

ADVANCE – Advanced Training for Women in Scientific Research A Review of an Innovative Concept

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(1) Introduction

There are significant differences in the career paths of male and female scientists. The road towards faculty positions not only takes longer for women, but there is also a significant portion of female candidates who drop out before reaching their goal, a phenomenon appropriately referred to as 'leaky pipeline' (eg. Rees, 1998; European Commission, 2002a; 2002b; 2004). This syndrome feeds on itself, since the paucity of females in leading positions, both in academia and industry, results in few role models for ambitious graduate students to emulate.

The ADVANCE project (<http://www.advance-project.eu>)¹ addresses the issue of gender equality in science and research and intends to make a contribution towards 'plugging the leaky pipeline'. The project supports female scientists in acquiring research and career management skills and provides tools to enable female scientists to successfully pursue and develop their careers. Participants are exposed to expertise in structural and organisational aspects of scientific career promotion, enhance their skills relevant to academia and industry, and experience a mentor-mentee relationship with senior researchers who function as role models. The ADVANCE initiative also supports the personal career strategies of the participants. Hence, the participating female scientists receive a broad repertoire of skills that are highly relevant for career development. With this intention, the ADVANCE project offers training and a mentoring program for female pre-doc, PhD, and post-doc scientist throughout Europe.

The project consists of two components: a *Mentoring and Coaching Program* and a *Summer School Program*. Both are described in detail in chapter 2. The Mentoring and Coaching Program offers career-relevant know-how to female researchers and provides support for building personal and professional networks with fellow scientists. The Summer School, in contrast, focuses on training in strategic career management, personal management, gender awareness, networking, funding in theory

¹ Funded by the European Commission through the 6th framework program, "Science and Society". Consortium: Academy of Management, Lodz, Poland; Danube University Krems, Austria (Coordinator); Helsinki Collegium for Advanced Studies, University of Helsinki, Finland; IFZ-Interuniversitäres Forschungszentrum für Technik, Arbeit und Kultur, University Klagenfurt, Austria; GGeP-The Graduate Gender Programme, University of Utrecht, the Netherlands; South-West University "Neofit Rilski", Blagoevgrad, Bulgaria

and practice, and communication strategies. Chapter 3 presents the implementation of the ADVANCE program. Insight related to the recruitment process, the participants, the lecturers, as well as the mentors and the mentees, is provided. Finally, initial results of the evaluation and feedback from the participants relating to the ADVANCE Mentoring and Coaching Program and the Summer School are presented in chapter 4.

(2) ADVANCE Concept

Individuals involved in decision making and policy definition in the sciences are typically invited to participate on the basis of their positions and/or the quality of their CV. These two aspects are highly interdependent. Too often, females in science start their careers strongly, but lose their footing. It is therefore crucial to offer women scientists access to training/expertise, networking and support, in order to break existing patterns. Scientists who start their careers face a wide range of challenges throughout the process of becoming an established professional. Among those challenges are professional expertise, networking, organisational literacy, process competence, opportunity management, and finally, work-life-balance (see Birbaumer, Gindl, Hefler, 2005). The ADVANCE program represents training and mentoring program in which the participants acquire essential research and career management skills, build support networks, and are assured of further encouragement that they might need.

The ADVANCE training concept includes a Mentoring and Coaching Program and a Summer School Program which are interlinked and run parallel. At its core, the Mentoring and Coaching Program seeks to enlighten participants about the channels of communication in both academia and industry in relationship to career development and advancement. As is, primarily men receive and exchange crucial bits of information essential for advancement.

In the ADVANCE project, the terms mentoring and coaching are understood in the following fashion: Mentoring² is a long term relationship that has both a personal and a professional dimension. It is established between two persons, a mentor and a mentee. The goal is to promote the mentee in terms of career development, networking, organisational know-how, etc., within the academic and industry research context. Coaching, in contrast, is a short term relationship that entails a focus on specific professional or personal issues. Coaching can take place either bilaterally (individual coaching) or in small groups (group coaching). Coaching aims at a quick and focused collaboration between the coach and the coachee, the former supporting the latter in developing her/his own skills.

