Women in Information Technology Initiatives in Canada: Towards Fact-based Evaluations

Wendy Cukier  
*Ryerson University*

Carole Chauncey  
*Ryerson University*

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Women in Information Technology Initiatives in Canada: Towards Fact-based Evaluations

Wendy Cukier
Ryerson University
wcukier@ryerson.ca

Carole Chauncey
Ryerson University
cchaunce@ryerson.ca

ABSTRACT
For more than a decade, government, the private sector, associations, universities and schools have initiated projects aimed at increasing the participation of women in information technology (IT). Despite these efforts, female enrolments in computer science, engineering and IT programs, have plateaued or even declined. While many initiatives report high levels of participant satisfaction, their other impacts are less clear. This exploratory study provides a meta-analysis of the program designs and evaluations of 70 such initiatives available in Canada. It assumes that programs need clearly defined assumptions, objectives and evaluation processes in order to be effective. It explores the assumptions that underlie the programs, the program elements and the forms of evaluation employed. The paper concludes that there is little systematic evaluation of these programs and that there is a need both to question some of their underlying assumptions and to develop more robust, multi-layered approaches to evaluation.

Keywords
Gender, Information Technology, Human Resources, Evaluation

INTRODUCTION
Ensuring an adequate supply of computer scientists and engineers to fuel the growth of the information economy has become a priority in many countries. Attention has focused on projected skills shortages—recent estimates suggest that Canada alone will face a shortage of 20,000 software workers during the first few years of this century (HRDC, 1998). Emphasis has been placed on expanding computer science, engineering and programming-oriented educational programs in both Canada and the USA. Increasing the participation of women in IT programs is one area of emphasis (U.S. Department of Commerce, 1997) and the decline in female enrolment in computer science and engineering courses at universities over the past five years has caused concern (Whittaker, 2000). In Canada, from 1989 to 1999, female students in engineering doubled to 20%, then plateaued. Female enrolment in computer science courses doubled at Canadian universities since the 1980s, but has fallen from 28% to 24% in the past five years.

Much attention has been focused on increasing the number of women studying math and sciences, or in attracting and retaining them in computer science and engineering programs (Applewhite, 2002; Martinson and Smandych, 2002; Cohoon, 2001; Trauth et. al., 2000; Cuny and Aspray, 2000; Klawe et. al., 2001). Different models and assumptions shape these programs—for example, scholars have differentiated "Liberal" approaches, which assume that women merely need to be made more aware of their options, from Marxist or structuralist approaches which assume that there are deep-rooted, structural impediments to women's participation, versus "cultural" approaches which presume that the social constructions of technology present invisible barriers to women (Gundy, 1996; University of Limerick, 1998). Recently it has been suggested that institutional barriers to women in IT are presented by the very definition of the profession. Treating the “IT profession” as synonymous with computer scientists and engineers does not reflect the current reality of the profession and excludes large numbers of women who work in information systems. (Cukier et. al., 2001a, 2001b, 2001c).

Regardless of the underlying assumptions, there are a growing number of projects aimed at increasing women’s participation in the industry (Cohoon, 2001; Cuny and Aspray, 2000). These programs operate at the local, regional and national levels and include activities aimed at increasing awareness of IT careers, promoting female role models, increasing young girls' participation in math and science, exploring female-friendly pedagogy, offering alternative entry routes, as well as providing mentors and networking opportunities.

However, despite the plethora of programs which have emerged to promote women in IT, the evidence of the long term impacts is uneven at best. As Campbell and Hoey (1999) note, "After early increases, the number and percentages of under-
represented groups in SMET are not increasing greatly and in some cases are decreasing. They also stress the importance of careful evaluation and attention to unintended consequences. Evidence from other sectors suggests that many social marketing programs, however well-intentioned, are undertaken largely for symbolic reasons; i.e. that stakeholders wish to be seen to be acting, regardless of their actual outcomes (Andreason, 1995).

METHODOLOGY

This paper consists of a review of 70 existing programs available in Canada, aimed at increasing women’s participation in IT. (See Appendix 1) International programs available in Canada were included as were broader programs aimed at increasing participation of women in engineering, science and technology, where relevant. Programs were also included which are aimed at providing non-traditional entry points to the industry which may accept males but are targeted at women. Methods of data collection included: literature reviews, program document review, interviews and an email survey conducted from January 2001- September 2002.

