GLOBAL CHALLENGE FOR WOMEN IN ENGINEERING

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The ultimate goal for the initiatives which we are taking in relationship to women in engineering is to create a global gender equity. This is a very ambitious goal in as much as the situation in various countries are very different both with respect to how the society is built and how the structure of economy and business is functioning. It is, however, on the route to the ultimate goal important that we come together and exchange ideas through conversations and presentations.

I shall not tire with detailed information about the Danish situation on the job market but just say that we generally have the same problem as in many other countries, i.e. far too few female engineers and when there is an unemployment situation among engineers it is always women who have the highest unemployment percentage.

All this may means that the engineering job market is not attractive for women or that they in one or the other way are discriminated. These are essential questions which I will not answer here but I will mention that the Danish society for professional engineers are working very active and competent in revealing the problems which exist in this connection so that strategies may be set up to solve them.

As executive officer for a major engineering education institution in Denmark I am of course mostly engaged in the question of changing the decreasing recruitment to engineering education and in this context considering how to plan and arrange the curriculum in an appropriate manner. It is a fact that we in Denmark generally see a far too low interest for studies at engineering schools, and thus the point and effort in my everyday work is to increase the recruitment in general and as part of this also to obtain more female students.

It is fair to say that the lowering interest in going to engineering school has given raise to a lot of debate and anxiety in the Danish society and with Danish companies.

We will 5 or 10 years from now in Denmark experience a very low production of qualified engineers which may lead to problems in filling out the necessary positions in the Danish job market and to preserve the economy and welfare of the society.

Anxiety has been so grave that both the Danish parliament and the Danish government have been discussing the lack in interest in natural science and technology and have been setting up financed programs for increasing the interest in natural science and technology i.e. to increase the number of students in engineering schools in general and certainly also the amount of women in the area.

It is not so that there has been a general drop in the fraction of a year group who would want to come into higher education, on the contrary. As a matter of fact there has been a growing interest in humanities and social sciences and what has been happening since 89 is that engineering has become a lesser and lesser part of the whole tertiary educational system and especially have women in these years moved away from engineering i.e. both the number of students but certainly also the percentage of female students in engineering has been decreasing (see Fig. 1).

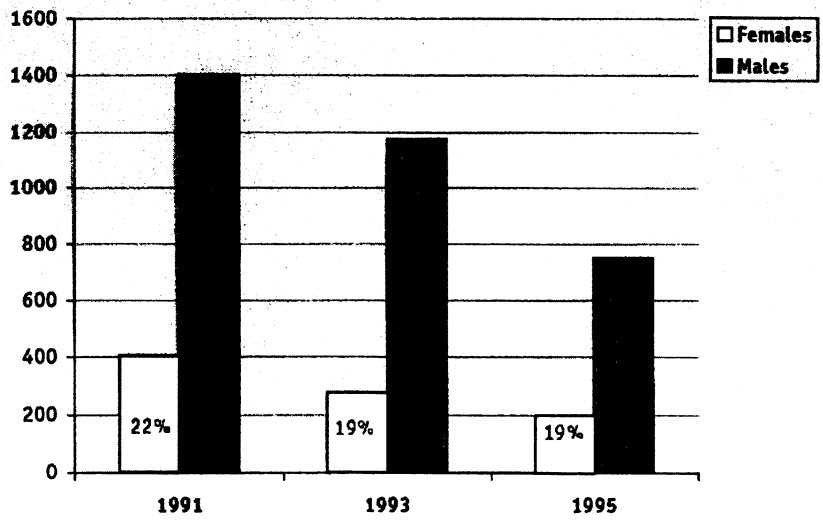

Figure 1. Distribution by Sex: Total Admission of Students in 1991, 1993, and 1995

It is a general point in our considerations at DTU that we shouldn't see engineering education as an isolated part of the society. We are part of a development and are attached both to the basic schooling systems and the job market and thus it is important for us to look at both what is happening before the students come to engineering schools and certainly also what is happening to them when they are getting a job.

The platform for choice of further education and career is being laid down very early in ones life and gets gradually qualified.

Some of the most important choices are those which relate to subjects which are not taken as part of the curriculum in primary and secondary school, and if first subject has been excluded from a young person's thoughts and sphere of knowledge it is very difficult to change the attitude and interest for those subjects which have been excluded.

Options for excluding given subjects are available in the Danish schooling system where young persons and especially young girls to a major extend whenever possible have been excluding especially physics and chemistry from their schooling programs.