The topics and didactic approaches of the ADVANCE Summer School Program are based on studies carried out earlier that have highlighted difficulties and have pointed out areas in which additional training is needed, in particular in research management (e.g. Howard Hughes Medical Institute, 2004). These studies have focused particularly on young researchers who were at the beginning of their independent scientific careers and were based on the American career structures. Based on a literature review (e.g. Gindl and Hefler, 2006; Dalhoff Jutta, 2006, Granovetter, 1995, Hey Barbara, Wieser Ilse, 2003, Lind, 2003, Zuckermann, 2001) and an 'expert workshop' which was organized in order to evaluate and supplement the predefined topics with respect to a European perspective, the Summer School curriculum and the didactical approach were revised and adapted to European needs (for details see: Zauchner & Gindl, 2007).

In summary, the ADVANCE Summer School intends to promote the participation of women in science and research, to support female scientists in acquiring research and career management skills,

² In summary, mentoring usually is understood as a relation between an 'established' person (mentor) and a person who starts to establish herself/himself in a certain professional field. The overall aim of this relationship is that the mentee is promoted by the mentor in terms of entering and pursuing a professional career. In this sense, mentoring is an approved method of knowledge transfer and personal development. Coming originally from the USA, since the beginning of the 1990s mentoring has gained continuously in importance within the EU and has become a tool to promote women in science and research. This development is based on the fact that women are more often excluded from traditional relations existing between established and young researchers ('old boy's networks').

and to foster their individual careers. The innovative aspect of the ADVANCE project is to provide a gender-sensitive training concept that focuses on evoking sustainable learning experiences by utilizing a broad variety of didactic methods. This approach combines personal, structural and contextual aspects, and supports the participants in transferring theoretical inputs into their own career context.

(2.1) Mentoring and Coaching Program

As well as the Summer School Program, the Mentoring and Coaching Program was based upon the expert workshop mentioned above and findings in literature (e.g. Buchinger & Gschwandtner 2003; Birbaumer, Gindl, Hefler, 2005; Löther, 2003; Schliesselberger & Strasser, 1998). Running parallel and closely linked to the Summer School (see 2.2.), the Mentoring and Coaching Program focuses on the target group of pre-, post-docs, and PhDs in science, engineering and technology. By being paired with experienced senior researchers, the female scientists receive career-relevant know-how and are encouraged to build personal and professional networks with other female scientists in order to further their career enhancement.

Additionally, coaches who are not necessarily scientists, but might be professionals or trainers within certain other fields of expertise, provide coaching to junior researchers according to their individual needs. The implementation of coaching and mentoring activities within every ADVANCE partner institution³ will support the promotion of female scientists within several academic settings, while at the same time strengthening and broadening the ADVANCE approach.

The structure of the mentoring and coaching concept is divided into steps: a planning process, a recruitment of mentees and mentors phase, a kick-off-meeting, the coaching and mentoring process, an evaluation procedure, and finally, a ceremony to mark the end of the program. Table 1 provides a comprehensive overview on the entire ADVANCE Mentoring and Coaching Program, including the program evaluation.

³ The ADVANCE Mentoring and Coaching Program is implemented in each consortium partner institution (for further details please refer to chapter 3).