The principal questions that guided the review were:
1) What are the assumptions which underlie programs aimed at increasing women’s participation in IT? (Specifically, how do they define the problem?)
2) How are these programs designed to address overt and systemic barriers to women's participation in the information technology profession? (What are the program elements?)
3) What evidence is there that these programs work? (What forms of evaluation are used?)
4) What are the elements of a fact-based intervention program aimed at increasing women’s participation in the IT profession?

Although every effort was made to collect information on relevant programs, further work needs to be undertaken to identify additional programs, perhaps through a survey of computer science and IT education programs as well industry.

PROGRAMS IN CANADA AIMED AT INCREASING THE PARTICIPATION OF WOMEN

The projects which were examined were grounded in studies which have identified barriers to the participation and success of women in science, technology and engineering disciplines. Among the factors most often referred to were:

- Socialization and early education: Computers are perceived as belonging to the male domain of mathematics, science, electronics, and machinery (Inkpen et al., 1994). Computer use and expertise have been associated with masculinity from a very early age. (Fletcher-Flinn & Suddendorf, 1996).
- Lack of female centered pedagogy: Women's ways of learning are different than men's (Gilligan et al., 1990; Tisdale, 1993). Often approaches to teaching math and computing-related subjects do not take into account female learning styles or rely on examples which are female-oriented.
- Male-dominated computing culture: Computer use and expertise has been associated with masculinity, and therefore, gender socialization serves to act negatively on female students’ attitudes towards computing.
- Absence of role models: The absence of role models begins in primary school, runs through university and into the work force. Teachers have been reported to play a role both in perpetuating gender socialization and negatively affecting girls’ experience with computers (Shashaani, 1994).
- Lack of access: In the classroom, it has been observed that males tend to dominate the computers during free time, and females will only use the computers when given specific instructions allowing them to (Koch, 1995). Compared to boys, girls spend less time per day playing video and computer games at home, own fewer games, and are less interested in and knowledgeable about the gaming industry (Klawe, 1998). They are more likely to be attracted to communicative activities, but most computer games and activities are male-oriented.
- Lack of confidence: Female students scored lower in perceived self-efficacy in computer use, defined as the belief in one’s own ability to use computers successfully (Busch, 1995). Problems with females’ sense of efficacy start in primary school and are evident in the gap between performance and self perception as early as grade 3. This persists as girls grow older and has often been characterized as "the imposter syndrome."
- Knowledge and interest in IT careers: The negative stereotyping of computing and "geeks" is another impediment. Often girls have a limited understanding of the range of opportunities that a career in IT might offer. Interest in IT careers is often formulated by age 10-14.
- Lack of networking and support structures: Girls and women with an interest and aptitude for information technology are often in a minority in classes, programs and jobs, which has an impact on their performance and retention rates (AAUW, 2000).
- Systemic barriers: There has also been research which has explored the systematic barriers to women that exist in employment in terms of recruitment and promotion, the neglect of a work-life balance, the absence of female role models, and the "glass ceiling" which limits the promotion (Fountain, 1999).
Strategies which have been developed to promote women in IT tend to be designed to respond to one or more of these identified barriers. Among the projects studied were those which include components intended to:

1) increase their interest in the discipline and of the opportunities which exist
2) improve core skills and confidence in mathematics and computer programming
3) increase the sense of belonging, particularly in environments where they are in the minority, often by developing networking opportunities with other women in IT.

Among the programs reviewed, half targeted university age females. More than one third were aimed at school children, some as young as 6. There were a small number aimed at special populations such as disabled women or immigrant women or those in low socio-economic groups. None of those investigated were aimed at seniors.

The programs ranged in terms of the sponsors and the structure. Many involved partnerships with industry and some were collaborations among a number of educational institutions. The objectives of the programs range considerably, but all have the goal of increasing the participation of women in Information Technology education and careers.

General education and awareness programs included a wide range of outreach programs aimed at raising awareness of computing and technology among children, parents and teachers. For example, some programs were designed to provide visits by volunteer scientists and engineers to K-12 classrooms. The Scientists and Innovators in the Schools (SIS) and Pathmakers programs are two such examples (http://www.scienceworld.bc.ca, http://www.carleton.ca/wise/pathmaker.htm). Others focus on organizing female role models as guest speakers and providing internet-based career counseling resources.

