Gender in Information Technology: Review of a Mentoring Initiative

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Abstract

There is a general lack of women in the Science, Engineering and Information technology research fields at all career levels. This is a worldwide phenomenon that seems related to social and cultural stereotypes. The Gender and Science ITC-irst group has investigated whose actions could be proposed to support the female researchers inside ITC-irst in spreading out effective role models and in improving their scientific skills. A first cycle of scientific lectures was organized in the winter 2002-2003. At the same time, a series of mentoring workshops was proposed with the main objective of increasing the experience of ITC-irst female researchers and to grow the self-esteem for all the participants. Given the positive results of the first initiatives, the Gender and Science ITC-irst group organized a second series of scientific lectures and mentoring in winter 2003-2004. All the activities were organized paying particular attention to gender issues. This paper describes the second series of activities, and their evaluation.

KEY WORDS: gender issues, information technology, women in science, mentoring, role models.

1 Introduction

A gender difference is present in the way of living the job. Although this difference may enrich the working environment, it is not always perceived as a value. Several studies have been showing that women have often difficulties in finding appropriate career models in science and information technology areas and are under-represented with respect to males at all career levels, with the greatest unbalance at the top of the hierarchy [1-3]. An internal study [4] highlighted a similar situation in our research institute ITC-irst [5]. Consequently
the Gender and Science ITC-irst group [6] decided to experiment some activities aimed at promoting the presence of women researchers, inspired by previous experiences in the specific fields of women in Engineering and Computer Science [7].

The group started in 2002 with a series of scientific lectures held by experienced international female researchers working in some of the most advanced scientific areas of Computer Science, Information Technology and Microsystems. The principal objective was to encourage female students and researchers by giving them successful examples of research careers experienced by women, in areas close to those of interest to our institute. In the same year the group organized some mentoring workshops [8] connected to the scientific lectures. These mentoring activities, addressed only to women scientists, aimed at increasing the awareness of women scientists of their role within the institute and at contributing to a positive change in the local cultural environment.

After the positive results of both the initiatives, the group planned a new series of scientific lectures and mentoring workshop in winter 2003-2004, opening the mentoring workshops to all researchers (female and male). Therefore the mentoring workshops offered an opportunity to improve one’s professional preparation and skills, paying special attention to individual styles and gender peculiarities.

The scientific lectures initiative and its evaluation are described in section 2 of this paper, whereas the description and evaluation of the mentoring workshop activities are reported in section 3. Conclusions and future work of the Gender and Science ITC-irst group are presented in section 4.

2 Scientific Lectures

2.1 Description of the Initiative

Despite considerable progress, women are still severely under-represented, with respect to males, in science, engineering and technology. Although two-fifths of PhDs in the EU are women, in approximately half of the Member States just one woman for every ten men reaches the higher echelons of a university career [9].

In the Eastern and Central European countries women constitute the majority of teaching staff in academies of sciences and in universities, but they tend to be concentrated in the lower academic positions [10]. Influence of social and cultural stereotypes seems to be mainly at the origin of this worldwide phenomenon. However, also the lack of role models, in particular for non-traditional careers as could be those in the Information Technology (IT) field, seems to discourage girl students to follow challenging scientific careers. Say researcher to girls and they probably think of a man in a white lab coat. If a girl has never met a woman engineer or a software programmer, she might conclude engineering and computer programming were men’s work, and turn away from an interesting career.

Important projects have been developed throughout the entire world to promote women participations into scientific and technological studies and jobs,
connecting girls with meaningful role models. The Women of NASA [11] sponsored the educational initiative *Women of the World*. Through this program, online chats were available with the nation’s most successful females in a wide range of professions, offering young people anywhere opportunities and experiences to gain insight into their own future choices. This project supported students, parents, and schools in an important learning opportunity to dialogue with USA’s most successful female leaders via the World Wide Web and provided a way in which they could dialogue with women typically not accessible to the public. The MIT Department of Electrical Engineering and Computer Science (EECS) organize a *Residential Summer Program* [12] to introduce High School girls to EECS in the summer after 11th grade. The goal of this project is increasing High School girls’ interest and confidence in pursuing engineering and computer science. The committee of *Introduce a Girl to Engineering Day* [13], inside the National Engineers Week in the USA, proposes plenty of initiatives: for example, an evening for middle school student girls to help them understand engineering, science & technology. Six female engineers will be the speakers; tours of lab and engineering areas, one-on-one time with female engineer-mentors, etc…

