THE WOMEN IN ENGINEERING PROJECT AT U.N.B. 
SHARING INFORMATION ACROSS CANADA 

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ABSTRACT 

A national Chair in Women in Engineering was created in May 1989 at the University of New Brunswick (UNB). The goal was to increase the participation of women in the engineering profession and to be a role model for women choosing or in this field. The Chairholder has initiated and participated in a number of national, regional and local events and has acted as a catalyst to drive the issues towards progress. A summary of the Chair’s activities, programs and strategies are discussed. 

INTRODUCTION 

The national average enrolment of women in Canadian engineering schools was 12 percent in 1988 and 16.5 percent in 1992. In the labour market, women make-up 58.2 percent of the total workforce, but only 3.3 percent of the certified technicians and technologists, 7.5 percent of engineers and 18.9 percent of specialists in the physical sciences. In 1991, there were 15 percent women in Engineering Master’s programs, 11 percent in doctoral studies and 3.6 percent Faculty. 

The Women in Engineering Chair has two main objectives: the Chair holder teaches and does research in engineering, and develops programs and strategies to increase the participation and retention of women in this profession. The mandate is national, and programs and strategies are to be shared with interested parties across the country. 

A few months after the creation of the Chair, a tragic event at Ecole Polytechnique in Montreal occurred on December 6, 1989: 14 young women (13 of whom were engineering students) were massacred by a man carrying an automatic rifle, going from class to class, separating the women and the men and killing the women, while calling them a "bunch of feminists". This shocking event, combined with the under-representation of women in this field, were incentives behind the establishment of the Canadian Committee on Women in Engineering in February 1990. The gender-balanced committee of nineteen members represented industry, the government, the profession, universities, deans, students and elementary and secondary education specialists and was chaired by the NT/NSERC Chair (UNB). The mandate was to uncover the social, environmental and cultural barriers responsible for the low 

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1993 WEPAN National Conference
representation of women in engineering, and to develop strategies and programs to integrate them as full participants in the profession (1-3). The CCWE was disbanded after the release of its report. But it was felt appropriate for the CCWE’s Past Chair to continue to publicize the existence of the report and to encourage organisations to implement its recommendations.

The Northern Telecom/NSERC Women in Engineering Chair: Programs and strategies

The Chair holder and assistants have developed several programs, amongst which are:

1. In the elementary and secondary education sector

1.1. School presentations:

Over one hundred school presentations are made per year in New Brunswick schools, reaching thousands of students with information on engineering careers; one third are done in elementary schools (grades 4 to 6), a third in junior high schools (grades 7 to 9) and the remainder in high schools (grades 10 to 12). A script was developed, followed by the creation of a video called: "Engineering: Design Tomorrow’s World", released in September 1992. The video informs young people of the importance of studying mathematics and science in high school, and de-stereotypes engineering by showing women role models solving problems, working with people, and creating the world we live in. A French version will be available in the near future. The video has been shown in hundreds of schools across Canada and has had a positive effect on both genders, but has been especially successful with girls and young women.

Measure of Success: In the past three years, the proportion of women enrol in engineering at the University of New Brunswick increased by 65 percent and men by 16 percent. The current enrolment level at UNB is 20 percent at undergraduate level. The short-term goal is to increase the average enrolment to 25 percent by 1995.

1.2. An engineering and science summer camp.

Worlds UNBound, an engineering and science summer camp will operate starting in 1993. The program will be similar to the Science Quest camp at Queen’s University in Kingston, Ontario and will be a member of YES Camps of Canada, a national umbrella organization of all of the student run camps at engineering schools across Canada. The camp is intended for students from grades 5 to 8, with a 50 percent participation of girls; its unique aspect is that it will provide activities in both official languages, and will move to various areas of the province of New Brunswick, making it accessible to many of the smaller communities.

One of the difficulties encountered by many camps is the overwhelming demand from boys and the lower level of participation of girls. The UNB program will try a new strategy: boys will be accepted on a first come, first served basis, but in numbers equal to the number of girls enrolled. The remainder of the boys will be on a waiting list. We
will suggest to boys that they may persuade some girls to join and thus more boys will be admitted as the number of girls go up. The intent is to make the young males take some ownership in the encouragement of the young females. This will replace the usual competitive spirit by one of cooperation and team-building.

**Measure of Success:** The goal is to see half of the participants choose a science, technology or engineering related program at a post-secondary institution after their high school diploma and for 85 percent to study math and science in high school. The program will track the campers’ academic selections over a ten year period.

1.3. **Meetings with parents**

Meetings will be organized for parents of students in K-12 in each of the eighteen School Board areas of the province. The goal is to sensitize them on the importance of providing gender-neutral career counselling, re-enforcing the importance of self-esteem in girls and increasing their awareness of how gender stereotyping can hamper the potential of girls. The program will be implemented over a five year period starting in 1993, and will be accompanied by presentations to the students in the schools during the day.

**Measure of Success:** The enrolment statistics of women students entering Engineering at UNB will be tracked over the same period, for each of the areas visited. The goal is to see the proportion of young women admitted into engineering be 25 percent of all those admitted from each of the high schools visited, within a three year period.

1.4. **A program for aboriginal communities**

A tour of role models (engineers of aboriginal origin) will be organized; these engineers (one female, one male) will talk to children in aboriginal communities about engineering careers. The purpose is to provide the message that an education can provide them with a bright future and a career that they can enjoy and be successful at.