Others included workshops and courses that were aimed at developing particular skills or more specialized knowledge. Some, for example, focused on bringing together several hundred girls to provide them with hands-on experience of computing opportunities; see, for example, the Ms. Infinity Program (http://www.harbour.sfu.ca/scwist/). Camps, fairs and career days were also sponsored by universities and associations such as the Canadian Information Processing Society (CIPS). Often these programs have as their objectives increasing awareness of information technology opportunities for girls and debunking many of the stereotypes. In addition, they often include female-oriented pedagogic elements focused on the application of technology to serve people.

These programs were also aimed at reducing traditional barriers to women entering computing fields. These include a wide range of computer literacy, formal education and certification programs aimed at opening career opportunities. There are also some specialized university-based programs such as Alternative Routes to Computing (ARC). This program is an effort to attract females with non-traditional backgrounds to university computer science programs that are more accessible to, and more supportive of, women.

Considerable attention has been paid to the development of mentors for women in technology. Mentors play a critical role in motivation, confidence building and problem solving. Mentors play different roles at different stages in the education and career cycle. They can play a role in raising awareness, as well as in creating interest in information technology and role modelling. They can also help build confidence and motivation as well as an understanding of career opportunities for university students, and can provide assistance in navigating organizational cultures and problem solving based on experience.

Formal and informal mentoring programs are designed to meet these needs. MentorNet is one of the best known mentoring program with participants in more than 80 universities who are linked via email to mentors in the industry. Other universities run programs in conjunction with alumni and industry partners in order to help young women understand the potential for careers in information technology.

Some programs are aimed at providing financial incentives to women in order to encourage their participation—targeted scholarships and sponsored training programs are examples.

**EVALUATIONS**

Most of the programs assumed that if they addressed identified barriers to women in information technology by increasing awareness, shifting attitudes, providing experience etc., they would have an impact on female participation in information technology education and professions. However, very few had any formal evaluation other than data on participation rates or satisfaction. There are a few exceptions:

- The office workers’ career center tracked placement, claiming an employment rate of 55% for its graduates
Women in Scholarship, Engineering, Science and Technology (WISEST) at the University of Alberta, did a longitudinal study of the 50 students that participated in the program and surveyed the girls’ teachers (University of Alberta, 2002).

• The GenTech Equity Project of UBC and Simon Fraser University also undertook a longitudinal study of participants.

The absence of evaluations, does not, indicate that these programs are without merit. However, it does suggest that many of the benefits are taken-for-granted. Given the continued poor participation rates of women in IT, it would seem that more examination of some of our assumptions is warranted.

**PROGRAM PLANNING AND EVALUATION MODELS**

There are well-established program planning and evaluation models which have been designed for program aimed at producing attitudinal and behavioural changes. (Stufflebeam, 1999) Specific guidelines have been developed to ensure gender sensitive evaluation models (McLaren, 2000). While the specific frameworks vary according to their purposes and application, these models emphasize the importance of clearly defined goals and assumptions, measurable objectives and performance measures. In particular, these models stress the importance of differentiating formative, process, impact and outcome forms of evaluation. Increasingly, there is recognition that well-designed programs with clearly elaborated assumptions, objectives and evaluations are critical to effective allocation of efforts and resources aimed at improving the participation of women in technology (Frehill et. al., 2002). Models include several levels of evaluation aimed at assessing the program design, the program implementation, short term impacts and longer term outcomes.

**Formative Evaluation**

Formative evaluation involves examination of elements of the program to provide feedback to the implementation process (eg. is the intervention likely to achieve the objective?) Based on both the theoretical and empirical research that has been done to date, this might include, for example, monitoring levels of interaction and participant satisfaction with program elements. Most of the programs had basic information about participation rates but little more. Ratings of participant satisfaction or response to particular program elements can be used to improve program design and delivery.

