TACKLING STEREOTYPES

MAXIMISING THE POTENTIAL OF WOMEN IN SET

WiTEC SWEDEN REPORT
Report compiled by Halmstad University (WiTEC Sweden)
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1. SPECIFIC NATIONAL CONTEXT

This section is a review of the Swedish context regarding women in science, engineering and technology (SET). Statistical data is provided to describe the Swedish labour market and academia.

The Swedish labour market

A characteristic feature of the Swedish labour market is that men and women tend to work in different sectors. Further, the table below indicates that there are more women than men working in the *Social work and Health Care sectors*. It can be noted, that men tend to be employed in the *Industry* and *Construction* sectors as well as other areas such as the *Engineering* and *Technology* sectors (See table 1).

<table>
<thead>
<tr>
<th>Employees aged 20–64 by industry and sector 2003</th>
<th>Women</th>
<th>Men</th>
<th>Sex distribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage distribution, numbers in 1 000’s and sex distribution (%)</td>
<td>Number %</td>
<td>Number %</td>
<td>W</td>
</tr>
<tr>
<td>Social work</td>
<td>301</td>
<td>16</td>
<td>47</td>
</tr>
<tr>
<td>Health care</td>
<td>259</td>
<td>14</td>
<td>52</td>
</tr>
<tr>
<td>Education and science</td>
<td>366</td>
<td>20</td>
<td>140</td>
</tr>
<tr>
<td>Retail trade</td>
<td>126</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>Personal service</td>
<td>11</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Recreational services, restaurants and hotels</td>
<td>90</td>
<td>5</td>
<td>71</td>
</tr>
<tr>
<td>Financial institutions and insurance</td>
<td>221</td>
<td>12</td>
<td>271</td>
</tr>
<tr>
<td>Wholesale trade and communications</td>
<td>139</td>
<td>7</td>
<td>347</td>
</tr>
<tr>
<td>Industry excl. constructions</td>
<td>173</td>
<td>9</td>
<td>503</td>
</tr>
<tr>
<td>Agriculture, forestry, fishing etc.</td>
<td>8</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Construction</td>
<td>16</td>
<td>1</td>
<td>172</td>
</tr>
<tr>
<td>Other</td>
<td>162</td>
<td>9</td>
<td>150</td>
</tr>
<tr>
<td>Total</td>
<td>1 872</td>
<td>100</td>
<td>1 838</td>
</tr>
</tbody>
</table>

*Source: Labour Force Surveys, SCB*

In the age group 20–64 years old, approximately 58 per cent of the women and 35 per cent of the men work in the 30 largest occupations.
Only three occupations have an equal sex distribution, i.e. 40–60 per cent of each sex. These are Secondary education teaching professionals with 58 per cent women and 42 per cent men, Cooks and Accountants both with 56 per cent women and 44 per cent men. The occupation that is most women-dominated is Office secretaries where a total of 98 per cent of the employed are women. The most male-dominated occupation is the sector called Motor vehicle mechanics and fitters, with less than 0.5 per cent women and 100 per cent male employees. Notably, men compared to women are more likely to be found within SET-areas such as System designers, Programmers, Machine-tool operators, Building caretakers, Mechanical engineering technology, Computer assistance (See table 2).

The 30 largest occupations 2003
Number and sex distribution (%). Ranked by numbers in occupation

Table 2

Source: Labour Force Surveys, SCB
The Swedish academia

A similar pattern of relative proportions is also evident within the academia where there is a lack of women in both engineering and technology programmes. In 2002 and 2003, female students who had completed an upper secondary education were unlikely to be found in areas such as the *Industry, Technology, Energy, Vehicle, Construction* and *Electrical Engineering*. Instead, women are more likely to choose education programmes such as *Health Care, Handcraft, Child Care and Recreation* training (See table 3).