In order to change this there has recently in the Danish primary schools already from second degree been introduced a new subject which is called science and technology. We are from the engineering schools participating in the re-education of the teachers who are going to teach this subject. Most teachers in the primary schools have very little insight in these subjects, and it is obvious that we from an engineering school's point of view in this type of re-educational program want to present angles which are connected with the type of work that engineers are doing as professionals.

We think that this area has very big potential for success but it is certainly also very time consuming and takes obviously time away from the main objectives for a university professor: research and teaching of the students.

We have also considered if we as an engineering school would be able to provide hands-on experiments for primary school teachers at our premises. We do that for students in high schools but have not gone into doing that type of thing for primary school students since this would be very time consuming and difficult in the way that the target group for that type of experiment in primary schools would be very difficult to define.

Many of us have experiences in giving lectures and other types of presentations for students both in primary and secondary school, and in this connection it could be very important to be able also to illustrate that women can be engineers. This is, however, not an easy task due to the fact the number of women we have on our scientific staff is very limited and those we have might sometimes find themselves misused in all types of role-modeling activities, not to mention that the overwhelming majority of the female professors we have at DTU are to be found within chemistry, biochemistry, and biotechnology, which, when it comes to the point, is only a relatively small fraction of the engineering profession as such. (see Fig. 2).

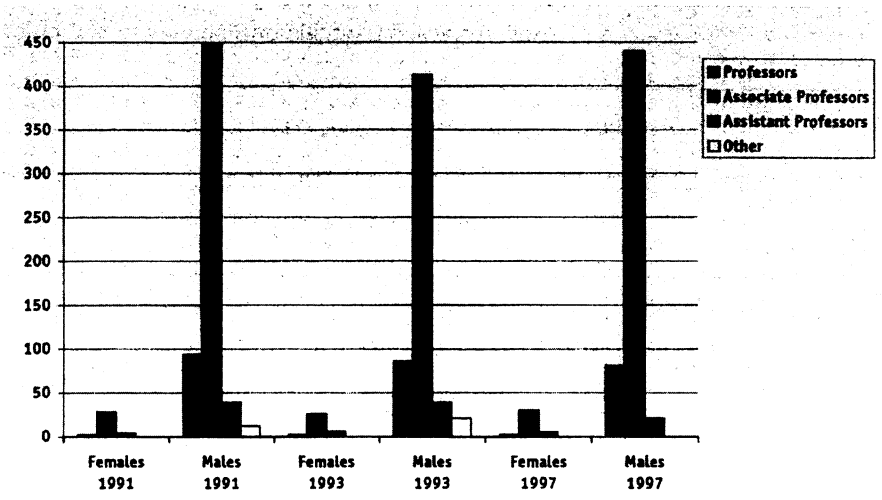

Figure 2. Distribution by Sex: All Scientific Staff Members (Tenure Track)

In order to improve on this situation it can be important to formulate a policy for the staff development and in this connection to set goals on how many female professors an institution may want on the staff in the years to come. We have done this at DTU and we have also with the permission of the Equal Status Council announced jobs within datamatics which can only be applied for by women. It is not an ideal situation in the way that some women - and often the most qualified ones - might think that they would rather have a job being competent to it than just having it because they are of female gender.

The jobs I have been mentioning here are only part of an integral strategy for DTU changing its curriculum in such a way that we can both recruit more students and in that connection also recruit more female students. We simply want to open up our school and change the more narrow and traditionally engineering oriented subjects into a curriculum which could be more attractive to young persons in general, men as well as women.

We want to make our curriculum more holistic, we want to fight the overloaded courses, and instead of focusing on the individual course in the curriculum we would rather formulate what type of competencies we expect our students to have at certain milestones during their studies. Obviously such definition of competencies should be worked out in close contact with the relevant industrial companies.

One of the proposals which we are using in order to broaden the knowledge about engineering professions for engineering students is to start a mentor program much like the ones we are seeing at a number of US engineering education institutions. It is a program which is much along the Danish way of thinking with an informal and direct contact between people at various levels both in career and maturity.

I should like to recognize Suzanne Brainard from WEPAN for her efforts in both inspiring and transferring the American mentor program into something which is useful in the Scandinavian context.

I am sure that mentor programs will become vehicles for better understanding and bigger recruitment to engineering studies and the engineering profession.