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Information and Communications Technology Council  
Conseil des technologies de l'information et des communications

## Developing Tomorrow's Workforce Today



REPORTS

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# College Enrollment: Is Interest in the ICT Sector on the Rise?

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# I Introduction

## Purpose of the Survey

In March 2007, the Information and Communications Technology Council (ICTC) carried out an e-mail survey of Canadian colleges across the country. Part of an ongoing effort to address technology labour market issues in Canada, the survey was conducted in response to requests from Canadian colleges and industry to measure enrollment levels and trends in technology programs at the college level. This report presents the key findings from the survey.

## Survey Approach

The survey was distributed electronically to approximately 200 colleges. The survey asked for enrollment figures for these types of programs:

- Computer Information Systems
- Computer Science
- Microcomputer Systems Technician
- Computer – Office Assistant
- Computer Engineering Technology
- Computer Systems Technology
- Business Computer Information
- Information Technology
- Computer Programming
- Computer-Aided Design and Drafting
- Photonics
- Web Design
- Game Programming
- Electronics Technician
- Various others, as defined by survey recipients

In most cases, the survey was addressed to the Dean of Information Technology. Respondents were asked to provide actual enrollment statistics (total enrollment, female enrollment and enrollment of foreign students) for the academic years 2004 – 05 to 2006 – 07, inclusive, and projected enrollment figures for 2007 – 08 and 2008 – 09. In addition, a series of qualitative questions were designed to gather respondents' views concerning the key factors contributing to recent and projected enrollment levels, as well as their suggestions on what steps might be taken to assist in the enrollment challenges faced by colleges.

To maximize the response rate, the research team followed up the e-mail distribution with a phone call to each recipient. Prospective participants were encouraged to respond and invited to ask any questions about the survey. Those who had not responded by the cut-off date received a second phone call reminder.

A total of 24 colleges responded by the deadline. A list of responding colleges is provided in Appendix A. Responses were sometimes incomplete, with a number of respondents not providing estimates for future enrollment. However, definite trends are apparent in the data we did receive.

## How the Results Will Be Used

The data is a critical component in developing ICTC's understanding of the current and future human resource supply and demand issues faced by the IT industry. The Council will use the information to help develop strategies to address the emerging issues from both a college and an industry perspective. The results will be distributed to participating institutions and posted on the ICTC Web site ([www.ictc-ctic.ca](http://www.ictc-ctic.ca)).

# II Key Findings

## 1. Recent Enrollment Trends

Total enrollment has declined by eight per cent, according to aggregated figures from the 23 colleges that gave at least three years of consecutive data from 2004-2005 through to 2006-2007, shown in the table below. (One large college did not give enrollment data for 2004-2005, and all enrollment figures for this college are not included in this or other charts showing three-year enrollment trends.) This decline includes a drop of three per cent in the second year, and a further five percent drop the following year. What is not apparent from this data is the extent of variation in enrollment numbers for individual programs. This can be seen further on in this report in data sets for individual subject areas.

Table 1 – Total Enrollment in Technology Programs

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	17,183	
2005 – 2006	16,609	-3%
2006 – 2007	16,271	-2%
<b>Overall:</b>		<b>-6%</b>

Data is insufficient to say much, with certainty, with respect to enrollment trends in technology programs for foreign students, or for women.

Data for the full five year period, including estimates for the 2007-2008 and 2008-2009 sessions is discussed below, in section 2.

## Individual Disciplines

### a) Computer Information Systems – Hardware/Networking

Enrollment in courses in Computer Information Systems was remarkably stable.

