Women in Industry & Technology

WomenIT

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Equal Practices in Education, Guidance and Working Life

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Equal Practices in Education, Guidance and Working Life

Published by
WomenIT-project, University of Oulu, Kajaani University Consortium

Published at
Painotalo-Seiska Iisalmi 2005

ISBN
951-42-7860-7 (printed version)
951-42-7861-5 (electronic version)

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FOREWORD

WomenIT - Women in Industry and Technology 2001–2006 is a development, training and research project seeking to desegregate working life. The guide you are holding is based on two publications in Finnish generated in the WomenIT project in 2004 and 2005, "Opetuksen ja ohjauksen tasa-arvoiset käytännöt" (Equal practices in education and guidance) and "WomenIT-projektit ja Hyvät käytännöt" (The WomenIT projects and good practices). Part 1 of this guide arose from the observations and experiences gained from discussions, reports, working group collaboration, training and expert consultancy with the various WomenIT actors in the fields of training, guidance and education during the project activities. Part 1 contains descriptions of phenomena and problems observed, recommendations of the WomenIT project for good practices and the actors' experiences as development work progressed. Part 2 provides an overview of all local projects in the WomenIT project: presentation of activities, results, experiences and insights. Although this guide focuses on education, guidance and training, we wished to include the local projects from the working life sector of WomenIT to demonstrate the multi-faceted nature of the project. The duration of the local projects was one to two years and they were implemented in 2002–2004. The supplement to the guide contains a description of the Finnish education system and checklists to help professionals in education, guidance and training to monitor their own ways of thinking and acting.

The WomenIT project achieved remarkable results. The actors involved now better identify differences between the genders and take them into account in e.g. teaching and education; good practices have become an integral element of the everyday work in schools and daycare centres. The girls and women participating in various project activities improved their technological skills, gaining courage, initiative and enthusiasm for technology. They are also more aware of their skills and the potential career choices open to them. Tangible results of the development work carried out within the WomenIT project include not only the many contributions by participants, but also new courses, educational content and models, teaching materials and practices.

We hope this guide will provoke thought, trigger debate, introduce new ideas and provide tips in developing education so that it better takes gender into account.

The WomenIT project staff has had the pleasure of working for several years with skilled professionals in the fields of education, teaching and careers guidance as well as working life. We wish to thank everyone who participated in and supported the project and contributed to these guides.

WomenIT project team
Oulu and Kajaani, 20 June 2005

WHAT IS WOMENIT?

WomenIT is a project focusing on training, research and development planned, administered and coordinated by the Kajaani University Consortium of the University of Oulu. The project, which was funded through the European Social Fund's EQUAL initiative and carried out in 2001–2006, sought to reduce the segregation of the labour market by gender. The activities focused on inspiring girls and women to work in technology, where women are sorely underrepresented especially in planning and management, and encouraging them to advance their careers.

The differences between girls and boys in learning results and performance in mathematics and natural sciences are very small and vary by sector. In terms of choice of studies and career as well as attitudes and values, the differences are greater. In Finland, women account for 18–20% of students in technological fields, while in social services and healthcare, the figure is about 90%. A similar division is also apparent in the proportion of women and men in the employed population in various industries.

The WomenIT project sought to exert a national and pan-European influence on the structures and operating models that maintain job segregation by gender and resulting in inequality in other areas of society as well. The WomenIT project was implemented in daycare centres, schools, institutes of upper secondary level education, polytechnics, universities, enterprises and labour organisations. These organisations had in place more than 40 different clubs, courses, seminars, research or development operations aimed at encouraging girls and women to embrace technology and to enter fields of technology, as well as to motivate them to advance in their careers. Most of the activities took place in the Kainuu and northern Ostrobothnia regions and in Lappeenranta. A more detailed description of the project and its innovative approaches can be found in part two of this guide.

Statistics source:
Vitikka, E. (ed.) 2004. Koulu - Sukupuoli - Oppimistulokset. Opetushallituksen moniste 8/2004. Helsinki: Edita Prima Oy.
Naiset ja miehet Suomessa 2003. Tilastokeskus. Tilastokeskuksen julkaisu.

PART 1

– Phenomena, recommendation and good practices in education and guidance

WHAT ARE WE SAYING?

This guide is the result of experiences derived both from the multi-year development work carried out under the auspices of the WomenIT project, as well as from earlier observations and experiences. It is the first guide of this type to be published in Finland and meets an obvious demand. The guide is intended as a practical support tool for education and guidance that takes gender into account, and to aid in dismantling gender roles and practices that foster inequality. We hope the guide will provoke thought and provide new ideas to developing the work of educators in gender-sensitive education.

The project involved people with lengthy experience in promoting equality as well as a sizable group of professionals in the fields of education, teaching and guidance. The first part of this guide contains descriptions of phenomena and problems observed during the project; these have been gathered both from the experiences of participants and from the training sessions, discussions and expert sources. Proposals for action, as well as experiences, results and models arising from the WomenIT project have been included in the descriptions of phenomena. In other words, focus in terms of content is on WomenIT experiences although studies on the phenomena are also presented as recommended additional material. Part 1 is based on the Finnish guide for equal practices in education and guidance, aimed at Finnish professionals in education and guidance, as well as other interested parties. WomenIT actors are Finnish; accordingly, the phenomena, challenges and experiences presented in this guide are drawn from Finnish society and Finnish education. Nonetheless, international experiences have in many respects been parallel to our observations. An overview of the Finnish daycare and school system is given at the end of the guide.

The focus of the WomenIT project was on supporting girls and women to pursue careers in technology and industry. Consequently, the phenomena and experiences contained in the guide are largely reflected through the prism of girls and women and equality as it relates to them, as well as the subjects of technology, natural sciences and mathematics. One of the most important matters in reading this guide is to remember that although there are differences between the genders that must be identified and taken into account in education and teaching, there are also differences between individuals. Not all girls are nice and quiet, nor are all boys loud and interested in technology. It is important to be aware of the fact that there are not only girls and boys in the educational environment, but individuals, too.

Likewise, it should be borne in mind that neither the WomenIT project nor this guide seeks to make all girls and women choose a career in technology or industry. The goal is to make choices genuine, regardless of gender (gender must not be an obstacle), whether choosing toys, tools or place of study. Being treated equally does not mean being treated the same.

This guide contains perspectives and experiences that arose during the WomenIT project and the activities therein. It does not comment on the innate, biological differences between girls and boys, on which we are not experts. The focus instead is on guided phenomena brought about through education and operating models, i.e. gender arising from interaction between individual and environment. The importance of early influences cannot be overestimated.

EARLY CHILDHOOD EDUCATION

Girls and boys, women and men

Gender-based role conceptions, the division of labour according to such conceptions and ideas about the differences between men and women in general are formed in early childhood. Even very young children have an idea as to so-called men and women's work – which jobs are intended for men and which for women, what the role of women and men is at home and in the workplace. Traditionally, women have been responsible for managing day-to-day life, childrearing and caretaking both at home and outside the home, while men have been principal breadwinners acting in the technologically oriented sectors of working life. Children are guided in many ways towards division of labour according to gender; girls are bought dolls to take care of while boys can play with building sets and blocks. The girls at one daycare centre in the WomenIT project indeed wondered whether a girl could really build a fire and use a hammer. Equally telling of the early inception of role models is the amazement of a boy in daycare that a man could also be President (Mrs Tarja Halonen is currently President of the Republic of Finland). Perhaps we can take some consolation in the words of a small girl: "Girls can be leaders too, can't they?"

Amount of work is an integral aspect in examining division of labour. Women continue to do most of the housework, and since they also hold jobs outside the home, it is no wonder a small child could be heard saying, "I guess women are the slaves in my home," as happened at one of the daycare centres in the WomenIT project.

Good practices
The children at a WomenIT daycare centre and school studied how their parents shared housework and how the genders were represented at companies in the area. These studies and their results engendered intense discussion over the traditional division of labour, which helped raise awareness about these issues both among the children and at home as well as among daycare centre staff and the participating enterprises.

WomenIT recommends
Differences between the genders should be taken into account in childrearing and guidance starting from a very early age, identifying the operating models and structures that impact on the formation of role conceptions. Efforts should be made to avoid giving children rigidly gender-based models; rather, the individual characteristics, talents and interests of children should be taken into consideration.

Parents and early childhood educators as the persons bringing up a new generation play an important role in matters of attention to equality and gender. Increasing awareness is a markedly important and effective tool that helps them to implement and foster equality in education. The awareness and

understanding of professional educators can be increased through training. Equality-related issues and gender awareness should be incorporated into the basic vocational training of early childhood educators and also introduced into further training. As skilled professionals responsible for a large share of childrearing, they also play an important role in raising the parents' consciousness, or at least in getting the ball rolling. In homes, more equal role models can be introduced by sharing housework more equitably among all members of the family.

The significance of play to child development is indisputable. Children need to play, but games are also an excellent educational tool and opportunity for interaction both between children and adults and among children. Play should also be seen as an opportunity to dismantle gender-based role conceptions and presuppositions. Adults may offer new variations on traditional games: "What if today, Sara was the captain of the ship?"

Technology in early childhood education

Over the past 10–15 years, daycare centres have acquired computers to help with administrative routines and as a tool in activities. At first, only few daycare centres had computers and only few tasks, primarily administrative ones, were performed with them, but computers have since become increasingly widespread. However, there are still daycare centres where the computer has been placed off limits and may only be used by a single person. This makes the computer itself something special, even mystical, attracting all the attention and thus obscuring its actual function as a tool.

Employees at daycare centres, mostly women, use the computer but if it malfunctions, a man is immediately summoned to help regardless of whether he is particularly skilled in technological matters. Women often confess to a fear of breaking the computer. Underlying this observation may be seen gender stereotypes of the technologically minded man and non-technological woman, as well as issues relating to gender-based education. Since childhood, boys are encouraged to build, use and experiment with technical devices while girls are not afforded an equal opportunity or they are cautioned about the fragility of the devices.

Observations made in the WomenIT project show boys often lack perseverance when it comes to using technical equipment. Boys eagerly fall on new devices, putter about for a while and then depart to take up something new. Girls then claim the "smoking ruins" left by the boys, as one early childhood educator aptly put it.

Good practices
WomenIT participants from the field of early childhood education were enthusiastic about various kinds of training in information and communication technology (ICT), which played a marked role in the development of their skills and in encouraging them. They also set an example for other employees. The participants reported that even those who had previously resisted had grown interested in ICT. Significant in terms of increasing interest were experience and knowledge as to the things that can be accomplished with various types of equipment.

At the daycare centres in the WomenIT project, computers were placed in the same premises in which other activities were carried out. The same computer

was used both by staff for their purposes and by children for theirs. Staff members supported each other e.g. by filling in for each other so that everyone had a chance to use the computer.

The WomenIT projects in daycare centres and in primary school involved linking ICT to other activities such as building, arts and crafts, fairytales and dance. This made technology a tool in bringing greater variety to activities.

WomenIT recommends
Computers and other technical equipment should be available to all daycare centre employees and preferably situated in the areas where other activities take place, i.e. also available to the children. Children should be guided in their computer use; limits should be set and children should be steered towards more goal-oriented use instead of just game-playing. Attention should also be paid to supporting girls in using the equipment so that girls and boys are given equal opportunities to practice and learn about using technological equipment. In this way, e.g. computer use can be made a natural part of daily activities (in daycare) and its significance as one tool among many is highlighted.

Daycare centre employees (and future kindergarten teachers and nurses) need to be trained in the use of ICT, thus strengthening their perception of their skills. And once women at daycare centres start to use (information) technology, they serve as an example of skilled female technology users to the children as well.

A practical tip from one of the WomenIT daycare centres: mark the computer's power button clearly by e.g. colouring it with a felt-tip pen so that children can easily locate the right button.

SCHOOLS

Girls and boys, women and men

Observations made in classrooms show great differences in the behaviour of girls and boys. In class, boys take up most of the time and space, account for most of the noise and receive the lion's share of attention and guidance from the teacher; girls more often work hard and quietly. However, it should be noted that there are differences within the gender groups: not all boys are loud and eager for attention, nor do all girls quietly play by the rules. Likewise, it should be noted that children do not automatically adopt these behaviour models, but rather comply with the models of girls and boys' behaviour that they have been offered and encouraged to adopt since early childhood. Girls may be seen but not heard while boys are expected to be "little rascals".

Observations indicate boys often assume the leading role in the classroom. If seats are not assigned, boys rush to claim their favourite seats, preventing the girls from choosing. Boys are most often the ones not adhering to commonly agreed rules. They shout out their views and opinions and do not ask for permission to speak by e.g. putting up their hand. Boys may prevent class from getting started by obstinately refusing to take off their hat or putting it immediately back on once removed. Teachers also often assume boys have not done their homework while girls are assumed to have been good and conscientious. In other words, it can be

seen that boys have taken up the task of wielding power – which is considered the suitable one for men – whether over the teacher, their classmates or activities. Girls for their part are mostly quiet, follow the rules, put up their hand, only speak when asked to, take part in cleaning up more often than boys, etc. Girls play out their role of being good and thus also contribute to keeping peace and order in the classroom.

> Phenomena describing classroom situations appear e.g. in the doctoral dissertation materials compiled by researcher Katariina Hakala at the University of Helsinki and assistant principal Riitta Soro of Loimaa Upper Secondary School. In her as yet unpublished doctoral thesis, Ms Hakala examines how the relationships between teacher and pupils are built. As part of her research materials, Ms Hakala looks at ethnographic material collected in comprehensive schools in Helsinki, which contains e.g. descriptions of classrooms. Ms Soro has studied teachers' notions of girls, boys and equality in the field of mathematics through a questionnaire and interviews. Teachers' views of girls as quiet plodders as well as of boys disrupting class more often than girls are clearly indicated in Ms Soro's research materials. International observations also support the Finnish experience.

Why is this tolerated? One reason may be that teachers are not aware of the invisible structures in the classroom and fail to observe the models of behaviour unfolding. They may think "that doesn't happen in my classroom" or "everyone is treated equally in my classroom". This closely involves the question of gender neutrality, which has been and continues to be considered the correct way of regarding girls and boys and the realisation of equality. Girls and boys are seen as children and pupils without identifying or acknowledging differences between genders or individuals and taking these into consideration in education and teaching. Equality is thought to be achieved by ignoring gender or treating everyone the same. At worst, gender neutrality or gender blindness leads to the realisation of stereotypical ideas and attitudes and thus to unequal treatment.

One view into the aforementioned phenomena involves the power wielded by boys with regard to others. It is often considered a stereotypically masculine operating model. Since it is permissible and appreciated in society, the behaviour of boys is condoned. The modern school is perceived as the domain of women and schools are accused of a focus on girls, against which boys are allowed to rebel. In these circumstances, if boys wish to retain their masculinity they have no choice but to conform to the given model, at least while others can see.

Perhaps teachers feel they have no means or tools to rectify the situation. Teachers may allow boys to call out answers to make them at least somehow involved in class discussion and activities. Likewise, boys may be asked questions that call for more deliberation; let them have the challenges so that they focus on learning instead of disruptive behaviour. Girls are not encouraged to more prominent roles in order to maintain at least a semblance of peace and quiet. The "disciplinary role" given to girls sometimes also appears in the classroom as well-behaved girls being seated next to disruptive boys to calm the latter down, at the expense of the girls' ability to concentrate on their own work. On the other hand, in accordance with the received model, boys often socialise with other boys, form gangs that have their own rules and "things" and fail to assimilate into the rest of the class and its operating models.

WomenIT recommends
Teachers must be aware of the operating models and structures in their classrooms and they must be provided with tools to manage the situations. Merely bringing up the matter for discussion may give rise to a process of consciousness-raising but the basic and further training of teachers plays

a particularly important role. Teacher training must be developed from the viewpoint of equality and gender problematisation.

Examining one's own operating model and ways of operating is a tool for increasing awareness. Checklists at the end of this guide help evaluate teaching and education from a gender-sensitive perspective. Observing one's own classroom "through the eyes of an outsider" may also help open eyes to the actual structures and behaviour models at play in the classroom: the allocation of space, sound and attention and the underlying rationales.

Good practices
Teacher training colleges implementing development activities with regard to both basic teacher training and further training were involved in the WomenIT project. Gender-sensitive training in multimedia and ICT was organised for both female teachers in working life and students enrolled in class teacher and subject teacher education. Natural science departments were also involved in the project, seeking both to attract more (female) students to subject teacher education and to enhance subject teacher education from the gender-sensitivity perspective.

The curriculum in schools also serves to guide toward gender-based roles and subsequent gender-based jobs. A case in point is the division of crafts education in Finnish schools into technical and textile craft. Traditionally, boys choose technical craft and girls take textile craft. The most blatant examples probably come from cases where schedules have steered pupils to make the traditional choices, e.g. by scheduling physical education for girls at the same time as technical craft, or vice versa. On the other hand, the possibility of being the only girl or boy in the group prevents many from making the non-traditional choice or ultimately leads to the only one dropping out of the class. Boys may shun a girl in technical craft class and vice versa. Neither does course content often encourage girls to choose technical craft or boys to take textile craft.

Teaching materials also often give a one-sided portrayal of women and men and the examples given conform to stereotype. Girls are often portrayed as passive observers and boys as active actors. Examples relating to mathematics and physics are taken from highly traditional male fields: cars, construction, and the like.
The national curriculum in basic education has only recently been reformed and no longer contains technical and textile craft but rather the subject "crafts". In grades 1–4, the same crafts lessons are taught to all pupils. From grade 5 onward, pupils may choose their emphases, but even then, the National Board of Education guidelines mandate that boys and girls be exposed to both technically oriented and textile-oriented crafts. Schools are now required to ensure that the goals laid out in the new instructions are reached.

WomenIT recommends
Contents of instruction and study materials need to be designed to be more inclusive so that they touch upon a multitude of life aspects, in other words offering contents relating to care and home to boys and technology to girls. In drafting local curricula, as in all school development efforts, principals must act as examples to other staff, become aware of any structures and operating models that might contribute to inequality and address the problems arising.

Single-sex groups

The purpose and significance of groups segregated by sex is one of the most interesting themes arising and experiments carried out in the WomenIT project. The Finnish school system is a comprehensive one; girls' schools and boys' schools in Finland were closed decades ago. Nor does the school system include instruction segregated by sex, with the exception of certain isolated pilot programmes such as those carried out under the auspices of WomenIT. The development work within the framework of WomenIT sought to offer girls a chance to enhance their technology skills and gain experiences in an area of life where boys have traditionally held the upper hand. The question of the difference between the instruction segregated by sex that has sparked national debate in recent years and yesteryears' girls' schools and boys' schools arises quite often. The main difference lies in the former segregated schools having different curricula for girls and boys; instruction for girls emphasised caring for the home and children and similar "women's pursuits" while boys were taught natural sciences and technology. Modern thinking focuses on teaching single-sex groups of girls those subjects they would otherwise miss out on, and vice versa. Inspired by experiences gained from the WomenIT project, a report has been commissioned on segregated education, experiences gained and research conducted and the benefits and challenges of segregated education. At the time of writing, the report is yet to be completed.

Single-sex education in Finland

Pirkko Hynninen ja Elina Lahelma

Ms Pirkko Hynninen teaches at the Department of Education, University of Helsinki and is also involved in a project of educational guidance and counselling. Ms Elina Lahelma is a professor at the Department of Education, University of Helsinki. Her research focus is on sociology and feminist studies in education.

Every now and then, concern over the school performance of boys rises to the fore in public debate. One of the means proposed as a solution has been a return to separate education for girls and boys. As activists who have worked in the field of gender and education for decades, we find these proposals somewhat amusing. The history of single-sex education and the transition to coeducation are complex issues. Diverse and contradictory arguments have been put forth both for and against single-sex education and coeducation.

History

In Finland, coeducation of girls and boys has a fairly long history. In a sparsely populated country, popular education in the countryside was always common to girls and boys, and the school authorities had no problems with this. Girls' schools for daughters of the gentility were created in the 1800s, later than boys' schools, while the concept of comprehensive education was embraced at a fairly early stage in grammar schools. Segregated education also translated into different curricula, which was rationalised through ideas about the natural dissimilarity of girls and boys – which were taken for granted – and their different social duties. In the 1900s, the curricula

for girls and boys in general education drew closer, except for instruction in various household tasks. Home economics became a common subject with the advent of comprehensive school (1970), but in practice, craft and physical education still remain segregated at most schools. In many ways gender is a divisive factor at schools – just consider the greeting "Good morning, boys and girls!" – and study materials contribute to conceptions about the responsibilities of women and men in society, to the idea of a dissimilar citizenship (e.g. Gordon, Holland & Lahelma 2000; Aapola, Gordon & Lahelma 2003, Palmu 2003, Lahelma & Öhrn 2003).

Until the introduction of the comprehensive school system, middle school at girls' schools lasted a year longer than at schools for boys because "upon turning thirteen girls exhibit more signs of weakness than boys" (Committee report from 1908, see Haataja, 1989). Nowadays, it is boys who are said to need an extra year of education.

The ideology of equality and the "new" segregated education system

Comprehensive school spelled the end of systematic segregation into single-sex schools. Since then, vocational education in practice carried on the tradition of single-sex education leading to specific occupations; for the most part, girls and boys study different fields and prepare for different occupations. Boys pool to study to become mechanics while girls become beauticians. An important element in promoting equality is doing away with segregation in education and jobs. There are examples of this in several WomenIT projects (described in part 2). Practical efforts have been made to inspire girls and women to take up male-dominated fields and thus improve their standing in the labour market – men's jobs continue to pay better than women's jobs.

In the 1980s, the Nordic countries in particular established experimental single-sex groups or introduced occasionally segregated instruction. These projects had their grounding in feminist and equality premises. The experiences thus gained have been utilised in the equality projects implemented in the 1990s and also in the WomenIT project. In the context of equality projects, single-sex education most often refers to segregation in studying subjects common to all pupils, even to the extent that instruction for girls addresses contents relating to male life experiences more thoroughly than for boys, who conversely spend more time on tasks more typically associated with women. Whereas the earlier segregated education was built on the concept of keeping separate the life spheres of men and women, the modern segregated education seeks to expand the skills and horizons of both genders. The idea of intrinsic and opposite differences between the sexes has gradually transformed into an idea of dissimilarities, arising from experiences, which must be dispelled.

Research has repeatedly shown that in mixed groups, boys receive more attention, occupy more space and have their voices better heard. Accordingly, single-sex groups have sought to improve study conditions and opportunities for girls in particular. Segregated education has indeed proved beneficial to girls. Their voices have been heard and they have had room to try their wings in subjects considered to be in the male domain, such as mathematics and natural science. When girls are no longer around, boys have also gained

novel experiences e.g. in taking care of smaller children, managing lunch duties and clearing up after themselves.

For the most part, segregated groups have been individual experiments whose results have not been more widely utilised in education although some have remained in effect beyond the experimental stage, primarily in their original environments.

Segregated education for girls and boys is no panacea to the problems schools are experiencing, but it serves a valuable purpose when executed with judgment. Segregated groups require the teacher to show solidarity to both. Assumptions about the "natural" abilities of girls or boys may (even) in segregated education lead to poorer learning results. In single-sex groups, the division of labour between the genders can be challenged on a hands-on level. The secretary in boys' groups is a boy, in girls' groups meetings are chaired by a girl. Perhaps the most remarkable benefit of single-sex groups comes from the way it brings up differences within gender groups: girls and boys come in many shapes and colours. Gender-based juxtaposition is called into question and the myriad ways of being rise to the fore. When teachers who have been through this experience hear talk of girls and boys as homogeneous groups, they may well ask, "Which girls? Which boys?" – and thus contribute to further dismantling the duality.

Sources:
Aapola, S., Gordon, T. & Lahelma, E. 2003. Citizens in the Text? - International Presentations of Citizenship in Textbooks. In: Torres, C. A. & Antikainen, A. (ed.) The International Handbook on the Sociology of Education. An International Assessment of New Research and Theory. Lanham, Boulder, New York and Oxford: Rowman and Littlefield Publishers, 381-399.
Gordon, T., Holland, J. & Lahelma, E. 2000. Making Spaces: Citizenship and Difference in Schools, London: Macmillan & New York: St. Martin's Press.
Haataja, A., Lahelma, E. & Saarnivaara, M. 1989. Se pieni ero - Kirja tasa-arvokasvatuksesta (The tiny difference – a book on equality education). Helsinki: Valtion painatuskeskus ja Kouluhallitus.
Lahelma, E. & Öhrn, E. 2003. 'Strong Nordic Women' in the Making? Educational Politics and Classroom Practices. In Beach,D., Gordon T. & Lahelma E. (ed.) Democratic Education: Ethnographic Challenges. London: Tufnell Press, 39-51.
Palmu, T. 2003. Sukupuolten rakentuminen koulun kulttuurisissa teksteissä (Gender construction in the cultural texts of the school). Helsingin yliopiston kasvatustieteen laitoksen tutkimuksia 189.

The British WISE (Women Into Science and Engineering) campaign has studied and compiled the experiences of some schools in single-sex natural science education and obtained interesting results that could also be applied in Finland. The study concerned secondary schools that had introduced experimental single-sex groups in education; in some schools, the segregation applied to all subjects while at others only natural science instruction had been segregated. In some schools, all age groups were divided while some only applied single-sex groups in the upper years of secondary school. Although the schools differed greatly from each other, their experiences in teaching single-sex groups were consistent:

- Girls felt they had benefited by gaining more self-confidence both in their practical skills and theoretical studies.

- The girls grew more positive in their attitudes towards natural science and technology.
- In mixed groups, boys tend to posture and dominate activities and equipment use; this phenomenon was avoided in single-sex groups.
- Most of the girls and quite a few boys as well enjoyed studying in a segregated group.
- The parents of girls in particular considered single-sex education an excellent mode of instruction.
- Teachers were pleased to teach girls, who also achieved good results.
- Most schools felt single-sex groups were no longer necessary after the age of sixteen.

Source:
Warrior, J. (ed.) 2004. In a class of their own? Teaching science in single sex classes in secondary co-educational schools. A Guide to good practice. WISE (Women Into Science and Engineering) publications. London.