<table>
<thead>
<tr>
<th>Students completing upper secondary education by programme 2002/03</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girls: 38 500</strong></td>
</tr>
<tr>
<td>% 100 80 60 40 20 0</td>
</tr>
<tr>
<td>Handcraft</td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td>Natural Resources</td>
</tr>
<tr>
<td>Media</td>
</tr>
<tr>
<td>Specially designed progr.</td>
</tr>
<tr>
<td>Individual progr.</td>
</tr>
<tr>
<td>Energy</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>% 100 80 60 40 20 0</td>
</tr>
<tr>
<td>Health Care</td>
</tr>
<tr>
<td>Child Care and Recreation</td>
</tr>
<tr>
<td>Arts</td>
</tr>
<tr>
<td>Int. Baccalaureate</td>
</tr>
<tr>
<td>Social Science</td>
</tr>
<tr>
<td>Business and Administr.</td>
</tr>
<tr>
<td>Hotel, Restaurant</td>
</tr>
<tr>
<td>Natural Science</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Industry</td>
</tr>
<tr>
<td>Technology</td>
</tr>
<tr>
<td>Vehicle</td>
</tr>
<tr>
<td>% 100 80 60 40 20 0</td>
</tr>
</tbody>
</table>

**Boys: 37 800**

*Source: Upper secondary school leavers, National Agency for Education*

Similar gender differences are also evident in higher education levels. Women are most likely to choose *Health-related science, Teacher training, Humanities/religion, theology* while men choose fields related to technology areas (See Table 4). In Sweden, the under-representation of female graduates is generally higher in engineering, manufacturing and construction areas than in sectors such as computing, physical sciences, mathematics and statistics (van Langen
& Dekkers, 2005). Notably, a study compiled by the Swedish National Agency for Higher Education in 2005 states that the trends are moving in the wrong direction. Also, it displays that the gender balance is becoming increasingly uneven. Overall, most programmes have a majority of women except the engineering programme. After a period when the gender balance tended to be evening out, the predominance of female students is increasing in general, but the proportion of men is rising again in the engineering sector (Högskoleverkets årsrapport, 2005. Rapportserie 2005:26R).

Table 4

Students completing higher education by field 2002/03

<table>
<thead>
<tr>
<th>Field</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health-related science</td>
<td>27400</td>
<td></td>
</tr>
<tr>
<td>Teacher training</td>
<td></td>
<td>15800</td>
</tr>
<tr>
<td>Humanities/religion, theology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine science and odontology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture/Forestry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Law and social science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine arts and applied arts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. STEREOTYPES

This section consists of reflections on the definition of stereotypes and how stereotypes arise and are operating within the society as well as the fields of SET.

General about stereotypes

A stereotype is a group-shared image of a category of people and can also be considered as an oversimplified notion or belief about what members of a group are like. It is the generalization to all members of a group i.e. gender, ethnics and religion that makes stereotypes problematic. Stereotyping is particularly damaging when applied to the different roles and the kinds of behaviours individuals of a group are expected to have because of their gender or status in the society as well as some organisations or institutions. Hence, both male and
female roles are limited due to the stereotypical characteristics that men and women are expected to have (Berger, 1995).

Stereotypes in SET

Ulf Mellström (1999) argues that three main stereotypes within the technology areas can be identified and that these cause problems when recruiting women to the fields of technology. The first one is the “mechanic ideal”. Technology is associated with machines, hard work, dirt and physical strength. Technical competence is often seen as a masculine character.

The second stereotype which, also is marked as a masculine hallmark, is the “engineer ideal”. In other words, here the “engineer ideal” is likely to be seen as a technical specialist who is a professional rational thinker, or in other words, a person who has qualities that we associate with masculinity. Here, the engineer does not have an explicit humane characteristic which often is considered as a female character (Mellström, 1999). Women are believed to be less interested in the technical aspects of engineering and more interested in putting technology in a social context (Salminen – Karlsson, 2004).

The third stereotype is the “computer geek”. In media the geek is often represented as a boy who spends most of his time in front of the computer. Also, he is the one who controls the various computer systems and finally becomes the hero when he saves the whole world by cracking a specific code. These symbolic masculine ideals have great power and exclude women in several technical and engineering areas and make the recruiting of women very limited. Still there is a strong symbolic connection between men and computers, even though, for example, computer programming, can no longer be viewed as the typical male-dominated area it was a decade ago (Mellström, 1999).

3. ORIGIN OF THE CONCEPTS EXISTING

This section is concerned with some of the major roots of stereotyping.

Stereotypes raised by family, friends and school

It can be noted that the separation of girls and boys during childhood and adolescence is likely to have been the cause of the problem with gender segregation within the Swedish labour market and academia.
The reason for this is that the separation of girls and boys at a young age has lead to different experiences, skills and knowledge in their preparation for working life and life in general. In other words, the essence of the problem with stereotyping arises from essentialism (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004).