Eleven colleges gave figures on this information.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	1,499	
2005 – 2006	1,482	-1%
2006 – 2007	1,488	0%
<b>Overall:</b>		<b>-1%</b>

### b) Computer Science

There has been a significant drop off in this subject. Note the percentage decline over the three-year period of 36 per cent. Seven colleges provided data for this three-year period for this subject.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	759	
2005 – 2006	642	-18%
2006 – 2007	560	-15%
<b>Overall:</b>		<b>-36%</b>

### c) Microcomputer Systems Technician

Here there is a significant decline of 31 per cent over the three-year period. Note that only two colleges are reporting, however, and the numbers are small for all years.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	67	
2005 – 2006	54	-24%
2006 – 2007	51	-6%
<b>Overall:</b>		<b>-31%</b>

### d) Computer – Office Assistant

This program shows growth of ten per cent, albeit from only three colleges reporting. The program is interesting in another respect, in that it attracts largely female students; on average 77 per cent of the students in this course over the three-year period were female.

Academic Year	Total Enrollment	Changes in Enrollment	Female students	Changes in Enrollment	Percentage of Female Students
2004 – 2005	440		335		76%
2005 – 2006	438	0%	382	12%	87%
2006 – 2007	491	11%	335	-14%	68%
<b>Overall:</b>		<b>10%</b>		<b>0%</b>	<b>77%</b>

### e) Computer Engineering Technology

This subject showed a great drop in enrollment over the three-year period, down by 58 per cent for the six colleges reporting.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	918	
2005 – 2006	800	-15%
2006 – 2007	581	-38%
<b>Overall:</b>		<b>-58%</b>

### f) Computer Systems Technology

One large college provided the figures in this chart showing the enrollment trend since 1999 for the Computer Systems Technology program. Though the enrollment situation varied for individual institutions, the figures from this one college roughly parallel the experience of other colleges for Computer Systems Technology, at least with respect to the sharp fall off in students following the peak 2002-2003 sessions.

Academic Year	Total Enrollment	Foreign students	Female students
1999 – 2000	508	No data	174
2000 – 2001	506	No data	152
2001 – 2002	570	No data	133
2002 – 2003	608	10	125
2003 – 2004	445	20	76
2004 – 2005	362	44	63
2005 – 2006	320	45	52
2006 – 2007	285 (est.)	27	49
2007 – 2008	285 (planned)	25	49
2008 – 2009	285 (planned)	25	49

Note the decline in enrollment above for the Computer Systems Technology program that has occurred in the 2004-2005 to 2006-2007 period.

Taking all three colleges, including the one above, that have reported enrollment for Computer Systems Technology for the three academic years, we can see that the number of students fell by 20 per cent over the three-year period.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	1,119	
2005 – 2006	1,016	-10%
2006 – 2007	933	-9%
<b>Overall:</b>		<b>-20%</b>

### g) Business Computer Information

This category sank by fifteen per cent over three years. The results come from six colleges and give data for a relatively large number of students.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	888	
2005 – 2006	831	-7%
2006 – 2007	770	-8%
<b>Overall:</b>		<b>-15%</b>

### h) Information Technology

The three colleges reporting here saw a sharp rise, then sharp fall in students for this category.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	275	
2005 – 2006	373	26%
2006 – 2007	269	-39%
<b>Overall:</b>		<b>-2%</b>

### i) Computer Programming

Here is another category with a sharp fall of 40 per cent. Note that most of this collapse occurred in the 2005-2006 year.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	631	
2005 – 2006	494	-28%
2006 – 2007	450	-10%
<b>Overall:</b>		<b>-40%</b>

### j) Computer-Aided Design & Drafting

The three colleges reporting here show a decline of eleven per cent, with all of that coming in the 2005-2006 year.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	209	
2005 – 2006	188	-11%
2006 – 2007	188	0%
<b>Overall:</b>		<b>-11%</b>

### k) Photonics

Here is a success story. Note that we have figures from only two colleges, but also note that enrollment has increased by 25 per cent.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	194	
2005 – 2006	239	19%
2006 – 2007	257	7%
<b>Overall:</b>		<b>25%</b>

### l) Web design

There has been an increase over the three years for this program as well, up by a total of 15 per cent, with nine colleges reporting.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	306	
2005 – 2006	299	-3%
2006 – 2007	359	17%
<b>Overall:</b>		<b>15%</b>

### m) Game programming

There is only one college reporting here, but it has achieved some success, with a 58 per cent increase from the second to the third year.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	0	
2005 – 2006	76	
2006 – 2007	183	58%

## n) Electronics Technician

There is a consistent drop with this program over the three-year period, but in the last year the decrease is less than in the second year.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	515	
2005 – 2006	470	-10%
2006 – 2007	434	-8%
<b>Overall:</b>		<b>-19%</b>

## o) Others – 26 programs at 13 colleges

The other category was used when a responding college felt that a particular course(s) did not fit into the categories named in the questionnaire. Rather than risk confusion with respect to assigning these courses a place in the above sets of program figures (a – n), they were categorized on their own. This was done to avoid misrepresentation.