Good practices
Several local projects under the auspices of WomenIT were executed in girl groups, the goal being both to foster the development of girls' ICT skills and to gain experiences with single-sex instruction. Various types of clubs and courses on technology, ICT and natural sciences were organised for all-girl groups.

The experiences in the main were positive: girls felt they had had peace and quiet to study the subject and tools when there were no boys in the groups to take up the instructor's time and boss the group around. The girls were motivated and supported one another and the groups stayed more peaceful than mixed groups. The teachers estimated the girls were also more active in asking for advice and instructions, which in turn provided motivation for them. Some of the local project actors continued with all-girl groups after the WomenIT projects but the girls' increased ICT skills also encouraged them to play more active roles in mixed groups as well.

"Onlies"

One of the phenomena relating to groups and gender is "onlies", a term used for the sole representatives of a gender in a given community, for example a woman in an ICT business or a man at a daycare centre. There is extensive experience of gender having a substantial impact in situations where there are no other representatives of that gender. The effects may occasionally be concrete in the extreme, for example when business decisions are made in the sauna, where the single representative of a gender has a hard time joining in. Research indicates the active force at play is not so much the work or the industry but rather the work community's invisible code of conduct and atmosphere, i.e. for example the attitudes of a male-dominated workplace to the only woman. It has been said that in some cases women still

must petition for exemption from their sex, just like they had to when applying to university more than a century ago.

> Lecturer Vappu Sunnari from the University of Oulu has studied "onlyness" and the stress experienced by university students from a gender perspective. According to her research, similar phenomena appear in work and student communities. An interesting phenomenon comes from male students in departments of education and the humanities feeling they are listened to specifically because they are in the minority, while female students in technology were not afforded similar consideration. Male students in technological fields wish to help and protect female students. If a woman says she does not know how to do something, the men come to her aid. In other words, women are seen as being weaker, in need of help and protection, while women may think they have it easy with everyone helping – it lets women ask even stupid questions.

On the other hand, an only woman may also be afraid to express her ignorance, especially if she feels her skills are inferior. Women may pack their days with activities feeling they are not up to the task and feeling in need of a great deal of instruction and support, as also happened in the WomenIT project. Only women in male-dominated workplaces must work many times harder than men, while it has been observed that less work is required of only men in female-dominated workplaces than of other members of the work community. Other research shows grading is also more lenient for men.

> For more information about "onlyness" and related phenomena, please consult the WomenIT publication Equality to everyday life (http://www.womenit.info/equalitytoeverydaylife.php) and Ms Sunnari's research from 2001 on the subject: Sunnari, V. 2001. Intellectually interesting or interesting because of one's sex – Female and male students' study experiences in varied university disciplines at the University of Oulu. In: High Heels to Hi-Tech. Increase gender equality in ICT-education and professions. Oulu Polytechnic Institute of Technology. Saarijärvi: Gummerus Printing, s. 66–76.

Girls, boys and technology in schools

Technical and technological skills have traditionally been a male domain. Girls are not supported, guided or encouraged to take up technology, which is evinced e.g. in toys designed for girls that wholly lack any elements guiding toward tinkering and building. Consequently, girls fail to develop skills in handling technical equipment and devices or any experience-based grasp of the fundamental rules of technology and mechanics, and thus their courage and faith in their own technical and mathematical abilities also fails to grow.

The same is apparent with grown women. For example, female teachers have said they ask a male colleague for help whenever they have problems with technological devices. With regard to ICT, the interesting aspect is that according to various studies, women in particular form the majority of ICT end users at work while at home the situation is reversed. At home, the computer is often placed in the boy's room. Other technological devices, tools and equipment are also most commonly used by the menfolk of the family except for household items such as microwaves, dishwashers and vacuum cleaners.

Girls' unrealistic perceptions of themselves with regard to technological proficiency are consistent with how girls view their mathematical abilities. The perception is often completely at odds with their school performance. Girls think that they "are

no good at maths" or that "maths is not their thing". However, their good test scores tell a whole different story. In thinking like this, girls often also give up easily. When faced with a problem involving mathematics or technology, they fail to give their full effort, thinking they "wouldn't manage anyway". In the teens, when gender identity is constructed and the change from childhood to adulthood is underway, the aforementioned phenomenon is heightened and adult female models are sought from the surrounding environment. In most cases, these models tend to a non-technical orientation and care professions.

Boys, on the other hand, are much more fearless in experimenting with technology and technical equipment. They are interested in the actual devices and study them, talk about them and compete in them. Boys are more interested in games than girls but often lack perseverance and goal orientation. Boys may tinker with computers "just for the fun of it" without any specific goals in mind, while girls look beyond the devices to their purposes: what is it good for, what can it accomplish, what is the goal? Whether girls and boys actually behave this way and whether the conduct is intrinsic or grounded in the experiences and conduct model they have been steered towards since early childhood is a question that remains open for debate. Nonetheless, boys are allowed to experiment, tinker and potter about with machinery while girls are brought up to be more responsible, "sensible" and goal-oriented in their activities.

There may even be a cause and effect at work in the boys' tinkering. Since early childhood, boys are encouraged to tinker, take apart and reassemble, potter about with machinery and other types of technical equipment. They come to learn about devices and their operating principles and structures and are therefore not afraid of breaking them and aware that what can be broken can usually also be fixed.

WomenIT recommends

Girls should be encouraged to experiment with technical tools and equipment from an early age, thus giving them experiences, increasing their skills in handling tools and equipment and their desire to experiment as well as their courage and faith in their own abilities. Technology should become a part of everyday life for girls as well. On the other hand, it is also important to acknowledge that we live in an increasingly technological world; technology is ubiquitous and women also know how to use it. Boys should continue to be supported in their predilection for technology but also encouraged to adopt more responsible, long-ranging and goal-oriented approaches.

Good practices

The WomenIT piloted several activities to develop the technological know-how of girls, including various types of courses and clubs in technology and ICT. The experiences were highly positive; the actors reported increased initiative, courage and enthusiasm for technology among the girls. In one technology club, for example, the girls taught and instructed other pupils, both girls and boys, outside club sessions. Teachers also estimated girls to have more actively sought advice and instruction.

Changes among the actors arising from development work in the WomenIT project also show in the female teachers involved saying they now do work they used to ask a man to do. For example, a few female teachers learned to use an electric drill during the course of the project and now do their own drilling.

The WomenIT project observed that girls using technology emphasise creativity, artistry and communications. This was clearly apparent in the project results and the contents most interesting to girls. Multimedia content was one of the

most popular sectors of ICT among girls and women. Girls clearly use the internet for communication more than boys.

WomenIT recommends
The role of content and goals should be highlighted in the use and teaching of technology skills. This also supports the growing trend in Finnish information society towards content provision; professionals are in demand. Goal-oriented use of information technology also lays the groundwork for better applications development in the future, which is one of the reasons why the IT industry is indeed motivated to attract more women into the field. Business will also require multi-skilled content experts to improve both the quality of content and the usability of hardware and software.

Children and young people should be guided towards wide-ranging interests in terms of technology and content.

Good practices
The WomenIT projects resulted in a great deal of carefully crafted and extensive content and multimedia output. Examples of these include the animations produced by children in daycare, the multimedia presentations and content made by schoolchildren, films, etc. Project output is described in greater detail in part 2 of this guide.

Practical tip: an excellent way to demonstrate the computer's system of files and folders is to take ordinary boxes of different sizes and place them side by side and inside each other to mimic the file hierarchy.

Practical tip: children enjoy taking computers apart and reassembling them. Old computers at schools should not be thrown out, but left for experimentation that increases insight into the operating principles of computers and thus also reduces fear of computers.

Guidance in making choices, student and careers guidance

Any number of choices needs to be made in school: what kinds of contents of instruction and teaching methods to use, which courses to take, how to guide students in choice of subjects and place of study, etc.

According to Linda Gottfredson, gender is a more influential factor in making choices than personal interest. The determining factors are firstly gender-related, followed by social acceptability. Personal feelings only rank third. For example, a boy will take football anyway, even though he might be interested in art or ballet, because all the other boys will be at football practice.

Source:
Gottfredson, L. 2002. Gottfredson´s theory of circumscription, compromise and self-creation. In Brown, D. & associates (ed.) Career choice and development. San Francisco: Jossey-Bass, 85-148.

As already stated in this guide, structures and practices in schools can be used even unconsciously to steer students to make certain choices. A prime example comes for class scheduling that denies all pupils equal opportunities to take the subjects and courses they wish. Personal experiences impact on choice of studies and career throughout life in interaction with society and the surrounding community and in relation to prevailing conceptions and values. Future choices can thus be influenced by making a difference in the structures and practices and the attitudes that contribute to the personal and social development of children and young people.

Introduction to gender-sensitive guidance

Päivi-Katriina Juutilainen

Ms Päivi-Katriina Juutilainen is lecturer in the methodology of guidance in the career counsellor education programme at the University of Joensuu. She took her PhD in education in 2003; her doctoral dissertation was entitled, "Guidance towards life or towards gender?"

Finland has the highest rate of labour market segregation by gender, i.e. separation into women and men's occupations, of all EU Member States (Työministeriö 2002, 4). Since the 1980s, several national and international projects have been put into place for the purpose of desegregation. A focal issue in desegregation is to provide women and men with equal opportunities to realise themselves in families, working life and society and with equal likelihood of achieving their goals. The guide you are holding delves into the long-ranging and diverse activities taken in the Kainuu region to promote desegregation: for nearly two decades, the work there has extensively penetrated into the various sectors of education and industry and also provided a comprehensive approach from a lifespan perspective. Since the 1990s, guidance as an individual and social resource has been considered a key approach to desegregation. This article examines guidance from a gender perspective through the prism of two central questions: why is gender-sensitive guidance necessary and what does it mean?

Why is gender-sensitive guidance necessary?

As the French writer and feminist Simone Beauvoir says, "One is not born a woman, but becomes one." These may well be the most famous words that call into question the biological origin of the differences between the sexes. Many subsequent studies have given support to Beauvoir's ideas: nurture and other cultural factors have been found to contribute to creating the differences between girls and boys in many ways. In addition to biological characteristics, a duality also appears on the level of psychological traits and functions, for example in ideas on the differences between the abilities, personal traits or values of women and men. (Bem 1993, 80; Lahelma 1992, 8-9.) However, although modern research no longer supports e.g. the common perception of girls having less mathematical abilities, the number of girls in fields involving mathematics, natural science and technology has remained fairly stable. Explanations are now being sought not only from individual characteristics relating to e.g. motivation but also from social and cultural factors. Many genderising processes would seem to be hidden in everyday school activities that continue to divide the worlds of women and men (e.g. Lampela 1995; Metso 1992; Soro 2002; Tarmo 1991).

My doctoral dissertation research (Juutilainen 2003) indicates that paradoxically enough, student guidance in schools seems to simultaneously reinforce and defy persistent stereotypes. Although girls with a mathematic bent were encouraged to choose non-traditional fields, they were nonetheless considered more suitable for education and teaching than for instance management positions. The support for boys towards non-traditional choices was less solid and traits such as leadership were "naturally" associated with boys. The results of the research also indicate that in modern society, in terms of cultural norms and attitudes in environment, it is easier for girls to break gender boundaries and enter traditionally male domains than it is for boys. Many studies (e.g. Astin 1984; Nummenmaa & Vanhalakka-Ruoho 1985) show that those girls who plan on entering a non-traditional field encounter structural obstacles to pursuing studies "thought to belong to the other gender".

What is gender-sensitive guidance?

Gender-sensitive guidance refers to professional guidance activities that allow the genderised structures and processes in society, as well as their impacts on the lives of women and men, to be identified, acknowledged and given meaning (Korhonen 1998; Nummenmaa & Korhonen 2000). It is this principle that should be materialised in the activities of counsellors and their skills in hearing, listening, observing and communicating with clients. The central goal of guidance can be defined as strengthening the client's capabilities as an actor. In terms of guidance in schools, this translates into the pupils' abilities to make meaningful choices of subject and plan their lives. From the perspective of gender-sensitive guidance, the essential issue is whether stronger actorship means different things for girls and boys. Have the parties to the guidance process decided in advance, through their

preconceptions, on proper choice of subject, field of studies or occupation solely on the basis of gender?

Gender-sensitive guidance may be described as a process of demolition and construction, seeking to do away with genderised conceptions and beliefs and building new meanings in their stead. The process becomes possible when individually experienced modes of perception and interpretation that often remain unspoken and intuitive are brought to the level of consciousness. This in turn results in the pupils/students better understanding the rationales behind their conceptions and actions as well as the underlying values, beliefs and assumptions. They may, for example, come to realise that the attitudes of their parents or friends have influenced their choices, although their personal interests lie elsewhere. In other words, awareness may liberate from the cultural constraints that usually take tangible form in the expectations and norms of one's environment.

What does gender sensitivity stand for in terms of professional expertise and activities? Firstly, it means that the careers counsellor possesses theoretical knowledge of gender socialisation, the gender system and equality legislation. The counsellor is aware and understands that in many aspects, the world is different to women and to men, and can take this into account when encountering clients. It also means the counsellor is capable of identifying and locating genderising structures and processes that impact on the lives of individuals and prevail in society, and especially in educational and work organisations. The counsellor is also able to identify linguistic elements that categorise the genders and strives to use language that values diversity. Counsellors capable of critical evaluation continually strive to become aware of their personal beliefs and assumptions relating to gender and call their own interpretations into question. They also give thought to how their personal actions impact on the guidance process. These aspects form the basis for counsellors to encourage their clients to embark on a critical process of evaluation that examines their personal actions and the underlying assumptions. As a phenomenon, gender sensitivity is a stage in evolution towards a diversely structured socio-cultural reality where gender constitutes neither an explicit nor hidden hierarchic category dividing the world in two. In other words, gender-sensitive approaches and actions seek to make themselves obsolete.

Sources:

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Bem S. L. 1993. Lenses of gender. Transforming the debate on sexual inequality. New Haven: Yale University Press.

Juutilainen, P.-K. 2003. Elämään vai sukupuoleen ohjausta? Tutkimus opinto-ohjauskeskustelun rakentumisesta prosessina. (Guidance towards life or towards gender?) Joensuun yliopiston kasvatustieteellisiä julkaisuja Nro 92. Joensuu: Joensuun yliopistopaino.

Korhonen, P.-K. 1998. Sukupuoli, elämänkulku ja ohjaus. Sukupuolisensitiivisen ohjauksen opetussuunnitelman kehittämistyön teoreettiset ja pedagogiset perusteet. Helsingin yliopiston Vantaan täydennyskoulutuskeskuksen julkaisuja 14. Helsinki: Yliopistopaino.

Lahelma, E. 1992. Sukupuolten eriytyminen peruskoulun opetussuunnitelmassa. Helsinki: Yliopistopaino.

Lampela, K. 1995. Sukupuolineutraalisuus oppilaitoksissa. Opettajien, rehtoreiden ja koulutoimenjohtajien näkemyksiä oppilaan sukupuolesta. Helsinki: Opetushallitus.

Metso, T. 1992. Yhdessä vai erikseen? Tytöt ja piilo-opetussuunnitelma. In Näre, S. & Lähteenmaa, J. (ed.) Letit liehumaan. Tyttökulttuuri murroksessa. Helsinki: Suomalaisen Kirjallisuuden Seura, 207-283.
Nummenmaa A. R. & Korhonen P.-K. 2000. Sukupuolisensitiivinen ohjaus. In Onnismaa, J., Pasanen, H. & Spangar, T. (ed.) Ohjaus ammattina ja tieteenalana 1. Ohjauksen lähestymistavat ja ohjaustutkimus. Opetus 2000. Juva: PS-kustannus. 70-82.
Nummenmaa A. R. & Vanhalakka-Ruoho M. 1985. Toisen sukupuolen ammattiin suuntautuminen. Työvoimapoliittisia tutkimuksia 55. Helsinki: Työvoimaministeriö.
Soro, R. 2002. Opettajien uskomukset tytöistä, pojista ja tasa-arvosta matematiikassa. Turun yliopiston julkaisuja. Sarja C, osa 191. Turku: Turun yliopistopaino.
Tarmo, M. 1991. Opettajien sukupuolilinssit. Kasvatus 22 (3), 195-204.
Työministeriö 2002. Tasavertaiset työmarkkinat / segregaation lieventäminen – projektin loppuraportti. Työhallinnon julkaisu Nro 303. Helsinki: Työministeriö.

The story of one WomenIT actor demonstrates the impact of counsellors' preconceptions of which Päivi-Katriina Juutilainen writes: a student counsellor recommended to a female student at the beginning of her studies in information processing science that she include pedagogical studies in her study plan, thus steering her towards teaching at the very outset of her study path. The student having earlier studies in education was probably the rationale behind the counsellor's suggestion, but it may well be asked if the counsellor would have automatically given the same recommendation to a male student, however interested he might have been in a career in teaching?

Good practices

Various types of development activities relating to student guidance and career choice issues were implemented in the WomenIT project: activities to develop work experience and cooperation with companies, e.g. guiding girls to choose work experience assignments in non-traditional sectors; student guidance development both in lower secondary and upper secondary schools; development of gender-sensitive careers guidance models, etc. Presentations on these development activities can be found in part 2 of this guide.

The WomenIT project organised eight days of training for careers counsellors, planners and vocational psychologists involved in careers on the subject of gender in choice of career, guidance and recruitment. The training addressed a wide range of equality issues and focused on equal guidance. At the beginning, many participants felt uncertain as to what they might gain from the training, feeling that they already provided guidance equally to girls and to boys and had no need for improvement. The year-long training resulted in careers counsellors going through processes that vastly improved their perceptions about equality issues. The participants reported monitoring their activities in guidance over the year and discovering the status quo to perhaps differ from what they had believed at the beginning of training.

Together with international partners, the WomenIT project produced two guides on gender-sensitive guidance: European Examples of Good Practice in Careers Guidance and Good Practice in Mentoring: European Guidelines.

WomenIT recommends

The new national curriculum for comprehensive schools in Finland calls for guidance to be provided throughout basic education, with both teachers and careers counsellors taking part. WomenIT recommends the development of teachers' know-how relating to study opportunities and careers guidance so that they may participate in the shared guidance efforts required in the

curriculum. One teacher in the WomenIT project said teachers often needed to be encouraged to comment on questions involving study and careers guidance and that development work such as that done within the framework of the WomenIT project was helpful.

Experiences gained in the WomenIT project indicate that content relating to choice of career and profession should be included in different subjects – for example, what kind of occupations might one consider with expertise in chemistry? It would also be advisable to incorporate visits to workplaces in subject teaching.

LEARNING NATURAL SCIENCE, MATHEMATICS AND TECHNOLOGY

In general, girls set their goals high in all subjects. If a girl gets a grade of 9 in language studies and an 8 in mathematics (the Finnish grading scale runs from 4 to 10, poor to excellent), she feels she is "poor at maths". Maths not being a girl thing seems to be "ingrained" in girls. This attitude is especially common in lower secondary school. Additionally, it is believed that a woman has to be particularly good to do well in mathematics.

In connection with an upper secondary school local project, the WomenIT project conducted a study of the self-images of girls and their attitudes towards mathematics, physics and chemistry. The survey consisted of a questionnaire on attitudes and self-image, an essay on an industrial visit, and group interviews. Boys were also asked to fill in a brief questionnaire. The following is a summary of the results of the survey carried out by Ms Maria Kukkonen.

Self-image in terms of studies and study attitudes:

- Only about a third of the girls described themselves somewhat positively early on in upper secondary school in terms of learning mathematics, physics and chemistry, compared to two thirds of the boys.
- A few girls reported their learning varied according to situation, attitude and subject. "Depends on the day and the subject."
- Most had experienced mathematics as positive in primary school.
- Experiences in secondary school were not as positive as in primary school. Only a third described their experiences as positive, most as varying.
- A number of pupils pointed out that their learning experience was related to the teacher's teaching skills.
- In choosing subjects, girls made their choices based on the usefulness of the courses (e.g. in terms of further studies) instead of their liking of the subjects.
- More than half thought studying for a profession relating to mathematics, physics or chemistry was possible or probable. However, attitudes towards industry, especially jobs on the factory floor, were clearly negative.

Girls' descriptions of study situations interpreted as positive:

- The teacher explained, demonstrated and simplified so that the matter could be thoroughly understood.
- The teacher was encouraging and helped out when necessary.

- The atmosphere was pleasant and allowed for conversation.
- Instruction involved work in pairs and groups as well as individual thought and problem-solving.
- Pupils realised they were successful in completing their assignments and did well e.g. on midterms.
- Regular interim assessments allowed pupils to monitor their success.

Girls' descriptions of study situations interpreted as negative:

- No interest in the subject and no insight into its significance, meaning or purpose
- Difficulties in concentrating due to the subject being perceived as either too easy or too difficult, because of a lengthy period of consistent studies, or for other reasons
- Not being able to manage or understand the subject caused frustration; thinking about an overwhelming assignment was irritating and making mistakes felt terrible, giving rise even to feelings of helplessness and despair
- Preoccupation with failures and insecurity experienced in earlier classes
- Perceptions of self were negative: I'm stupid, lazy and not as good as the others.

Pupils would give up easily in study situations interpreted as negative. In many regards, negative perceptions seemed circular, which might indicate that girls occasionally were caught up in a spiral that reinforced their problems.

On the basis of the results, it would be advisable to support the metacognitive skills of girls so as to heighten their awareness of circular patterns of thought and action that hinder their studies. Girls should also learn to seek concrete positive alternatives to negative interpretations of situations. Careers counselling might be able to help in this respect. More study evaluation sessions in small groups of students should be organised, as meta-cognition is developed better together with others than alone.

For more information:
Kukkonen, M. 2003. Tytöt kielteisten tulkintojen noidankehässä. Dimensio 67 (5), 14-18.
Kukkonen, M. 2005. "En ole yhtään matemaattinen ihminen" – tyttöjen minäkäsitys, asenteet ja itsearviointitaidot uravalintojen lähtökohtana. In Teräs, L. (ed.) 2005. Koulutus, sukupuolisosialisaatio ja teknologia -näkökulmia segregaatioon. Raahe: Rannikon Laatupaino Oy.
Kukkonen, M. 2003. Oppilaan minäkäsityksen tilannevaihtelu, oppiainesidonnaisuus ja jatkuvuus. Oulun yliopiston kasvatustieteiden tiedekunnan tutkimuksia 100. Oulu: Oulun yliopistopaino.

Observations made in the WomenIT project show girls' interest in natural science to flag as girls move up in school. An explanation may be found in the building and reinforcing of gender identity rising to the fore in puberty and girls perhaps finding it difficult to include in their lives a sector that is traditionally held to be in the male domain. On the other hand, evaluation of personal abilities and criticism increases in puberty, perhaps intensifying girls' feelings of inability in e.g. natural science and mathematics. Girls are often interested in getting good grades, but the goal is to have them take an interest in the contents of the subjects as well.

Good practices
Several courses focusing on natural science and geared to girls were implemented in the WomenIT projects. Experiences with these courses show that experimentality, learning through examination and in interaction with others inspires girls to study natural science. Content also plays an important role – topics need to be of interest to girls, e.g. the environment and other people.

One way of generating interest in natural science among girls was having older girls in upper secondary school teach primary school-aged children. The older girls reported gaining better insight into phenomena relating to natural science when explaining them to others. At the same time, they served as role models and an inspiration to younger learners.

The WomenIT project also included development of natural science subject teacher education and educational methods and contents in physics and chemistry instruction in vocational education. WomenIT projects are presented in part 2 of this guide.

Development of teaching methods

The following puts forward some ideas relating to the development of teaching methods that came up during the LUMA (natural science and mathematics) training organised by the WomenIT project. The training was led by assistant principal Riitta Soro, lecturer Vappu Sunnari and researcher Kalle Juuti. Training focused on the subjects of natural science and mathematics but the ideas can well be applied in other subjects as well.

- Pupils value joint planning so that their ideas are also taken into account when planning instruction. This would seem particularly important to girls.
- Subjects difficult to grasp such as mathematics should be discussed more in class instead of the teacher just writing formulas and the like on the blackboard.
- Pupils would prefer more discussion in small groups.
- Schools offer a fair amount of project and teamwork but an increase would further develop both schools and instruction.
- Study materials and information sources used in instruction should cover a wider range of topics.
- Pupils would like more visits to companies, industry, museums and exhibitions.
- More external experts should be used in schools.
- Pupils would like to see more use of the internet, email and chatrooms as well as simulations.
- Themed instruction seems to increase the interest of pupils in it; for example examining a given aspect of mathematics (architecture, technical equipment, etc.)

WomenIT recommends
WomenIT actors say schools do not engage in sufficient pedagogical discussion, which should be increased and further developed. The WomenIT activities sparked debate in many teachers' lounges on the different ways in which girls and boys learn. WomenIT actors recommend the pairs work they used as a

new way of working, and increased cooperation with other schools and levels of education.

Teaching and learning physics

WomenIT actors say the theoretical learning results of girls with regard to physics are at least on a par with those of boys, but girls lack interest. Experiences gained in the WomenIT development work indicate the following are key factors in inspiring girls to study physics:

- Physics education in comprehensive and secondary school could involve even more experimentality and learning by doing. Many students have noted that "you don't get to the fun stuff in physics and maths until university".
- Topics and approaches should be diverse and also elective at least to a degree and reflect the interests of girls without succumbing to stereotypical definitions of "girly stuff"; topics should involve things that truly interest girls and arise from their spheres of life, such as people, environmental protection and physics in everyday life.
- Content, visual aspects and the meaningfulness of assignments play an important role for girls in physics instruction, as they do in ICT and other subjects as well.
- Girls feel they learn more about physics and the other natural sciences when teaching them to others, for example younger pupils.

Researcher Kalle Juuti from the University of Helsinki was involved in the Mirror GISEL local project funded from the EQUAL initiative that examines and develops ways of teaching physics and chemistry that demonstrate how interesting the subjects are and reinforce the interest of young people and girls in particular in physics, thus motivating them to study the subject and choose specialization course in physics in upper secondary school. For more information on the GISEL project, please visit http://www.malux.edu.helsinki.fi/malu/tutkimus/gisel/index.en.htm.