Additionally, women and men are expected to hold certain convictions and behaviours. Men are very often “taught” to believe in what they do, be more creative, to be independent and superior whereas women internalise their values in an effort to become more careful and less competitive. As a result, girls and boys experience different priorities later on in life whilst making choices in regards to education and employment. Notably, the unintentional and implicit differentiation between men and women, stereotypical images of masculinity and femininity are relatively likely to situate one gender in a hierarchical position in relation to the other (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004).

Stereotypes and stereotypical images are reproduced within working life, in educational institutions and when children experience the traditional stereotypes in their families. Women are still connected to reproduction i.e. taking care of the household and the children to a greater extent than men while men are connected to production and the technological sphere. Mellström (1999) writes for example about mediators – men, usually fathers, who introduce boys to the world of technology and at the same time pass on the idea that technology, especially, is connected with masculinity. As a consequence, boys will have access to technology and computers at an early stage in life.

According to Uotinen (2002), boys are “taught” to play and fiddle with the computer out of pure curiosity and they develop a feeling for computers and technology when usually their fathers (or male friends) encourage them to play and independently work with computers. As the boys develop an understanding of computers and technology themselves, they do not value the IT teaching in school very highly because they are often more skilful than the teacher. The educational institutions thereby, of course, reinforce the stereotype that boys are more suitable for IT than girls when the boys already have the advantage over girls who have not had the peer group support in technically oriented matters.

4. HOW THE CONCEPTIONS INTERFERE

This section provides perspectives on the impact of the stereotypes acting against women and some reflections on why technology is a question of gender equality.
Impact of stereotypes against women

As mentioned before, probably the most important impact of gender stereotypes is that they influence both women and men in their education and career choices. According to Mellström (1999), women and men have been raised with gender stereotypes and sometimes tend to reproduce them in very subtle ways.

The (male) stereotype “computer geek” can be viewed as an example of how the conceptions interfere. The “computer geek” is not only associated with the one who controls the various computer systems, but the geek is also associated with young men playing games with violence and action. Girls therefore define themselves in opposition to the “computer geek” and the nerd culture which they experience as strange. The nerd culture does not correspond to their values and as a consequence girls are seldom interested in computer games at all. Notably, computer games are a significant channel for getting to know and getting used to information technology. Playing computer games can be seen as a starting point for taking a deeper interest in computer/information technology and its functions. As a result it can be argued that there is a recurrent connection between playing computer games, to simple programming and to the acquisition of expertise. While boys are more likely to be attracted to computer games than girls, they are also more likely to be found in the fields of IT when they are adults. When reaching the age for choosing a field of education and profession, several men have an information technological advantage over women who in general have not been stimulated and supported by parents and friends while they are young girls. Girls and women do not, due to the stereotypes, generally have access to tools and methods for taming technology. Therefore their situation in relation to technology and IT is different to that of boys and men (Uotinen, 2002).

Why is it then important to view how conceptions interfere and to view the stereotypes within the fields of SET? Why is this topic important in the discussions of equality? As we have seen, stereotyping limits both women and men to choose some education programmes and career choices. Another reason is that in the past technology was strictly linked to the productive sphere and all the areas within technology were carried out by men, and thus masculinity. Importantly, technology is considered as something which conducts society. Therefore technology is linked to power, which is also linked the elite of men. In other words technology is a source of power and as long as men have the power to define and use technology they also have the power over society. Therefore technology is a question of gender equality (Mellström, 1999).
5. RECRUITING WOMEN INTO INDUSTRY AND ACADEMIA

The following section is concerned with the recruitment processes within the areas of SET. Concrete examples of conditions that provoke unequal situations between men and women are presented and discussed.

Low recruitment numbers stem from different factors

Within the IT-sector the recruitment of women is far more complicated than is the recruitment of men. According to the report “Jämít” (the Gender Council for Transport and IT), the historical as well as the social circumstances must be considered if we would like to understand why the fields of SET remain heavily male-dominated. In the past, higher education in engineering was a male oriented area. It was not until 1921 that women were allowed admittance to engineering courses at the Royal Institute of Technology Stockholm on the same formal conditions as for men (SOU 2000:58, Jämställdhet och IT). Today, about 25 per cent of all students at the Royal Institute of Technology Stockholm are women and 30 per cent of all teachers are women (http://kth.se/om/siffror.html). When it comes to engineering students in Sweden, only about 25 per cent of all students are women (Högskoleverkets årsrapport, 2005. Rapportserie 2005:26R). This means that there are still very few visible role models of female students and female lecturers in the technical subjects who actually can attract more women to SET studies.