**Process Evaluation**

Process evaluation focuses on questions related to how well the program is designed and implemented uncharacteristically; for example, process evaluations will ask whether the target population is being reached. Are students aware of the program and its potential benefits? Are the students who are most likely to benefit from the program participating? A process evaluation might also attempt to assess elements of the program—for example, levels of satisfaction with training programs or with the information provided to participants or with the matching process. In general, the programs reviewed had some basic information about the number of participants but little else. There appeared to be a wealth of ideas from project managers about elements that worked and did not work, but there was little formal assessment of the processes.

**Impact Evaluation**

Impact evaluation is focused on assessing whether or not a program has achieved its short-term objectives. For example, have knowledge and attitudes changed? What benefits do participants believe that they have gained? A number of institutions do conduct impact evaluations, which focus particularly on satisfaction levels. Generally, these evaluations make assumptions about outcomes based on research that has identified impediments faced by females in information technology education or careers. It has been suggested that, if girls are more aware of opportunities that information technology provides and if they are satisfied with a program promoting information technology careers, they are more likely to choose information technology careers. However, there is a difference between perception of impacts and measurable outcomes.

**Outcome Evaluation**

Outcome evaluation determines important, yet difficult to answer questions. For example, did the program affect behaviour? Was there an effect on the recruitment and retention of women to information technology programs or careers? What were their employment prospects on graduation? Did the program have an impact on their careers? What are the costs associated with the program?

In order to undertake a comprehensive evaluation of women in IT programs, a variety of evaluation techniques must be used. In addition to regular surveys to collect data related to process and outcome evaluation, there would, ideally, also be an effort to develop a case-controlled evaluation in which students with similar characteristics (matched case) not participating in the program and students in the program would evaluate the program’s performance. In addition, a longitudinal study to track results over time is desirable.
Good outcome evaluations are notoriously hard to do, not only because they are expensive, but because it is so difficult to isolate the impact of particular interventions. Often, multiple factors affect outcomes—for example, students in IT programs may have particular characteristics which may be more significant predictors of the outcomes than the intervention itself. Longitudinal studies are hard because they require a long term commitment and keeping track of students once they leave the institution is often not easy. In addition, many universities place more priority on other issues and place surprisingly little emphasis on evaluating their core activities.

Well-designed programs aimed at promoting the participation of women in information technology must clearly define their performance measures at the outset. For example, if the objective is improving retention of women in the program, measures should be developed to assess these, ideally in comparison to students with similar attributes not participating in the program. We found one case, for example, where there was an effort to link a mentoring program to retaining women in math, science and engineering fields. The MentorNet Program noted that overall retention in math, science and engineering fields among protégés responding to the survey was 95%, and concluded that MentorNet participants "display unusual levels of confidence and retention in majors and careers compared to what might be expected in the general population of women in these majors" (Lichtenstein, 2001) However, there is no information provided about what retention rates "might be expected in the general population" and more importantly further exploration of the causal factors is warranted (Lichtenstein, 2001). As participants are self-selected, it may be that students volunteering for the program share characteristics, which are also predictors of success. More matched, case-controlled studies would be helpful.

Another impression from the existing work that has been done is that evaluations are completed by individuals with a stake in these programs. Care must be taken to ensure that the findings are credible and not obscured by their enthusiasm for the project. At the very least, an effort should be made to acknowledge the limitations of evaluations when they do not actually assess outcomes.

Therefore, a comprehensive evaluation of women in IT programs should ideally include:
• formative, process, impact and outcome components;
• a comparison of results for participating and non-participating students;
• the assessment of effects over time; and
• consideration of costs as well as benefits, disadvantages as well as advantages, limitations and areas for improvement.

CONCLUSION

This exploratory study is intended to raise some questions about programs aimed at promoting the participation of women in IT. We have seen growth in the number and visibility of these programs, sponsored by government, corporations, associations, universities and schools in Canada. While there is a prevailing notion that these programs are valuable, often the principal evidence of their value is based on participation rates and levels of satisfaction without any formal evaluation of outcomes.

We do not challenge the fundamental notion that efforts should be undertaken to promote the participation of women in information technology; however, we do wish to suggest that more investigation is needed into what works and what does not work, given the level of resources committed. Good evaluations should include well-defined objectives and a solid theoretical framework. A systematic and regular assessment of satisfaction is of course important, but evaluations should also go beyond that to attempt to understand the factors which shape satisfaction levels and perceptions of success. Often, this requires significant pre and post participation data as well as good tracking of outcomes.