In their study "Tytöt, pojat ja fysiikka. Lukiolaisten käsityksiä fysiikasta oppiaineena" (Girls, boys and physics: upper secondary school students' conceptions of physics) the research group comprising Häkkilä, J., Kärkäs, M., Aksela, H., Sunnari, V. and Kylli, T. has examined the ideas, attitudes and choices of upper secondary school students with regard to studying physics. The publication came out in the University of Oulu's Teaching development unit's publication series in 1998 and it has abstract in english.

Teaching and learning mathematics

Finnish statistics show that for example in 2000, 29% of girls and 55% of boys took advanced mathematics in upper secondary school. The PISA 2000 study showed there was virtually no difference between Finnish girls and boys in terms of their skills in mathematics. Nor could any significant difference be observed in matriculation examinations. Girls have accounted for 41–42% of those taking the advanced mathematics examination. Very few girls choose advanced mathematics as a compulsory subject but prefer to take it as an elective. Classes for mathematics and natural science often comprise only boys and advanced mathematics is mostly

taught by men. However, mathematics plays an important role not only as a basis for the development of technical skills and studies in technology but also in supporting the development of thinking in general – mathematical thinking develops logic.

Source of national statistical figures:
Kumpulainen, T. 2002. Koulutuksen määrälliset indikaattorit 2002. Opetushallitus. Jyväskylä: Gummerus.
Opetushallitus. 2003. Lumaprojekti tiedottaa 8. Indikaattorit 5. Moniste 3/2003. Helsinki: Opetushallitus.

Various kinds of competitions and punishments have for long been used in mathematics instruction. For example: the teacher posts on the wall a graph where multiplication tables appear on individual levels (the multiplication table of one on the lowest level and of ten on the highest), while pupils are depicted with symbols or facial images. As pupils learn their multiplication tables, their image is transferred to a higher level. The pupils showing less or slower progress are "left hanging down below" while those who learn quickly also move upward quickly. Teaching methods such as this pose a risk of creating negative tension in instruction (a fear of being shamed by staying stuck on the lowest level in front of the whole class) and lead to superficial learning instead of insight and applied learning. Many teachers today have learned mathematics by means of competition and punishment, and it may be asked to what extent these acquired habits continue to influence their work and ways of teaching.

Girls have learned that they should be industrious and diligent; they find it hard to try and fail. This leads to girls learning multiplication tables by heart so as not to appear lazy and bad in school. Some studies indicate girls are more afraid of failure than boys and in general do not enjoy competition or performance for its own sake. Girls wish learning situations to involve goals in terms of content as well as aspects of community and assistance to others (the teacher).

In his doctoral dissertation, researcher Markku Niemivirta from the University of Helsinki has studied the impact of personal factors, including the impact of gender, on the motivation and performance of students in assignments.

Attitudes also have an impact. An attitude along the lines of, "Why should women be taught mathematics when they just can't cut it" will surely have an effect on the students' attitudes as well. Or say a female class teacher has gained a negative attitude towards mathematics through personal experience; she might pass on that attitude to her students, and especially to girls. The following matters should be given thought:

- To what extent do the expectations of teachers differ with regard to girls and boys learning mathematics?
- Do teachers believe mathematics to be of equal importance in the future of girls and boys?

Ms Riitta Soro, PhD (Ed.) has studied the beliefs of teachers about girls, boys and equality in mathematics instruction.

The attitude of principals towards the various subjects is sometimes also obvious; teachers of natural science and mathematics may be respected more highly than teachers of other subjects and their opinions also on matters other than their subject are taken into consideration and valued.

Experiences gained in the WomenIT development efforts indicate the following are key factors in supporting and inspiring girls in mathematics and mathematical fields:

- Ideas about the usefulness of mathematics and technology must be made concrete, including e.g.
  - How can mathematics help people? Girls can inspired e.g. by studying biomathematics!
  - Mathematics helps develop logical thinking and problem-solving skills, i.e. insight!
  - Mathematics applies to many fields.
- Girls shouldn't be left alone with mathematical problems but ensured the necessary support and guidance so that they don't start thinking they don't understand and never will.
- Girls should be provided with role models and acquainted with study opportunities and potential careers in the field of natural science.
- Attitudes at home ("mum never needed maths") should be influenced e.g. by including informative content, brief lectures by experts, etc. in parent-teacher conferences. However, it is important that contacts are not only informative but also seek to make parents aware of the importance and usefulness of mathematics and natural science and their many applications in everyday life; these skills are needed in cooking, housework, servicing vehicles, managing personal finances, etc.
- Good results can be obtained with segregated groups and segregated instruction when properly planned and executed.

Good practices
One of the local projects in the WomenIT project involved the planning and execution of mathematics clubs led by university students studying to become subject teachers and attended by pupils in primary school. The activities helped enhance the expertise of both future teachers of mathematics and the pupils, and also provided the pupils with meaningful after-school activities.

Practical tip: various kinds of games, crafts and the like can be used to bring greater variety to mathematics instruction. For example treasure maps are a fun way to learn about coordinates and can be used as early as in first and second grade.

Girls, women and learning about technology

Women seem to achieve the best results in learning about technology when they can think about its uses (applying technology to everyday life). When using technology, women prefer a greater amount of guidance and manuals than men. It would also appear that many women wish to learn about technology in a "supported" manner, i.e. have someone by their side making sure they are doing the right things.

Women often tend to downplay themselves especially with regard to technical skills, while the opposite holds true for men. Men are also bolder to experiment even if their skills are lacking. On the other hand, men are often expected to be skilled in technical matters. Consulting the manual except as a last resort is considered unsuitable for them.

Women seem to learn about technology well in groups of women where they can practice their skills in the "strong suites of men". Technology is often perceived as a male domain, and if there is even one man in the group, he assumes the role of actor and renders passive the others, i.e. the women. It has been observed that in mixed groups, men take on the role of actor as is expected of them, while women adopt the role of passive bystander and watch the men work. In problem-solving situations involving technology, boys and men often also solve the problems and do the work for girls and women. On the other hand, women achieve good learning results in small groups where support is given by peers and matters can be discussed together, causes relating to phenomena can be considered and suitable solutions to problems can be sought and executed together.

Women learn about technology when they are given an opportunity to use it – or are forced to use it, as the case may be. Teachers must be persistent in dealing with resistance caused by erroneous preconceptions when it comes to personal technical skills. Once the initial resistance is overcome, enthusiasm will prevail. Women are also shy to demand better and more suitable tools even if such might exist, but make do with what is at hand.

The aforementioned phenomena may also be considered from the viewpoint of girls and women being raised to care for others and put aside their personal desires: girls are supposed to think of others. The phenomenon has been interpreted to mean that with socialisation, women and girls must justify their activities and use of time with rational reasons and benefits. They lack the right inherent in masculine identity of using limitless amounts of time on something simply because it interests them. There would still seem to be substantial differences in the cultures of girls and boys with regard to scope and quality of housework responsibilities: girls clean the house, cook and care for their siblings, while boys wash the car.

Good practices
In the development projects implemented within the framework of the WomenIT project, girls and women have learned through actions and experience to take up assignments calling for technological skills, have noticed they can manage as well as boys and men in technical matters, and have consequently taken an interest in technology.

Practical tip: give girls leeway in terms of topics; they can be truly creative and inventive!

Practical tip: pay attention to materials and tools when teaching girls technical skills; e.g. smaller-sized tools are also available.

EQUAL SCHOOLS

Legislative provisions and regulations

The educational institutions at the various levels of the Finnish school system are governed by separate legislation that also requires the equal treatment of pupils. The Finnish constitution prohibits anyone from being treated differently from other

persons, without an acceptable reason, on the ground of sex, and calls for children to be treated equally and as individuals. The Equality Act (Act on Equality between Men and Women) obligates the authorities and all parties providing training and education to ensure that women and men have equal opportunities for education and occupational advancement. Instruction, research and study materials shall also support equality, meaning that e.g. text, assignments or illustration in textbooks may not uphold prejudice or provide formulaic ideas about the division of labour in families and working life.

The Equality Act amended in 2005 contains two provisions concerning educational institutions that represent a marked change from the earlier Act dating back to 1986: the prohibition on discrimination based on gender and the obligation to prepare equality plans have both been extended to apply also to educational institutions, with the exception of comprehensive school. This puts educational institutions on a par with other work communities.

The new Act offers a more specific definition of gender-based discrimination than its predecessor. Under the Act, direct discrimination means treating a person less favourably than another in a comparable situation because of their gender, pregnancy or childbirth. Indirect discrimination means situations where an apparently neutral provision, criterion or practice may in fact put persons at a particular disadvantage on the basis of gender, parenthood or family responsibilities. Other forms of prohibited discrimination include sexual harassment, harassment on the basis of gender and orders or instructions to engage in discrimination based on gender.

The provision concerning educational institutions defines treating a person less favourably than another in student selection, provision of instruction, assessment of study performance or other actual activities of the educational institution as prohibited discrimination. Study opportunities may not be advertised as open to women or men only without acceptable reason justified under law. The obligation to report and compensate also applies to educational institutions, meaning that if a person feels they have been discriminated against or harassed, the educational institution is obliged to submit a report on its actions and, if it is found to have violated the prohibition against discrimination, to pay compensation to the injured party. The provision on prohibition of discrimination does not apply to comprehensive schools.

Under the new Equality Act, educational institutions shall prepare equality plans which shall be drafted together with staff and representatives of students and contain a study on status quo and problems as well as a plan on necessary action. The plan shall pay particular attention to the factors noted in the Equality Act to realise equality and prevent discrimination (student selection, teaching arrangements, assessment, prevention and abolishment of sexual harassment and harassment based on gender). The plan shall be reviewed at intervals of at least three years, and preferably annually. The reviewed plan shall contain an evaluation of action taken and results thereof. The equality plan may comprise part of the curriculum or other plan. Educational institutions providing basic education (comprehensive schools) are not required to prepare equality plans under the Equality Act.

Sources:
Laki naisten ja miesten välisestä tasa-arvosta (Equality Act) 8.8.1986/609. Finlex, Valtion säädöstietopankki. Oikeusministeriö, Edita Publishing Oy.
Laki naisten ja miesten välisestä tasa-arvosta annetun lain muuttamisesta (Equality Act) 1.6.2005/232. Finlex, Valtion säädöstietopankki. Oikeusministeriö, Edita Publishing Oy.
Suomen perustuslaki (Constitution) 11.6.1999/731, 6 § Yhdenvertaisuus. Suomalaisiin kotitalouksiin jaettu julkaisu ”Suomen perustuslaki”. 2000. Vammala: Vammalan kirjapaino Oy.

In the Finnish WomenIT -publication on equal practices in education and guidance, equality consultant Ms Sinikka Mustakallio of World of Management Ltd. proposes the following as equality plan content:

- shared vision and mission for equal education and an equal learning environment
- commitment to developing an equal learning environment on the part of all school employees (principals, teachers, careers counsellors, pupil/student welfare officers, school nurses, etc.)
- further training of teachers in gender-sensitive teaching that promotes equality
- development of student guidance and further training for careers counsellors
- development of study materials, teaching methods and working methods from the viewpoint of gender equality
- preparing a set of ground rules for equal behaviour and an atmosphere of equality in the school
- development of equality education on the mainstreaming principle in all subjects
- equality in the school's club activities

Source:
Leinonen, E. (ed.) Opetuksen ja ohjauksen tasa-arvoiset käytännöt – sukupuolen huomioiva opas kasvatuksen arkeen. 2005. Iisalmi: Painotalo Seiska.

In the same publication, Mustakallio underscores the importance of clubs and other unofficial activities from the viewpoint of equality. She mentions boys' clubs for do-it-yourself and floorball along with classes for girls in cooking and apparatus gymnastics as examples of unwanted yet common occurrences.

The requirement of equality in daycare centres, schools and educational institutions is contained not only in the aforementioned legislation but also in national curricula and the early childhood education plan.

WomenIT recommends

Attitudes play a major role in creating equal opportunities for both genders in choosing education and occupation. Efforts should be made at all levels of education to change the attitudes that guide towards choosing occupation along traditional gender lines. Instruction and careers guidance starting in comprehensive school can help impact on attitudes.

Attention should be paid in teacher training to the way the personal attitudes of teachers impact on the ideas of pupils as to occupations suitable for girls and for boys.

Schools and educational institutions should pay attention to sexual harassment and its various manifestations, address any occurrences immediately and draft measures for abolishing and preventing harassment e.g. through campaigns.

Development of schools and instruction from an equality perspective improves the environment of the entire school. It is therefore recommended that comprehensive schools also prepare equality plans. Students should also be involved in equality planning in schools and educational institutions.

In autumn 2004, the WomenIT project published an equality guide for enterprises and work communities. The guide, available in English in 2005 and entitled "Equality to Everyday Life", examines the opportunities afforded by

equality planning to work communities and representatives of employees and the benefits of equality to work communities. The guide also addresses in more detail equality planning in schools.

Project planner Ms Leena Teräs of WomenIT has outlined the three steps to equal activities in schools that may serve as the fundamental principles of classroom work:

Personal name
Everyone has a name that should be used when addressing them.

Not addressing children as "boys and girls" can help eliminate stereotypes, generalised images such as "girls are industrious, boys are boisterous".

Personal space
Everyone is surrounded by a personal space whose boundaries are not crossed without permission.

A concrete way of determining personal space is experimenting as to the distance from another person that feels natural. A peaceful classroom may also be considered a part of personal space. Others are not to be disturbed by touching, talking, moving around, etc.

Personal belongings
Everyone is entitled to personal belongings. No one takes or borrows another's personal belongings without permission. Everyone takes care of personal and shared belongings.

Respect for others' belongings and taking care of shared belongings contributes to a sense of community.

Source:
Leinonen, E. (ed.) Opetuksen ja ohjauksen tasa-arvoiset käytännöt – sukupuolen huomioiva opas kasvatuksen arkeen. 2005. Iisalmi: Painotalo Seiska.

The role of teachers in equal schools

Linda Levi has proposed three roles of teacher for equality in mathematics instruction. However, these roles can well be expanded to all instruction.

Role 1: Offer equal opportunities and respect difference.
Role 2: Ensure equal learning experiences.
Role 3: Compensate for inequality in society, i.e. guide girls and boys to making non-traditional choices in line with their personal abilities and interests.

Source:
Levi, L. 2000. Gender Equity in Mathematics Education. Teaching children mathematics 7 (2), 101-107.

According to Riitta Soro, an equal teacher can

- discuss matters relating to gender and learning
- identify the differences between the genders and the needs of girls and boys
- encourage both sexes and assure them that everyone is capable of the same things as the opposite sex if they only want to

Source:
Soro, R. 2002. Opettajien uskomukset tytöistä, pojista ja tasa-arvosta matematiikassa. Turku: Pallosalama Oy.

In promoting equality in your own school/educational environment, the following rules should be borne in mind:

1. Commit to long-term efforts (both teachers and school management as well as other employees and parents).
2. Seek training and information.
3. Talk with your colleagues and other stakeholders.
4. Openly discuss with others the work you have done and your values with regard to equality.
5. Make equality an official goal for the organisation and also pay attention to changes in attitude on the level of individuals.
6. Prepare for resistance to change.
7. Give change time to take effect.

Source: Adapted from the Internet-based training package of the Ministry for Foreign Affairs on promoting gender equality in development cooperation by NGOs, http://global.finland.fi/gender/ngo/. 5th November 2004.

Equality issues are highly complex and often involve resistance and intense claims fraught with emotion as well as stereotypical conceptions and unconscious ideas. Teamwork supported e.g. by colleagues helps advance the cause of equality. Actors in the WomenIT project have also felt that forging ahead all alone with a cause is difficult, especially if that cause involves equality.

HOMES

Girls and boys, women and men, and technology

Mothers are important female role models in ICT use, as in the home fathers are the ones using the computer instead of the mothers, even though computer use may be part of their daily work. In fact, various studies indicate women constitute the majority of computer end users, but they use computers in working life instead of in the home and are thus not seen by their daughters as role models. The expertise of women goes unseen or unacknowledged; whenever a technical device malfunctions, it is the father or son that tries to fix it. If the mother should in passing say to "press that" and thus solve the problem, her contribution is not acknowledged. Or, should the situation be reversed, any comment along the lines of "wow, mum, how did you do that?" shows the mother was not expected to succeed and her skills are considered barely short of supernatural.

In homes, the computer is more often placed in the boy's room, which clearly communicates the message that ICT belongs to boys and men. Boys are also often bought mopeds, cars and other technical devices. Boys are more likely to be allowed expensive hobbies and equipment for which the father pays, even if the mother is otherwise responsible for the children's expenses. Studies done in Finland show boys are also paid a larger allowance than girls: boys receive €17–€18 on average per month while girls are given €13–€14.

Researcher Ms Terhi-Anne Wilska from the Turku School of Economics and Business Administration has studied the consumption and livelihood of young people and families with children as well as consumption and information technology especially from the viewpoint of young people.

WomenIT recommends
Homes play a major role in initiating change in attitudes. Discriminatory structures and attitudes towards women's technological skills should be acknowledged in the home as well. Women, too, can use and learn to operate technical devices. On the other hand, it should also be realised that computers and related equipment are not the only items of technology in our environment; everyday technology abounds in the form of alarm clocks, coffee makers, washing machines, telephones, VCRs, baby carriages, etc. – all of which are used by women. In fact, a wider definition puts anything man-made as technological. Homes should pay more conscious attention to spending by the various family members. Daycare centres and schools in the form of parent-teacher conferences may help launch discussion into these matters.

Games and toys

Toys that encourage technologically oriented games (e.g. Lego and building sets) are one-sided in the extreme. The Lego bricks geared to girls consist of ready elements that leave little room for the challenges of building. They often also contain "care elements" communicating to girls that caring is one of their duties. Princess Legos are a prime example of Lego bricks geared to girls, while Lego bricks geared to boys may be highly complex with their demanding instructions and diverse devices, etc. The Legos often also depict items traditionally in the domain of boys, such as vehicles, car repair shops, construction tools, etc.

Boys are often bought different types of building sets and construction toys while girls are steered towards playing with dolls (baby dolls and girl dolls). This way, children are taught models of women's work and men's work from a very early age. However, it has been observed that if there are no adults present, boys may also often choose to play with traditional dolls geared to girls.

Computer programs for children are often very one-sided and focus only on a given aspect such as mathematics, linguistic development or drawing while games tend to be geared to boys' interests with adventures and battles.

WomenIT recommends
Children should be offered a wide range of toys and tools regardless of gender and steered toward choosing non-traditional toys, i.e. baby dolls for boys and construction sets for girls, however taking care to ensure variety. Likewise, adults should pay attention to their own choices and activities and thus serve as role models to children.

The toy and game industry should introduce more diversity to its selections and gear and market construction sets to girls, too, and develop the content of games for greater diversity. However, the industry cannot act alone but needs the support of (professional) educators and scientists. On the other hand, change cannot come about if consumers do not reflect upon and alter their own buying habits. A wider range of options nonetheless contributes to genuine choice; a one-sided selection results in one-sided choices.

Good practices
The daycare centres involved in the WomenIT project consciously steered girls towards games of construction by occasionally restricting access to building sets to girls only. Provided an opportunity and space, girls were clearly also interested in construction.

The entrepreneurship game "Beacon – my day as a managing director" produced within the framework of the WomenIT project combined instruction in technology and entrepreneurship. Designed for girls in comprehensive school and secondary education, it may equally be played by boys. The purpose of the game is to choose one of four female entrepreneurs and strike a balance between the demands of work, family and leisure. The game, available only in Finnish, can be played free of charge at www.womenit.info/johtotahti.

GENDER STEREOTYPES
What are girls and boys like -the impact of gender stereotypes on perception of self and on equality

Leena Teräs

Ms Leena Teräs was project planner in the WomenIT project. She has extensive experience with equality work in projects and grass-roots activism alike, as well as lengthy work experience outside academia in education and management in private and municipal organisations and business. Ms Teräs is a member of the ICT working group of the Athena II – Advanced Thematic Network in European Women's Studies ATHENA II 2003-2006 network and the working group on development of HILMA, a national university network for women's studies.

Stereotypes
The sex of a child is determined at birth or with modern technology even earlier. The child being either a girl or a boy is ensured through surgery, if necessary. Since birth, children are raised to become girls or boys.

Generally stereotypes are ideas and generalisations linked to various groups in our culture. Stereotypes form a basis for observation to such an extent that human interaction would seem to necessitate a clear image of at least the age and gender of interaction partner. The underlying need for such grouping comes from rapidly grasping the overall picture, which in turn is necessary e.g. to assigning and assuming hierarchical positions in interaction. Mode of speech and topics of discussion are largely determined by the age and gender of the other person. In other words, stereotypes are used as fundamental information moulded by culture that switches on whenever conscious and critical observations are not being made and the internal diversity of groups is ignored.

Impact of stereotypes on self-image
Although stereotypes represent gross generalisations and rough ideas of a certain group, they exert a huge guiding influence. As products of Western culture, we share a common set of cultural codes that also includes stereotypical generalisations of different groups of people. Due to the interactive nature of the growing process, we also adopt images and expectations concerning ourselves, which thus allows them to impact on our personality from a very early age.

Self-image lies at the core of personality. It can be construed as perceptions of self with regard to personality, identity, abilities, opportunities, beliefs, etc. It may be contradictory and flawed: internal self-image may not necessarily jibe with external observation. A person may, for example, have a fat body image although others consider that person thin. Nowadays the only biological and to a certain extent hereditary element of our personalities is considered to be temperament, which defines primary individual reactions. Everything else is determined through interaction. We strive to become what our environment expects of us.

The impact of stereotypes in learning gender
When a child is born, no one has any idea of the newcomer's character, abilities or characteristics. The child and the people around it launch a process of getting to know one another and formulate a common means of communication on the basis of biological sex. At first, interaction is characterised by touch, sound and facial expressions that are conveyed through the processes of caring. Gradually, the child begins to grasp its surroundings and mutual understanding develops. Interaction contributes to personality development, but the child's limited range of expression leaves much room for interpretation: whom does the child take after, what is gender-typical behaviour. The child is seen through a veil of images. The child responds to feedback: acceptance encourages and guides the child to repeat and reinforce certain types of behaviour and certain characteristics. While the child is clothed in sex-appropriate dress (pink for girls and blue for boys), the child is also the target of expectations as to the kind of girl or boy it will grow up to be. These expectations and interpretations are more or less based on the gender stereotypes prevailing in our culture and from the very outset steer the expectations of parents and friends and relatives as to how the child will be. Gender stereotypes have been found to be quite consistent in the West and accordingly, this environment raises children in a surprisingly consistent manner. Children as young as 2–4 years of age are already aware of what is suitable for girls and boys: which toys do girls play with and which are for boys, how do girls behave and how do boys, etc. The acquired gender role forms the framework for subjective gender identity and becomes a permanent foundation for the individual's self-image: how I represent myself as girl or boy.

Gender socialisation that takes place during childhood and youth directs the abilities and interests of a person and may even prevent these from coming out. Later life experiences may serve to tear down gender roles and gender stereotypes. As personal experience grows, individual characteristics may be examined and highlighted despite even traditional role expectations in the surrounding environment.

Link between gender socialisation and equality
Gender socialisation (i.e. raising children to become male and female) is used to uphold and renew the prevailing inequality between women and men. A gender system consisting of a split into two separate and disparate groups along gender lines and the hierarchical relationship of these groups can be determined in organised society. In the hierarchy, the male is made the norm, thus also making matters in the masculine sphere of life valued and worth pursuing in our society. The sectors of life and work of women, as well as characteristics associated with femininity, are valued less. It is considered only natural to seek to move away from these aspects towards a masculine sphere of life. Often, this is also perceived as the goal of equality efforts: women should act and behave like men. On the other hand, equality is thought to be achieved once women enter areas belonging to the male spheres of life. Once an individual has assimilated gender roles as part of its gender identity, any behaviour contrary to it may seem almost unnatural. The inequality of the genders results in girls acquiring characteristics and behavioural models considered male being more acceptable than vice versa. It is hardly unusual for a woman acting in a male-dominated group to be "promoted" beyond her gender and called "one of the guys". The same does not apply to a man in a female-dominated group; men would not consider being called "one of the girls" a compliment.

A gender contract that helps to structure the jobs, values, areas of responsibility and obligations of men and women either overtly or covertly is discernible in the gender system. This gender contract governs the relationship between the sexes and exerts a strong influence on gender roles and gender stereotypes. The gender system is intertwined into economic, social and political structures. Traditionally, these areas have been in the male domain and thus built on a foundation of cooperation between men. At the time these structures were born, the participation of women in any activities outside the home could not even be conceived. Even today, these structures must be assimilated in order to adapt into society. Since the gender system has been built into the modes of operation in various dimensions of society, it is difficult to identify and consequently to root out practices that foster inequality.

The role of school in upholding gender socialisation
Alongside homes, schools have been found to be among the institutions most strongly renewing gender stereotypes. The apparent gender neutrality of schools "gender does not matter, everyone is treated the same" in practice contains traditional attitudes towards girls and boys, which appear as gender-stereotyped educational goals. Since the early years of comprehensive school, the physical strength of boys is highlighted e.g. by boys being asked to set up the chairs in the auditorium even if girls of the same age are much bigger and by all outward appearances, more suited to the job. Girls are responsible for cleaning up and for responsible behaviour in general, such as keeping the peace in the classroom. Disruptive boys are still seated next to well-behaved girls without a thought to the girls' loss of a tranquil study environment. Gender hierarchies also manifest in the way success at school is explained: the good performance of girls is downplayed as diligence or buttering up the teacher while successful boys are intelligent and obvious scientist material. When boys fail to succeed, the fault lies with the school, and usually its excessively female staff of teachers; in fact, failure by boys is actually a healthy and laudable (masculine?) reaction by the boys to a school system considered girlish.

The hierarchical relationship between the sexes in the school world most clearly manifests as sexual harassment of girls/women. Intensified sexual control thus puts the girls in a lower position in the hierarchy. By puberty, girls can expect comments on their appearance, groping, name-calling, etc. Internalised sexual control manifests in the body as a sense of shame and lies at the core of socialisation into girlhood. Internalised shame acts as the triggering mechanism for hierarchical positioning throughout life. Sexual harassment is used to "put girls in their place": girls must stand aside and give the boys the space they want. Girls must learn that they are inferior to boys and men. Occasionally, the same practice is targeted at female teachers, even to the extent that male pupils seek to prove their power over the female teacher through harassment. In these cases, teachers can fall back on their dominant status in the structural hierarchy as adults and teachers and thus repel the attempted wielding of power. With girls, the situation is more problematic and a boy may even harass a girl to show her he likes her. In order to survive, the harassed girl may adopt a strategy of playing along with the harassers, which will manifest as heightened repetition of feminine stereotypes. In other words, the girl acts as seems to be expected of her.