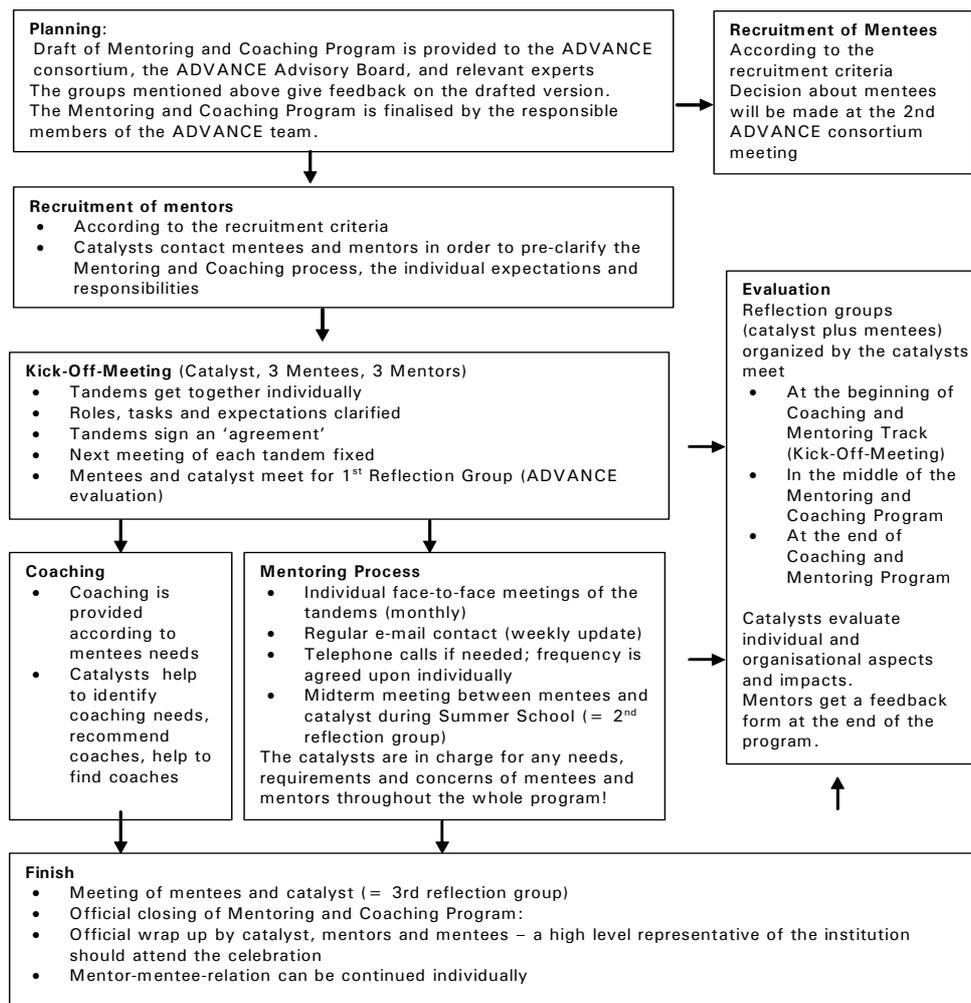


Table 1: Overview on the ADVANCE Mentoring and Coaching Program.

(2.2) Summer School Program

The emergence of the knowledge society requires a new set of competencies and skills. Traditional didactic concepts which primarily focus on teacher-centered approaches are likely to fail, as they do not take into account the requirements when dealing with new, flexible, and constantly changing conditions. Hence, the task of teaching experts, such as the ADVANCE Summer School participants, requires didactic methods different from simply presenting numerous contents.

Therefore, based on the notion that gender sensitive didactic needs to be rooted in a constructivist understanding of learning (Schachtner, 1997), the ADVANCE Summer School intends to actively involve the participants into a learning process that is characterized by cooperation, collaboration, and a consideration for the unique individual contexts of women. The program aims at evoking learning processes which raise awareness for gender specific aspects of scientific careers and at developing strategies for individual career advancement. The intention of the ADVANCE Summer School therefore is not only to provide information in respect to technical knowledge and other related topics, but to also consider the process of learning collaboratively from each other as a crucial element. This approach pertains equally to the participants as well as to lecturers, trainers, moderators, and role models.

Within the Summer School curriculum, a combination of theory and practice, combined with the integration of the individual perspectives and the experiences of the participants, assures an optimal learning process. Learning by experience links work and problem solving processes to the learning process. Working toward immediate and accessible solutions will bring the participants into an active and creative role. Case studies, role-plays, and group interactions will enhance the skill of 'understanding and communication'. The participants will be encouraged to tackle and successfully handle problems on an individual, group and organizational level (eg. Gindl and Hefler, 2006).