Further, few education programmes are gender inclusive and Minna Salminen-Karlsson (1999) argues that sometimes a confusion between making gender inclusive education and recruiting more women to SET may appear. Recruiting women to male-dominated education programmes is often the primary concern when initiatives are taken to break gender barriers within the academia and the labour market, and not whether women drop out and how they succeed in their studies. To evaluate special recruitment initiatives we therefore have to have a wider definition of the concept.

Higher education programmes that are successful in recruiting women are not automatically successful in retaining female students or making women feel at home within the male-dominated subjects (Wistedt, 2001).

Schools and education, not only within the higher education but also at a lower level, are yet to be seen as a problem concerning the recruitment of women to the fields of SET. Technology as a topic is, for example, not sufficiently established in our schools. It can be argued that there is an apparent lack of both didactic technical
research and gender awareness in teaching and study materials. The way in which technology is taught today leaves many girls and women unaware of technological opportunities (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004). Thus, the problem already emerges for girls and boys in upper secondary school. School counsellors and career advisors give, perhaps, sexist and other stereotypical advice. A report published in 2002 (Greenfield et al., 2002) stated that young girls who already lack appealing role models in their immediate environment working in the fields of SET are insufficiently informed about this area and about what courses and career opportunities there might be.

All these factors at school and university levels influence the under representation of women in industry. The symbolic masculine ideals have great power and employers tend to exclude women in the fields of SET and make the recruiting of women very limited. Still, women are seen as outsiders and not having the (male) skills required in the technology industry (Mellström, 1999).

6. RETENTION OF WOMEN IN ACADEMIA AND INDUSTRY

This section displays the retention of women in SET in academia and industry and some of the problems women face in the existing educational and working environment.

Lack of support, contacts and networks

A big problem today is that most professions and education programmes are still designed by and for men. As a result, women are being forced to adapt to existing structures. Almost all studies conducted on technology and gender issues indicate that women entering technology sectors face tremendous difficulties that impact on their physical and mental powers. The reasons for this may be that the tools and equipment used in the technology industry are usually adapted to masculine measurements and power. As a result, work-related injuries are more common among women than men within technology occupations. Another reason is that women are seldom received with open arms in technology workplaces or other types of industries. Women often experience a lack of personal contacts and networks in the SET academia and industry and they seldom operate in technological networks where new knowledge and contacts are developed. The lack of support impacts on their mental health and women are more likely than men to drop out within this field. As a result, the stereotypes that presuppose that women are not suitable in the SET academia and industry are reinforced. (Neighbourship, I.O.
The low proportion of women means that men still hold the symbolic power over both technology and engineering and the power to define what technology is. In an environment of this kind, many women gradually fall silent. The language used may also exclude women. The environments of the IT and engineering worlds often embrace a language and an open sexism that many women find offensive and stressful. Together with a low evaluation of women and how they are viewed, this may keep women away from technology subjects (SOU 2000:58, Jämställdhet och IT).

7. PROGRESSION OF WOMEN IN ACADEMIA AND INDUSTRY

In this section the stereotypes and the conditions that afflict the progression of women in SET in academia and industry are discussed.

Unequal situations due to segregation and discrimination

One aspect of stereotyping is the presiding gender-related power structure in society. In most cases women as a group are subordinate to men as a group. This gender-related power structure is expressed almost everywhere within society. Notably, gender research identifies that when a power structure is rescinded through active equality efforts, it is soon recreated through other measures (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004). It should be mentioned that the gender segregation remains even though we face a gradual increase in the proportion of women within SET-areas. The reason for this is the high level of horizontal segregation which has an impact on the progression of women. In other words, when women enter the male-dominated areas they are more likely to be allotted monotonous jobs, be given less complicated and tedious tasks whilst men are found in the superior positions (Wahl et al, 2001). This pattern is likely to be found in all SET-areas and as a result women do not find these areas attractive.