Academic Year	Total Enrollment	Changes in Enrollment
2004 – 2005	9,363	
2005 – 2006	9,208	-2%
2006 – 2007	9,256	1%
<b>Overall:</b>		<b>-1%</b>

## 26 Programs Identified in the 'Other' Category of the Questionnaire

Enterprise Network Specialist  
 Electronics Engineering Technology  
 Interactive Multimedia Developer  
 Interactive Multimedia  
 Animation  
 Graphic Design  
 Network Engineering Technology  
 Telecommunications Technology  
 Electronics Engineering Technology  
 Broadcast Technology  
 New Media Production & Design  
 Graphic Design Fundamentals  
 Electronics Technologist (Computers and Telecommunications)

Infographie et animation en 2D et 3D  
 Techniques informatique – Gestion de réseaux  
 Technologie Systemes Ordinees  
 Internet Specialist  
 Industrial Control & Automation  
 Arts & Science program. Students take different University transfer courses  
 Techniques de bureautique  
 Telecommunications Engineering Technology  
 Geomatics Technology  
 Computer Networking Technician  
 CAD/CAM Engineering Technology  
 Computer Works  
 Electronics Engineering Technology

## Notable Enrollment Findings for Individual Disciplines

- Total enrollment reductions in percentage terms were greatest in Computer Engineering Technology, with a fall of -58 per cent for the six colleges reporting.
- Other programs showing severe enrollment drops include Computer Programming, down by 40 per cent over three years, Computer Science, down by 36 per cent, Microcomputer Systems Technician, down by 31 per cent, Computer Systems Technology, down by 20 per cent, and Electronics Technician, down by 19 per cent.
- Total enrollment gains were highest in Game Development. Though only one college reported data for this type of course, it showed rapid growth in its three-year lifespan to date, with a growth of 58 per cent from its second to third year. The college submitting the figures did not provide any estimates for future years.
- The program most widely taught, with eleven colleges responding, is Computer Information Systems – Hardware/Networking. There was a drop of only one per cent for these programs over the three-year period.

## 2. Projected Enrollment Trends

Approximately ten of the colleges included estimates of future enrollment levels, with some including projections for only some of their courses. Collectively, these colleges are projecting a decline in enrollment over the five year period from 2004-2005 to 2008-2009 of 10 per cent. Though these colleges have seen sharp fluctuations in the percentage of foreign students in their technology programs, they expect to see a decline of only nine per cent over the five year period for these overseas students.

The most complete data for future enrollment trends from this data is for Computer Information Systems – Hardware/Networking. The eight colleges that reported here collectively expect a decline of eighty per cent at the end of the five year period. This comes after an expected 12 per cent increase from the fourth to the fifth years. One college is canceling the program.

One college that was teaching over a thousand students in a Computer Engineering Technology program in 2005-2006 projects that there will be approximately 900 students in the program in 2007-2008, but only a little over a hundred students in the 2008-2009 session. This same college is predicting rising enrollment in other courses, however.

