004/2005 planned to live outside of Canada upon completion of their degree. This was similar to the proportion from the graduating class of 2003/2004. Overall, close to one in five Canadian-born doctoral graduates in 2004/2005 planned to leave Canada following graduation. On the other hand, over 72% of graduates born outside Canada or the United States intended to remain in Canada upon completion of their doctoral studies.

Graduates from the life sciences and physical sciences were more likely to have plans to leave Canada than were graduates in other fields. About 27% of graduates in life sciences and 34% of graduates in physical sciences had plans to live outside Canada following graduation, compared to 15% of graduates of programs in the social sciences. These differences reflect in part the number of foreign and visa students graduating in the various fields of study.

Conclusion

In knowledge-based economies, like Canada's and those of many other countries in the world, a premium is placed on highly-educated and highly-skilled individuals. Such individuals are key sources of the knowledge that fuels innovation, productivity growth and scientific advancement in all facets of the economy, from advances in health research to the development of solutions to environmental challenges to innovation in industry. They contribute as well to the intellectual life of the country and to advancing our understanding of complex social and political issues. Finally, they are a key resource for the educational system and the development of succeeding generations of postsecondary graduates.

It is important, therefore, that we have information on the trends in doctoral graduates, their characteristics and fields of study, and their post-graduation plans regarding employment. The world-wide demand for such highly-skilled individuals is strong and they tend to be highly mobile internationally. It is therefore also important to have information on these graduates' plans to remain in Canada.

Enrolment trends suggest that Canada's production of PhD graduates may rise over the coming years. Enrolment and graduation trends also indicate that increasing numbers of women are now pursuing advanced studies. The key to retaining doctoral graduates in Canada is to provide them with research and employment opportunities that offer them the potential to apply the knowledge and skills they have developed through years of study in interesting and rewarding work environments.

References

1. "Darren King. 2008. [Doctoral Graduates in Canada: Findings from the Survey of Earned Doctorates, 2004/2005](#). Culture, Tourism and the Centre for Education Statistics – Research papers. Statistics Canada Catalogue no. 81-595-M – No. 065.
2. American Survey of Earned Doctorates, Summary Report 2005.