Further, the horizontal segregation is to be found not only within the labour market but also at the Swedish universities. The proportions of female students are high, thus, as mentioned before; we find that women and men are divided into different education programmes. In Sweden, many women seek employment in the Health and Medical fields as well as within Humanities. In contrast, there are a greater numbers of men seeking employment or education in the technology sector (Schlyter, 2004). The vertical segregation is extremely profound within Swedish universities. Importantly, there are fewer
women to be found higher up in the academic hierarchy. In 2004, there were about 3,800 professors in Sweden. Notably, 25 years ago, when these professors were students, statistics show that approximately 63 per cent of the female students were found in the humanist science program, 42 per cent in social science, 36 per cent in medicine, 34 per cent in natural sciences and 10 per cent in the technical programmes. At present, Sweden would have had the same distribution among professors if women and men had the same opportunities to become professors, however, only about 14 per cent of all professors in Sweden are women. This means that male students have about five times more chance than female students to become professors (Schlyter, 2004). This statistical evidence is especially found within divided personal categories in SET. The under-representation of women in higher academic positions is thus said to be amongst women. For example, women are not seen to have the same opportunity as men to get interview appointments and they cannot combine high career jobs with family commitments. This is a significant way of describing how stereotyping exists and how it generates considerable hardship. By attributing the problems to women’s behaviour, universities can deny that discrimination exits in the academic life. Hence, today the academic environment is almost gender-neutral (Knudsen, 2002). Also within the SET industry, women are supposed to prioritise private life in preference to “choosing” to take more parental and domestic responsibilities at home. This might explain the lack of women in leading positions in SET industry. Women are sometimes blamed for not wanting a career because they are “not able to manage work and family”. This stereotypical thinking provokes many women to set aside their career for their family responsibilities (Schlyter, 2004).

However, we see some positive trends. A larger reduction for men than for women is noticeable in post-graduate studies. In 2004, females starting post-graduate studies exceeded the number of men for the first time; approximately 50.3 per cent were women and 49.7 per cent were men. Though, the most equal gender balance among new enrolments can be found in humanities, social sciences and natural sciences (Högskoleverkets årsrapport, 2005. Rapportserie 2005:26R).

The number of women awarded with PhDs has increased during the last decades. Between 1945 and 1970 only 4 per cent of the PhDs were women. In 1970 about 15 per cent of the PhDs were women and in 2003/04 the number of women awarded with PhDs was 45 per cent. However, today the female PhDs are found mostly in the humanities. In the middle of 1970 the proportion of women PhDs in the humanities was 28 per cent and today the number is about 50 per cent. This can be compared to the amount of women awarded with PhDs within technology. In the middle of 1970 the proportion of women was only 4 per cent and today there is 25 per cent female PhDs within the technology sector. The number of female students admitted to postgraduate programs within technology is only 30 per cent
Even if more women are to be found at higher levels within the education institutions, several studies show that different types of discrimination against women exist; for example, in academic seminars where men take up more space and are louder than women (Gunnarsson, 1995). This fact may indicate that men are more likely than women to develop a self-confidence which makes their later career choices easier. It can also be noted that male doctorate students often refer to other male students' work whilst similar gender discrimination could not be traced in the way that female students act (Lindroth, 1997).

Further, Christine Wennerås and Agnes Wold at the University of Gothenburg state in a ground-breaking study that gender bias is rife even in the supposedly objective field of science. They found that in the peer review process, the scientific competence of female applicants was judged to be far lower than men with identical publication records. The women would have to have published three more papers than male applicants in prestigious journals such as Nature and Science to be judged to be of equal competence. This can be considered as clear evidence of outright discrimination. Women are excluded on the basis of arguments for lacking competence and merits which, without doubt, makes the progression of women in SET very difficult. Importantly, we need to consider that competence and merit are assessed in relation to norms. Men have the symbolic power to define the concepts of technology and engineering. As a result, the assessment boards tend to down-value much of the research by women (http://www.newscientistjobs.com/).

8. HOW TO PREVENT STEREOTYPES ACTING AGAINST WOMEN IN SET

This section displays some strategies on how to prevent stereotypes from acting against women in SET.

Strengthen the discipline of gender studies

It is necessary to strengthen the discipline of gender studies (however there might be a risk that a discipline of gender studies is seen as taking care of the so-called gender issues so that other disciplines can avoid gender mainstreaming and remain gender blind). Also, gender mainstreaming must be more focused in the academic disciplines and professions of SET and most of all it has to be established as an ongoing process. From compulsory comprehensive school to
university and institutes of technology, the educational approach should be changed and generally be based on a philosophy of gender equality (SOU 2000:58, Jämställdhet och IT).