### 3. A Case Study

- A closer examination of the enrollment data for one Canadian college with a large number of technology students shows the following:
- From 2004-2005 to 2008-2009, a five year period that encompasses three years of actual data and two years of future estimates, this college saw a general decline of 21 per cent in total enrollment in technology programs.
- This decline was most severe in the Electronics Technician program, with a projected drop of 50 per cent by the end of the five year period. Indeed, at the end of the three years of actual data, there has been a drop of 200 per cent in this program. Enrollment numbers are expected to rise for this program, settling out at a level fifty percent down from the 2004-2005 period.
- Other programs with sharp declines in enrollment include Computer Engineering Technology, down by half, and Computer Information Systems and Computer Systems Technology, both down by nearly 30 per cent over the five year period. A Telecommunications Engineering Technology course saw sharp declines, but is expected to be down by only 20 per cent in the fifth year as compared to the first year.
- This college has seen some success, however, with its Web Design program that has more than doubled in enrollment. This increase has come with a transition from a one-year to a two-year program.
- A Computer-Aided Design and Drafting course has remained remarkably stable over the three years of actual data, and is projected to remain at the same level for the two projected years. It is now up five per cent over the last year, and is set to go down five percent in 2007-2008.
- This college does not have a program specifically labeled “Computer Science.”

## 4. Taking Action

### Enrollment trends

**In your opinion, what factors have contributed to the technology enrollment trends in your institution (e.g., decline in total enrollment, increasing enrollment of women, etc.)?**

#### *Contributing Factors*

Respondents identified a variety of factors as contributors to recent enrollment trends in technology programs in colleges. Among the key factors/trends cited for **declining** enrollment levels were:

- The downturn in the technology sector that occurred several years ago, with ongoing news of workforce reductions, and the difficulty for new graduates in finding jobs in the sector
- A decline in overall college enrollment for some colleges
- Declining interest in science, math, and engineering at the high school level
- The failure of high school students to graduate with adequate math skills, due to teaching styles
- A tendency on the part of high school students to avoid taking math classes that are necessary for the technology and software industries
- Competition from faculties of health science for top students
- Problems in computer education in high school
- A healthy job market draws potential students into the workforce, with no perceived need for additional education – the opportunity cost for education is higher in light of good job opportunities
- Reduced glamour level for technology occupations in comparison to previous years
- Lack of available grant money for students
- Large out-migration of people from the north to the south
- Competition from Internet-based education and distance education programs
- Expense of keeping equipment and courses up-to-date in rapidly evolving technology sectors

Among the factors identified as major contributors to **increasing** enrollment in college technology programs were:

- Growing interest in computer and video games
- Attractive new educational facilities with state-of-the-art equipment
- Increased marketing efforts

- Canadian Information Processing Society (CIPS) certification for some courses
- Industry support
- High-quality faculty and academic reputation

### Section 2: b

#### **What factors/conditions have been taken into account in projecting future enrollment figures (e.g., decreased/increased demand, changing quotas, etc.)?**

- Availability of third-party funding
- Declining high school populations in four to five years
- Reduced industry demand
- Ongoing tracking relating to industry demand
- Trending from previous enrollment intakes
- Competition from increasing number and size of universities
- The decision to keep enrollment at a set level, with well-qualified incoming students
- Newly designed programs, with more business studies options
- Numbers of available foreign students
- Availability of student grant money
- Reluctance to over estimate numbers of students applying
- Space limitations

#### **Steps to be Taken by Various Key Players Re: Enrollment**

Respondents were asked what, if any, steps should be taken by governments, the private sector, colleges, or their associations, and secondary schools, to maintain/increase/ decrease enrollment in Canadian technology programs at the college level. A summary of responses is provided below:

##### **By the Federal Government**

- Provide accurate, up-to-date figures on industry demand for graduates, on a national basis
- Run a nation-wide advertising campaign that highlights jobs available
- Promote awareness and positive attitudes towards technology education and technology employment
- Promote research and development
- Create IT jobs
- Increase funding, grants and scholarships

- Ease entry for foreign students. Don't deny visas to students unless they are truly unsuitable.
- Provide grants to institutions to keep equipment and facilities attractive and up-to-date