The *Gender and Science ITC-irst* group proposed the first *Women in Science lectures* initiative in 2002, a scientific lecture series held by experienced international female researchers [7]. The speakers were professors at prestigious universities or in charge of research groups in some of the most advanced scientific areas of computer science, information technology and microelectronics. The principal aim of the initiative was to encourage female students and researchers by giving them successful examples of research careers experienced by women, in areas close to those of interest to ITC-irst institute. Since this first experience obtained positive results [8], the group decided to propose a second series of *Women in Science lectures* for the winter 2003-2004, with a slightly different organization derived from the first series results. First of all, for this second series the heads of scientific departments inside ITC-irst and other local scientific subjects (university) were involved in drawing up and in the selection of the speaker list. This fact favoured a higher rate of participation and a more effective local relapse. Secondly, a propaedeutic activity for stimulating networking has been organized: young researchers and research managers could meet personally the speakers during individual meeting for showing demos and speaking about their own scientific interests. Thirdly, to give our audience a different point of view, a non-scientific speaker has been invited among the five ones, a journalist who will refer on discriminations in progress in the scientific field towards female researchers. Afterwards, she will conduct live her daily radio transmission involving the present people. During the transmission, a local female researcher will be interviewed.

### 2.2 Evaluation of the Initiative

In order to evaluate the 2003-2004 *Women in Science Lectures* series, two aspects have been considered: the participation to the lectures and the networking activity connected with them.
Regarding the participation, a high number of people, internal and external researchers, attended both the lectures so far given. This is definitely the consequence of the higher involvement of the scientific departments in the lecture organization.

Regarding the networking activity, the contact with the speakers both for the Gender and Science ITC-irst group and ITC-irst researchers has been positive. The members of Gender and Science ITC-irst group, meeting the speakers, could improve their knowledge about the gender theme and get new enthusiasm and ideas for organizing future initiatives. ITC-irst researchers could establish new contacts and reinforce old ones for future projects.

Being the second Women in Science Lectures series not concluded yet, a deeper evaluation will be done only after the last lecture, in September.

Objective of the Gender and Science ITC-irst group was to propose alternative models for female scientists career, different from the classical male models. The idea was to propose models of female scientists that arrived at the top of the scientific career realizing a good balance between scientific and private life.

3 Mentoring workshop activities

3.1 Mentoring overview

We think that mentoring activity is one of the pursuing strategies for increasing the presence and the advancement of women in technical-scientific fields. After the success of our first mentoring workshops cycle (2002-2003, [8]), a second cycle has been organised for 2003-2004. The activity had several objectives and aimed at improving both the skills of the researchers and the quality of the working environment. In fact, awareness of individual capabilities and professional preparation lead at the same time to a consciousness in both male and female researchers about the role of women in the research and may contribute in this way to a less chilly climate.

In our case, the most explicit aim is the improvement of personal and professional skills of both junior and senior researchers, so that they can acquire more self-confidence and self-esteem. In fact women who successfully pursue careers in science, despite these challenges, often have to face additional difficulties in their interpersonal relationship and self-esteem [14]. Furthermore, a social environment that attributes familial and care-taking roles to women, who are expected as wives and mothers, competes with research demands, so that sometimes female researchers can feel stuck in their career. In addition, since this activity was open to all research personnel, male and female; it was an occasion to meet new colleagues, who could be interested in participation in similar activities and in discussion on gender issues. Finally, this initiative has also the long-term aim to contribute to a positive change in the local cultural environment, enhancing internal and external visibility of women and giving an example of an environment accessible and approachable by either gender.
3.2 Description of the initiatives

Mentoring is traditionally a relationship in which an experienced person, the mentor, provides support to a less experienced person, the mentee. In the traditional model a personal relationship is established, where the mentor fulfils either or both the technical and psychosocial needs of the mentee. The model followed in our institute is instead a collective, cross-gender mentoring. The collective aspect is a consequence of different factors. Firstly, one-to-one relationships require a lot of people to act as mentors and models, as well as a well-built organisation to manage the mentorship; being at the beginning of this kind of initiatives we can look at this model only as a possible future goal. Secondly, the proposal of thematic seminars on specific topics seemed to be the most appropriate way to reach our objectives. We decided for an external person as mentor, being difficult to find a person with such a professional preparation and with the personal wish to take on this role inside our institute. The choice of a cross-gender mentorship is also the result of several factors, but principally we tried a different strategy with respect to our 2002 mentoring experience, when an exclusively female mentor activity was performed (female were in that case both the mentors and the mentees), believing that a more egalitarian environment will benefit men as well as women. However, we are aware that this choice might have some disadvantages (principally the reproduction of the same problems of cross-gender relationships existing in a gender-privileged society). For this reason we always favoured speakers that were sensitive to gender and job topics.