With regard to the learning process, a balanced mixture of several thematic categories, didactic scenarios, and lecture formats was designed as follows:

(2.2.1.) Moderated Groups

The core elements that individually accompany the participants' learning processes consist of moderated groups. Each group is accompanied by a professional moderator. The aim of the moderated groups is to reflect on given issues and to share opinions on topics that are presented within the Summer School. This takes place both on a group and on an individual level and provides a link to the ongoing Summer School activities. The structure fosters individualised and sustainable learning effects.

(2.2.2.) Topics

Within this scenario, a number of relevant topics that affect the careers of female researchers in academia and industry are focussed upon. The topics encompass the following themes:

- 1) Research Structures and Gender in Academia and Industry
- 2) Professional Networking
- 3) International Funding Mechanisms
- 4) Flop Management

The presentation formats are developed in close cooperation with the lecturers, with the aim of assuring a broad variety of approaches, ranging from lectures, group work, to round table discussions, and practice.

(2.2.3.) Skills Building

In contrast to the topics type, skill building entails training and practice of personal and management skills. The aim is on the one hand to address the topic of the working and leading teams and, on the other hand, to enhance communication skills to with the goal of 'getting a face' in the scientific community. The following issues were identified as essential:

- 1) Leadership skills and working in teams
- 2) Negotiating and conflict management
- 3) Communication skills
- 4) Increasing visibility and self marketing

The lecture formats are based upon intensive training and practice sessions and are held by experienced management and communications trainers. Role-plays, group work, and video analysis are the formats of this scenario type.

(2.2.4.) Career Strategy

This category aims at developing a strategic career plan which involves short-, mid- and long-term perspectives. The development of an individual strategic career plan is regarded as a core activity within the ADVANCE Summer School. Therefore, this category continues throughout the entire Summer School. The aim is to also integrate the topics and the skills categories, as well as the reflections within the moderated groups. It is anticipated that the participants arrive at a clearly defined concept for their individual career advancement. The lecture format consists of workshops which involve a selected variety of didactic interventions. Also within this category, lecturers are supported in their activities by the group moderators.

(2.2.5.) Key Notes/Expert Talks

Based on the concept of role modelling, participants of the ADVANCE Summer School become acquainted with women and men, who have succeeded in their scientific careers. Experts from academia and industry, both from Eastern as from Western countries, are invited to share experiences and to provide insights into (hidden) mechanisms and strategies for mastery. As for the lecture formats, podium discussions, dinner talks, and semi structured interviews are planned.

(2.2.6.) Social Events

Getting into contact with each other, learning from each other and are part of the informal learning processes. Social events, either optional or as part of the Summer School offerings support this venue for learning.

(3) ADVANCE Implementation

(3.1) Mentoring and Coaching Program

The implementation of the ADVANCE Mentoring and Coaching Program started in December 2006 with the application procedure and will be completed by the end of 2007. Each ADVANCE partner institution nominated responsible persons for the Mentoring and Coaching Program, so-called 'catalysts'⁴. It was the task of the catalysts to recruit three mentees⁵ in their own institution and three corresponding mentors from their own or from an outside institution, and to assure the running of the program. Throughout the program, the catalysts were in charge of the Mentoring and Coaching Program, for meeting the requirements, and for addressing the concerns that the mentees and mentors might have.

(3.1.1) Recruitment: Mentees and Mentors

The ADVANCE mentees, all female scientists, were recruited according to specific criteria. They had all completed graduate degrees in either engineering, science, or technology (career stage: pre-, Ph.D., or post-doc), were all interested in the pursuit of a scientific career in academia or industry, were willing to plan and reflect the personal career, were also open to address gender issues, exhibited responsibility for maintaining the mentor-mentee relation, and were finally also committed to participate in the Summer School.