##### **By Provincial Governments**

- Increase funding
- Marketing initiatives to promote technology education, and to give the field a good public image, possibly in conjunction with the federal government
- Provide tax incentives for companies to hire in the technology sector
- Create IT jobs
- Promote and support technology and Research and Development
- Incentives for students and companies, grants, and lower tuition
- Nationwide marketing campaign, possibly in conjunction with federal government, which highlights technical jobs available.
- Require students to fulfill technology education credits in order to graduate from high school
- Simplify course approval process
- Provide additional understanding of the ICT sector for civil servants/teachers in education departments
- Establish Engineering Technology Association with many specializations for community college graduates
- Make Computer Science an obligatory subject in high school
- Revise curriculum of high school Computer Science
- Investigate viability of IT/ICT trades apprenticeship(s)
- Provide capital funding for equipment and space

##### **By the Private Sector**

- Get senior executives to announce publicly the need for various types of technology workers. Make available other demand information for workers.
- Ease working conditions for technology workers
- Partner with colleges
- Promote technology
- Approach colleges and offer upgrades for equipment, curriculum review, scholarships and promotion
- Fund employee upgrade training
- Provide recognition for achievements in technology education sector

- Participate in program advisory committees at institutions near them
- Hire students in co-op programs for work terms
- Donate up-to-date equipment
- Provide new venture investment in the knowledge-based economy

### By Colleges or Their Associations

- Appropriately market programs
- Work with local advisory committees to ensure appropriate programs are offered
- Keep equipment modern
- Recruit students with dynamic promotional messages
- Keep technology programs open
- Continue to review and revamp curriculum
- Perform labour market research to determine what technology is in demand and what the needs are of industry
- Promote to students overseas in joint efforts to maximize effectiveness of promotional budgets
- Work within industry standards such as Comptia
- Partner with high schools and middle schools

- Continuously renew programs
- Develop multi-institutional collaborative programs

### Section 2: c By Secondary Schools

- Provide some focused programming on the hardware/software side to ensure careers in ICT are highlighted. i.e. ITSA type programming
- Demystify math and sciences for the students
- Promote college education and not just university
- Partner with colleges
- Continue to highlight benefits of college programs for their students
- Renew and update curriculum and teaching staff to ensure that technology is viewed as current, vital, and innovative by students
- High school counselors should spend more time in advising students of career options and be aware of what the ICT sector can offer
- Simplify the high school curriculum to concentrate on fewer, accomplishable goals
- Make science and technology programs interesting and fun

## Appendix A: List of Responding Colleges

Algonquin College of Applied Arts and Technology  
 Canadian Business College  
 Canadian Institute of Telecommunications  
 Cégep Andre-Laurendeau  
 Cégep de Drummondville  
 Collège Gerald Godin  
 Collège Montmorency  
 Collège O'Sullivan  
 Collège Shawinigan  
 Édouard-Montpetit  
 George Brown College  
 Heritage College  
 John Abbott College

Keyano College  
 Keyin College  
 Langara College  
 Northern Alberta Institute of Technology (NAIT)  
 Northern College of Applied Arts and Technology  
 Nunavut Arctic College  
 Southern Alberta Institute of Technology (SAIT)  
 Seneca College  
 Saskatchewan Institute of Applied Science and Technology (SIAST)  
 Winnipeg Technical College  
 Yukon College

**The Information and Communications Technology Council (ICTC)** is a non-profit sectoral council dedicated to creating a strong, prepared and highly educated Canadian ICT industry and workforce. ICTC is a catalyst for change, pushing for innovations that will provide labour market intelligence, life-long professional development and quality education and training for the Canadian ICT industry, educators, governments and the ICT workforce. We forge partnerships that help develop the quantity and quality of ICT professionals needed to improve Canada's position as a leader in the global marketplace.

To achieve its goals, ICTC focuses on four areas that are proven building blocks of a healthy, forward-looking sector:

- **Skills Definition** – defining the skills required to be a professional in the ICT sector.
- **Labour Market Intelligence** – providing up-to-date statistics and analyses of human resource developments in the ICT sector.
- **Career Awareness** – providing programs and tools to explore the career possibilities in Canada's ICT sector.
- **Professional Development** – dedicated to continuous learning for ICT workers so they can maintain and improve their skills sets and increase their opportunities within the sector.

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