The mentoring initiative has been planned on the basis of the results of our past mentoring activity [8]. The main differences with our past experience (besides the cross-gender character) were: the development of independent activities of seminary cycle Women in Science and Mentoring Workshops, the organisation of two longer mentoring workshops instead of four (2-hours) seminars, the opportunity of getting feed-backs from the mentors, and the restricted number of participants. We think that in such a way we could grant higher involvement of participants and effectiveness of the meetings. Both seminars were carried out by organisational psychologists and they aimed not only at improving practical skills in the treated topics, but also at reflecting on the possible ways to achieve better results.

The first mentoring seminar focused on the capability of presenting a scientific paper, providing the tools necessary to prepare a paper and to present it in public in a clear and convincing way. The bases of the theoretical aspects of information transfer were given, as well as feedback on the effects of the presentation and tips for improvements.

The second mentoring seminar concerned scientific visibility. In particular, it addressed the issues of constraints and possibilities offered by our belonging contexts. A novelty was introduced in this second seminar: each participant had the possibility to get personal feedback and/or advice from the mentor. In fact, the participants were given two months to communicate with the mentor after the
seminar. At the moment results of this telementoring are not available since it is still in progress.

Being this activity devoted to the research personnel inside our institute, it was promoted inside our job place by means of brochure, web site and advertisement on the internal journal.

3.3 Evaluation of the Mentoring Workshops

3.3.1 Workshop participants profile

19 people took part in the first workshop (10 males and 9 females) and 15 in the second workshop (8 males and 7 females), for a total of 34 people (18 males and 16 females). Among researchers that attended the mentoring, the average age was 35. Male participants have been slightly more numerous than females in both initiatives. People age has been partitioned into the following classes:
- 25-30 years (20% of the participants);
- 31-35 years (38%);
- 36-40 years (25%);
- more than 40 years (17%).

Regarding the type of degree and the working experience: 75% of them have a scientific or technical curriculum, whereas 21% humanistic, others did not specified; 29% of the participants have worked less than 3 years in the research field, 38% between 3 and 6 years, 33% more than 6 years. 21% of the participants had a scientific PhD, and 17% are PhD students.

3.3.2 Evaluation questionnaire

To evaluate how the participants appreciated the initiative, we asked them to fill out a questionnaire immediately after each of the workshops. All the collected questionnaires were anonymous. The questionnaires included a total number of 16 close-ended questions aimed at evaluating the organisational aspects, the speaker, different aspects of utility (personal awareness, acquisition of new skills, professional growth, etc.) and the overall quality of the workshop. Two last open-ended questions aimed at collecting free comments and suggestions. The questions evaluating the speaker and the utility required answers on a four-point grading scale of agreement (total agreement, partial agreement, partial disagreement and total disagreement). According to the questionnaire answers, both the two workshops were highly appreciated by participants. On average all the items got positive rates (total or partial agreement on positively expressed items): very few negative answers were recorded, and most of the items got 100% of positive rates. The results on average do not seem to be influenced by sex, age or research experience of participants (averages and standard deviations for all those categories were very similar). Interestingly, there is a trend for women to rate higher utility of the workshop at the personal level rather than at the professional level (see Figure 1); in addition, the “personal level item” is the only one where women are more enthusiastic than men.
4 Conclusion and Future Work

The mentoring initiative presented in this paper was carried out at ITC-irst, the Institute for Scientific and Technological Research of Trento, Italy. It consisted in two main activities: a scientific lectures series and a mentoring workshops cycle. The scientific lectures were presented by experienced international female researchers, whereas the mentoring workshops were held by organizational psychologists (one female and one male). All the speakers were sensitive to gender and job issues. The scientific lectures proposed positive role models, with the aim of encouraging female students and researchers to continue in pursuing the scientific career. The mentoring workshops focused on the improvement of both researchers skills and of the working environment. Both the activities obtained positive results and high level of participation and appreciation.

In the near future the Gender and Science ITC-irst group is going to propose the following activities:

- a third cycle of Women in Science scientific lectures;
- an analysis of the ITC-irst research personnel, focused on the female researchers positions;
- participation in the Gender Action Plan of two European Projects launched under the Sixth Framework Programme.
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References