After the mentees had been selected, the catalysts searched for corresponding mentors within or outside their institutions. The ADVANCE mentors had to fulfil several criteria: being an expert in engineering, science, or technology, to possess excellent national and international contacts and networks, to work in a field similar to that of the mentee, to be open to learn from the mentee, to reflect upon herself and her individual situation in her home institution, to be sensitive toward gender issues, and finally to stay in regular contact with the mentee over a 9-month period. The selection of mentors was made by the catalysts according to the profiles and needs of the mentees and mentors. Previous evaluations of mentoring programs pointed out the necessity of paying especial attention to the matching between mentee and mentor (e.g. Buchinger, Gschwandtner 2003). A good matching between mentee and mentor is a crucial and is the most decisive factor for a mentoring program to succeed. It is indispensable that the mentees and mentors are optimally matched.

After the tandems were fixed, the catalysts contacted both the mentees and mentors in order to clarify the process of the Mentoring and Coaching Program, the individual expectations, and the roles and responsibilities of both parties.

(3.1.2) Running the Mentoring Program

⁴ All catalysts are members of the ADVANCE Mentoring and Curriculum Committee.

⁵ The mentees also participate in the ADVANCE Summer School.

In each partner organisation, The ADVANCE Mentoring and Coaching Program started with an official 'Kick-off-Meeting'. Mentors (n=3), mentees (n=3), and the catalyst came together to set off the Mentoring and Coaching Program. The aims of the Kick-Off Meeting were:

- to become acquainted,
- to reach a shared understanding about the mentoring and coaching content and process (roles, tasks, expectations, etc.),
- to clarify organisational details,
- to sign an 'agreement' of mentees' and mentors' roles and responsibilities, and
- to hold the 1st 'reflection group' (part of the evaluation of the ADVANCE project).

Within the frame of the 'Kick-off-Meeting', the mentors and mentees sign a 'commitment' document in which they agreed on the mutual roles, tasks, and the mode of collaboration. The collaboration requires that the three mentor-mentee-tandems meet regularly face-to-face at each ADVANCE-institution. They are to meet at least once a month in person. The mentee arranges the date and place for the meetings and the issues that they intend to raise. The mentees and mentors are in regular e-mail contact (weekly update). Telephone calls are made if needed; the frequency is agreed upon individually.

If any questions, remarks, needs, or comments are raised by the mentees or the mentors, the respective catalysts are responsible for addressing these issues. For example, the catalyst is in charge for the Mentoring and Coaching Program, for meeting the requirements and concerns of the mentees and mentors at any stage of the program. Furthermore, the mentees have the possibility to be supported by specific professional coaches. It is the catalysts' task to call attention to this possibility, to make offers, and to explore the mentee's coaching needs (see chapter 3.1.3).

Finally, the Mentoring and Coaching Program will end up with an official ending. From our experience, a public 'Closing Celebration' is important, as it signifies that both the mentors and mentees have fulfilled the program. It also provides the opportunity for leaving the program with satisfaction, and it finally also functions to increase the visibility of the program. A high level representative of the institution should attend the festivity. After the official ending, a continuation of the mentor-mentee relationship is optional and depends on the wishes of both parties.

(3.1.3) Running of the Coaching Program

The Coaching Program refers to individual mentees' demands and supplements the Mentoring and the Summer School program. It seeks to cover issues which are neither addressed by the Summer School nor fall into the realm of the competencies or experiences of the mentors.

After the clarification of needs and agreeing on the coaching topics, an adequate coach is recruited by the catalyst. Issues like knowledge about the situation of female scientists (if possible in the field of science and technology), experiences with female scientists, and gender awareness have to be considered in this context.

(3.2) Summer School

The first part of the ADVANCE Summer School (module 1) took place from the 23rd of July to the 3rd August 2007. Module 2 was held from the 7th to the 9th September 2007 and was designed as an intensive follow-up with regard to the strategic career plan component.