In addition, where objectives include specific impacts beyond "feel good" results, such as improved performance, participation, school and career success, it is important that these performance indicators be defined at the outset and that the research design have some basis to compare the results to. For instance, saying that a program produced higher retention rates requires a valid comparison to a a control group, or at the very least, average performance levels. In addition, such studies must control for factors which may distinguish those who volunteer to participate in women in IT programs from those who do not. A third general area for more research would be an investigation of best practices.
### Appendix 1. Selected Programs Available in Canada

<table>
<thead>
<tr>
<th>Program</th>
<th>Website/Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alberta Women's Science Network (AWSN), Mark the Millennium with a Mentor</td>
<td>CCWEST paper from ICWES12</td>
</tr>
<tr>
<td>University of Alberta, &quot;I Liked Science, but Now What Do I Do?&quot; project</td>
<td>Project's final report</td>
</tr>
<tr>
<td>Alberta Women's Science Network (AWSN)</td>
<td><a href="http://www.awsn.com/index.html">http://www.awsn.com/index.html</a></td>
</tr>
<tr>
<td>Alberta Women's Science Network (AWSN), SCIberMENTOR Program</td>
<td><a href="http://www.scibermentor.ca/">http://www.scibermentor.ca/</a></td>
</tr>
<tr>
<td>Algonquin College of Applied Arts and Technology, Career and College Prep Program for Women</td>
<td><a href="http://www.algonquincollege.com/ccp/womensprg.htm">http://www.algonquincollege.com/ccp/womensprg.htm</a></td>
</tr>
<tr>
<td>AMIT Program, University of Victoria</td>
<td><a href="http://www.uvcs.uvic.ca/tecweb/amit/welcome.html">http://www.uvcs.uvic.ca/tecweb/amit/welcome.html</a></td>
</tr>
<tr>
<td>ARC, University of British Columbia and Simon Fraser University, Diploma in Computer Science (A SWIFT initiative)</td>
<td><a href="http://www.arc.cs.ubc.ca">www.arc.cs.ubc.ca</a></td>
</tr>
<tr>
<td>Association for Women in Science (AWIS) Mentoring Project</td>
<td><a href="http://www.awis.org/mentoring.html">http://www.awis.org/mentoring.html</a></td>
</tr>
<tr>
<td>Carleton University, CWSE (Chair for Women in Science and Engineering in Ontario)</td>
<td><a href="http://www.carleton.ca/cwse-on/cwse.htm">http://www.carleton.ca/cwse-on/cwse.htm</a></td>
</tr>
<tr>
<td>Canadian Association of Girls in Science (CAGIS) Girls Club: online girls science club, with several physical chapter locations</td>
<td><a href="http://publish.uwo.ca/~cagis/">http://publish.uwo.ca/~cagis/</a> and email</td>
</tr>
<tr>
<td>Computer Research Association's Committee on the Status of Women in Computing Research (CRA-W), Distributed Mentor Program and the Canadian Distributed Mentor Program</td>
<td><a href="http://taz.cs.ubc.ca/swift/cwic/Programs.html">http://taz.cs.ubc.ca/swift/cwic/Programs.html</a></td>
</tr>
<tr>
<td>Computer Research Association's Committee on the Status of Women in Computing Research (CRA-W), Career Mentoring Program</td>
<td><a href="http://www.cra.org/Activities/craw/dmp/index.html">http://www.cra.org/Activities/craw/dmp/index.html</a>, and</td>
</tr>
<tr>
<td>Carleton University and CWSE, Pathmakers. Mentorship program, providing role models, peer relevant advice &amp; experience and career information.</td>
<td><a href="http://www.carleton.ca/cwse-on/pathmakers/">http://www.carleton.ca/cwse-on/pathmakers/</a></td>
</tr>
<tr>
<td>Centennial College, New Media Continuing Education Dept. in association with Dixon Hall's Career Steps Program, FutureSmart Skills Training Program</td>
<td><a href="http://www.thecentre.centennialcollege.ca/newsletter/newsletter_archives/2002-mar/prog_shorts.htm">http://www.thecentre.centennialcollege.ca/newsletter/newsletter_archives/2002-mar/prog_shorts.htm</a>, and the Dixon Hall FutureSMART brochure</td>
</tr>
<tr>
<td>College of the North Atlantic (a consortium of all community colleges in Newfoundland and Labrador) Techsploration mentoring program</td>
<td><a href="http://www.northatlantic.nf.ca/">http://www.northatlantic.nf.ca/</a></td>
</tr>
<tr>
<td>Connestoga College, Focus for Change, School of Academic Support and Preparatory Studies</td>
<td><a href="http://www.conestogac.on.ca/programs/schoolaccess/focuschanges.html">http://www.conestogac.on.ca/programs/schoolaccess/focuschanges.html</a></td>
</tr>
<tr>
<td>Connestoga College Information Technology Help Desk Certificate</td>
<td><a href="http://www.conestogac.on.ca/cc/tnwd/ithdpfw.html">http://www.conestogac.on.ca/cc/tnwd/ithdpfw.html</a></td>
</tr>
<tr>
<td>Digital Eve, programs include web design, computer</td>
<td><a href="http://www.digitaleve.org/about/index.htm">http://www.digitaleve.org/about/index.htm</a></td>
