

Motivation of young people for studying SET. The gender perspective

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Abstract

The paper will report about the idea, aim and concept of the European Commission project MOTIVATION starting 2008 and lasting two years. This coordination action will compile an exchange between the partner countries¹ (Austria, France, Germany, Netherlands, Slovakia, Spain, Sweden) about different factors, which influence the image of sciences and technology. Young people often have obsolete and unattractive job images in their minds and peer groups, teachers and media are influencing this image in their function as socialisation agents.

First, content analysis of media as socialisation instances will be done; results will be exchanged and analysed for demonstration how, for example, gender stereotypes in science and technology are represented in TV and in magazines. Second, focus group discussions with young people will give information about possible peer group influence. Third, interviews with teachers will give information about their perceived influence on the attitudes of teenagers. Fourth, teachers' study and job consultants' attitudes will be exchanged. Fifth, chances for changing attitudes and examples of good practice will be described in qualitative case studies. Sixth results of case studies and evaluations will lead in developing and designing a website as recommended main action.

Keywords

Gender, youth, images of SET, peer group, socialisation agents

1. Introduction

Science, Engineering and Technology are job fields with future potential. Not only the predicted chances at the labour market but also the increasing variety of these jobs are objective criteria of so called dream jobs (Huber et al. 2006; VDI 2002). In a current Eurobarometer survey 82% of all interviewed persons of the 25 EU Member States agree that "young people's interest is essential for the future prosperity of Europe" (European Commission 2005, p.100).

In many European countries the number of students in SET degree courses and of graduates with SET degrees declined between 1998 and 2004, like in Austria, Denmark, Italy, Germany, Hungary and Finland, as did in Korea and the United States (OECD 2006).

From a social-psychological study (Wintermantel et al., 2002) we know that job choices are decided on the ground of two factors. First individual characteristics of young people like job

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related interests, self efficacy, desires and their values. Second job characteristics , like media representation of the job, job advertisements, own experiences or of others in relevant job fields. The authors found out that especially those job characteristics are stereotyped which do not fit to the real job demands. For instance young people refuse the field of engineering because they have the stereotype of “lonely nerds” and “conservative tinkerers” which conflicts with their desire for team work. As Thaler (2006b) put it, actually the perceived picture of engineers is still stereotypical in comparison to the self -description of engineers or engineering students. More generally Wajcman (1991) described the gendered dualistic thinking especially characterizing images of engineering.

From European Project Womeng (Dahmen 2005; Sagebiel 2005a; Sagebiel & Dahmen 2006; 2005; Thaler 2005; Thaler & Wächter 2006; Wächter 2005) as well as from the former European Project INDECS (Sagebiel 2005d) we know that interdisciplinary technology and engineering education (Wächter 2003) is needed on the part of companies and organisations as well as from students themselves. Moreover even engineering students complained about less job information.

2. Methodology

MOTIVATION is broken down in four so called content work packages (wp) focussing on media (wp2), on teachers and advisors (wp3), young people’s self images in connection to job decisions (wp4) and good practices (wp5). Exchange about what has been done in research is the first objective, evaluation of content, methods and didactics of information about SET under gender aspects the second objective and understanding interdependencies with gendered job decisions is the third objective. Collecting measures of good practice, evaluating them and creating new effective methods for changing images of SET under gender aspects is the fourth objective. The following methodological measures will be taken:

- Content analyses of print and non-print media regarding their contribution towards a weakening or strengthening of a stereotyped image of SET .
- Focus group discussions with young people about influencing factors for their educational and occupational choices.
- Interviews and focus group discussions with teachers and job consultants about their perceived influence on the attitudes of teenagers towards science and technology related jobs.
- Qualitative case studies about examples of good practice for changing attitudes of young people on SET.
- Workshops for knowledge exchange with invited experts.
- A website with results of case studies and evaluations.