(3.2.1) Lecturers and Moderators

Besides an expertise in their respective field, an essential prerequisite for the selection of the lecturers, trainers and moderators for the Summer School was, that they themselves are aware of the gender mechanisms in scientific careers and that they sensitively take these issues into account when

developing and holding seminars. As the reflection on gender and science is a continuous focus of the Summer School, all lecturers, trainers, group moderators and role models are required to be competent in dealing with gender issues, both in terms of a theoretical knowledge of gender theories, as well as in practice when interacting with participants in the context of the Summer School.

An expertise in a given field has to be supplemented by an appropriate experience of teaching and/or facilitating groups. Especially group moderators are required to have substantial experience in facilitating group processes and to emphatically respond to participants' needs.

(3.2.2) Participants

The participants of the Summer School were recruited in two ways. In an initial step, the 19⁶ Summer School participants who were ADVANCE mentees at the same time were selected within the mentee-recruitment procedure. Afterwards, based on a particular application procedure, 17 participants were recruited for the Summer School. This application process took place between December 2006 and the end of January 2007. In total, 190 female scientists applied for the Summer School, however only 17 could be chosen for participation.

Thirty-three scientists participated in module 1 of the ADVANCE Summer School. Mean age was 34,48 years, the youngest scientist was 23 years, and the oldest was 54. For various reasons, three women had to cancel their participation shortly before the start of the 1st module. The structure of the participants represented a broad variety of nationalities (13)⁷, and various disciplines (25), Participants came from both Eastern (13) and Western countries (20)⁸, and there was a broad distribution of career stages: pre-doctoral (7), post doctoral (14), and PhD students (12).

(4) Evaluation Strategy and Initial Results

Formative evaluation is regarded as a fundamental tool for maintaining and improving performance during the lifetime of the ADVANCE project. Therefore, evaluation is considered an inherent part of the project, starting from the very beginning. The evaluation strategy employed in the ADVANCE project involves the collection of quantitative data through questionnaires and the collection of qualitative data.

The design of the Summer School and the Coaching and Mentoring Program incorporated the results of both the analysis of the relevant literature and the results of a preparatory workshop with the target group. Hence, it was assured that the target group's needs were met. The evaluation strategy of the ADVANCE project encompasses both a process evaluation and an impact evaluation of the Summer School and of the Mentoring and Coaching track.

(4.1) Mentoring and Coaching Program: Pactical Experiences

In order to monitor and evaluate the Mentoring and Coaching Program, regular reflection groups are organized by the local catalysts. The reflection groups are held at the beginning of the program, during the first module of the Summer School and at the end of the program. The main purpose of the reflection groups is to continuously monitor and adapt the program according to the needs of the participants. The last reflection group will mainly focus on the impacts of the ADVANCE project, both on an individual and an organisational level.

At the present, the experiences from the first reflection group and first experiences concerning the

⁶ The mentioned scores refer to persons, and not to percentages of the 33 participants.

⁷ The mentioned scores refer to persons, and not to percentages of the 33 participants.

⁸ The higher number of participants from Western countries is related to the fact that there are more consortium partners from Western Europe than Eastern Europe, who are sending their mentees to the Summer School.

implementation of the program are available, the complete evaluation will be published separately after the end of the mentoring track⁹. The first reflection group focussed on the participants' expectations concerning a successful mentoring process. In general, the participants anticipated to benefit with regard to personal career development and building up essential skills for academic careers. The mentees themselves proposed to contribute to the success of the mentoring process in terms of exchanging experiences and discussions about personal interests and goals.

Practical experiences with the recruitment of the mentors within the ADVANCE project show that impediments were mainly given due to a lack of time resources of the proposed mentors. The main impediment when trying to recruit mentors were their time constraints. Most contacted potential mentors, however, expressed interest in the Mentoring and Coaching Program. Another impeding factor was competition between companies and institutions. The matching and subsequently the mentoring relation between individuals with the same professional background who were professionally involved in competing institutions were sometimes problematic.

