

# Learning computer skills

by Heather Dryburgh

In the western world, one widely-held assumption links men with a fascination for machines and technology. The computer is proving to be the latest machine attracting the attention of men, who are training and working with computers in much larger numbers than women. However, computers are an essential part of many workplaces and employers need both men and women with computer skills.

Although some come to the job with computer-related education, many workers need training or retraining to keep up with new hard- or software. Various training and education methods are available, but do men and women choose similar ways of learning computer skills? How effective do they feel their computer training has been? This article uses the 2000 General Social Survey (GSS) to examine how men and women aged 15 and over learned their computer skills and which methods they found most important. After a brief look at all computer users, the article focusses on the training preferences of men and women working in three broad occupational groups: computer professionals, high skill occupations and all other occupations.

## Most learn by trial-and-error, or with help from friends or family

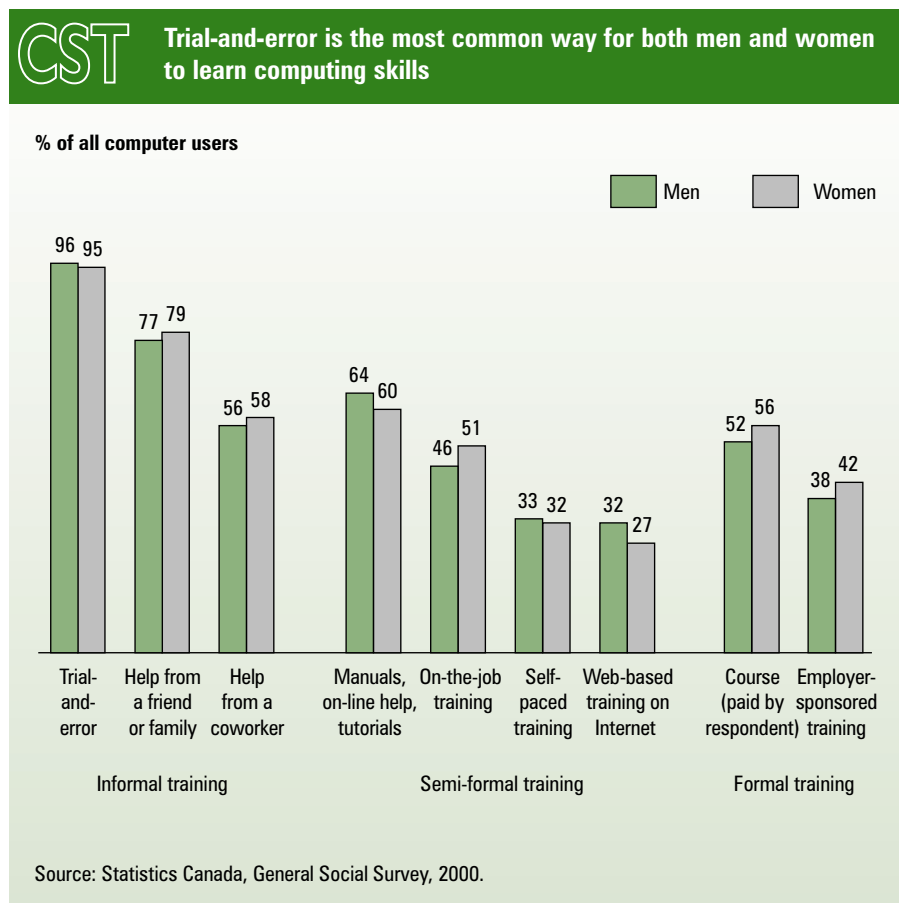
In 2000, 96% of all computer users reported that they had taught themselves computer skills through

trial-and-error; 78% had received informal help from a friend or family member. Formal training, such as a course at an educational institution (54%) or an employer-provided course or training program (40%), was less common. Web-based training on the Internet was the least common way to learn computer skills (30%).

Men were generally more likely than women to use self-learning methods; on the other hand, women

were more apt to use facilitated methods such as on-the-job training and informal help from friends, family and coworkers.