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<tr>
<td>Initiative</td>
<td>URL</td>
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<tr>
<td>Digital Eve Toronto, Outreach (mentoring) Program (also in Kitchener- Waterloo, Ottawa and Hamilton) (COUNT AS 4)</td>
<td><a href="http://www.digitalevetoronto.com/esteem/outreach/index.html">http://www.digitalevetoronto.com/esteem/outreach/index.html</a></td>
</tr>
<tr>
<td>GenTech Equity Project, UBC and Simon Fraser Universities, research directed at diversity and IT</td>
<td><a href="http://www.educ.ubc.ca/faculty/bryson/gentech/index.html">http://www.educ.ubc.ca/faculty/bryson/gentech/index.html</a></td>
</tr>
<tr>
<td>GenTech &quot;Girls First&quot; Computer Centre, UBC and Simon Fraser Universities, research directed at diversity and IT, with a focus on gender equity</td>
<td><a href="http://www.educ.sfu.ca/gentech/shrcreport2.html">http://www.educ.sfu.ca/gentech/shrcreport2.html</a></td>
</tr>
<tr>
<td>GenTech, Einstein's Sisters Project</td>
<td><a href="http://www.educ.ubc.ca/faculty/bryson/ObjectLessons.html">www.educ.ubc.ca/faculty/bryson/ObjectLessons.html</a></td>
</tr>
<tr>
<td>GenTech, Computers For Lunch</td>
<td><a href="http://www.computersforlunch.com/">http://www.computersforlunch.com/</a></td>
</tr>
<tr>
<td>Hypatia Project, a partnership of public and private sectors in Nova Scotia aimed at increasing the participation of women in science and technology</td>
<td><a href="http://www.mun.ca/cwse/Armour,Nan.pdf">http://www.mun.ca/cwse/Armour,Nan.pdf</a> and the ICWES12 conference CD</td>
</tr>
<tr>
<td>IBM, Scitechmatic Stars</td>
<td><a href="http://www.can.ibm.com/k12/scitechmaticcs/starintro.htm">http://www.can.ibm.com/k12/scitechmaticcs/starintro.htm</a></td>
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<tr>
<td>IBM, Women in IT Chapters</td>
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<td>IBM, Women in IT Mentoring</td>
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<tr>
<td>IBM Women in IT Camps</td>
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<tr>
<td>Lakehead University, Superior Science Girls Club - conferences, seminars, workshops</td>
<td><a href="http://www.lakeheadu.ca/~eventswww/supsci_motherday.html">http://www.lakeheadu.ca/~eventswww/supsci_motherday.html</a> and email</td>
</tr>
<tr>
<td>Laurentian University, Sudbury's chapter of WISE, Women into Science and Engineering. Events, workshops, research information dissemination, work-shadow program</td>
<td><a href="http://laurentian.ca/wise">http://laurentian.ca/wise</a></td>
</tr>
<tr>
<td>Mentornet</td>
<td><a href="http://www.mentornet.net">http://www.mentornet.net</a></td>
</tr>
<tr>
<td>Microskills, Women's Enterprise Centre, Training Program: Self-Employment Training Program For Women IT Professionals</td>
<td><a href="http://www.microskills.ca/WERC/WERCPrograms.htm#SETPwomenPr">http://www.microskills.ca/WERC/WERCPrograms.htm#SETPwomenPr</a></td>
</tr>
<tr>
<td>Niagara College, Women into Trades and Technology Certificate, research and information dissemination, conferences, workshops and individual courses.</td>
<td><a href="http://www.niagarac.on.ca/study/programs/other/skill0730/career.html">http://www.niagarac.on.ca/study/programs/other/skill0730/career.html</a></td>
</tr>
<tr>
<td>OT Program, Simon Fraser University</td>
<td><a href="http://www.sfu.ca/otp">http://www.sfu.ca/otp</a></td>
</tr>
<tr>
<td>Office Workers Career Centre, Short Programs: employment related research and information, self-directed computer software training, career and skills workshops</td>
<td><a href="http://www.officeworkers.org">www.officeworkers.org</a> plus email questionnaire</td>
</tr>
<tr>
<td>Planet Actua, a network of 27 local organizations that provide science and technology day camps across Canada, including the Actua National Girls Program</td>
<td><a href="http://www.planetactua.com/pro_na_gi_e.html">http://www.planetactua.com/pro_na_gi_e.html</a></td>
</tr>
<tr>
<td>Ryerson University: Math Challenge</td>
<td><a href="http://www.ryerson.ca/ITM">www.ryerson.ca/ITM</a></td>
</tr>
<tr>
<td>Ryerson University ITM Mentoring Program</td>
<td><a href="http://www.ryerson.ca/ITM">www.ryerson.ca/ITM</a></td>
</tr>
<tr>
<td>Saint John, New Brunswick Community College, Girls Exploring Trades and Technologies! Day Camp</td>
<td><a href="http://www.saintjohn.nbcc.nb.ca/FrameltMain.htm">http://www.saintjohn.nbcc.nb.ca/FrameltMain.htm</a></td>
</tr>
<tr>
<td>Society for Canadian Women in Science and Technology. ms infinity (math + science = infinity career choices), workshops</td>
<td><a href="http://www.harbour.sfu.ca/scwist">www.harbour.sfu.ca/scwist</a> plus email questionnaire</td>
</tr>
</tbody>
</table>
Society for Canadian Women in Science and Technology. Quantum Leaps. Seminars http://www.douglas.bc.ca/qleaps/