(4.2) Summer School: First Evaluation Results

Standardized evaluation criteria and guidelines for the evaluation of the Summer School were developed by the ADVANCE consortium. Besides qualitative evaluation within the reflection groups, each lecture was evaluated separately and a questionnaire covering the participants' impressions of the Summer School in general was provided at the end of module 2. Currently quantitative data and data from open questions from these questionnaires are available⁹ (n=30).

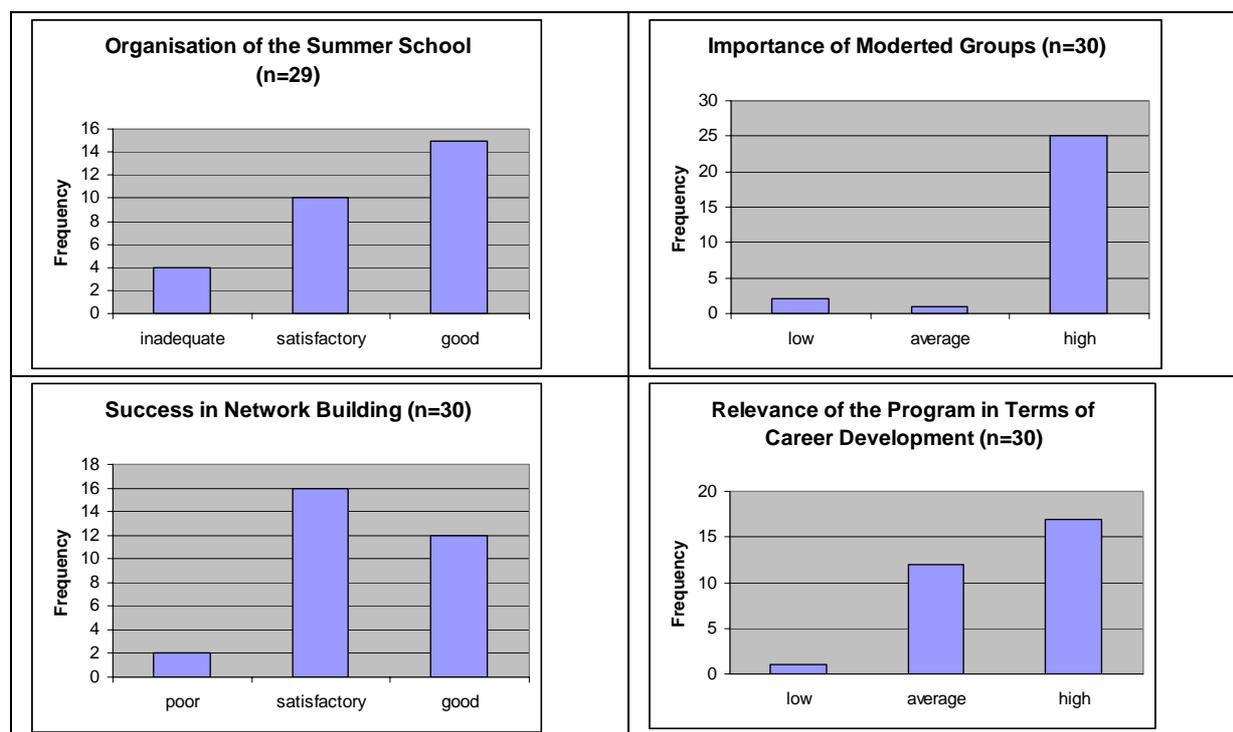


Table 1: Summer School evaluation results

As can be seen in table 1, the participants found the Summer School to be well organized and appreciated the general didactic structure with respect to the moderated groups. Possibilities for

⁹ The final evaluation results are supposed to be published in Spring/Summer 2008.

networking were mainly regarded to be satisfactory. Also the participants of the Summer School said that the program was relevant to them in terms of career development.