In puberty, subjective gender identity enters a stage of re-definition. Because of heteronormativity, relationships with the opposite sex must be defined despite personal sexual orientation. Stereotypical behaviour tends to become heightened in a state of re-definition, and the entertainment industry with its excessive emphasis on sexuality also steers in this direction. In the school system, choice of career falls at this highly problematic developmental stage. Traditional orientation in career choice is boosted by traditional gender roles, sexual harassment, heteronormativity and the media.

What we can do in our everyday life to prevent gender stereotypes from riding roughshod over personal preference and to prevent inequality from being renewed is to critically examine our thoughts, assumptions and operational models. We have all assimilated these stereotypes, and the only way to identify them is to bring them to the fore and assess their validity. Change in practices towards greater equality requires all actors to adopt gender sensitivity, i.e. become aware of the different treatment and valuation of the genders. Examination of prevailing practices is often a good way to introduce into discussion several areas of activities that may never before have been addressed collectively. Discussions often help gain a more diverse perspective, allowing practices to be altered in ways that better serve the members of the community. Equality and inequality alike arise from deeds. Neither state is a permanent one, affording an opportunity for change. Increases in equality can be brought about by changing ways of thinking and acting in a direction of greater equality.

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MEN AS CONTRIBUTORS OF EQUALITY IN THE WOMENIT PROJECT

A large number of men, primarily teachers, were involved in activities in the various WomenIT local projects. The WomenIT project largely involved questions relating to education and the dismantling of structures that contribute to inequality, matters relating to the assimilation and teaching of gender roles, etc. Natural science and technology were emphasised in terms of contents. The project included a questionnaire to the men involved; this chapter has been compiled from the responses received. All respondents were teachers. The article also makes use of experiences brought up by the actors in their reports.

Both veterans and novices in the area of equality were involved in WomenIT activities. Although the majority of actors were new to the subject, they had prior interest in and some familiarity with equality issues. Those men who had earlier experience with concrete work to promote equality had gained that experience primarily in a school setting. In addition to project activities, the men carried out work on behalf of equality in the form of discussions, bringing the matter to the attention of parents, and some also through political action. One of the men noted that awareness of the issues had helped him question certain ingrained ideas relating to gender semantics and become aware of covert actions to belittle and ignore women.

Factors providing motivation for work on behalf of equality and participation in the WomenIT project seemed to involve matters relating to both content (technology and natural science) and development of education and equality. The underlying reasons for many to participate came from first-hand observations regarding the differences in the motivations and behaviour of girls and boys and their different school performance. However, observations as to the different valuation of women and men more generally in society as well as a desire to make a difference also came into play. It may be said that on a project-wide level, the men were primarily motivated by matters relating to content and developing their own work. Equality was also seen as a wider social issue than gender equality alone. The innovative nature of the activities (for example, a dedicated technology course for girls) was an inspiration. The financial and educational resources made available through the WomenIT project seemed to be a significant factor in attracting men to the activities and holding their interest. Study trips and international cooperation were considered important.

In addition to excellent resources, factors impacting on continued activities (not dropping out of the programmes) seemed to be the rewarding nature of the work, positive feedback obtained, opportunities to learn new things and a sense of accomplishment and contribution to change for the better. On the other hand, heavy investment in terms of commitment and work contributed to a desire to see things through. The men (and women) involved in WomenIT activities reported having received mostly positive feedback on their activities. There had been some initial scepticism but as the work progressed, feedback from colleagues and e.g. parents of pupils became mostly positive. One of the teachers did observe that it could well be questioned whether the positive feedback focused more on promoting equality or on enhancing the skills of girls.

According to the questionnaire, men considered equality to be a central vision in human interaction and wellbeing in society, a fundamental human right and the provision of equal opportunities yet keeping in mind the dissimilarity of girls and boys, which at least one teacher did not find to be entirely due to upbringing. When asked about their own contribution to equality, the men felt that

- their personal contributions start in their own families and households and are hopefully reflected in thoughts and deeds in teaching and other duties
- their contributions remained modest and insufficient but they sought to do better
- school provided too little space and opportunities to reflect on observations relating to equality and personal efforts on behalf of equality, or to examine structures and practices
- their personal contribution as men seemed somewhat controversial.

The men's experiences of changes in their attitudes towards equality varied. Some felt their attitudes had changed quite much. Examination of equality-related

problems at various levels, learning about new possibilities in instruction and experimentation served to deepen personal awareness and visions of activities, and also to provide new insight. Others felt there had been little change; some recounted having heard along the way viewpoints and opinions with which they did not concur.

The men also considered the equality situation in general to be varying. In some aspects, clear progress has been made quickly while in others, the situation may even have deteriorated. There remains much room for improvement e.g. in equality matters in working life, although workplaces may differ in this regard. Much also remains to be done in schools in terms of attitudes and practices. Indeed, men considered heightened awareness of structures and practices a key element in favourable development.

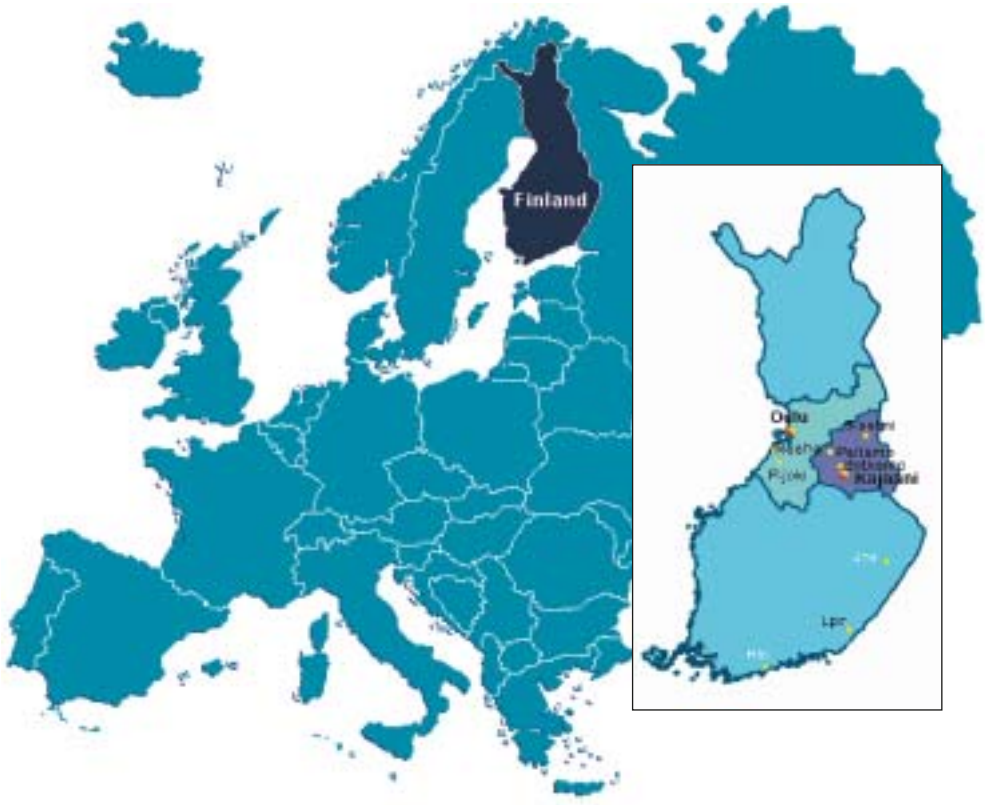
Men have for long been urged to take part in work on behalf of equality but their involvement has not grown significantly more active. Some of the reasons put forward by men responding to the survey were:

- many unfortunate and erroneous assumptions and threats associated with work on behalf of equality
- lack of courage and energy
- unclear goals
- men's fear of losing something
- hard-line feminism and various "movements" going overboard, occasionally acting illogically and contrary to their goals, which alienates men from work on behalf of equality

And in the words of one male teacher, "I try to keep work on behalf of equality and the different movements separate, thus making my snickering benign." In other words, involvement in work on behalf of equality is not a cut and dried issue for men.

PART 2

WomenIT development work and good practices in education, guidance and working life



This part presents in greater detail some of the local projects in the WomenIT project as well as gives an overview of all WomenIT projects. It is based on the Finnish publications "Opetuksen ja ohjauksen tasa-arvoiset käytännöt" (Equal practices in education and guidance) and "WomenIT-projektit ja Hyvät käytännöt" (WomenIT projects and good practices), to which the actors' reports and accounts have supplied the material.

WomenIT project at Nakertaja Daycare Centre

Daycare centre teachers Ms Eeva Moilanen and Ms Pirjo Similä,
Nakertaja Daycare Centre, Kajaani
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

The goal of the WomenIT project at the Nakertaja Daycare Centre in Kajaani was to develop modes of operation to encourage and inspire girls to try working with technology. Earlier on, the children had mostly used the computer for playing various kinds of educational games. Boys were clearly more interested in using the computer than girls. Another goal was to change for the positive the attitudes and preconceptions of early childhood educators towards technology and technology education. The activities brought together the contents of early childhood education, ICT, photography and videotaping, building things, dance, drama and games.

The project involved one group of children at the Nakertaja Daycare Centre, their parents, group workers and indirectly all daycare centre employees. The project was integrated into other daycare centre activities and taken into account in the group's plan of action.

Execution
The first autumn saw the beginning of building games with existing tools as well as practice in drama and expression. Storytelling was practiced both individually and in the group. The children started to learn computer skills with a drawing program. In the spring, more building materials were acquired along with technical equipment: a computer and peripherals, video camera and tripod, digital still camera, and minidisc player and microphone to bring greater variety to the activities. Girls especially enjoyed building with big Lego soft bricks, constructing ball races, playing house and building creatures with Duplo bricks, which combined craft and building.

Two story projects were also implemented in the group that spring. No technical aids were used at that stage. The projects were a combination of art, building and shadow theatre. One of the stories was further worked into a spring pageant for which the children made the sets. As the story project progressed, the children were acclimatised to appearing on video; the show was filmed, watched and reviewed together. A project of interviewing children in the group was executed in spring; a child was chosen as topic of the week and interviewed first with a toy microphone and then with a real one. During the final year of WomenIT activities, all "children of the week" were interviewed on tape.

The second autumn brought some new children to the group, which came to consist of fifteen girls and six boys. More building supplies were acquired, which inspired the girls to more versatile games. The children's stories about their families were taped on the minidisc player and the children continued to learn to

use the computer and digital camera. A poetry project had the children working on poems in a variety of ways: as plays, a stick puppet show and tabletop theatre. Some of the shows were taped on video or photographed with the digital camera, some made into PowerPoint presentations. The children also made animations and worked three songs into video performances.

Some of the daycare centre's staff took part in several ICT training courses and contributed to the WomenIT working groups.

Experiences
The staff was very prejudiced against technology at first but the enthusiasm of a few employees quickly caught on among adults and children alike. ICT became a natural element in everyday activities at the daycare centre and employees have independently sought out further ICT training. Administrative tasks, such as preparing work rotas and study materials, image processing, PowerPoint presentations and video editing are done where the children can see it, on the same premises and with the same computers that the children use. The children have embraced technology as a natural tool that is part of everyday activities, as was the original goal. The girls have had many ideas about using the equipment. They have taken pictures with the digital camera on their own initiative and taped each others' ex tempore performances, joke-telling, stories, dances and song recitals. An essential element in the WomenIT project was indeed giving the girls a chance to use technical equipment. It should also be noted that employees at the daycare centre are women and their using technical equipment serves as an example for the children. The women also felt they had become more emboldened in using the equipment.

Huuhkajavaara Primary School and Daycare Centre – HuWit

Director Ms Erja Kyllönen and class teacher Mr Olli Heikkinen,
Huuhkajavaara Primary School and Daycare Centre, Kajaani
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

The starting point of the WomenIT project at Huuhkajavaara Primary School and Daycare Centre in Kajaani was to study the differences in choice of career between men and women, to alleviate girls' preconceptions about technology and technical fields, to promote the equal use of ICT by girls and boys and to train staff in using technological equipment. The Huuhkajavaara Primary School and Daycare Centre had earlier taken part in the Nord-Lilia project funded by the Nordic Council of Ministers, in which themes of equality and gender were also present.

Execution
WomenIT activities lasted for two years and involved all daycare centre and school employees and children. At the beginning of the project, the parents of pupils responded to a questionnaire on their choice of career and the sharing of housework to determine e.g. the grounds on which they had chosen their career and whether their choices were in line with gender-related expectations. The questionnaire also sought to locate parents who had made non-traditional choices; however, none of the respondents were engaged in a non-traditional occupation.

The second part of the activities geared to pupils at Huuhkajavaara primary school and daycare centre was ICT instruction initially for girls in the form of a club, which later was expanded into classroom instruction. The premise was to make the computer more of a tool and change the prevailing practice of boys using the computer more often than girls, and mostly to play games.

All pupils in second grade learned to use word processing software and drawing programs, to combine their work on both and to scan pictures and documents into the computer. The drama training that was part of the WomenIT project gave ideas for a joint spring pageant. During the winter, the second-graders had used the story crafting method to create fairytale characters. The children created the characters in groups and the characters were then painted and made into puppets. The gender of the creatures was discussed in drama practice and they were imagined as male and female. These characters served as the basis for a show in spring that was videotaped and made into a film in editing instruction.

In the run-up to Christmas, a CD on Christmas stories was made with the 4-to-6-year-olds. At first, the children were taken through story crafting exercises. The story was then recorded on computer and finally the children used the Paint program to illustrate it. The children at the daycare centre also experimented with and studied an ordinary and digital camera. They took pictures of each other in the costumes and of the various structures they had built indoors and out. They also built a set and used story crafting to write a story that was then filmed. The girls worked together to make the props and build the sets and created a title sequence on the computer.

All employees, most of whom are women, were trained to use the new equipment acquired, such as the data projector and digital video camera. Digital camera and digital video camera use was also practiced on excursions.

Experiences
The project was well received in the work community although questions of "Why?" and "What?" came up at first. The parents of the pupils were also of a positive mind, especially once the film had been made.

Staff training was successful and is ongoing. The children grew used to using the computer as a tool and it has become a natural part of everyday activities at the daycare centre and school alike. Both girls and boys adopted a positive attitude towards computer use; the girls active in the club are especially natural in using the computer. All children in the building came to address the topics of equality and girls and technology. The adults became aware of the different ways of girls and boys of doing things, and came to understand that the girls' way was just as acceptable.

Teppana Primary School – TeppisIT club

Class teachers Ms Raili Tupiini and Mr Aaro Heikkinen,
Teppana Primary School, Kajaani
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

The WomenIT project carried out at the Teppana Primary School in Kajaani sought to proactively influence school-aged girls so that girls and boys would have equal opportunities to function in the information society. Teachers had noticed that girls did not have chances and opportunities to practice technical matters and that "boys walked all over the girls" whenever technical matters were studied. The school organised a TeppisIT club for girls in the 3rd and 4th grades. The club sought to encourage girls in acquiring skills and knowledge in technology-oriented crafts and media education, to create a basis for future studies (keep up learning motivation and guide towards a greater range of alternatives) and to make technology part of everyday activities at the school.

Execution
The club met for two hours a week during three semesters and for three hours a week in the final spring semester. Girls learned technology from a wide perspective. Basic computer use comprised e.g. operating systems, text and image processing and digital photography and the safe use of the internet; woodwork included e.g. making a toolbox for tools, while in electrical work the pupils studied the operating principles of radios and electric circuits and made their own radio (soldering, checking solders under a microscope and with a multimeter). Other devices and their operation were also examined. An exercise in problem-solving was building a device to change a rotating motion into back and forth motion. Additionally, the girls learned how watches function and used an assembly kit to make a pendulum clock. They also learned how to change car tyres and how to service their bicycles (cleaning tyres, oiling parts, fixing observed malfunctions in safety equipment and patching broken bicycle tyres). Computers were used to prepare the instructions in woodwork and other activities. The teachers' educational video on the computer also served as instruction in some tasks. The focus was on device design, tool use and learning a wide range of skills.

In addition to club activities, the WomenIT project at Teppana school involved company visits, where club members not only learned about the company's business, but also about the tasks of women at the company. Club leaders also took part in ICT training and in several other training courses organised by WomenIT.

Experiences
Among other things, the girls servicing their own bicycles and making a toolbox for their own tools awakened homes to realise their opportunity to engage in technological hobbies. Feedback was highly positive. Many girls reported receiving real tools for their own toolbox as Christmas gifts. The pupils were enthusiastic. Occasionally the boys were annoyed that there was no similar club for them.

The course gave girls positive experiences and new learning experiences in e.g. manual skills, computers, the internet and digital cameras. They are now accomplished tool users. The club helped some girls discover their strengths and it will thus impact on many choices later in life.

More attention is being paid to the elective courses in technical and textile craft at schools so that choices would not be made solely along traditional lines. Boys who observed the club asked the teacher leading it to teach them knitting.

The club members' skills and the experiences gained from the club will in future be utilised in accordance with the curriculum. The girls' computer skills will be used in implementing the school's ICT strategy e.g. in connection with twinned class activities. Every effort will be made to transfer the established good practices into the school curriculum e.g. in the form of various experimental groups of girls/boys.

The club was led by one male and one female teacher acting as equal partners in the club. This showed the club members that anyone could take part in technical craft and that it was natural for women also to become involved in all aspects of technological undertakings. The female teacher noticed she had formerly asked men to help with tasks that she could have performed herself, and has since changed her ways. The club also received positive feedback in the work community. Other teachers were interested in the club's activities and discussed ways of utilising club experiences in other school activities. Cooperation and teamwork allowed support to be given to pupils who found technical skills difficult.

Girls were instructed to boldly take up new tasks and tools that may have seemed somewhat daunting. Some girls experienced a wave of helplessness in mid-task, which manifested as unnecessary and continuous questions about matters they had already learned. In these situations, they were encouraged to independent problem-solving. The instructors helped the girls in jobs requiring physical strength.

The project's educational activities supported the instructors' views as to the ability of pupils to choose between technical and textile craft according to their own interests. The teachers considered the upbringing of girls to be one reason why girls have scant opportunities to participate in technical studies. Girls seldom have a moped of their own to work on.

Kajaanin Keskuskoulu Comprehensive School – communications course for girls

Class teacher Mr Esko Piippo and special education teacher Mr Vesa Valtanen, Kajaanin Keskuskoulu, Kajaani
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

The girls' communications course organised at Kajaanin Keskuskoulu Comprehensive School started out from the observation that girls and boys are roughly equally interested in communications technology in comprehensive school. The pupils use communications technology occasionally in the context of other subjects, largely depending on the teacher's orientation. In the upper grades of comprehensive school, computer studies and communications education are elective subjects. In elective subjects, girls tended to choose "non-technological" subjects, while boys chose more subjects that involved the use of computers or other communications technology as part of the studies.

The club sought to encourage girls to study the use and utilisation of ICT from the 5th grade onward and to make girls interested in ICT. In the club, the girls developed their expertise so that in later educational choices they would be able to choose subjects involving the use of communications technology.

Execution
The communications club for girls met once a week for two hours at a time for a period

of two years. Club activities involved full-semester project work to which the various sectors of activities were linked. The club members made Web pages containing e.g. images, text, animation and video clips. The starting point was to present the pupils themselves on the web pages from various perspectives. During the course, the girls also prepared a video documentary about woman leadership on which local female leaders were interviewed. The video will also be shown to various decision-making bodies. Woman leadership is one of the central themes of the WomenIT project.

The project started out from creating basic skills (use of still and video camera, image transmission to computer, etc.), progressed to more demanding tasks (image processing on computer, script writing and video shooting, etc.) and sought tangible results (making Web pages on an electronic platform or CD, and the documentary on female leaders in Kajaani).

The club activities were long-ranging concepts that remained in the possession of the pupils in the form of documents. Almost all club members completed their own CD-ROM on which they presented their family, friends, hobbies, favourite music or other matters of their choice on edited Web pages. Some pupils also made a miniature film linked to these pages. The major output of the project was the video documentary on female leaders. The development of the pupils' ICT skills and the manifestations of their artistic creativity as well as developments in the pupils' visual skills by using ICT were other noteworthy aspects in terms of the project's results.

Experiences

Project activities were based on the pupils' personal interests. Working in an all-girl group gave an opportunity to bring out personality and did away with the tensions arising from the presence of boys of the same age. Help could be asked for more openly and describing oneself in the projects came more naturally. Additionally, the girls felt they could openly ask for guidance in using the fairly difficult software. The active interaction of the group was one of the remarkable aspects of the club's activities; this was particularly manifest in video work, in which the group's creative views were implemented from the script stage onwards. For example, video themes were brainstormed in the group and the usable ones picked out from the results. In general, working in an all-girl group gives girls greater mutual equality in working with technology, which may be significant when social interaction in the group contributes to learning. At least the girls seemed to interact well with each other. The skills of the girls in the club varied greatly.

The project leaders were men. No particular significance was attributed to gender in the work or in guidance although the girls may have been somewhat shy in showing their video work to teachers. However, this might also have been due to a more general fear of appearing on video.

During the course of the project, the participants learned to pay more attention to the operational models of the genders and the different group cultures of girls and boys. The subject of equality as such is not addressed in the work community. Teachers seem to adopt the common view stating that "as a teacher, I treat both genders equally".

The pupils were enthusiastic about the club and a great many signed up for it after the first year of activities. New pupils also showed an obvious interest, and the attitude of the work community was positive.

During the project, it became obvious that schools need to utilise ICT to a greater degree in instruction so that children of different genders and from different social backgrounds could equally acquire the skills and knowledge necessary in mastering

an increasingly technological environment. The project has shown that girls can well master ICT if only they are given an opportunity.

In the club, some thirty girls gained ICT skills that will serve them well in future school years and which they can build on and perhaps even turn into a career. The incentive to all these dimensions originated in the project. Much depends on whether they have a chance to further develop their skills in coming years. It should be noted that many families of club participants acquired cameras and new computer software.

The project also showed that pupils are able even at a fairly early age to exploit their learners' curiosity to gain at least partial mastery of fairly complex computer programs. This should be taken into account when determining the suitable age for pupils to start using computer software.

Furthermore, the club reinforced the view that a progressive curriculum of communications studies that could consistently be implemented in connection with various subjects should be prepared alongside the comprehensive school curriculum. The project provided some of the elements for this work. It also gave rise to a description of how to advance instruction from individual assignments to the creation of an entire multimedia product. The material produced in the project can also be used e.g. in courses on electronic image creation in art subjects. The club continued as a school activity in the following autumn.

Human identity is built from a wide range of materials over the course of life. Today, central building blocks for identity come from the skills that give expression to a person's expertise. Instruction, learning, schooling oneself and practicing skills at school are important parts of identity growth that guides the choices a child makes in different situations.

Another element of identity is sex of birth that is the foundation of growing into girlhood and womanhood. The dimensions of gender roles are learned culturally through imitation, observation and adjustment of personal behaviour. At some stage of growth, girls and boys behave quite differently in school groups. These are groups where the essence of being boys and girls is learnt. Being part of a gender group imposes invisible boundaries on the skills that are valued. Even if schools are equal, they nonetheless inadvertently replicate gender identity stereotypes that guide pupils to seek traditional education and careers. The schools are not at fault; it is a question of wider cultural consequences.

If schools can impact on gender role stereotypes, the way to accomplish this is by growing skills that reinforce for their pupils a wider gender identity in terms of skills than is traditionally customary.

Hauhola Secondary School – Girls and technology

Teachers Ms Lea Nieminen and Ms Maija Nuortimo,
Hauhola Secondary School, Kajaani
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

The goal of WomenIT project activities at the Hauhola school in Kajaani was to use an elective course to introduce various occupations and training in technology

and the possibilities open to women in technology to 8th-grade girls. The project also sought to prevent the exclusion of girls from technological professions. The premise was that as long as girls are not taught technical craft as a compulsory subject, they fall behind boys in technical skills and knowledge and thus fail to choose technological fields. The course also sought to strengthen the girls' self-esteem in technology-related matters. This was achieved through executing the course for girls only and by planning activities so that no advance knowledge of technology was necessary. The female teachers provided particular support in the course. The teacher being a woman is important to girls in a field that is foreign to them. Girls find it easier to ask questions from a woman than from a man since a woman can probably better understand the kinds of problems they might have.

Execution
The course comprised assignments in physics and chemistry as well as some electronics assembly. The course was implemented in spring 2003, in addition to which study trips were made and the pupils took part in a science camp in Stockholm.

Course contents:

- Learning about electronics through building (key chain lamp and mobile phone charger or vibration tester for a bicycle)
- building a VHF receiver
- water studies
- visit to the University of Oulu and one of its technological research units (hosted by a female engineer), to Helsinki University of Technology and two science centres and several companies

The teachers took part in the electronics instruction and study trips.

Experiences
A survey showed the self-confidence of girls in technical work clearly increased. Girls realised they were just as capable of sawing, drilling, soldering and screwing screws as the boys. The technical craft instructor noticed the girls managed the assembly of a radio better than the boys since they were capable of long-term efforts that required patience.

The ideas of most of the girls about technology and studying technology changed and many thought it possible they would pursue studies in technology. The matter was discussed on visits to educational institutions and the change evolved only gradually. All girls reported they had learned new things and would choose a similar course again. The atmosphere and approach to work was different in an all-girl group than in a mixed group; particularly noticeable were the support and encouragement given to others, and the freedom to ask questions. For example, when one girl couldn't get her radio to work, the others took turns in trying to determine what was wrong. There were no instances of jealousy or bringing others down. The work progressed peacefully and at a leisurely pace. A new way of working involved the presence of two instructors, i.e. partners, which was found to be highly beneficial by all parties.

