Encouraging More Women Into Computer Science: Initiating a Single-Sex Intervention Program in Sweden

Gerd Brandell, Svante Carlsson, Håkan Ekblom and Ann-Charlotte Nord
Luleå University of Technology, Sweden

The process of starting a new program in computer science and engineering, heavily based on applied mathematics and only open to women, is described in this paper. The program was introduced into an educational system without any tradition in single-sex education. Important observations made during the process included the considerable interest in mathematics and curiosity about computer science found among female students at the secondary school level, and the acceptance of the single-sex program by the staff, administration, and management of the university as well as among male and female students. The process described highlights the importance of preparing the environment for a totally new type of educational program.

Introduction

The fields of computer science and computer engineering are dominated by men. In Sweden, this is more accentuated than in many other countries. The percentage of women admitted to computer science and engineering (CSE) programs at Swedish universities is extremely low and has varied between 5 and 10% during the period 1985-1995.

At the Luleå University of Technology about 1000 students have been admitted to a masters program in CSE since it started in 1982. Only 70 (7%) have been women, and the percentage has decreased over the years. This gender imbalance prompted the radical idea of starting a CSE program which only admits women—the first single-sex program at the university level in Sweden. The idea was radical not only because the program would be the first of its kind, but also because it was in conflict with general opinion and official policy in Sweden that there should be no special educational provisions for men or for women.

Our basic hypothesis for the introduction of the single-sex program was that more women in CSE would benefit the field of information technology. We believed that more women working in the computer industry would mean that new perspectives would be introduced, thus influencing the design of systems and the choice of applications. We also believed that there were many women who could contribute to these developments, including women who had not chosen to specialise in science and mathematics in secondary school. CSE education in Sweden is heavily based on mathematics. Hence, it was considered important to attract women who had been discouraged from specialising in CSE by science rather than by mathematics. We thought this group was too large to neglect.

Another hypothesis for the program’s introduction was our belief that women are repelled by the masculine culture surrounding computers and by the prospect of being in a minority in computer education courses. A single-sex program, we
believed, would boost their confidence to begin a course of study in CSE. At the same time we were afraid that this "special treatment" would be discredited by future employers, other students, and by the women themselves. Therefore, we felt that it was very important to demonstrate that the academic level of the program was the same as that offered to students in the regular course.

In this paper the process of gaining acceptance for the single-sex CSE program is described. A crucial element involved the administration of a survey questionnaire to female students in upper secondary schools. The findings revealed substantial interest in a program of this kind and helped to convince other important groups that the approach was worth trying. Also described are the specific changes made to accommodate women's needs, as well as some of our experiences of the program's first two years. It is important to point out that the single-sex program is an intervention in progress. Thus a final evaluation of its success cannot be provided. Instead, the current status of the project is presented and ideas for future research are suggested.

Background

The Swedish Education System

The Swedish upper secondary school (Grades 10-12) is presently undergoing major reform. We anticipate that this will have minimal impact on the gender balance of CSE courses. The education system described below is that which was in place when our single-sex program was introduced.

Of all students completing compulsory schooling (Grade 9), 98% enter upper secondary school. Programs of study in the upper secondary level prepare students for tertiary studies and/or occupations in specific areas. There were several different upper secondary school programs and each consisted of a large number of compulsory courses. Only a few were directly aimed at preparing students for tertiary studies. The most popular ones were social studies, science, technology and economics. Only two, the science and technology programs, gave direct access to university level engineering and science courses.

Engineering education at the university level is organised into two different programs: the masters program which is of four and a half years duration, and a shorter program of two or (more often) three years of study which leads to a bachelors degree. Students are admitted to all engineering programs strictly according to their grades from upper secondary school.

The number of students choosing the science program in upper secondary schools is less than the number of places available at the university level for students with that background. About 20% of all students entering upper secondary school choose the science or technology programs, while the demand from universities is estimated to be about 30%. The choice of upper secondary school programs is also strongly gendered. Only about 25% of the students in the science and technology programs are female.