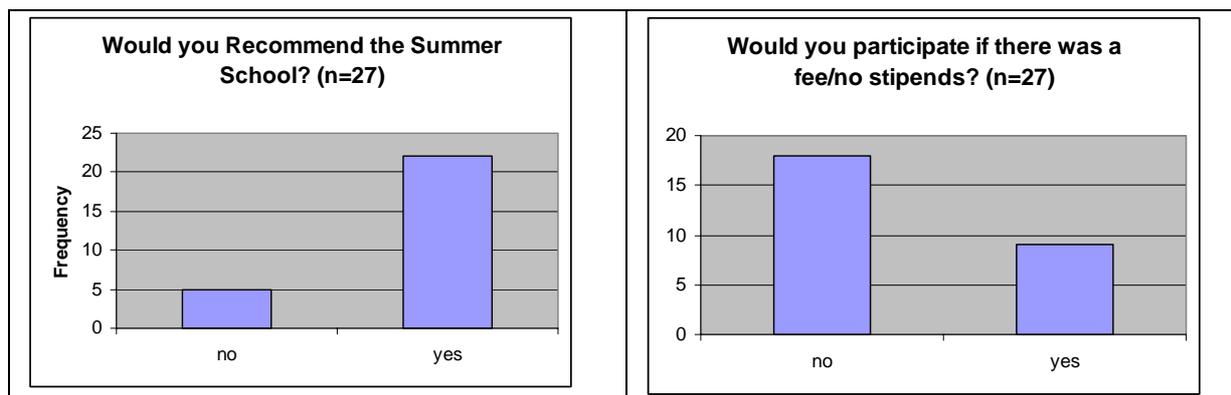


Table 2: Recommendation/Participation Summer School

The majority of the Summer School participants would recommend the participation in the program to their colleagues, however only nine said that they could have afforded participation if there was a fee, respectively if there had been no stipends. Asked for the reasons for not recommending the Summer School to their colleagues, the five women mainly mentioned the quality of some of the trainers and the lack of professional English in some cases. The personal highlights mentioned, focus on the interaction with the colleagues, respectively networking, the exchange of experiences and the reflection and training sessions in the context of the personal career planning.

As for the lectures, the seminars in strategic career planning, networking, flop management, international funding mechanisms and the expert talks were assessed positively. The following learning outputs have been emphasised: presentation techniques, practical exercises, proposal writing and funding mechanisms, new knowledge from experts, and encouragement for self studying in continuative topics. Nevertheless, more depth concerning some topics, a quicker transfer of information and more comprehensive topics of some lectures were requested. The participants' recommendations concentrate on offering trainings with different levels (basic and advanced), supplementary topics like conflict management, work-life-balance or intercultural training, writing skills for scientific presentations and publishing, and finally on the possibility to present the own institution in order to initiate potential cooperation.

Asked for recommendations for improvement in general, the Summer School participants suggested having a follow-up-meeting to reflect the long-term-impact of the Summer School (e.g. after one year). Some mentioned that the time in between the modules was too short. Some women did not appreciate the imbalance of female and male trainers (only two trainers of the summer School were male), which was not regarded to be the way of giving a representative impression of visions/views in scientific research.

(5) Conclusion and Outlook

The ADVANCE project, which seeks to promote women in Academia and Industry, is based on two components: the Mentoring and Coaching Program and the Summer School Program.

The Mentoring and Coaching Program seeks to foster the careers of female scientists in male dominated contexts by providing mentor-mentee relationships. A parallel running Summer School enhances this program. Preliminary evaluation results and feedback of practical experiences by participants illustrate positive impacts and outcomes of the ADVANCE program. Based on the final formative and summative evaluation results, the Summer School curriculum and the Mentoring and Coaching Program will be refined. The ADVANCE consortium will develop "transfer models" with the goal of achieving sustainable implementation in the organisations involved. To this end, both the resources of the Summer School and of the regular coaching and mentoring in the context of personnel development will provide valuable on-going resources.

These models will be made available free of charge to interested institutions and will comprise the following components:

- 1) Refined Summer School Program
 - Detailed Curriculum
 - Teaching Materials
 - Trainers` Network

- 2) Refined Mentoring and Coaching Program
 - Profiles of mentors and coaches
 - Training program for catalysts/mentors
 - Implementation plan for the program

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