The majority of computer users had used several training methods to acquire their computer skills. Over half had received between two and five different kinds of training, while 11% reported using all nine methods. Very few people (5%) learned their computer skills using



This article is based on data from the 2000 General Social Survey (GSS) on access to and use of information communication technology. The GSS is an annual telephone sample survey covering the non-institutionalized population aged 15 and over in all provinces. The representative sample had 25,100 respondents, with an 81% response rate.

**Working population:** refers to those persons aged 15 and over working for pay, including the self-employed.

**Occupation:** three occupational groupings were used in this analysis: *computer professionals* are computer programmers, systems analysts, and computer engineers; *high skill occupations* are jobs where workers are not computer professionals, but perform high skill computer work such as data analysis, some types of computer programming, graphic design or desk top publishing; and *all other occupations*.

**General technology use:** this is an index of general technology use, with one point scored for use of each of the following: fax machine, cellular telephone, automated teller machine (ATM), telephone answering machine or service, pager, cable television, satellite dish, and digital video disc (DVD). Scores range from 0 to 8. High scores indicate high technology use and low scores indicate low technology use.

## Training

Nine measures of training are used in this article. They can be grouped into three general categories of formal, semi-formal, and informal training methods.

**Formal training:** This category includes two components: (1) taking a course at an educational institution (school, college, institute) for which the person registered and/or paid; and (2) taking a course or training program provided by the person's employer or a former employer, held in a classroom or training facility on or off the worksite.

**Semi-formal training:** This category includes four components: (1) self-paced training provided by the person's employer or former employer using videos, CD-ROM, training manuals, or training based on computers; (2) on-the-job training provided by the person's employer or a former employer; (3) manuals, on-line help, or tutorials provided by the computer or software manufacturer; and (4) Web-based training on the Internet.

**Informal training:** This category includes three components: (1) informal help from a coworker; (2) informal help from a friend or family member; and (3) teaching oneself through trial-and-error.

**Self-learning methods:** Generally preferred by men, these methods include Web-based training; self-paced training; use of manuals and on-line help; and trial and error.

**Interactive (or facilitated) methods:** Generally preferred by women, these methods include formal courses; employer-sponsored courses; on-the-job training; help from friends and family; and help from coworkers.

only one method, and of that 5%, the majority taught themselves through trial-and-error.

However, this general description of education and training obscures the somewhat different patterns that are found when looking specifically at computer users in the workforce.

According to the 2000 GSS, the computer training and education

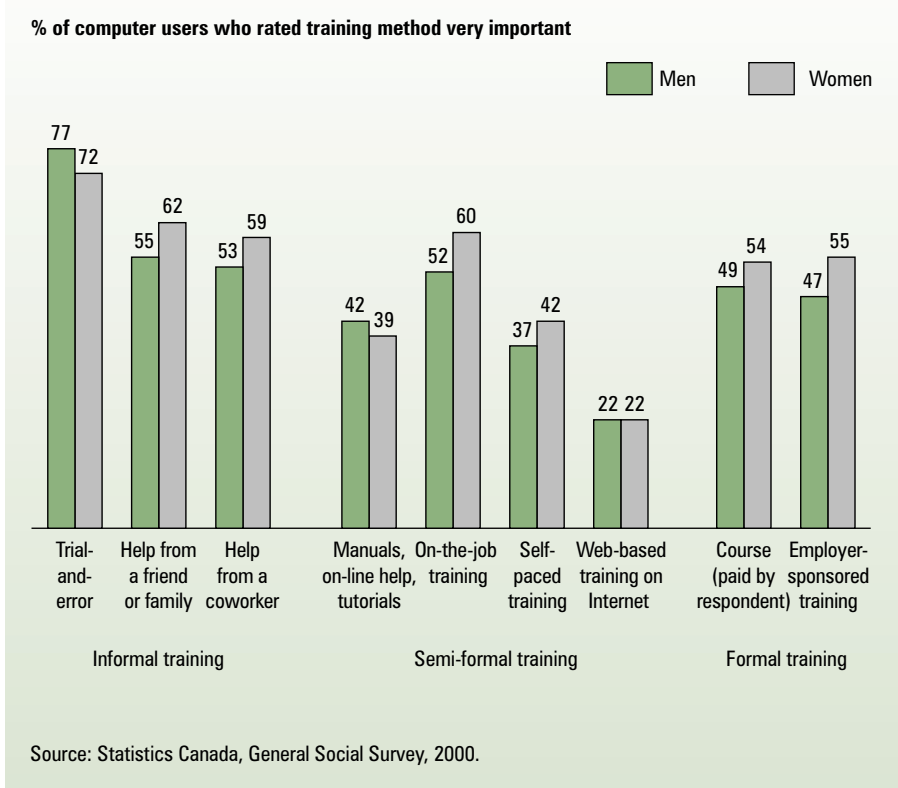
of working women varies across the three occupational groups; it also differs somewhat from men's experience within these groups. For example, women computer professionals were significantly more likely than women in the other two occupational groups (high skill and all other occupations) to use Web-based training; nevertheless, they were still much