More profound ways for women and men to relate to each other and to technology

According to the report compiled by the Gender Equality Council for Transport and IT in 2000, it is important for women and men to set aside antiquated standards, structures, working methods and organisations. We all need to find strategies to relate to each other and technology. According to the report these strategies imply defining clearly the ways men and women approach technology, and the strategies must also enable women’s knowledge, attitudes and values to be expressed in different ways when it comes to developing new technology. It is important to create a situation in which all levels of society place a higher value on women’s ways of approaching technology (SOU 2000:58, Jämställdhet och IT).

Encourage women to apply for education programmes and professions in SET

Universities as well as SET-professions should promote equality in all their activities and encourage women to apply for these education programmes and work areas to a greater extent. It is also important to make the concept of recruitment wider. The recruitment process must, as Salminen-Karlsson (1999) discusses, include retention because it is not enough to just recruit women and then not pay attention to whether they drop out or feel welcome.

Not only pay attention to the number of women in SET

It is important to make the subtle discrimination more visible. Today it is of little help to pay attention only to representation and the number of women and men in the fields of SET. The horizontal segregation may reinforce stereotypes and it is of great importance to maintain an overview over the SET fields and find out where women actually are working and what positions they have. The societal and structural limitations for women to gain access to SET must be more visible if we really want to encourage cultural change.
Gender-awareness for recruiters

Christine Wennerås and Agnes Wold at the University of Gothenburg stated the fact that “evaluation committees” and recruitment staff in the academia often provide a system of frequently evaluating applicators in a non-neutral way (http://www.newscientistjobs.com/). Lack of objectivity in recruitment and promotion processes can be prevented if both women and men in positions to employ and promote people are trained in gender-awareness. Hopefully the discrimination against women in SET can be reduced by increasing the awareness of stereotypes or by paying attention to the differences where the male is seen as the norm and the female as the alternative or the exception among leaders within SET fields.

Assist young girls

It is important to assist young girls to discover SET and to view these areas as a future professional field at an early stage to provide a basis for change concerning stereotyping. In order to recruit and retain girls, teaching methods within compulsory school are in need of reorientation. Here, measures that have proven to be successful are for example: groups that consisted of girls only, technology materials which girls have shown they like, female teachers and an open attitude to questions and subject areas that interests girls. Another suggestion is that flexible and innovative educational practices from a gender perspective should be promoted in subjects like mathematics, physics and technology. These practices should allow association of scientific and technological discoveries in our day-to-day lifestyle as well as acting as a prevention tool for our community problems. Further, these practices will eliminate the stereotypes among girls and boys in favour of generating positive attitudes towards science and technology (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004).

Role models

More women in the fields of SET will of course minimise negative attitudes against women and reduce stereotypes. Also, women presently in SET must be more visible. This can be done by showing female role-models, for example in different media channels, student literature and so on. Both women and men will then find that SET is not an exclusive area dedicated to men.
More women networks and mentoring

Women networks within SET areas make it possible for women to exchange ideas and experiences. In several cases networks provide mentors and coaches which will strengthen women in male-dominated areas. Acknowledging female personal and professional resources and capabilities helps women to tackle and surmount obstacles in accessing employment and developing their professional career in the fields of technology (Neighbourship, I.O. Metal & Municipal Technology Centres, 2004).

Gender knowledge considered as a special merit

Gender knowledge should be considered as a special qualification and merit in the recruitment and promotion process in the areas of SET. Gender thinking at all levels in SET causes stereotypes to be less powerful.

Establish creative technological environments

A central incentive for the future is to develop both physical and virtual technological environments where girls and women can meet, receive and offer technical information and where they can ask and respond to technical questions. In Sweden, one way of stimulating a broadening of technology has been the development of municipal technology centres (which is based on the idea of municipal music schools) where it is possible for girls and boys to start their training when they are six years old and continue until they finish upper secondary school. The concept was developed by the Swedish Business Development Agency (NUTEK) in co-operation with the Swedish National Labour Market Board (AMS). Although municipal technology schools are aimed at both sexes, 50 per cent of the places at municipal technology centres are intended for girls and women (http://www.nutek.se/sb/d/232/a/2356).
9. LITERATURE


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