**Measure of Success:** The enrolment of aboriginal students in engineering at the University of New Brunswick will be tracked between 1994 and 1997.

1.5. **Other programs**

Workshops and sessions with teachers and guidance counsellors on the appropriateness of non-traditional career choices for girls and young women will be done. Visits of the Engineering Faculty at UNB will be organized for groups of young women, upon request.

2. **Universities**

2.1. **A Network Project**

In 1993, a national network and newsletter for recruitment and retention officers of women in engineering programs across the country (33 universities) is being implemented; the newsletter will appear three times per year, initially. The main goal
is to provide a forum for the exchange of information on successes and failures on recruitment and retention strategies.

**Measure of success:** The goal is to receive information from at least 15 percent of the network contacts persons per year and to extend the mailing list by one-third, each year, for three years.

2.2. **Speeches and lectures to engineering students and professors**

Several speeches are done in each academic year, across the country, on how engineering ethics should be extended to include gender equity, sexual and personal harassment, and a respectful attitude and behaviour towards all peers, colleagues, employees and managers. At UNB, the Chairholder gives lectures on this topic in each of the Engineering Profession (Ethics) courses given, thus reaching all students before their graduation. Speeches have also been given by the Chair at national conferences such as the Canadian Congress of Engineering Students and the Canadian Conference on Engineering Education. The topics also discuss how environment, language, teaching style, and stereotypical attitudes can influence success and failure and thus the attraction and retention of women students.

**Measure of Success:** Changes in the environment of engineering schools can be measured in three ways: (i) the level of enrolment of women; (ii) their retention; (iii) by surveys, the level of comfort of the environment, use of gender-inclusive language, attitude of the men students and professors, and the proportion of women faculty hired.

3. **Employers of engineers and engineering associations:**

3.1. **Workshops**

Workshops are organized to sensitisie employers and employees as well as members of engineering associations on how to improve the environment and enhance the quality of the experience for women engineers in industry and in the profession. The benefit of integrating the feminine perspective into engineering works and designs is discussed. These workshops are conducted for large, medium and small firms and governmental departments whenever they can be scheduled, upon request.

**Measure of Success:** The hiring patterns of UNB engineering graduates will be tracked between 1993 and 1997. Success will be defined as an equal proportion of women hired to that of men, according to their availability in the pool of candidates. A survey of women engineers will track the level of progress made by the organisations hiring them. A base survey was conducted in 1993, tracking the hiring patterns for UNB graduates from 1989 to 1992.

3.2. **The CCWE report**

The Chairholder is tracking the level of interest in the CCWE report by the number of copies purchased and the number of speeches requested. Key responsibility centres have formally endorsed the report, amongst which are: the NCDEAS (National
Committee of Deans of Engineering and Applied Science), CCPE (Canadian Council of Professional Engineers), an umbrella organisation linking the twelve provincial and territorial professional engineering associations in Canada endorsed the report and has created a joint Ad Hoc committee with the Deans, students, industry and the Women in Engineering Chair to develop an action plan to implement the recommendations of the report. This group is also in the process of collecting a national inventory of projects whose objectives are linked to the participation of women in the profession. This will foster cooperation, the sharing of ideas and programs of interest, minimize duplication and create new partnerships.

CONCLUSION

If Canada is to succeed in increasing the participation of women in the fields of science, technology and engineering, all aspects of attraction, retention, hiring and career development must be addressed concurrently. Results can already be measured in Canada by the increase in the enrolment of women in engineering undergraduate programs. An improvement in the appropriateness of articles found in student publications has been noted, although some sexist issues still occur from time to time. These blatant acts hurt the image of the profession and they may eventually have a negative effect on enrolments. Several employers have instituted new policies on employment equity and on harassment. Nearly half of the engineering associations in Canada have created a committee to address issues of concern to women engineers.

Diversity enriches the solutions and women will bring many qualities to the engineering profession, such as communication and interpersonal skills and a consensus building approach which facilitates team work. The presence of women in engineering will bring the field closer to societal needs. Recent research (4) also shows that women have strengths in the area of characterising and conceptualising problems which relates to innovation. It is through innovation and good marketing techniques that countries will be successful in the global marketplace. A gender-balanced perspective can only be a positive move in a field that has had a predominantly masculine perspective for too long. After all, products and technologies must be appealing to both genders.

Executives of major companies have begun to state how important these qualities really are and to appreciate the positive impact women are having on their organization. All this is remarkable progress and will lead the way for many other firms that lag behind in this respect.

Our task, in the Women in Engineering Chair at UNB has been and continues to be: working towards gender equity in the engineering profession. Equity, not in the sense of equal numbers of women and men, but in the sense of equal chances of success and career development, in the sense of equality in the respect obtained from peers and employers; it means a world where harassment (personal or sexual) has disappeared and a culture where diversity is valued. Occupations in non-traditional fields pay well. If more women feel comfortable in making these choices, they will achieve economic independence which, in turn, will give them more control over their own lives.
REFERENCES

1. CCWE (1992) Report of the Canadian Committee on Women in Engineering: "More than Just Numbers". Copies can be purchased from the Northern Telecom/NSERC Women in Engineering Chair, Faculty of Engineering, University of New Brunswick, P.O. Box 4400, Fredericton, N.B., Canada E3B 5A3.