SWIFT, Supporting Women in Information Technology, Virtual Family Workshops http://taz.cs.ubc.ca/swift/vf/workshop.html

SWIFT, Supporting Women in Information Technology, Virtual Family Workshops http://taz.cs.ubc.ca/swift/vf/millionaire.html

Times Change Women's Employment Service, Short Programs: Career Planning Workshops, Job Search Workshops, Educational Counselling, job board, self directed computer software training www.timeschange.org


Wired Women, programs including Introduction to the Internet, HTML for High School Girls, as well as other short courses, including the Under the Hood series http://www.wiredwoman.com/education/objectives.shtml

Wired Woman, two $5000 Scholarships at BCIT http://www.wiredwoman.com/education/scholarships.shtml

WISEST, Women in Scholarship, Engineering, Science and Technology, University of Alberta, Summer Research Program http://www.chem.ualberta.ca/~wisest/wisestMain.html

WISEST, Women in Scholarship, Engineering, Science and Technology, University of Alberta, Choices Program http://www.chem.ualberta.ca/~wisest/choices.html

WISEST, Women in Scholarship, Engineering, Science and Technology, University of Alberta, SET Program http://www.chem.ualberta.ca/~wisest/UYs/UAYs.html

Women into Science and Engineering (WISE) University of Calgary, scholarship, tutorials and talks. http://www.acs.ucalgary.ca/~womense/WISEframes.html

Women in Trades and Technology, National Network, programs and WIT (Women in Information Technology) http://www.wittnn.com/english/Index.html

Women into Science and Engineering (WISE), Carleton University and the University of Ottawa. Conferences, mentoring program, career information http://www.wise-ottawa.ca/

Women in Motion (now WIM/YIM) http://www.women-in-motion.org

REFERENCES