less likely than men computer professionals to learn this way. Other than Web-based training, the education and training experiences of men and women in computer professions were fairly similar.

The differences in the high skilled and the "all other occupations" groups were more considerable. Women in jobs requiring high-level

	Men	Women	Total	% women
	(000)			
Computer professionals	293	104	397	26
High skill occupations	4,039	3,137	7,176	44
All other occupations	4,494	4,059	8,553	48
Total	8,826	7,300	16,126	45

Source: Statistics Canada, General Social Survey, 2000.



computer skills were more likely than their male colleagues to report using interactive training methods — both formal and informal; men were more likely to rely on self-learning methods. On the other hand, women in the “all other occupations” group were more likely than men to have experienced training. This was true for eight of the nine training methods, the exception being trial-and-error.

**Informal training methods get largest proportion of high ratings**  
Workers who used computers were asked to rate the value of each training method they had used on a scale from very important to not at all important. Compared with formal or semi-formal methods, they were more likely to rate informal methods as very important for learning computer skills. The only exception was on-the-job training. Men ranked

trial-and-error and using manuals higher than women. These two methods most closely represent the self-learning ideal often associated with computer work, and which tends to be highly valued by professors of computer science.<sup>1</sup>

Working women rated facilitated methods — for example, on-the-job training, informal help from a coworker, family or friends, and self-paced learning — higher than men. These results are consistent with research that finds women greatly benefit from using social facilitation to learn computing skills.<sup>2</sup> Women were also more likely than men to identify formal training as a very important method of learning.

**Computer professionals find formal training more important than others**

Looking at how the working population rated various training methods, some similarities and differences emerge among the three occupational groups. First, whether people were in computer professions, high-skilled jobs or all other occupations, they rated trial-and-error most important and Web-based training least important for learning computer skills. On the other hand, computer professionals were more likely to report having these two types of training and to consider them very important than were workers in the other two groups.

Workers’ assessment of the usefulness of the remaining types of training also differed between occupations. For example, compared with other workers,

1. Rasmussen, B. and T. Håpnes. 1991. “Excluding women from the technologies of the future? A case study of the culture of computer science.” *Futures* 23,10: 1108-19.  
2. Busch, T. 1996. “Gender, group composition, cooperation, and self-efficacy in computer studies.” *Journal of Educational Computing Research* 15, 2: 125-35.

computer professionals more often described employer-provided courses, manuals, on-line help, and on-the-job training as very important.

Informal help from coworkers, family or friends were among the highest rated learning methods for the “all other occupations” category, whereas computer professionals ranked family or friends fairly low and were divided on the importance of help from coworkers. And while women computer professionals did not consider help from coworkers to be one of their most useful training method, their male colleagues rated it the third most important way to learn computing skills.

### Gender differences in training ratings greatest among computer professionals

Although women and men ranked training methods differently within each occupational group, computer professionals showed the largest contrast. Women computer professionals had taken training similar to men’s, but did not find the same things to be very important; considerably more women than men gave a high rating to employer-provided courses, on-the-job training, and self-paced video and CD-ROM training provided by their employer.