The actions of the instructors changed in that they were more fearless in doing what they had formerly asked men to do for them. On the other hand, it was observed that women lack so many skills relating to technical work – creative solutions and problem-solving were required on many occasions. Seminars, training and participation in the working group moulded thinking and encouraged considerations of how girls and boys are treated in class. In physics classes, for example, in electrical

engineering, girls need separate encouragement before they take up the work. Girls often turn out to be very skilful once they receive adequate encouragement.

A survey of parents indicated the pupils were highly motivated in the project. Encouraging feedback was also received from close colleagues, teachers in mathematics, physics and chemistry and feedback from the principal was high praise. The general consensus seemed to be that girl groups and equality were now accepted at the school.

The project helped realise that girls and boys are not treated equally in Finnish schools. Inequality arises e.g. from the division of craft into technical and textile craft. Although in lower secondary school girls and boys can in principle choose both, in practice this becomes difficult because by that stage, the boys have such a lead over girls in terms of technical skill that the girls don't have the courage to join the boys.

Technical craft supports studies in physics and its lack among girls contributes to girls falling behind in that subject. Similar arrangements as with home economics should be made also for technical craft, making it available for girls and boys alike. It would be desirable for the new national curriculum to bring about the much-hoped for change. It is also hoped that the opportunity under the new curriculum to choose emphasis after 5th grade will not make the situation revert to the former traditional line of most all girls taking textile craft and boys taking technical craft.

The course on girls and technology is an elective at our school and the course will continue to be implemented as a school activity. All in all, new electives introduced in the curriculum were the girls and technology course, a science course with a technology section and textile craft for boys.

Oulunsuu Primary School, Kastelli Secondary School and Upper Secondary School – development and pilot project on technology education

Technical craft teacher Ms Merja Anundi, Kastelli Secondary and Upper Secondary School, Oulu
Project managers Ms Eija Leinonen ja Ms Johanna Matinmikko, WomenIT

One of the premises of the development and pilot project on technology education implemented at the Oulunsuu Primary School and the Kastelli Secondary School and Upper Secondary School in Oulu was the need to reform and develop technology curricula in schools towards greater emphasis on promoting equality. In schools, e.g. practical teaching arrangements may sometimes even prevent the realisation of equality. Pupils having to choose between technical and textile craft in comprehensive school is one of the drawbacks. In practice, this choice and the ensuing orientation towards textile or technical craft is taken as early as in third grade (the old national curriculum). The new national core curricula will bring some relief, but unequal practices may remain if instruction and education in technology is offered only as an elective. Equality aspects are mentioned in the new core curriculum and it is stated that pupils choosing textile craft should also be provided an opportunity to take technical craft; conversely, pupils taking technical craft (mostly boys) should be afforded an opportunity to take textile craft as well.

Groups of pupils had already swapped places at Kastelli Secondary school; for one study unit period, girls had taken technical craft and boys, textile craft. The WomenIT project sought to increase the interest and motivation of girls to learn technology and take technology-related classes by developing the school's curriculum and system of elective subjects so as to give girls a chance to take part in the instruction of technology and technical craft. Motivation among girls is expected to increase e.g. by enhancing the technological competence and technological literacy of girls. These goals were pursued by making changes to the curriculum and developing gender-sensitive pedagogy. In the context of the Kastelli project, gender-sensitivity translated into seeking to accommodate the needs and wishes of girls in instruction with regard to e.g. tools, materials, working methods and topics. For example in electronics building, the girls' favourite was a nightlight equipped with a red heart. The miniature drills that had been lacking in the school's range of equipment were procured immediately at the beginning of the courses. An upright drill seemed "too heavy" a tool for making a 1-mm hole. The mixed groups of boys and girls allowed the pupils to develop their teamwork skills and also to impact on their attitudes e.g. by undoing stereotypical conceptions of technology being the domain of boys and men only.

Execution
During the project, a compulsory course on technology and industrial life was organised for all pupils in the 7th grade. The scope of the course was one hour a week for one semester. The technology course was provided to upper secondary school students in the spring semester 2003. Both boys and girls took part in these courses, which consisted of e.g. electronics assembly, computer-assisted design (CAD), history of technology, introduction into business and industrial life, technical design, drawing and measuring. Girls who had chosen to take textile craft as an elective were thus given an opportunity to learn about technology and be instructed in technical craft. As a female engineer, the instructor on the course could serve as a role model for the girls and encourage them to evaluate their potential in technology-related professions in the future. Impacting on the entire school's environment of attitudes to embrace equality was a challenge all of its own.

The teachers' attitudes reflected their interest in the project, the encouraging atmosphere and, for example on the part of teachers of mathematical subjects, a genuine desire to work together.

The 7th-graders taking the course were given an opportunity to choose an 8th-grade elective on general technology studies, which was implemented in the 2002–2003 school year. Plans were also made to continue the activities with an eye to including technology topics in other courses as well and organising technology-related electives both in lower secondary and upper secondary school.

Feedback on experiences
The experiences of participants were compiled during the courses and self-evaluation and feedback surveys were conducted. The surveys measured e.g. the pupils' own estimates of their technological proficiency, stereotypical attitudes and future plans including favourite occupation.

The profiles built for girls on the basis of the survey indicated that no two girls were quite alike. There was great dissimilarity in the attitudes and behaviour of boys as well. Some of the boys represented very traditional male role models and ways of thinking, and they were usually also very interested in technology. However, many of the boys who valued technology also considered it important that girls are taught as much technology as boys and felt that women could well be engineers

or mechanics. With regard to the girls, there were two distinct groups depending on level of interest in technology. The interest in technology or lack thereof was in turn reflected in attitudes, estimates of personal technological prowess, choices and feedback on the course. On the other hand, the survey responses map out an image of those girls to whom technology was of no interest at present and whose experiences with technology seemed quite negative. When asked, "Could you choose a technology-related occupation at some point later on in life?" a girl answered, "I could, but being an engineer is just too boring."

The attitudes of course participants were also gauged. Half of the girls thought technological fields were better suited to men. However, girls thought women could be competent engineers – only 16% disagreed. Some 16% of the girls thought girls and women in general were uninterested in technology. All girls thought both women and men will need to understand technology in the future. Most also agreed that girls and women studying technology will boost equality between women and men but thirty per cent of the girls nonetheless stated they had no interest in technology, while another thirty per cent said they might choose a technological occupation if they had a better understanding of technology, thus revealing their insecurity as to their technological skills. The pupils preferred to study technology in mixed groups of girls and boys. The contradictions appearing in the responses reflect the pupils' own insecurity and inconsistencies: instruction in technology is considered important both for the future (success in working life) and from a viewpoint of equality, etc. but at the same time, technology is considered too manly a pursuit (and therefore dull) while personal abilities and competence in technology are underestimated. It seems apparent girls feel they "lack something", perhaps knowledge or experience to serve as a basis for making choices e.g. to take technologically oriented courses or make career plans in technology.

Course feedback also gave information about the technology education topics girls would like to study. The absolute favourite was housing, construction and interior design; in more general terms, topics having to do with home and family. The second most popular topic among girls was photography. More than 80% of the girls preferred these topics. Design, musical instruments, sports equipment and the textile industry were also found very interesting but some girls also mentioned computers, aircraft, electronics and even engines. The girls' favourite topics differed from the boys' favourites, as boys often preferred topics having to do with computers, metal technology, the electrical industry and electronics, and vehicles. The range of boys' interests was wide as well.

The favourite occupations of girls were teacher or doctor: only one girl said she might become an engineer. Other favourites included flight attendant, hairdresser, fashion designer, singer, journalist and running a café.

On the basis of observations, the activities impacted on the life and attitude environment of the pupils and the school to foster equality and dispel prejudices. The project encouraged school staff, pupils and parents to support girls in studying technology. Parental feedback from parent-teacher conferences was also positive; parents were highly complimentary of the school's technology instruction. The pupils gained greater skills and knowledge and improved their skills in working together. The interest of girls in technology also clearly grew, also among those who did not participate in the course. Many girls asked about opportunities to carry on with their studies by e.g. taking technical craft as an elective in 8th grade. A sea change was also visible in attitudes. At first, many of the boys would yell out, "What are those girls doing in here?" and "Let me show you!" Gradually, the girls and boys learned to work together and the boys enjoyed helping the girls e.g. in using machinery. However, some of the girls preferred to work in all-girl teams together

with their peers but their progress was hardly hindered by the boys' activities. The girls rather had a chance to show the whole group that they could manage just as well as the boys. The girls' work also exhibited their meticulousness, carefulness, goal orientation and a desire "to get it done".

Reforming practices
The scope and duration of the project (two school years) contributed to continuity. The project resulted in changes to curricula that now allow girl pupils as well to take part in technology instruction regardless of their earlier course choices.

The experimental project allows us to provide a model and encourage other schools as well to develop their curriculum to include girls as well in technology education and technical craft instruction. Likewise, we hope that as more schools gain experiences, the idea of girls needing technology education as part of general studies would find wider support in school administration and authorities. Technological competence should be designated a core element of general education. Technology education should thus be added to the list of compulsory subjects starting in primary school and carried on through comprehensive and upper secondary school in the form of courses tailored to age and abilities.

Technology and technological prowess is important in modern society, as technology is a tool of control and influence, as well as promoting wellbeing in personal lives and throughout society. Everyone comes face to face with technology and technological devices. Technology can be used to impact on environment and its quality and even to control social relationships.

Karjasilta Upper Secondary School and Madetoja Music-oriented Upper Secondary School – network course FYKE (physics and chemistry)

Teachers Ms Asta Noukkoudenmäki-Huhta and Ms Irma Parkkila,
Madetoja Music-oriented Upper Secondary School, Oulu
Teachers Ms Sirpa Risteelä and Mr Jari Kinisjärvi,
Karjasilta Upper Secondary School, Oulu
Project managers Ms Eija Leinonen and Ms Johanna Matinmikko, WomenIT

"We've got the girls and you've got the boys. Should we get together?" This message from the physics and chemistry instructors at Madetoja Music-oriented Upper Secondary School to their counterparts at Karjasilta Upper Secondary School launched a joint WomenIT project that sought to develop contents of instruction and teaching methods that encouraged girls in particular to study the natural sciences and pursue further studies in fields of applied natural science. Other goals included reinforcing views of girls and boys as equals in studying and mastering the natural sciences, launching educational cooperation between local class and subject teachers and learning interaction skills and teamwork with people of different ages and opposite gender. The project targeted students of physics and chemistry in the first and second grades of the Karjasilta and Madetoja schools as well as ten classes of pupils at three different primary schools.

Execution
The upper secondary school students planned and executed info spots in the primary schools and created a world of physics and chemistry for the pupils. The info spots covered e.g. motion, energy, friction, optics and circuitry. The world of physics and chemistry allowed pupils to learn about acidity and alkalinity, electrochemistry, electricity and magnets, balance, measuring devices, sound and light.

Traditionally, few girls participate in physics practical training in upper secondary school, but the course held by the upper secondary school students for the younger pupils attracted a great many girls. At the same time, it also encouraged primary school pupils to take an interest in natural science. The course was given additional dimensions through visits that gave the upper secondary school students a great deal of information about study opportunities and enterprises applying natural science.

Experiences
The upper secondary school students felt they gained deeper and more concrete insight into phenomena in physics and chemistry by explaining the matters to younger pupils. The students also learned interaction skills and teamwork with people of different ages and gender. The project's mode of execution was particularly successful as it attracted more girls than traditional practical training in physics and chemistry and because feedback indicated the project generated interest in the natural sciences among the girls in primary school. The teachers in primary school said the upper secondary school students' positive attitudes were also conveyed to the pupils. The activities encouraged students and pupils to talk with one another and express their ideas about natural science phenomena. The info spots and world of physics and chemistry were considered meaningful activities and the upper secondary school students were complimented on their design and execution. It would seem that activities of this type interest girls and deliver positive results.

During the course of the projects, the various stakeholders met several times. Participation in the project increased interaction between upper secondary school teachers, teachers in upper secondary and primary school, and instructors and pupils. The upper secondary school teachers' awareness of different learners in their classes increased during the project. The teachers involved in instruction started to pay attention to questions and examples touching on topics that were of equal interest to both genders. Girls seemed particularly interested in phenomena relating to human physiology and chemistry. The dissimilarity of girls and boys as learners was also debated in teacher staff rooms.

The activities were positively received in the work community. The publicity the activities brought the schools was considered an especially positive outcome. The primary schools found the world of physics and chemistry to be an excellent mode of cooperation and hoped it could continue. There are plans to offer a course of this type to upper secondary school students in future as well.

Development of student guidance methods from the gender perspective in secondary school – the Oulu case

Career counsellor Ms Marja-Leena Huttunen, Myllytulli Secondary School, Oulu
Project manager Ms Marjo Riitta Tervonen, WomenIT

The WomenIT project at Myllytulli, Pohjankartano, Maikkula and Rajakylä secondary

schools in Oulu sought to provide the pupils with new information about technology and career counsellors with information about the gender perspective in student guidance. Activities started in the 2002–2003 school year and continued through the 2003–2004 school year. The girls in 8th and 9th grades and the supplementary class, who were involved in the project, had a chance to visit educational institutes in the fields of technology and industry and also to visit and do work experience in enterprises. A total of more than 60 pupils and teachers were involved. In addition, careers counsellors from the schools visited the WomenIT partner JIVE in Sheffield in the UK.

The pupils had mentors in the enterprises. During the project, the mentors from the various enterprises held one joint meeting. The enterprises' information officers and female employees were also part of the corporate visits, which together with work experience sought to increase awareness of the opportunities in technology and industry. For girls, the support from women has been invaluable.

The careers counsellors were active participants in the training on the subject of gender in career choice, careers guidance and recruitment organised by the WomenIT project. The course helped improve the gender-sensitive guidance skills of the counsellors and also provided a new perspective into student guidance, careers discussions and the operations of their respective workplaces. The career counsellors are now better able to incorporate the gender perspective into their work. Work experience can be more effectively used as a tool in choosing career and further education. The self-evaluation form used in the work experience undertaking remains in use.

Gender sensitivity refers to taking into consideration the central meaning of a gender perspective. In practice, it is used to refer to the ability to recognise the dissimilarity and differences of men and women in, for example, ways of communicating, and in relation to financial and political power and justice. It means the ability to listen and observe the dissimilarity of men and women in different situations.

The project was communicated to pupils and staff, guardians of pupils and to partners as well as to other external parties on numerous occasions. The press also took an interest in the project: the newspaper Oulu ran three articles on the WomenIT girls' Euroscola trip (executed with external funding). The articles also focused on equality issues.

Girls in the 8th grade taking an interest in technology was one of the visible results of the programme. However, breaking traditional ideas about suitability and daring to conquer new horizons is difficult because traditional roles are learned "in mother's milk". All manner of preventing exclusion has been a primary theme throughout. Generating groups and team spirit was an important process that made even pupils in need of special education take an interest in schoolwork. For the pupils in the supplementary class, the project offered entirely new perspectives into the future.

The 9th grade girls who went on to upper secondary school took more advanced courses in mathematics. The girls also had the courage to apply for the field of their choice outside Oulu as well. The project group had more students pursuing vocational education than other ninth grades.

The girls in the supplementary class applied for further education primarily along the lines they had already been considering in the autumn. One girl chose to study metalwork, supported in her choice by visits to vocational institutes.

The development of the approach and policies will continue in another project (TEKNO-TET, work experience in technology).

Suomussalmi Upper Secondary School - learning about technology through peer mentoring

Teacher Ms Aila Kupiainen, Suomussalmi Upper Secondary School, Suomussalmi
Project manager Ms Marjo Riitta Tervonen, WomenIT

The girls in the first and second grades of Suomussalmi Upper Secondary School were offered WomenIT courses to provide them with extensive insight into jobs in technology and industry and to get to know women studying and working in the field of technology. The purpose was to get the girls interested in technology and provide them with inspiration when choosing a career. The project also sought to supply the impetus for introducing a technological orientation to the curriculum at Suomussalmi upper secondary school. An additional hope was that if girls were also interested in technology, more Suomussalmi-born experts in technology might be enticed to return to their hometown and perhaps start up enterprises.

The project involved several courses, one of which focused on peer mentoring. Female students of technology visited the school and mentored the upper secondary school students. The WomenIT courses at Suomussalmi Upper Secondary School also offered company visits, an ICT course, an electronics assembly course and a physics practicum. The various sectors of technology were also presented on a course held at the Suomussalmi-opisto vocational school. The courses were taught by both men and women.

In the mentoring section, the girls were provided with peer mentors hailing from Suomussalmi who were currently enrolled in technology studies at the University of Oulu or Helsinki University of Technology. Mentoring refers to guidance and support from a skilled and experienced senior to a junior. Widely used in business, mentoring seeks to transfer accrued wisdom and experiential knowledge to juniors and thus promote their development. Mentors are like godparents guiding their actors or mentorees. Mentoring is voluntary and no remuneration is paid. In Suomussalmi, there were a total of nine mentors guiding twenty actors, all girls in upper secondary school. The figure is substantial, as a single age group at Suomusalmi upper secondary school numbers some sixty. The mentoring was launched with a one-day coaching seminar at the University of Oulu in November 2002. Lasting a year, the mentoring programme ended in November 2003 with a science camp trip to Stockholm.

During the course of the year, the mentors and actors met during holidays, on company visits and on the trip to Stockholm, in which all mentors and actors took part. On each visit to companies and educational institutions, women in the field were sought out to recount their experiences. The organisers on most visits had managed to secure truly compelling women to speak about their career choices. Over the course of the year, the participants in the mentoring programme evolved in terms of awareness of issues relating to womanhood; this was evident e.g. in the questions put to the women met on the company visits. Reconciliation of work and family life came up on numerous occasions.

The programme culminated in a study trip for actors in spring 2004 to Helsinki with tours of the Helsinki University of Technology, the Finnish Science Centre Heureka and a couple of enterprises in technology and industry – and again, meeting the women working or studying in these.

The mentoring programme also comprises studies in a virtual learning environment and interviews of online mentors presented monthly in the WomenIT portal (www.womenit.info). Mentors studying technology found this a particularly important channel. The online mentors provided an opportunity to learn about the highly encouraging jobs and life stories of women in the field. All interviewees assured women can succeed in technology just as well as men – provided they're good engineers.

The mentoring could be said to consist of three levels: engineers in working life/ online mentors with MSc (Tech) degrees, technology undergraduate mentors and the upper secondary school actors in the WomenIT activities.

Most of the actors and mentors were enthusiastic about the programme. However, at the orientation stage some actors already felt the field was not for them. They did not intend to pursue studies in the field but took part in the WomenIT activities out of interest. Communications were not always very active due to distance. The girls became acquainted with many different career models during the project and gained a wide range of examples of the various supervisory and management positions held by women. Girls studying e.g. business and healthcare also need courage to seek out management positions. Girls acting as school helpers can encourage girls in primary school in the use of ICT.

All in all, the girls received an extremely diverse view of technology. Knowledge about matters pertaining to womanhood, entrepreneurship and professions and study opportunities in industry and technology increased. Even if the girls involved in the project decide not to seek a career in technology, they have improved their ICT skills and gained a deeper understanding of the importance of technology in

society. Their confidence in using technology also grew, as did their awareness that gender should not be an obstacle.

The girls also gained greater knowledge about technology and succeeding as a woman when learning about the field of technology in single-sex groups and meeting women active in the field. The mentors, online mentors and numerous women working in technology provided excellent role models to the girls. In future, efforts will be made to take note of gender differences in school education and to encourage girls more to take an interest in technology. The material produced under the auspices of the WomenIT project will be utilised in education. When learning about technology in different fields, examples can be taken from topics interesting to girls, such as wellbeing, health, communications or environmental protection.

Overall, the peer mentoring programme and the WomenIT course in Suomussalmi had a great impact on the students' plans for the future. Twelve of the participating girls took the matriculation examination in spring 2004. Five of them applied to and were accepted by a university of technology. Four enrolled there and the fifth ended up starting forestry studies, another non-traditional choice. Simply fabulous work from the women in Suomussalmi!

Paltamo Communications-oriented Upper Secondary School - course on gender-sensitive careers guidance and women entrepreneurship

Teacher Ms Anja Leinonen, Paltamo Communications-oriented Upper Secondary School, Paltamo
Project manager Ms Marjo Riitta Tervonen, WomenIT

The course for girls on gender-sensitive guidance and woman entrepreneurship funded by the WomenIT project ran at Paltamo Communications-oriented Upper Secondary School during the 2002–2003 school year and again in 2003–2004. The purpose of the student guidance course was to foster atypical career choices by upper secondary school girls, particularly into the fields of technology and industry. The goal of the course on female entrepreneurship and leadership was starting a virtual enterprise. In this course, technology skills were developed and entrepreneurship and leadership studied. Both courses attracted 10–15 girls/school year.

The courses comprised mentoring, company visits, lectures on female leadership, careers guidance in groups, entrepreneurship information, software training and starting a virtual enterprise. High-calibre speakers from all parts of Finland gave talks on female leadership and entrepreneurship as attractive career options for young women. Other WomenIT actors also attended the lectures.

The participants reinforced their technology skills by taking part in the Multimaker training that resulted in the main assignment of the course, the virtual enterprise. Matters pertaining to female entrepreneurship and leadership were discussed alongside activities relating to the virtual enterprise.

The girls on the course also took part in designing and producing the entrepreneurship game for girls entitled "Beacon – my day as a managing director" and also tested the game. The course culminated in a trip to Paris in October 2003 to visit e.g. a science centre and the offices of Finpro and the Finnish Tourist Board MEK. In April 2003, the participants attended the ITE (Interactive Technology in Education) conference.

The results of the first course (in school year 2002–2003) were the virtual enterprise StayHT International and its website along with a model for gender-sensitive entrepreneurship and technology training. The second course gave rise to another virtual enterprise, LunaCenter – service station for wellbeing. Both virtual enterprises contained all the elements of a real business, from staff to managing director, and were given a highly credible visual look.

StayHT International is an international hotel that also comprises a spa, restaurant, café and shop. Primarily catering for business travellers, it features modern conference facilities equipped with computers and internet access. The shop at the hotel sells Finnish specialities from salty liquorice and rye bread to diamonds. Hotel staff are skilled and service-minded, and the enterprise has plans for international expansion. The girls in the project are active in hotel management.

LunaCenter – service station for wellbeing is an enterprise that operates in connection with hotels around Finland. It offers programme services such as extreme adventures, spa activities and children's parties and also markets makeup and designer clothing. Company executives are women.

The students' motivation remained high throughout the course, although sessions were occasionally held in the evenings and on weekends. Feedback was also encouraging throughout. Attitudes clearly changed as the course progressed, although feedback indicated the threshold to becoming an entrepreneur remained fairly high. This aspect speaks in favour of early intervention – upper secondary school may be too late a stage to influence attitudes. Nonetheless, entrepreneurship remained a career option for the girls.

Public performance skills, self-knowledge, technology skills and fearlessness in using computers increased. Independent thinking sharpened in coming to see gender-related viewpoints. The WomenIT project attracted attention in the media and among partners. The virtual enterprise was presented e.g. at the upper secondary school days in Helsinki in autumn 2003 and the Educa fair for professionals in the field of education in January 2003 in Helsinki. It was also written up in a number of publications. The girls on the course held presentations on their virtual enterprise like seasoned marketing pros at a number of events, to widespread congratulations and acclaim.

The experiment at Paltamo Communications-oriented Upper Secondary School provided a model that can be used to teach entrepreneurship and technology to girls in particular. Curriculum reform remains a work in progress but the courses may be offered later as well, if only the school allocates sufficient resources. Within the limits of school resources and the lesson framework, the model is ready for inclusion in the curriculum.

Using drama training to build and support equal interaction in early childhood education

Project planner Ms Leena Teräs, WomenIT

In spring 2004, a brief intensive pilot programme in drama training with an emphasis on examining gender stereotypes and gender roles was implemented in the WomenIT project. The experiment was designed for daycare centre employees and teachers of pre-school and primary education as well as teachers in primary school.

The training sought to generate and intensify awareness of gender roles, the relationships between genders and hierarchies, and to seek ways of dismantling them together with the children. The goal was to reduce the guiding influence of gender roles and change assumptions and images of the genders by identifying gender stereotypes, thus achieving a state of more equal interaction between the genders.

The training was divided into four sections. In between courses, the participants worked with their respective groups of children, putting into practice what they had learned and gaining new insights. The observations were reviewed at the beginning of the new training session and the phenomena observed formed the basis of training. The entire programme was built to provide direct tools for use in the spring festivities at the participating day care centres and schools. A review of these was also held at the end of the course.

Training started with exercises relating to gender roles and gender stereotypes, which were made manifest by playing characters of the opposite gender. The exercises sought to examine how gender can change through small changes in behaviour, dress and features. The purpose was to attain the finer nuances of playing a gender. A comprehensive overview of feminine and masculine stereotypes was prepared by listing the most essential phenomena in each performance.

Mythological characters were used to get in touch with not only forgotten cultural heritage but also the non-rational, occasionally non-gendered reality that renders possible many types of roles and heroism. Free association opens up a path to unconscious images and assumptions that may then be examined with the help of mythology. Creating a personal story helps locate experiences alien to gender.

Components of training:
1. Releasing creativity
2. Story crafting and seeking roles
3. Creating the learning environment (sets, costumes, physical exercises, etc.)
4. Training in video filming and editing
5. Review of final works

Gender in career choice, careers guidance and recruitment (SAVOR training), WomenIT

The SAVOR training on gender in career choice, careers guidance and recruitment organised by Kajaani University Consortium was geared to WomenIT actors and

other interested parties. Consisting of four two-day sessions, the training was held between January 2003 and February 2004 and completed by fifteen participants. Subjects included education, training and career path in lifespan; gender-sensitive guidance; gender and work organisations; development of the working community; and equality planning. The course also worked on WomenIT study materials, a video for student guidance and an entrepreneurship game designed for girls. Head instructor was Päivi-Katriina Juutilainen PhD, of the University of Joensuu, along with Merja Korhonen PhD, of the University of Joensuu (lifespan studies) and equality consultant Sinikka Mustakallio of WoM Ltd (equality planning).