Academic research on computing culture suggests that many women feel isolated and hesitant to seek help in the male-dominated environment of computer education and work.<sup>3</sup> According to the 2000 GSS, although men computer professionals seemed more likely than their women colleagues to highly rate informal help from a coworker and formal courses, the differences were not statistically significant.

### Men have more experience with computers than women

Factors other than the ones already mentioned could also influence the way



men and women assess training methods. For example, research indicates that computer experience may have an impact on the kinds of training men and women find effective for learning computer skills.<sup>4</sup> GSS data show that a larger percentage of men than women have access to a computer, use the Internet and rate their computer skills as excellent. Men also tend to score higher than women on a general technology use measure and have more years of experience with computers.

The type of work done, and the kinds of skills required for that work, may also influence people’s assessments of the various methods for learning computing skills. A comparison of the skill level of computer activities identified has shown that women were more likely to be doing moderate skill level computer activities than men (47% of women, 35% of men), and less likely to be doing high skill level activities (53% of women, 65% of men).<sup>5</sup>

### Men and women still rate training differently even when they have similar experience, skill and training

Because the experiences of men and women are often dissimilar, a multiple regression model was developed to see if the gender differences in training ratings held true after

- Rasmussen and Håpnes.
- Fisher, A., J. Margolis and F. Miller. 1997. “Undergraduate women in computer science: Experience, motivation and culture.” *SIGCSE Bulletin* 106-10.
- High skill is defined as data analysis, write computer programs, graphics or desk top publishing; moderate skill is defined as word processing, data entry, record keeping, using a spread sheet program, playing games, and using a CD-ROM encyclopedia or educational CD-ROMs. See also: Marshall, K. Summer 2001. “Working with computers.” *Perspectives on Labour and Income* 2, 5 (Statistics Canada Catalogue no. 75-001-XIE).

	Men	Women
	%	
Access to computer	69	66
Self-rated computer ability		
Excellent	15	8
Very good	19	22
Good	28	31
Fair	24	23
Poor	15	16
Internet use in past 12 months	56	50
General technology use index <sup>1</sup>	3.8	3.5
Average years of using computer	7.5	7.1

1. See "What you should know about this study" for definition.  
Source: Statistics Canada, General Social Survey, 2000.

accounting for differences in experience and skill.<sup>6</sup>

The results generally confirmed the differences already seen: women were significantly more likely than men to rate employer-provided courses, self-paced training, on-the-job training, and informal help from friends or family as very important. Men, on the other hand, rated trial-and-error higher than women. However, there was no significant difference in men's and women's ratings of manuals, on-line help and tutorials.

The regression analysis does suggest that age is an important factor in the way people choose to rank training methods. Among those 25 years and over, women in both high skilled jobs and all other occupations rated formal courses higher than did their male counterparts and than women in the computer professions; this did not hold true for workers under 25.

6. Variables in the model include experience with computers, skill level of work, number of training methods experienced, education, and occupation.

It is possible that younger computer professionals are in the process of taking formal computing courses or have just completed them. As such, they may rate the value of their training higher than older colleagues who did their formal training less recently and may find it less relevant to their current work.

When all other factors including gender are taken into account, computer professionals rated most methods higher than workers in highly skilled occupations; however, informal help from friends or family was less important to computer professionals than highly skilled workers. Interestingly, there were no statistically significant differences among the three occupational groups in the ratings given to the trial-and-error and self-paced methods of training, after controlling for other factors in the model.

### Summary

Among computer users in the population aged 15 and over, a higher proportion of men than women used self-learning methods to acquire their

computer skills. Women, on the other hand, were more likely to employ formal methods such as on-the-job training as well as informal help from coworkers.

In assessing the importance of various kinds of computer training, both men and women in three broad occupational groups rated trial-and-error as the most important, and Web-based training as the least important, method. Overall, a higher proportion of women than men rated facilitated computer training as very important, while men tended to regard self-learning as very important. These findings suggest that employer-sponsored training is particularly valuable for women working with computers.



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