Evaluation of the training brought up the fact that SAVOR training had influenced the participants involved in careers guidance to pay more attention to their guidance methods and especially to motivating girls to pursue careers in industry and technology. The participants reported the training further sensitised them to female clients who were interested in atypical professions. The training provided information about working life and the status of women in working life. This information can also be utilised in guiding women who are already active in working life. Another concrete outcome is the student guidance video prepared for WomenIT materials production; the participants and the producer collaborated on the script. Participants report they have conveyed information about equality to their colleagues and started to observe phenomena in schools. The training will continue to be provided by Kajaani University Consortium.

Contact person: Project manager Ms Marjo Riitta Tervonen, WomenIT

Developing teacher and pupil work experience and cooperation with companies, Paltamo Secondary School

The project involved fourteen girls in lower secondary school in 2002–2003. The girls had one week of work experience in WomenIT partner companies, where the work community was primarily male. Various fields of study and labour organisations were also examined during the course, and visits were made to enterprises and educational institutions in Kainuu and Oulu.

Company visits to and work experience in industrial enterprises supported girls making atypical choices. As the project progressed, the girls experienced genuine interest in developing new conceptual models. They were encouraged to break new ground in a variety of contexts, bringing about an increase in woman energy. The girls were enthusiastic and took initiative instead of waiting to be told what to do.

The work experience allowed the girls to form a preliminary image of the work and opportunities available also to women in male-dominated industries.

Contact person: Careers counsellor Mr Kari Vattulainen, Paltamo Secondary School, Paltamo

Kainuu Vocational College, WomenIT project 1

Two WomenIT projects were executed at Kainuu Vocational College. One of the projects sought to inspire girls to take an interest in technology expert positions in industry and guide them towards the higher education in technology available in Kajaani. Kainuu Vocational college determined a major success factor to be supporting guidance and the placement of students.

A course entitled "Learn to learn" was created for a systematic model of careers and recruitment. In this course, students learned about the educational institution's general practices, factors relating to learning, opportunities for further studies and factors impacting on employment. The careers and recruitment section on the website supports the contents of the course. On the website, students can find topical and specific information in support of their career choices as well as information about further studies and employment in their chosen field. The careers and recruitment model clarifies career paths for girls to positions of technology expert in industry.

The project was launched at Kainuu Vocational College in summer 2002 and ended in autumn 2004. Participants included students, teachers and careers counsellors at the college, and the project also involved instructors in the field of technology and company employees who presented their activities to the pilot group. Some of the careers counsellors worked in the WomenIT parent project's international working group.

Thanks to the WomenIT project, some of the girls participating in the pilot are planning to pursue further studies in the field of technology. A systematic model of careers and recruitment was developed for Kainuu Vocational College, including both the "Learn to learn" course and a personal study monitoring form that has been taken into use at the college.

Contact persons: Project manager Ms Tarja Peitsaho and development manager Mr Esa Toivonen, Kainuu Vocational College, Kajaani

Focus on the future – careers guidance groups for women, Sotkamo Employment Office

The project sought to develop gender-sensitive careers guidance models suitable for unemployed women and women threatened by unemployment, and to support their atypical choices in the labour market. The project was premised on multi-vocational cooperation with persons providing guidance and advisory services, careers counsellors in schools and persons in charge of training and recruitment in companies. The project's careers guidance groups (three groups, six sessions per group) focused on opportunities in wellbeing technology and biotechnology, both industries of interest to women. The tacit knowledge of women about everyday life and the requirements of wellbeing is needed in these industries.

During autumn 2002 and spring 2004, a total of 18 women attended the careers guidance groups meeting in Sotkamo and Paltamo. The groups not only provided

access to information but also allowed the women to examine their career paths and gain support and encouragement to make atypical choices as well. Each guidance group visited companies and educational institutions. On these visits, women studying or working in male-dominated fields spoke of their career choices and experiences. The visits were considered very encouraging and enlightening. The project also developed group guidance methods by applying methods from socio-dynamic guidance, and updated the technology expertise of employees at the employment offices. Project staff were actively involved in training and events organised by WomenIT.

Feedback indicated all participants found the project necessary. They derived the greatest benefit from updating their information about professions and education and from the study trips. The participants' study motivation increased during the project. Group sessions also offered peer support and a welcome diversion from everyday life. The work community was interested in the project and a person in charge of labour training came along on the visits to educational institutions.

Four of the participants found jobs and two are pursuing self-motivated education to qualify for a new profession. At the end of the project, five participants were in labour market training. Many plan to pursue polytechnic or university studies in the future. The women's careers guidance group will remain an element of vocational and careers guidance services in Sotkamo.

Contact person: Psychologist Ms Aila Leino, Sotkamo Employment Office, Sotkamo

Steps to technology, Education Services of Raahe region

A one-day intensive seminar on technology organised in Raahe in January 2003 attracted an audience of some 50 girls in the upper years of comprehensive school. The intensive seminar examined the production and publication of Web pages, digital image processing and video and sound processing. The actual Steps to technology event held in May 2003 was attended by all girls in grades 7–9 at the city's schools as well as some volunteers from upper secondary schools, a total of some 250 girls plus teachers. The two-day event (Friday and Saturday) replaced one day of school, during which substitute activities were organised for boys. The project manager took part in the WomenIT SAVOR training on gender in career choice, careers guidance and recruiting.

The event included e.g. a lecture from Mrs Liisa Kirveskari, union officer for the Finnish Metalworkers' Union, who is employed in the metal industry, and a tour of the Department of Process and Environmental Engineering at the University of Oulu. The girls also had a choice of 16 companies to visit. On the second day of the event, workshops focused on e.g. computer games, Web pages, graphics, sound and image processing, and computer assembly and disassembly.

A third event was organised in spring 2004 in Raahe, where girls and teachers toured various workshops in separate groups. The girls got to e.g. make homepages and process text, sound and images on the computer. The teachers' programme included instruction in PowerPoint, image processing and the internet. A tour of the campus and a lecture on the development of communications technology at

the University of Oulu Department of Information Processing Science were also on the programme.

Within the curriculum, girls were given opportunities to learn about non-traditional industries.

The intensive seminars received excellent feedback noting that the girls were particularly excited about the workshops that allowed them concrete, hands-on experimentation with technology. The media also expressed an interest in the events, which were covered in a number of papers. Neighbouring municipalities also enquired whether they might become involved in similar activities.

Contact person: Head of Education Services Ms Sirkka-Hannele Saarinen, Education Services of Raahe region, Raahe

Plan for student recruitment in information processing science, Kajaani Unit of the Department of Information Processing Science, University of Oulu

The project involved preparing a student recruitment plan for information processing science in summer 2003. The plan was introduced by the Kajaani unit of the University of Oulu Department of Information Processing Science in autumn 2004. The student recruitment plan plays particular attention to recruiting girls as well.

The project's main goal was to support girls in choosing careers in technology, to plan earlier studies e.g. in comprehensive school or college to support a career in technology and to lower the threshold for girls to apply to the Department of Information Processing Science. These goals were pursued e.g. by offering the girls a chance to learn about information processing science in a highly positive light.

The student recruitment fair of the Department's Kajaani unit, entitled "Difficult choice" was held in Kajaani on 14 April 2004 and featured a special Girls' Corner offering information and entertainment relating to technology and designed particularly with girls in mind. The Girls' Corner with its easy chairs and bright colours was a comfortable environment hosted by model Saimi Nousiainen. At the Girls' Corner, girls could try out various types of software such as an interior design program, hairstyle and makeover software, Sims Double Deluxe and Pop Idols games and dance on an X-Box dance mat. An online information search contest for three girls at a time was held every hour on the hour.

A woman's perspective was gained from a talk by Marja Karjalainen, managing director of a local telecommunications company, on the female perspective in her industry. Host Saimi Nousiainen was also interviewed on her attitudes towards ICT.

In addition to publicity in the local paper, the Girls' Corner also received nationwide attention in a piece on computer games for girls and the Girls' Corner at the recruitment fair, which aired in a computer games program on MTV3 and SubTV channels in early May 2004.

The goal was to create an environment where girls would feel comfortable and could try out fun and useful stuff on computers without any bias or earlier skills.

Nonetheless, many of the girls proved very proficient in computer use, but undoubtedly many also had an opportunity to try something new. The presence of Saimi Nousiainen was a pleasant surprise, an interesting person whom many young girls wanted to see and meet in person. Nousiainen also spoke at the fair about her own choices and the importance of making personal choices, even if they might be atypical.

Girls Corner proved a highly successful idea: technology in a pleasant setting. A similar concept will certainly be utilised in future as well.

Some changes also occurred in the thoughts of the work community and more attention will certainly be paid to girls in student recruitment. Much thought in coming semesters will go into ways of marketing ICT education to girls.

Contact persons: Senior assistant Ms Jonna Kalermo and designer Ms Satu Heikkinen, Kajaani Unit of the Department of Information Processing Science, University of Oulu, Kajaani

Training in adult mentoring, WomenIT

WomenIT organised training in mentoring adults starting in January 2003 and ending in September the same year. The training involved six pairs of mentor and actor, women living in Kainuu or Oulu. The mentors and actors represented different fields and the mentors held higher positions than the actors, who were only starting out in their careers. The mentors and actors met approximately once a month between January and September. The final meeting was held during the international WomenIT mentoring meeting that was attended by British, Danish and German mentors and actors. The instructor was Tuulikki Juusela of Womco Ltd.

In mentoring, the actors are encouraged to manage their challenges and take on new challenges. The participants have networked also since the training ended. The younger women, i.e. the actors, gained support in managing their work and advancing their careers while the mentors obtained new and fresh insights from their mentorees.

The journey of each pair of mentor and actor is a story in itself. Some found collaboration easier than others, some became lifelong friends. In future, training in mentoring will be available from Kajaani University Consortium. The workplaces of some mentoring participants are already planning the introduction of a wider mentoring programme.

We recommend the activities to all locales where the baby-boomer generations are taking retirement. Mentoring is a good practice also in terms of disseminating tacit knowledge, and especially recommended for women who have chosen a non-traditional career. In general, mentoring tailored to individual needs benefits anyone only starting out in professional life.

Contact person: Project manager Ms Marjo Riitta Tervonen, WomenIT

Sub-project for working life sector, Department of Information Processing Science, University of Oulu

The WomenIT project reinforced inter-departmental development efforts from the viewpoint of human resources work and HR management in the University of Oulu Department of Information Processing Science e.g. by preparing an equality plan. Hilkka Poutanen, who is HR planner in the Department, took part in WomenIT training and seminars dealing with equality in communities and the preparation of equality plans.

The Department arranged an open seminar entitled "Equality work in organisations" on 10 February 2004 at the University of Oulu. The seminar discussed equality planning and realisation of equality in workplaces at the national level and presented successful examples from real life.

Equality planning in the Department is gaining a more solid footing. A team was established in the Department to work on two different versions of the existing plan, i.e. as provided in the Equality Act, the Department will prepare a plan relating to human resources policies and a plan concerning educational activities and materials.

Involvement with the WomenIT project provided more information about equality. It is recommended that equality-related matters remain "on the front burner" allowing planning to progress appropriately and involve the planning, execution and monitoring of concrete measures.

Contact person: Designer Ms Hilkka Poutanen, Department of Information Processing Science, University of Oulu, Oulu

Equal practices in working life, The Finnish Association for Human Resource Management, Henry ry

The Finnish Association for Human Resource Management, Henry ry was an actor in the WomenIT development project. Project activities were reported to the association's lifespan division and Oulu regional division, which is led by Hilkka Poutanen and is a member on the lifespan division's working group on reconciliation of work and other aspect of life. The division met approximately one a month during its two years of operations (2002–2004) to address issues relating to lifespan. These issues included personality development in adulthood, career advancement, wellbeing in the workplace, and reconciliation of work and other aspects of life. Experts also gave talks at divisional meetings. One of the speakers was Vesa Pääkkönen of Octel, who recounted the equality plan execution process at his company. The meetings also reviewed the results of the working groups.

The lifespan division concluded its work with a seminar held in Helsinki on 24 February 2004 and entitled "Working life span and its management". WomenIT contributed to the costs of the seminar. The seminar presented the output of the working groups either through participants or with talks by experts. Johanna Lammi-Taskula was on hand to speak of her research into the reconciliation of work

and other aspects of life, while Vesa Pääkkönen spoke about preparing equality plans. The written output of the lifespan division's working groups is available to members on the HENRY website.

The activities of WomenIT and the importance of equality plans from the perspective of human resources work in organisations were presented at the June 2003 meeting of the Oulu regional division.

The involvement of HENRY made it possible to nationally and regionally bring up and make visible the importance of equality work in human resources management. The reconciliation of work and other aspects of life and preparation of equality plans are substantial elements in highlighting the wellbeing and image of organisations. Organisations that visibly attend to these matters are on a sound footing both now and in future. It is also a definite advantage both in terms of recruitment strategy and wellbeing in the workplace.

All organisations, human resources departments and labour market organisations are recommended to make their equality efforts clearly visible. Work on behalf of equality is a matter that is the equal responsibility of women and men.

Contact person: Head of Oulu regional division Ms Hilkka Poutanen, Henry ry, Oulu

Equality workbook, IT-Mind

The goal was to prepare an equality guide in the form of a workbook for companies. The guide "Equality workbook" has been published online only at www.womenit.info/tasa-arvotyokirja/index.html.

The "Equality to everyday life" guide for enterprises and organisations prepared as part of WomenIT training was taken into account when preparing the workbook, as the idea is for the two guides to complement each other. The workbook takes a lighter approach than the WomenIT guide but brooks no compromise on the issues. Assignments are designed to promote equality planning. The workbook will also be of use to companies obliged under law to prepare an equality plan. On the other hand, the workbook was written to benefit the majority of Finnish employers, i.e. those companies to which the statutory obligation does not apply. Existing equality plans are mainly in place in large enterprises and existing guides are also primarily geared to large organisations. There is obvious demand for a guide like the workbook.

The staff of IT-Mind Ltd assisted in preparing the workbook's contents. The project was launched in early February 2004 and concluded at the end of June 2004.

Our small work community was highly enthusiastic. In other organisations we contacted, it was usually men who initially brought up the typically doubtful and even downright negative attitudes about the workbook in particular and equality in general.

In other words, a kind of gender blindness is unfortunately common. People simply wish to shut their ears when they hear the word "equality" – it is a tough threshold to cross. It invokes the phenomenon of which equality consultant Sinikka Mustakallio spoke: Finnish employers are usually law-abiding but the Equality Act is easily ignored as if it was never meant to be complied with.

The contents of the workbook are in line with our goals. We hope to achieve our goals also in terms of bringing the workbook into widespread practical use.

Contact persons: Key expert Ms Ritva Jyrkkä, key expert Ms Arja Ranta-aho and managing director Mr Petri Lintula, IT-Mind, Kajaani

Training in development of equal practices in working life, WomenIT

The training took the form of four two-day events. Its purpose was to create new models for reconciling work and other aspects of life and to develop equal practices in working life by innovating support models and enhancing the ability of work communities to engage in equality planning. Four days of training were organised jointly with training on the subject of gender in career choice, careers guidance and recruitment (SAVOR training) provided to vocational guidance experts. Representatives of labour market organisations (Union of Salaried Employees, Union of Professional Engineers and the Finnish Metalworkers' Union) as well as enterprises and labour organisations participated in the training, which was provided by consultant, Pirkko-Liisa Ketolainen Lic.Ed. of Psykologian Tieto-Taito Ltd, Päivi-Katriina Juutilainen PhD of the University of Joensuu and Managing Director Sinikka Mustakallio of WoM.

Participants were not easy to recruit for training. Equality is yet to be perceived a major issue even in human resources planning despite workplaces with more than thirty employees being obligated, under the Equality Act in force at the time (Act 609/8 August 1986), to prepare equality plans. WomenIT has actively underscored themes relating to equality planning since the inception of the project. It could indeed be noted that the theme seminar held towards the end of the training schedule attracted new participants.

The training resulted in the launch of the equality planning process in several work communities. Training participants also contributed to preparation of the equality guide aimed at enterprises and organisations that was published in autumn 2004.

Permanent processes were initiated in the minds of individuals and work communities, and some workplaces started to prepare equality plans.

We recommend instituting similar training, especially to supervisors and management, as the commitment of management is essential to an equal work community.

Contact person: Project manager Ms Marjo Riitta Tervonen, WomenIT

Women's labour market training for the technology sector, WomenIT

The training was geared to unemployed women in Kainuu with training in business and administration or the caring professions. Almost thirty women applied for the training and fourteen were accepted. Five of the women were trained in the

caring professions (practical nurse, nurse or public health nurse) and nine held qualifications in business and administration. The purpose of the training was to encourage the women to enter and find employment in technological fields or to pursue further education. The training consisted of orientation studies, general subjects (Finnish, mathematics and English), vocational studies (computer studies), work experience, entrepreneurship information and equality education. Company visits and study trips were also organised. The vocational studies were completed at Kajaani Polytechnic.

Women were trained to strengthen their technology skills and increase their awareness of technological industries being very suitable for women. Wellbeing technology is expected to see intense growth in the future and it is an industry that needs women. As a combination of caring and technology, the wellbeing industry holds particularly great potential for women who have trained in the caring professions.

The students showed interest in the training. Team spirit was strong and friends were made. Teamwork skills, interpersonal skills and the friends made during the course helped the participants forge ahead.

The participants' own estimates put learning stronger computer skills and finding a place in working life or studies as the most important results of the training. Almost all fourteen participants either enrolled in further education or found employment after the training. Some were employed by the place where they did their work experience, others with the help of employment subsidies and others in other duties. Two went on to continue their education.

The training was also the subject of the final project of an engineering student at a polytechnic. The study concerned identifying suitable teaching methods for women.

Contact person: Project manager Ms Marjo Riitta Tervonen, WomenIT

Female entrepreneurship and leadership in ICT, technology and industry, WomenIT

The goal was to provide training to the following WomenIT partners: Paltamo Communications-oriented Upper Secondary School, Linna Upper Secondary School, Pyhäjoki Entrepreneurship-oriented Upper Secondary School and Lappeenranta University of Technology. A total of five days of training was organised and girls from the Suomussalmi Upper Secondary School also took part.

In January 2003, professor Iiris Aaltio from Lappeenranta University of Technology, who is a specialist in female leadership, gave a lecture on the following subjects: leadership and female leadership, corporate cultures and the myths behind female leadership, changes in the management environment making room for female leadership, women as corporate managers, reconciliation of work, career and family, and self-knowledge and career. Managing director Mirja Erlund, who chairs the Board of Directors of the Central Association of Women Entrepreneurs, spoke on the following subjects: encouraging women and young women to pursue a career and strengthen their personal leadership qualities; the significance of woman-to-woman support and understanding for women making careers; developing one's own work as a female entrepreneur; limitless possibilities and no glass ceiling. In

May 2003, managing director Eppie Eloranta of Nicefactory Ltd visited the school and recounted her unusual success story as a mother of five and woman of many trades. In January 2004, Mirja Erlund and Eppie Eloranta visited the Paltamo Communications-oriented Upper Secondary School for a second time.

The local projects and training introduced the participants to sectors of industry and technology as well as entrepreneurship and leadership, fields in which women are still underrepresented. The brilliant speakers served as role models and reinforced the girls' dreams and aspirations.

All participants were wildly enthusiastic about the WomenIT courses and training that allowed them to hear top experts in their field. Entrepreneurial spirit increased and found concrete expression e.g. in the establishment of a virtual company at Paltamo Communications-oriented Upper Secondary School and the girls' cooperative at Linna Upper Secondary School. Similar entrepreneurial training should be offered in all comprehensive schools and institutions of upper secondary level education!

Contact person: Project manager Ms Marjo Riitta Tervonen, WomenIT

Women & Leadership, project activities centre for young people and the Intotalo business pre-incubator

Women & Leadership was pilot training that sought to create an annual new educational module as well as a culture of leadership and entrepreneurship for upper secondary schools. The project targeted female students in the first and second grades of Linna Upper Secondary School in Kajaani and ran from autumn 2002 to spring 2003.

The goal was to encourage and support girls in making choices free of outside influence. The idea was not to offer technology, leadership and entrepreneurship

Photo: Samuli Karjalainen

as a ready career option but rather to guide the learners through activities towards taking initiative, showing entrepreneurship and implementing their own ideas. The young people were not the object of activities but active players instead.

Project work skills and commercialisation of personal expertise are focal skills in working life today. The Women & Leadership module provided the resources to conceptualise projects and manage the planning and innovation process. It also offered hands-on experience with project work, entrepreneurship, management, marketing and teamwork. These skills were put to the test in real-life activities, in projects planned and executed by the participants.

The participants in the Women & Leadership training were guided through project activities to assess their personal strengths and expertise now and in the future. The idea was for young women, having examined their life goals, to realise the value and usefulness of technology as a tool for self-actualisation and the future.

The students believed they had developed skills and experiences useful for the future. The independent project activities for which the students were responsible was considered especially educational. The team of girls in the Women & Leadership training adapted well to the Intotalo environment and became valued members of the community. No active contact was made with the students' parents during the project.

The girls executed two projects; one was an evening event for young people at a restaurant that did not serve alcohol. This project sought to provide greater familiarity with restaurant culture and the related teaching of manners. The other project was Power Camp, a leadership camp for girls. The marketing and programme of the four-day camp was planned and executed entirely by the young people themselves. Feedback from the eighteen girls from the Kainuu region who participated in the camp was positive.

The role of coach differed greatly from the traditional role of teacher. Training in the Women & Leadership course involved team coaching rather than individual guidance. The learners were given free rein inasmuch as possible and the job of the coach was to provide support and guidance while still staying in the background. The more responsibility the learners assumed for the actions, the more they learned from the project activities.

The Linna Upper Secondary School was very pleased with the Women & Leadership course. The good experiences obtained encouraged to continue the training in the form of a project adventure course targeting upper secondary schools in Kajaani. Two new courses started in autumn 2003. An indication of the activating effect of the Women & Leadership course is the outdoor café Intohimo (Passion) started by four girls who took part in the course. The girls started the café as a business and ran it for one summer in the centre of Kajaani. They provided employment not only to themselves but also for three weeks to one girl not on the course.

Contact persons: Project manager Mr Marko Leppänen and couch Ms Eija Gerlander, Intotalo, Kajaani

New media content provision course, Pyhäjoki Entrepreneurship-oriented Upper Secondary School

This course for four female participants started in October 2002 and ended in spring 2003. The themes involved not only preliminary assignments, but also the daily life of new media entrepreneur, entrepreneurial skills, processes and techniques for new media content creation and provision, execution of a small-scale media production and presentation of works. The training was provided by a new media enterprise run by a female managing director. At the same time, cooperation was launched with YLE, Finland's national public service broadcasting company. The instructor taught scriptwriting, filming and editing and arranged a visit to Yleisradio in Helsinki. The participants' practical work assignment was making a video presentation of a local female entrepreneur and they also visited a company designing online media software. The project instructor also taught the use of technical equipment and making online videos and organised all study trips.

The girls' attitude towards their own skills improved markedly during the course. Digital media was initially considered "boys' stuff" although the best results most often came from girls once they dared to try. The work community quickly adapted to the idea of girls also possessing technical expertise.

The course injected new enthusiasm into the documentation and presentation of the camp school. Working methods at the local paper also evolved, and the course would seem to impact on the girls' choices as well.

The use of digital media evolved into a more integral part of normal activities since the girls also learned to fearlessly use new equipment.

Contact person: Teacher Mr Tauno Rajaniemi, Pyhäjoki Entrepreneurship-oriented Upper Secondary School, Pyhäjoki

WomenIT project in Lappeenranta, Lappeenranta University of Technology

The project was a university-level study unit of 18 credits (under the old degree system) targeting entrepreneurs, wage earners, students and unemployed persons. The training focused on women entrepreneurship, managing a technology company and business development in a technology company. The idea was to provide additional resources for developing an industrial or technology company. In practice, the focus was on starting and developing a business. The training programme started on 13 February 2003 and ended on 14 May 2004. Of the 25 students originally selected, 19 completed the training.

Our training programme included many examples of how women entrepreneurs have succeeded in fields atypical for women. Several guest lecturers spoke of their own career choices. The students found especially useful that they could exchange ideas and experiences, and they also encouraged one another to develop or start a business of their own.

The participants were hugely enthusiastic about the programme, the lectures and the guest speakers.

The goal was to have a few enterprises established during or immediately after the training. We estimate that those students who already run a business gained more resources and development tools to further their business. However, to date no new enterprises have been started.

The new and interesting study units devised especially for the training programme will hopefully remain part of the university's basic education. Many new contacts were also made in the programme, and the cooperation and networking opportunities of both staff and students gained new scope.

Contact persons: Training coordinators Ms Tuuli Ikäheimonen and Ms Tuuli Rantala, M.Sc.econ Ms Piia Lepistö, Lappeenranta University of Technology, Lappeenranta

WomenIT project at the Montessori Playschool in Kajaani

The goal was to guide 3–6-year-old girls at the daycare centre towards building and the use of computers and peripherals in a creative way together with mathematics learning tools familiar from the Montessori pedagogical approach. The activities sought new ways to use ICT with girls of playschool age. Staff training was also a sector of the activities, which were held once a week in small groups (2 x 5 girls) in a separate space, initially under the guidance of an instructor and then independently.

The activities involved e.g. a project entitled "From wood to paper", learning about forests, paper manufacture and making a newspaper. In the end, the girls made their own newspaper. Building games linked with crafts and drawing brought technology closer to the girls, who also did woodwork and assembled a playhouse in the yard. A drama experiment executed at the end of the project inspired both adults and children to use a video camera.

The all-girls group provided encouragement for creative activities, design and taking responsibility. One construction set was set aside for the girls and only subsequently made available to the other children at the playschool as well. The construction set encouraged girls to incorporate technological materials in their games. Staff ensured that everything involving e.g. ICT wasn't left to a single girl. Everyone willing was given time to practice with the support of others.

The girls are now able to take on technological challenges in a completely new manner. The women on the staff also took an interest in computer use and e.g. video editing in the late stages of the project. Parents praised the project and wished for it to continue. The girls are now comfortable using computers and digital cameras. The project provided the initial impetus for a permanent practice.

Contact person: Director Ms Maarit Tihinen, Montessori Playschool, Kajaani

ICT club for girls, Pietari Brahe Primary School

The main goal was to influence girls' attitudes towards technology by providing motivation and knowledge about the possibilities of ICT as a tool. The target

situation was for girls to fearlessly and enthusiastically use ICT as a tool in a setting of learning by doing and cooperation. Participants also learned about using ICT in making a newspaper. The club targeted girls in the 5th and 6th grades and, for one semester, their mothers as well.

The work was based on the pupils' own interests, making the girls highly involved in the work. Subjects examined included image processing, making a home page and building a multimedia family album. The girls produced multimedia presentations, homepages, files and a club paper, and also learned about copyright matters.

Since the girls were more interested in the end result than in how ICT works, we based the activities on the girls' personal interests and sought to encourage the girls to use ICT to produce materials about topics that interested them.

The enthusiasm of the girls was perhaps best manifest in their arriving for the club some thirty minutes early, almost without fail, and working during recess every day while the paper was being made. During the first semester, the girls' mothers were also actively involved.

The club enriched and diversified the school's experimental activities and was received with great interest. Especially the pupils, when looking at the results, discussed the girls' skills in a positive vein. The girls in the club lost much of their timidity towards ICT.

Our observations indicate that girls are equally prepared as boys to take up new challenges when working with ICT. Pupil-driven choice of topic and mode of working were meaningful in learning to use the hardware and software, and also seemed a suitable choice for use in schools.

Contact persons: Class teachers Ms Liisa Halonen and Mr Tapio Suvanne, Pietari Brahe Primary School, Kajaani

LUTIKKA –Natural sciences and ICT for girls, Kätönlahti Comprehensive School

The course sought to encourage and inspire girls to take an interest in natural sciences and ICT and to contribute to their willingness to choose courses, subjects and studies in the fields of natural science and technology. The premise of the course was awareness of girls often losing their interest in natural science in upper school years and natural science becoming more typically a boys' choice.

The course in experimental nature studies was implemented as a club in grades 1 and 2 and as an elective and club in grades 3–6. Study packages applied to surrounding nature formed the framework of activities. The participants also made their own instruments and other nature-related products. ICT was used whenever possible. In the second year, the focus was on physics, chemistry and ICT, which was used as a tool in making websites. Typically more in the boys' interests, these activities were now geared to girls.

The all-girls group allowed participants to progress at their own pace. In mixed groups, boys might have taken the lead and started dispensing advice.

The pupils were very enthusiastic and would have been ready to join up in the following year as well. Colleagues provided encouragement and showed interest, and we have received much positive feedback.

We observed that the participants will in future have the courage and desire to take part in similar courses. In other words, we achieved our goal of encouraging girls to choose studies relating to natural science and ICT. These results could not have been obtained in a mixed course held in an ordinary classroom setting.

The idea of the course and the methods employed remain part of regular schoolwork. It has been proposed that the activities continue in an afternoon club or school club. Lack of participants will not hamper continuing the activities, if only sufficient resources can be allocated.

Contact persons: Class teachers Ms Mari Törrönen and Mr Heikki Kallunki, Kätönlahti Comprehensive School, Kajaani

My Gener@tion – ICT club for three generations, Kajaani Teacher Training School

The three-generation ICT club My Gener@tion+ was an innovative experiment targeting girls at Kajaani Teacher Training School along with their mothers and grandmothers. The club consisted of ten groups of three members, i.e. grandmother, mother and daughter. Highlighting collaboration across generational boundaries, this club based its activities on the versatile utilisation of ICT. The ensuing encounter of the values and attitudes of three generations was highlighted in the multimedia applications produced in club activities.

The goals of the club were to learn basic ICT skills, gain deeper insight into ICT skills and their use in multimedia, to consider the impacts of ICT from the female perspective of Finnish families, to utilise the school's portal in club activities (interaction), to introduce new perspectives to cooperation between school and home, lifelong learning, breaking boundaries between generations through the use of ICT, and consolidating individual skills through communal efforts.

The club studied e.g. the following subjects: computers and peripherals, the internet, multimedia design and execution, and digital images. The topics included family albums, genealogy, women in working life through the decades, and professions in our family. The activities culminated in a camp school held in Copenhagen on 2–7 May 2003.

The club targeted women of different ages to encourage them to take up technology, making ICT a shared interest for the women in the family. Interesting topics provided easy access to ICT utilisation and dispelled prejudices about computers.

The mothers and grandmothers involved in the club "showered roses" on the training they received, with particular emphasis on their increased ICT skills. In discussions on equality, staff members wished they had boys in the target group as well. Some felt boys today were more vulnerable to social exclusion than girls and therefore required particular support in their life management skills.

The project successfully brought together three generations in a learning environment focusing on ICT. The knowledge of mothers and grandmothers became valuable capital for the daughters e.g. through the multimedia shows "Professions in our family" and "My childhood – three perspectives". Additionally, the club contributed to better cooperation between school and home, especially with regard to the grandparents.

Thanks to the club, the girls' ICT skills substantially surpass those of the age group in general. The most surprising outcome was the active input of grandmothers in developing their skills. Some went on to buy a computer and obtain an Internet subscription. The positive attitude and fearless embracing of ICT by the participants is worthy of special mention.

After the My Gener@tion+ club ended, activities were continued in the school's ICT club that caters for pupils who otherwise do not have access to ICT.

Contact persons: Head teacher Ms Seija Blomberg and teacher Mr Pentti Mankinen, Kajaani Teacher Training School, Kajaani

Technology for girls, Paltamo Secondary School

The goal was to alleviate girls' prejudices towards technology and give them the courage to choose subjects traditionally considered to be in the male domain. The premise was that girls have negative attitudes towards and shy away from technology, although their theoretical skills e.g. in physics are at least on a par with those of boys. The course sought to shake off fears and prejudices.

Pupils in the 7th – 9th grades of comprehensive school could substitute the "Girls and technology" course for one applied course. The course, which lasted one

school year, involved making small electronics devices from ready assembly kits and visiting companies, science centres, museums and schools. International cooperation took the form of a trip to a science centre in Sweden.

This elective course for girls gave them an opportunity to learn about technology and related professions from a wide range of perspectives. We sought to encourage girls to choose technical craft, which is available in our school, and to take the advanced courses in mathematics, physics and chemistry when they go to upper secondary school. This would provide them with better opportunities to pursue careers in technology.

The girls' positive attitude and enthusiasm for technology was evident already at the beginning of the course. The pupils' parents considered the chance to take part in the course a kind of privilege. The work community also reacted positively, although the course did necessitate some departures from regular daily routines.

The project introduced new dimensions to traditional schoolwork. The girls got to study technology by doing, examining, experimenting and observing. Even the girls themselves were surprised at how fascinating technology was; from the teacher's viewpoint, the electronics assembly work was handled extremely dexterously. Attitudes towards technology became more positive and the threshold to take courses in mathematics and technology was lowered. This is evidenced e.g. by the fact that some of the girls elected to take the technology course that was being offered in the following year. The course, which was made possible by the WomenIT project, was made a permanent feature of the curriculum. In 2004–2005, the course was also chosen as an elective by enough pupils to start a group.

Contact persons: Teachers Ms Irja Härkönen and Ms Kirsti Haataja, Paltamo Secondary School, Paltamo

Learning about technology, Ruukinkangas Comprehensive School

The goal was to introduce girls to technology and its many manifestations and to show how many study opportunities, jobs and companies there are in Finland that involve technology. Another important goal was for the girls to overcome their "fear" of technological devices and to root out the preconception that technology was "a boys' subject that girls couldn't possibly comprehend."

At the lower level of comprehensive school (grades 3–6), pupils attended clubs to learn image processing, using a digital and video camera and the Internet as well as various kinds of software such as Paint, Word and Gif Animator.

At the upper level of comprehensive school (grades 8–9), girls were offered an elective that included three units for eighth-graders: a computer course to learn the operating system and to examine hardware, e.g. hard drive and buses; an electronics course during which e.g. a small electronic device was built; and a stone treatment course on which girls learned stonemasonry skills. In the 9th grade, the focus was on modelling various types of devices and programming them with Robolab, learning to use PowerPoint, making home pages featuring Robolab devices on the Internet and studying information security and computer viruses.

The girls visited a capacitor manufacturing plant in Suomussalmi and the electrical engineering department at Suomussalmi-opisto college. Towards the end of the course, we visited educational institutions and companies in the fields of technology and industry in Kuopio and Helsinki. The pupils were also given assignments on the visits.

We sought to teach "appropriately for girls". Clear instructions and manuals are important factors. A great deal of support is needed in processing new information – support so that the pupils dare ask any question. The pupils were introduced to different jobs and places of study in the field of technology.

The pupils were enthusiastic and interested in the topics. The work community's attitude was positive. Two female teachers trained as ICT experts (15 credits under the old degree system) alongside work and also took a course in video and the theory of electricity. Parents' attitudes were favourable.

We feel we achieved our goals. The teachers' professional skills were enhanced and the girls learned a great deal about ICT as well as studying and working in the field of technology.

The future will tell whether the girls choose to pursue studies or careers in technology.

The clubs for lower grades will probably continue but technology is not an elective for girls in the upper grades. Any future technology subjects depend on the new curricula. The teachers can utilise their new skills when planning new courses.

Contact persons: Teachers Ms Pirjo Westersund and Mr Veikko Nuottajärvi, Ruukinkangas Comprehensive School, Suomussalmi

Girls and technology, "tech girls" at Suomussalmi

The WomenIT project at Suomussalmi Upper Secondary School comprised four courses: Electronics; Learning about industry and research; Practical technology; and ICT. Practical technology, executed together with a local vocational college, included e.g. car servicing and practicing welding and building, while programmable devices were built from a set of legologo bricks in the electronics course. The majority of the WomenIT courses were taken in 2003.

A study trip to Stockhom was taken in November 2003 and one to Helsinki in May 2004. Destinations on the Stockholm trip included TomTit Experiment science centre, the museum of technology and museum of natural history and the industrial upper secondary school run by Scania in Södertälje. In Helsinki, the group visited Helsinki University of Technology, the LUMA centre promoting science, and some companies.

Mentoring was also an element of the courses; more about mentoring in Suomussalmi can be found in this guide.

All in all, over 20 girls participated in the courses, a substantial number considering that an age group at Suomussalmi upper secondary school numbers some sixty. The

most popular course has been the one on learning about industry and technology, which has taken the girls on study trips in Kainuu and elsewhere.

Contact person: Ms Aila Kupiainen, Suomussalmi Upper Secondary School, Suomussalmi

Course: Take an interest in natural science and technology! Kastelli Upper Secondary School

The course "Take an interest in natural science and technology!" was developed during the project at the Kastelli Upper Secondary School in Oulu. The course, which sought to support girls in particular in their career planning and study of natural science and mathematics, was implemented in autumn 2003 in the first period of the school year.

The course was based on development and research into the self-evaluation skills of girls with regard to mathematics, physics and chemistry. The goal was to locate tools to support the pupils' self-evaluation skills and do away with flawed self-evaluations concerning studies and career planning. For example, students may think they have no mathematical skills although they do well in mathematical subjects. The study conducted by Maria Kukkonen consisted of a self-evaluation stage and interviews that provided more detailed information about how the perceptions of girls as to themselves and the study of these subjects were formed in classroom situations. The study analysed learning situations that were perceived as positive as well as negative ones.

The results of the research provided a basis for planning the course, which consisted of four study units, an industry visit and a visit to the wellbeing technology study programme at Oulu Polytechnic. The study units were entitled "Uses of IT in schools", "Careers guidance information package", "Reading scientific and mathematical texts", and "Experimentation and observation in natural science". During the industry visit, the students carried out small-scale studies at various workstations, interviewed the employees and gained more information about the various jobs. Finally, the students prepared a written report, poster or PowerPoint presentation on the themes they had examined.

The study gave teachers an insight into how the girls perceived themselves as learners, which allowed them to develop their own teaching approaches. Getting to know female engineers during the industry visit gave the girls positive role models. The course also allowed the students and teachers to get to know each other better and faster than an ordinary classroom setting, which was believed to lower the threshold of asking questions.

Maria Kukkonen's research generated particular interest among colleagues. Students praised the course for its diversity and flexibility.

The goals of the course were achieved. Students were given tools to examine their own studies and all teachers involved in the project today take the new perspectives gained in the experiment into account in their classroom work.

Student feedback mentions e.g. improved teamwork skills, good team spirit and better study techniques. Some students also felt thinking about their future career helped them make better course choices. The course allowed students to utilise

ICT facilities offered by the school more quickly than in other autumn semesters. Cooperation between teachers was considered important, as it allowed teachers to learn from their colleagues. The self-evaluation study provided teachers with information e.g. on how to keep up motivation in various classroom situations. Discussions with researcher Maria Kukkonen provided insight into girls as learners.

The goals achieved during the course "Take an interest in natural science and technology!" – the knowledge, skills and attitudes – will be reinforced in subject studies. The study techniques and working methods learned by the students will be utilised and reinforced in courses in physics, chemistry, mathematics and ICT. The project provided examples and experience with these working methods. The school will also seek to establish an ICT clinic as part of careers counselling. Industry representatives will be asked to speak in careers counselling and other classes throughout upper secondary school and studia generalia lectures as well as careers and student recruitment fairs will be arranged for the entire school. The school will also maintain close links with working life.

Contact persons: Careers counsellor Ms Anja Kunnari, teachers Mr Pekka Meriläinen, Mr Juha Pitkänen and Mr Jarmo Sirviö, Kastelli Upper Secondary School, Oulu

Mathematics tutoring programme, Oulu Polytechnic, Institute of Technology

The project sought to boost the performance in mathematics of students at the Oulu Polytechnic Institute of Technology by establishing a mathematics tutoring programme and developing it into a permanent student support function at the Institute. The goal in spring 2003 was also to pilot the mathematics tutoring programme separately for groups of girls and boys and to monitor the experiences of both tutors and tutorees in these segregated groups.

The mathematics tutors (instructors) were primarily students in their second and third year of studies who had successfully passed their mathematics courses in their first year of studies. The tutorees were primarily first-year students, but some upperclassmen who wished to re-take courses they had failed also attended. Tutoring was provided weekly at pre-set times for two hours at a time three afternoons a week.

Girls acting as mathematics tutors was thought to encourage other girls at the Institute to pursue engineering studies. Additionally, it reinforced the conception among both sexes as to girls and engineering studies not being an impossible and abnormal combination. Personal instruction in small groups made it easier for the more shy students to freely ask questions.

The actual activities were positively received. After some initial difficulties and uncertainty, the mathematics teachers also reacted positively. All students who provided feedback found the activities necessary; some considered small groups suitable while some tutors would have preferred a larger number of tutorees.

Project outcomes include launching and piloting the mathematics tutoring programme at the Oulu Polytechnic Institute of Technology. Most meetings were well attended by tutorees; only a few meetings lacked any attendants. A particularly encouraging development was more students participating in the second year.

However, tutoring in segregated groups was not a successful experiment. Not enough girls could be recruited as tutors or tutorees, apparently because girls had full schedules even without tutoring appointments. A separate girls' group could thus not be established, perhaps because the tutoring programme was ultimately not communicated effectively enough to the students. The teachers who were informed of the programme did not necessarily pass on the information to their students. A tangible result came from one tutor who believed to have averted a few failing grades.

The Institute decided to carry on with the tutoring programme because students found it useful and assumed it would continue. The Institute is also considering expanding the programme to physics as well.

After the end of actual instruction at the Institute in May 2003, a refresher course on mathematics was organised for those who had failed the course. The mathematics tutors helped with this course as well.

Contact person: Project manager Ms Kaisa Korpela, Oulu Polytechnic, Institute of Technology, Oulu

Developing contents and methods of instruction in physics and chemistry, Raahe Vocational School and Lybecker College of Arts and Crafts

The project involved planning and implementing a course on the chemistry of dyeing that was part of the compulsory course in physics and chemistry for artisan students and an elective for laboratory assistant students. Half of the course was implemented at the laboratory of Raahe Vocational Institute and half as study trips to workplaces in the field in the Tampere region. The course was attended by students and teachers from both educational institutions.

The goals of the course were to reinforce the importance of physics and chemistry, to develop teaching methods, to utilise the special expertise, tools and premises of the educational institutions, to utilise textile technology in laboratory assistant education, to build on the cooperation between educational institutions and to facilitate the networking of students in different fields.

The premise was to generate interest among girls and women in scientific knowledge and its importance and applications in one's own profession. The goal was to reinforce vocational skills (dyeing, chemistry) and gain added value from the networking of students in different fields.

The students were provided with information about study and career opportunities in the field of textile technology as well as further information about vocational orientation options. The teachers, leaders of the activities and other competent, enthusiastic and skilled women involved in the project may have served as role models for the students.

The work community's initial attitude of cautious optimism later turned clearly positive.

An evaluation survey found experiences with the course to be good. The project improved choices and bolstered the students' courage to pursue employment in an industry dominated by the other sex. As the age distribution of students was wide, the course also coached in taking into consideration people of different ages.

Development of the curriculum continues. The project provided experiences and material for future courses and ideas for developing other curricula (combining theory and practise, exploratory learning).

Although the textile industry is perceived as a women's field, the study visits showed that the majority of supervisors and employees were men, especially in technical textiles and industry. Students seemed to gain a desire to do away with this separation. They also realised that it would be in their best interest to consider jobs in atypical fields that might nevertheless offer interesting and challenging work.

Contact persons: Assistant principal Ms Pirkko Rouvinen and teacher Ms Paula Virtanen, Raahe Vocational School and Lybecker College of Arts and Crafts, Raahe

Kainuu Vocational College, WomenIT project 2

The second part of the WomenIT project at Kainuu Vocational College involved developing an ICT study unit and plan for flexible teaching arrangements. The project sought to encourage girls to pursue technology specialist jobs in industry and to guide them to the higher education in technology available in Kajaani.

The IT study unit was benchmarked against the European Computer Driving Licence (ECDL), an international certificate tested by pilot groups from three fields of education. The groups took part in teaching and tests for the certificate in autumn 2003, and 54 per cent of the pilot students also qualified for the certificate. Differences between fields of study were reflected in the groups' results.

The teacher pilot group compiled from different fields of education had teachers assess the ICT education needs and compatibility with working life needs in their own fields. The group determined two alternate ways of introducing the ECDL. Girls achieved the ICT study unit after passing the international level of ICT skills and knowledge, which inspires them to pursue further studies in the field of technology.

The plan for flexible teaching arrangements in industrial fields of education serves to inspire girls to pursue technology specialist jobs in industry. The plan of Kainuu Vocational College is based on an analysis of teaching arrangements already in place at the college and a synthesis of teaching arrangements implemented elsewhere in Finland. New and creative approaches were introduced to teaching.

The flexible teaching arrangements in industrial fields of education open up to girls opportunities to choose different training programmes and career paths. Flexible teaching arrangements ensure girls have an opportunity to study the various study programmes in industry and perhaps switch programmes.

Gaining an international IT qualification awakened girls to realise their ICT skills, which in turn encourages girls to make atypical choices.

The attitude of the work community at Kainuu Vocational College to the project's goals varied from enthusiasm to opposition. The project organised pilot teams in the study programmes of business and administration, culture and technology and transport. The pilot teams clearly reflected the development of the student's vocational identity, which was also transmitted to their attitudes towards equality.

The international certificate integrated into the ICT study unit directs and harmonises ICT education provided at Kainuu Vocational College. The assessments and proposals made for each field of education in the teacher pilot programme increased the amount of ICT education in many fields of education. The results of the feedback surveys among pilot programme students indicated the success of girls in qualifying for the ECDL increased their interest in and enthusiasm for ICT. In other words, the ICT study unit brought about interest in and enthusiasm for technology.

The courses offered during the project and the results received were integrated into the college's basic activities. The ICT study unit (European Computer Driving Licence ECDL) will gradually become part of the various study programmes at Kainuu Vocational College. Trained teachers serve as ECDL experts in their particular fields of education.

The international certificate in the ICT study unit harmonises and enhances ICT education provided at the college. Quick feedback to students about qualifying for the certificate increases their faith in their abilities and encourages towards further studies.

Contact persons: Project manager Ms Tarja Peitsaho and development manager Mr Esa Toivonen, Kainuu Vocational College, Kajaani

Equality issues training project, Women's Studies at the University of Oulu

The equality issues training project was planned and implemented in women's studies during 2002–2003. Participants were WomenIT project staff members, leaders of WomenIT local projects, women's studies students, University of Oulu employees and other interested persons. The premise of the training project was to develop a focus area of basis studies in women's studies consisting of study units that would strengthen the knowledge and skills of participants in dealing with equality issues in educational, training and work organisations. The idea was to provide basic knowledge and new perspectives into e.g. definitions of equality, the Finnish Equality Act and the history, current challenges and future visions of equality work. The "Equality issues" study unit of five credits (under the old degree system) consisted of the following courses: 1. Introduction: Sameness/difference, socialisation, the politics of values and equality (1 credit); 2. Human rights and equality legislation and social policy on the local, national and international level from the perspective of equality work (1 credit); 3. Equality in everyday life and dimensions of everyday life: "care", "emotion", "salaried work", "leisure" and gender (1 credit); 4. Peripheralising structures and processes in operating environments (1 credit); and 5. Local, national and global visions for an equal future (1 credit).

The course offered an opportunity to learn about the phenomena and concepts relating to equality and the structures and processes that uphold inequality and

segregation. Becoming aware of existing problems and examining the actions developed to resolve these problems as well as the debate on the subject challenges participants to gain deeper insight into the phenomena and provides information also about the more unfamiliar phenomena. The training project clarified concepts and terminology relating to equality and offered the participants methods of analysing their own actions, the values impacting on actions and attitudes from the perspective of realising equality. The project also resulted in the publication of a collection of articles on equality and women's studies.

The participants were happy with the course, which launched many processes of awareness and change. The steady increase in number of participants also reflected the positive impacts of the course. Work community attitudes varied from hostile through critical to encouraging.

Contact person: Lecturer Ms Vappu Sunnari, Women's Studies at the University of Oulu, Oulu

Women and multimedia (NAMU), Department of Educational Sciences and Teacher Education, University of Oulu

The NAMU project sought to lower the threshold of using new technology for the female teachers who were the projects' target group. The project involved a never-before tested way of combining the female perspective and new technology into a single course.

The NAMU course was implemented in spring 2003. Course participants met for five weekends of contact education and worked in an online learning environment between meetings. The course consisted of technology workshops, expert lectures and preparation of a project on the subject.

The participants' ICT skills and expertise were developed during the course by offering new ideas for using ICT tools to develop teaching. The course examined opportunities for developing new and open teaching and learning models and sought to support networking. The impacts of ICT on society and teaching in particular were examined with a critical eye, and ICT and its applications were studied from a female perspective.

Current teacher training makes some use of multimedia; however, this was not the case at the time teachers currently employed in the field were in training. Consequently, it was only a natural choice to target female teachers in the field.

The feedback from students was positive. More teachers than could be accommodated applied for the training, indicating intense interest and demand. All participants seemed interested in the subject and wished to improve their personal ICT skills. External comments were also positive and encouraging.

The participants gained the most recent information about women's studies and practical models for applying multimedia to schoolwork. The project also provided a new spark to work for many participants, who came to better understand the potential and limitations of ICT in supporting learning and teaching. Participants were able to communicate online and study materials were also distributed over

the Internet. Participants working at different school levels also gained useful knowledge not only from course materials but also from each other.

In future, gender equality will be taken into account in the ICT education provided in the department of education. Course content will also be utilised in teacher training e.g. in the courses of introduction to ICT, didactics of ICT and digital media in educational technology.

Contact person: Lecturer Mr Kari Kumpulainen, Department of Educational Sciences and Teacher Education, University of Oulu, Oulu

Girls, work and technology (TEE!), Faculty of Education, The Research Unit for Educational Technology, University of Oulu

The project sought to extensively introduce class and subject teacher students as well as class and subject teachers in working life to ICT applications. The goal was to encourage the use of ICT applications in work and to support career choices in technology for girls and women. Creating positive attitudes towards the use of technology was thus pivotal to the project. The idea was for teachers to convey this attitude to pupils and students and thus encourage girls as well to make use of technology.

The project included a course of five credits (under the old degree system) on the possibilities of ICT in working life. The course consisted of a theoretical section on learning and a practical section, which was implemented as multiform learning comprising contact teaching, communal online assignments and independent studies.

The course also included a hidden curriculum as to how teachers or students of teaching could convey their personal positive experiences to pupils. This would allow the dismantling of the traditional conception of ICT applications primarily being part of "the men's world", serving the needs of men rather than women.

The project generated interest and participants were easy to locate. Students felt they had gained more courage in learning about various ICT applications. Those students whose attitude towards technology had initially been negative experienced an obvious change for the positive in their attitudes during the course. Interest in learning more about the uses of technology and finding out about the subject also increased. The students found the course atmosphere positive, which encouraged them to examine ICT applications and ask for help whenever they needed it. Those students who had been involved with technology prior to the course also found the course beneficial.

Course participants gained information and personal experience with several common ICT applications central to education. Additionally, lectures delved into themes relating to society, technology and learning. Every participant first studied a given application from a technical viewpoint and then examined its appropriate applications in teaching. Finally, the students combined their technical and pedagogical learning and knowledge by writing a pedagogical manual on a given application.

During the project, the educational technology research unit started to consider the theme of equality more extensively and now seeks to introduce a gender-sensitive attitude more visibly and consciously to educational technology studies. For example lectures will deal with the equality theme from the viewpoint of technology and technological development.

The outcomes of the project will primarily be employed in the educational technology research unit in the Faculty of Education at the University of Oulu. Our future courses relating both to basic and continuing education in the faculty will make use of experiences obtained from the project.

Contact persons: Professor Ms Sanna Järvelä, planning officer Mr Jaakko Lounila and teacher Ms Essi Kallio, Faculty of Education, The Research Unit for Educational Technology, University of Oulu, Oulu

Planning and organising mathematics clubs, Department of Mathematical Sciences, University of Oulu

The activities during the WomenIT project were planned and implemented by lecturer Alli Huovinen and students of mathematics. The activities were targeted at pupils in comprehensive school and at subject teacher students.

Pairs of mathematics students were given the topic for one club meeting on which they prepared final lesson plans under guidance and presented these plans to each other. After this, the clubs were started at eight schools; in spring, four more schools joined up. The club instructors in autumn were 14 students of mathematics, in spring there were 22 students and one class teacher student specialising in mathematics.

The mathematics clubs sought to interest more pupils in studying mathematics. A particular goal was to increase the interest of girls in mathematics so that women could also choose to pursue careers in technical fields. The goal was for club instructors to gain greater mastery of the subject, learn to plan and implement study units and become more secure in their identity as teacher. Additionally, the clubs provided children with a safe and meaningful after-school activity.

Girls often don't choose the advanced mathematics course in upper secondary school, which narrows down the range of career options available to them. Club activities seek to instil a mathematically oriented way of thinking into students in the early years of school by utilising a teaching method differing from normal class instruction.

It would seem that mothers have come to realise the importance of mathematics and girls are being given more encouragement to take up mathematics. Feedback from mothers in particular was thoroughly positive and encouraging. The activities were also well received in the work community.

There were no ready curricula or textbooks for mathematics clubs, meaning the instructors had to come up with inspiring topics. This also gave the instructors a good grounding for their future work as teachers. A few of the first club instructors have already started practical teacher training and the fruits of club work are reflected in their efforts.

The number of club members doubled after the first term. The number of girls in particular rose sharply and in spring they well outnumbered boys. All parties (children, parents, instructors and teachers) reported their interest in mathematics had grown. Study motivation also increased as the clubs showed the many uses of mathematics, and this interest is likely to hold in future as well.

Thanks to our activities, mathematics clubs have continued in the participating schools in the Oulu region and other municipalities and been taken up by new schools as well. In future, the instructors who were involved in planning and implementing the clubs could begin to train new club instructors. Mathematics clubs could also continue to provide after-school care and meaningful activities to children, the mathematics experts of the future, as well as practical training for students of teaching.

Contact person: Lecturer Ms Alli Huovinen, Department of Mathematical Sciences, University of Oulu, Oulu

Girls, women and education in technology, Kajaani Department of Teacher Education

The goal was to familiarise women studying to be teachers and pupils in primary school, girls in particular, with modern technology through technology training. The purpose was to develop gender-sensitive technology education activities suitable for daycare centres and comprehensive schools. The course offered female students a chance to study technology training, a field that is often perceived as a male domain.

The course comprised lectures and group classes for students. In these classes, various problem-solving assignments were completed using e.g. teamwork. The model plane project served as an introduction to the wider project concept that integrated various skills and subjects.

Additionally, the students held a technology club for pupils at the teacher training school. Originally, the club was intended for girls but as only six girls enrolled in the club, the group was supplemented with six boys.

The students involved in the project were highly motivated and interested in the new topics of study. The students of teaching gained practical experience in providing technology training and realised that it wasn't that difficult after all. In the feedback received, many wrote of how they intended to utilise the course topics in their future work. These teachers will thus also serve as role models – women skilled in technology – for young girls. As the girls participating in the clubs gained greater skills and knowledge, it becomes easier for them to choose technologically oriented courses and studies also in future.

Elements of the course will be integrated into future courses on technology training, and club activities may also be continued at the teacher training school.

Contact persons: Lecturers Ms Aulikki Keskitalo and Mr Juha Turpeinen, Kajaani Department of Teacher Education, Kajaani

Physics for subject teachers, Department of Physical Sciences, University of Oulu

The goal was to attract greater numbers of physics students to subject teacher training, to lower the threshold of students to enrol in subject teacher training, to attract more girls into subject teacher training and to lower the threshold of using ICT in teaching.

The project launched a new "Physics for subject teachers" course, designed to be taken before actual subject teacher studies. The students were informed about being a teacher and educated in didactics. The students also selected brief and extensive subject matters that were worked on during the course and on which classes were given. Visits to nearby schools provided insight into the work of teacher and a chance to practice teaching. More emphasis was given to demonstrations towards the end of the project.

The students' teaching was videotaped during the course for purposes of self-evaluation. The method was fairly brutal, but the students took it well. Students examined the videos in seminar-type meetings.

There are few female physics teachers. The course on physics for subject teachers provided encouragement to enrol in subject teacher education and also gave experience and self-confidence. It lowered the threshold of enrolling in subject teacher education. Students participated quite actively in the course.

The students prepared and gave brief lessons during the course and their improvement was obvious as the course progressed. Two lessons by each student were videotaped and critically examined in the group. The students had a chance to try out subject teacher studies and decide whether it was something they wished to pursue, thus bringing greater clarity to their career plans. The course on physics for subject teachers contributed to thirteen students enrolling in subject teacher studies in 2004, compared to only eight the previous year. The new course is a tangible manifestation of the support and assistance provided to subject teacher students by the department. Another outcome worth mentioning is the increased cooperation between the various parties.

The course was integrated into the department's activities and will be offered every year as an elective period of subject studies in the subject teacher training programme. Cooperation with the Faculty of Education will also continue, and more demonstrations will be held in schools. Cooperation between the various parties proved especially valuable.

Contact person: Lecturer Mr Kari Kaila, Department of Physical Sciences, University of Oulu, Oulu

Developing the education of subject teachers in chemistry, Department of Chemistry, University of Oulu

The project sought to further develop the education of subject teachers in chemistry. Its goals were to combine theory and practice in the teaching of chemistry,

illustrate phenomena in the subject, didactics and teaching critical of the contents of instruction.

More teachers of mathematics subjects majoring in chemistry are needed and their abilities to provide teaching should be substantially improved. Many of the students pursuing these studies are women.

A course on chemistry for subject teachers (20 credits under the old degree system) was implemented within the framework of the project in spring 2003. The course comprised a period of teaching and laboratory work, portfolio work and the planning and preparation of assignments, demonstrations and teaching sessions.

The course gave students greater self-confidence and experience in teaching chemistry. Both students and teachers found the course valuable.

As a result of the project, the students started putting together a portfolio to support their work as teachers, practiced actual teaching and gained more experience in performing. The teaching sessions were videotaped for later personal analysis. As course participants complete their subject teacher studies, the outcomes of the project will be dispersed in the form of concrete teaching concepts and information about equality.

Contact person: Lecturer Ms Leena Kaila, Department of Chemistry, University of Oulu, Oulu

Studying at the Department of Information Processing Science - a study from the gender perspective, Department of Information Processing Science, University of Oulu

The study sought answers to the following questions concerning the Department of Information Processing Science:

- What is the typical path of studies?
- What differences based on gender can be observed in study paths?
- How is gender reflected in course choices and dropout rate?
- What kind of study environment is the department especially for women?
- How could the degree programme be made more gender-sensitive?
- What impacts do study choices have in working life?

The study was conducted through student interviews and by compiling statistical data from the study register and data on graduates. The goal was also to chart the possible hidden structures in the degree programme, to examine the employment of department graduates, to compare the studies of men and of women, and to study the impact of studies on employment.

The WomenIT project brought equality issues to the fore at the Department of Information Processing Science. Attempts will be made to alleviate the factors impeding the successful studies of female students that were observed during the study, which will also have an effect on teaching and student guidance. The Department will thus become friendlier to female students, which in turn might even impact on employment.

The Department wishes to safeguard the attractiveness of information processing studies to potential students and to review the contents of instruction so that women and all students in the Department have equal opportunities to study, graduate and find employment.

The project provided the Department with the desired new information. Development targets observed in the study will be taken into account when reforming the structure of studies. The data obtained will also be utilised in student counselling and study planning. Gender-sensitive recruitment material to be handed out e.g. to comprehensive-school leavers, careers counsellors and employers was also produced in the project.

The project helped provide information for the use of Department employees, especially those involved in student counselling and study planning. It will also serve as a platform for debate in the Department on questions involving equality and gender. The development targets arising from the study were summarised to serve as a basis for further development.

Contact persons: Designers Ms Heli Mikkonen, Ms Anna Ruuska and Ms Heli Alatalo
Department of Information Processing Science, University of Oulu, Oulu

Study on the structure of curricula in degree programmes leading to MSc (Tech) degrees from a gender equality perspective, Faculty of Technology, University of Oulu

The study sought to obtain insight into the factors and practices that potentially introduce inequality into the structures and contents of curricula in degree programmes leading to MSc (Tech) degrees. An integral element of the study were proposals for measures to rectify the detected faults. Additionally, the study sought to introduce into debate among teachers of technology and those preparing curricula the significance of gender in a positive and constructive spirit.

Initially the study employed statistical research methods to determine study paths, i.e. how a given student accrued credit and which student support services that student had taken advantage of. The statistical data was used to determine whether the study paths of female and male students differed and examined the relationship between planned study path (as presented in the study guide) and actual study path. Potential differences between the genders were taken into account.

In the next phase, students and teachers were interviewed on themes arising from the earlier phase.

At least in Finland, no studies had previously been conducted on the structure of curricula in particular (e.g. the timing and succession of study units, compulsoriness and electiveness of study units, scope of degree and study paths). To date, research data has been obtained on course content, the manner of content presentation and, to some degree, teaching methods.

This research is an integral element in advancing equality throughout the educational process. Girls and women must be able to count on the positive images offered

to them in school with regard to e.g. studies in mathematics becoming reality in higher education. This promotes girls and women pursuing technological studies and also encourages them to commit to technological studies and subsequent careers in technology.

The results of the study were presented to parties responsible for preparing curricula, including the faculty's study committee, the careers counsellors of the various departments and the faculty's head of academic affairs. Several events to present work to promote equality carried out at other universities were also organised to foster further discussion.

Additionally, the curriculum development model arising from the research can be applied to technology education at university level also at other educational institutions besides the University of Oulu.

Gender was introduced as one aspect from which the curriculum development process may be examined. More attention was paid to supporting the studies of female students and plans were also made for types of support involving their particular environment. In this, models of support designed for male students returning to their studies after military service provided an example. Discussions on the theme of equality continue with Department employees and cooperation on equality issues has been launched with other universities of technology.

Contact persons: Project manager Ms Katariina Alha and designer Mr Aimo Rahkonen, Faculty of education, University of Oulu, Oulu

WomenIT – Women in Industry and Technology 2001–2006

WomenIT was a project focusing on training, research and development planned, administered and coordinated by the Kajaani University Consortium of the University of Oulu. It sought to desegregate working life from the split into traditionally gender-identified women's and men's jobs and professions. The more than 60 partners involved in the project participated in a total of some 40 development plans (local projects).

The WomenIT project was funded through the European Social Fund's EQUAL initiative, which seeks to prevent inequality and discrimination in the labour market and to promote social inclusion, one of its dimensions being the added value gained from international cooperation. The WomenIT project was part of the thematic field of equal opportunities for women and men and specifically part of the action plan to reduce gender gaps and support job desegregation.

Innovative operating models
The overall key concept in implementing the WomenIT project was the awareness of real change requiring more than just introducing girls and women to technology and attracting them to the field. In order to achieve more lasting change, it is necessary to influence structures and policies in the segregated labour market. This means both acknowledging the factors causing gender inequality and identifying unequal operating models and structures. The process is a lengthy one and it is made particularly challenging by the fact that the aforementioned phenomena are unconscious, and by the erroneous but widely spread conception of equality

having been achieved in Finnish society. Development partnerships were created in line with this key concept. Throughout the project, the increased awareness of equality among partners and their gender-sensitive development work through individual local projects was supported through various forms of operation (e.g. training and group work).

The WomenIT organisation
The WomenIT project organisation consisted of three sub-projects: sub-project 1 involved the administration of development partnerships and the coordination of activities that supported or were targeted at the entire development partnership. Sub-projects 2 and 3 were formed around the partners' sub-projects (local projects) so that sub-project 2 comprised projects involving working life while sub-project 3 focused on the educational and pedagogical sector. The steering group acted as development partnership expert, supported the execution of the project and monitored the achievement of targets and results.

Working groups
The project employed a working group-based operational model designed to consolidate and bond the development partnerships both horizontally (between actors) and vertically (between actors and the administrative organisation as well as with other elements of society). In addition, the working groups served as forums for exchanging experiences and providing training. Expert support was also made available through the working groups.

Online environment
As the development partnership was scattered over a wide geographical area, an internet-based online environment was secured for the project. This supported the activities of the working groups in particular so as to reduce the need of physical meetings and allowing common matters to be processed and taken forward also outside face-to-face meetings. Likewise, the environment was used for dissemination of information, reporting and training as well as open discussions and exchange of experiences across working group lines.

Training
Various types of training, such as the "Equality issues in schools" seminar (five credits under the old degree system) together with women's studies at the University of Oulu, were provided both to support the development of equality knowledge and gender-sensitivity as well as in relation to the theme of girls and technology.

International activities
International activities helped bring greater insight and cooperation in mentoring, careers guidance, research, developing working life practices, reconciling work and other aspects of life and support models for those who have made atypical choices. The activities included joint working groups, seminars, goal-oriented action plans, material production, science camps and visits to educational institutions, companies and equality authorities in different countries. Originally, the project's partner nations were the UK and Denmark; contact was made with France and Germany through the UK.

A Transnational Co-operation Agreement (TCA) was signed between Finland, Denmark and the UK. In this agreement, operations were divided into themes and the coordination of these themes was allocated among the partners.

Country	Name of project	Specific theme
Finland	WomenIT	research, education
Denmark	Get a Life, Engineer!	work and family life balance
UK	JIVE Interventions	careers, mentoring
France	Nouveaux acteurs de la mixité des emplois tehniques	
Germany	Gender Mainstreaming in der Informationsgesellschaft	

Responsibility for coordinating international activities circulated among the partners at six-month intervals according to a pre-determined schedule. This allowed a more even allocation of resources between the partners. An external evaluation of a participatory and reflective nature was also added to the international action plan, helping partners to specify and deepen the added value obtained from international activities and also to discover common elements in work on behalf of equality. The online cooperative environment used by the WomenIT project was also used in work on the various themes in international cooperation.

Communication
A plan for communication, dissemination of information and marketing was prepared at the early stages of the project. The goal was also to increase the recognition of the actors among the general public. Internal communications were managed through email lists and the online environment. External communication made use of the project's website and information list as well as more traditional media such as newspapers, magazines and trade publications and radio and television. Visibility for the project was also sought from the various events and fairs in different subjects. The general goal of communication was to put the actors and their development efforts on centre stage.

Evaluation and reporting
The WomenIT project was evaluated at many levels: target audience, sub-project, theme/working group, local project and entire project. The evaluations from different levels and of the various events were compiled into reports. A summary of reports on the local projects of partners was prepared every six months for the final report on the entire development partnership. The final report on WomenIT thus took the shape of a serial story comprising records for each six-month period. The sequential progress of the development partnership can easily be followed from this report. In spring 2003, an external evaluator prepared an interim assessment on the project. The results of this assessment were utilised in further planning. A final assessment on how well the results and practices achieved had taken root was conducted in summer and autumn 2005.

Material production
The production of materials was based on development efforts carried out during the WomenIT project both within the local projects of partners and the activities of working groups as well as at development partnership level. The project resulted in a great deal of communications and marketing materials as well as various types of educational and information materials (guides, videos, etc.).

Publications:
- WomenIT-projektit ja Hyvät käytännöt (WomenIT projects and Good practices)
- Tasa-arvo arkeen – WomenIT-projektin tasa-arvo-opas yrityksille ja organisaatioille, also in English: Equality to everyday life
- Opetuksen ja ohjauksen tasa-arvoiset käytännöt – sukupuolen huomioiva opas kasvatuksen arkeen (Equal practices in education and guidance)
- Research publication: Koulutus, sukupuolisosialisaatio ja teknologia – näkökulmia segregaatioon (Education, gender socialisation and technology – perspectives to segregation)
- Together with the Equal/Mirror project: Monimutkaista, mutta mahdollista – hyviä käytäntöjä tasa-arvotyöhön, also in English: Difficult but doable
- In international cooperation: European Examples of Good Practice in Careers Guidance and Good Practice in Mentoring: European Guidelines

Other material:
- Johtotähti – päiväni toimitusjohtajana –game (Beacon – my day as managing director)
- Rajana vain mielikuvitus - Imagination is the only limit – video, subtitled in English
- Women's euro -pin
- MONInaiset ELÄMÄT - playing cards (Versatile lives)
- Posters
- Suomi - tasa-arvon mallimaa? - set of postcards (Finland – a model country for equality?)

Mainstreaming
Mainstreaming means conveying results of activities and established good practices beyond the scope of the project into the wider arena. It stands for dissemination and rooting of experiences and their inclusion in strategies both at the level of operations (such as in schools and enterprises) as well as at the level of decision-making and politics in society. In practice, mainstreaming can be understood as a method/methods. One way is to influence general policy-making and decision-making; examples in this area include ministries, administrative organisations, civil servants, politicians, labour union players, employers and regional authorities. This method is called vertical mainstreaming; another is referred to as horizontal mainstreaming. WomenIT implemented both in line with its mainstreaming strategy and mainstreaming plan. Mainstreaming tools in WomenIT included proposals for measures directed at various parties that describe the phenomena arising during the project and the measures proposed to address these phenomena; tours of presenting results together with the actors; training; newspapers articles; and influencing via radio and television. A good principle for executing mainstreaming in WomenIT was found to be intense participation by actors and their empowerment. The actors joined shared delegations to present the methods and results of the WomenIT project.

The greatest goal of activities in the WomenIT project and a result that in the main was also achieved was to support the awareness process of the actors in matters relating to equality. In this respect, the project was successful. For some actors, achievements were excellent. Expertise in equal operations increased vastly in the project's sphere of activities.

Contact person: Project coordinator Ms Marja-Leena Haataja, WomenIT

SUPPLEMENT

This section consists of an overview of the Finnish education system and checklists to help professionals in childcare, education and guidance to evaluate their own work from a gender-sensitive perspective.

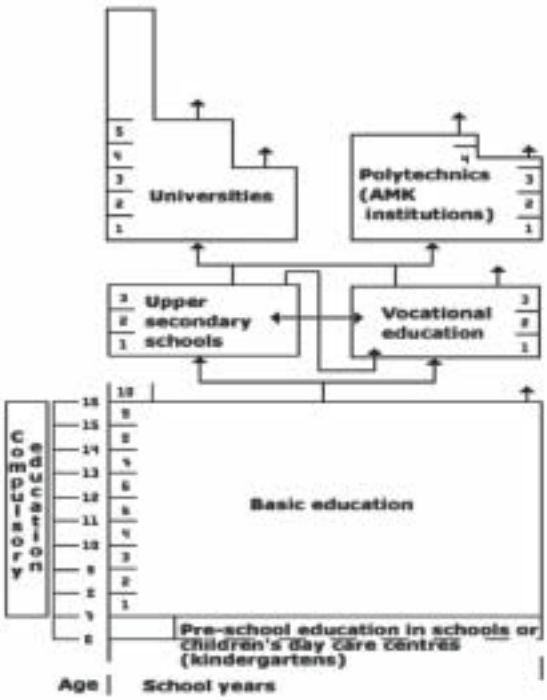
The Finnish daycare and school system

Early childhood education aims to promote the healthy growth, development and learning skills of children. It is provided at daycare centres and preschools, and in morning and afternoon play activities. The early childhood education services organised by society seek to support parents in their right and obligation of bringing up their children. A national plan has been prepared regarding early childhood education.

All children below school age are entitled to receive municipal **daycare** either at a daycare centre or in family daycare (the care provider takes the children into his/her home). Daycare costs are calculated according to size of family and income. There are also private daycare centres and family daycare providers in Finland. The cost of these is subsidised by the state. Daycare is designed to provide families with small children a safe, stimulating and inexpensive form of child care.

Pre-school education is intended for six-year-olds who will start their compulsory education in the following year. Participation in pre-school education is voluntary, and it is provided in daycare centres and in pre-school classes operating in connection with comprehensive schools. Almost all six-year-olds take part in

Education System of Finland



Source: National Board of Education. http://www.oph.fi. 17th June 2005.

pre-school education. It prepares children for school by emphasising the child's individuality and teaching children to function in groups. A core curriculum has been drawn up for pre-school education. The focus in pre-school education is to create a playing and learning environment. Instruction is not divided into subjects or lessons, but it does include various subject fields and objectives, such as language and interaction, mathematics, environmental and natural studies, and health.

Basic education means the general education provided for each age group in its entirety. Its completion in comprehensive school takes nine years. Instruction is guided by the national curriculum that constitutes the basis for local curricula. The basic education (comprehensive school) syllabus is divided into subjects and teaching groups are formed according to year classes, i.e. forms or grades. During the first six years (primary school), instruction is usually given by the class teacher, who teaches all or most subjects. Instruction in the three highest forms (lower secondary school/secondary school) is usually in the form of subject teaching, where different subjects are taught by subject teachers. Basic education also includes pupil counselling and, if necessary, special education.

Upper secondary school offers general education and ends with the matriculation examination. Upper secondary school studies consist of compulsory, specialisation and applied courses. Each student is responsible for completing a sufficient number of courses that they may choose according to their study plan. The matriculation examination concluding upper secondary school studies is drawn up nationally, and there is a centralised body to check its individual tests according to uniform criteria. There are four compulsory tests in the matriculation examination and candidates may voluntarily take optional tests. Tests are arranged each spring and autumn. **Initial vocational education** prepares for vocational qualification. It is provided in vocational institutions and in the form of apprenticeship training, in which students combine theoretical education and work. Work experience also plays a major role in vocational education given at educational institutions. There are a total of 52 vocational qualifications in Finland. Students may also choose study modules from both modes of education. Upper secondary education and vocational education take 3–4 years to complete.

The Finnish system of **higher education** comprises two parallel sectors: universities and polytechnics. **Universities** are characterised by scientific research and the highest education based thereon. **Polytechnics** are oriented towards working life and base their operations on the high vocational skill requirements set by it. Studies leading to a polytechnic degree take 3.5–4.5 years. The university degree system was reformed in 2005 to comply with the ECTS system. Under the new system, the scope of the lower academic (Bachelor's) degrees is 180 ECTS credits. These can usually be completed in three years. The higher academic (Master's) degrees, which consist of 120 ECTS credits, can be taken in an additional two years.

Most education in Finland is funded by the state and municipalities and free of charge to students. No charges are made in basic education although some fees may be charged e.g. for study materials in the upper levels of basic education. Students in post-basic education may apply for student benefits. The most important education policy guidelines are regional accessibility of education, equal opportunities to education for both language groups (Finnish and Swedish), no separation of the sexes, instruction free of charge and the State's financial aid scheme for students.

Sources:
National Board of Education. http://www.oph.fi. 17th June 2005.
Ministry of Social Affairs and Health. http://www.stm.fi. 17th June 2005.
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For more information, please visit http://www.eurydice.org.

http://www.womenit.info
http://www.womenit.info/equalitytoeverydaylife.php
http://www.womenit.info/equalpractices.php
http://www.womenit.info/careersbooklet.php
http://www.womenit.info/mentoringmodels.php

Checklists to help build a more equal and gender-sensitive learning environment

Several studies indicate teachers are inclined to ask pupils different types of questions depending on whether the pupil is a girl or a boy. Girls are asked simpler questions relating directly to the study material and homework that can be graded on a simple right/wrong scale. Questions put to boys allow creative application of knowledge and experiences. Similar behaviour has been observed among careers counsellors.

In study materials, gender, related values and their hierarchy are clearly present. Teachers, careers counsellors and other educators should be aware of such differences and consciously attempt to alter their adopted practices that impact on the subliminal level. In her book, "Se pieni ero" (The tiny difference), professor Elina Lahelma has presented a series of checklists that allow professional educators to assess their own performance with girls and boys. These lists have been utilised and reworked in the WomenIT project; below is a sampling of questions.

Teachers:

1. How often do you call on girls, how often on boys?
2. What kind of feedback and how much of it do you give to girls and to boys?
3. Do you listen to girls? Do you demand that boys listen?
4. How do girls get your attention, how about boys?
5. Do you insist that boys play by the rules when it comes e.g. to raising their hands?
6. Do you apply similar standards to appraising the performance of girls and boys?
7. Does the behaviour of pupils vary in different subjects?
8. What are the attitudes of girls towards technology, mathematics and natural sciences?
9. What is your own attitude towards technology, mathematics and natural sciences?
10. How do you organise teamwork and roles within teams?
11. How do girls and boys behave in teams?
12. What are your teaching methods and contents of study materials like, what kinds of topics and examples do you choose?

13. How do you keep the classroom peaceful? Which pupils do you rely on? Does gender make a difference as to which pupils need to be calmed down?
14. Is your attitude towards pupils gender-neutral: gender doesn't matter? Watch to notice the point at which gender comes into play. What kinds of situations bring up gender?
15. How often and in what kinds of situations do you address pupils collectively as girls and boys instead of using their names? What kind of impact do you want to have then and what is the actual impact? Would it be possible to use given names instead of addressing pupils collectively?

Study materials:

1. Are men and women equally represented?
2. How and in what types of roles do the genders appear? Are girls passive bystanders and boys active players and leaders?
3. What are the functions and duties of the genders? Do girls play with dolls and boys with cars? Are the girls nurses and boys engineers?
4. Observe the spheres of life from which concrete examples are drawn. In mathematics, is distance illustrated by driving a car? Does physics use a block and pulley to demonstrate the halving of mass? Does the material for mathematics and natural science contain examples drawing on the lives of girls and women?

Careers counsellors:

1. How do you present various jobs to students? If a girl or boy tells you they want to work with people, do you tell the girl about nursing or teaching and the boy about engineering or the military?
2. Images of jobs have a substantial impact on career choice. Are you able to update your own information e.g. during work experience?
3. Do you challenge your own perceptions as to jobs suitable for girls/women and boys/men?

Principal's checklist

1. Principals must be committed to acknowledging equality in schools.
2. Class overlap when preparing schedules (e.g. technical craft at the same time as physical education for girls) may steer choices.
3. Does the workplace allow flexible reconciliation of work and family life; does it afford flexibility as life situations change?
4. How are various tasks allocated in the workplace with regard to both teachers and other school staff?
5. Do you encourage your staff to take on new challenges, e.g. male teachers to teach first and second grade and comparably women to teach upper grades?
6. Do the teachers of certain subjects have more say in matters involving the whole school?
7. Are the technical craft facilities open to all teachers? What about other common school facilities?
8. What kind of clubs do the teachers run and how are the genders represented in the clubs?
9. What kind of activities do you ask pupils to join: setting up chairs in the assembly hall, sports events? How are these divided by gender?

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