3. Youth, Gender and SET in media

Movies, television series, music clips and commercials not only mirror social reality, they also contribute in constructing culturally dominant images. Job decision processes are influenced by various factors. Beside human interactions and official job information presentations unofficial information sources become increasingly important. Trumper (2006) found in a survey of 635 9th-grade students in Israel (in the ROSE project, concerning the Relevance of Science Education) that “out-of-school experience in physics” has the strongest

correlation to “interest in physics”. Another example of best practice is the project Komtec (see chapter 6.). Those out-of-school experiences in science, technology and engineering could also be related to vicarious experiences through media. Relevant media like magazines and television series are today’s informal vocational counsellors for young people. They present different job fields in a colourful way and offer many possibilities for identification and information. And like Schreiner and Sjøberg point it: “An educational choice is an identity choice” (Schreiner & Sjøberg 2006, p. 12).

That television plays an important role in youths’ life can be seen by the following number: 66% of young women watching every day on TV daily soaps and mystery stories, in Germany preferably the channels PRO 7 and RTL which offer mainly soaps, documentary soaps and various TV-shows for a young target audience. Explanations for the influence of soaps can be found in, amongst others, social learning theories (Bandura 1976). According to the social learning theory, behaviour is more often imitated if the role model is more attractive, more glamorous and/or more realistic and similar to self, in other words, actors in soap operas offer good role models.

The issue of youth, gender and media will be divided into four main tasks. Relevant literature in partner countries will be collected and summarized, also for identifying most influencing media in each country. Further more methodological tools will be developed for content analyses of print media and TV.

Images of SET will be studied in magazines which target on youth as audience. SET in print media are male dominated presented, women scientists and engineers are rarely shown. Husu and Tainio (2007) focused in their study on representations of women scientists in Finland and analysed personal interviews with women scientists in newspapers and magazines. They state that the Finnish print media offer “fairly varied role models for young women planning a career in research, but, on the other, the division of disciplines of the interviewees followed traditional gender patterns. The largest group of the interviewees came from the humanities, a field traditionally favoured by women” (Husu & Tainio 2007, p.11).

Analysing television programmes respectively series and soaps, one must take a look at the special soap opera as a case study and not only analyse pictures and content but also interactions, even interaction with the so called “active viewer” (Livingstone 1998). Contacts and exchange with relevant stakeholders will be realised for instance through invitation of media professionals to the expert workshops.

4. Youth, Gender and SET at School and Beyond

Even if education of girls has always progressed in the last century to equal boys’ education and sometimes overpass it, researchers have discovered that far from ensuring equal opportunities for all children, school, unconsciously, creates exclusion through images, habits, language, learning material, teachers’ attitudes, etc. Those issues are especially difficult to address because most of the actors are not aware of them.

Marie Duru Bellat (2004 and before) and Claude Zaidman (1992) demonstrated that gender differences are also built at school through different ways: Through peer relations among the children, through attitudes of teachers towards children, often unconsciously gendered, and through learning material, representing sometimes only women or addressing only men issues, as if women never existed. The mention of women in history or in history of sciences

and mathematics is often very rare. At the same time, the examples used in mathematical problem solving or in sciences, may present slight gender discrimination. For example, in maths problem solving, the situations implies always women who are mothers or serve as nurse or in a commercial shop, when men are directors, astronauts, engineers, medicine doctors, etc.. A last effect of gender segregation is produced by the institution itself which tend to promote men more than women in management position.

This work package will study those aspects: how a gendered image of SET is constructed at school and could be challenged at school too by appropriate measures or programmes.

The peer group influence on gendering images of science will be investigated through literature and through fieldwork, in classrooms: workshops with young people and activities as debates, papers on gender and SET. In each country, debates will be organized with young people between 15 and 18 (end of secondary education), when they decide about their future. Different groups will be addressed, privileged and non-privileged. The project will be integrated within existing activities with the collaboration of teachers. The aim of the activity will be raising awareness and identifying social barriers to gender equality.

The effect of teachers' attitude in gendering SET images will be investigated in literature, as well as focus groups and interviews of teachers will be used. Curriculum contents and teaching material (books, manuals, etc.) will be analysed, as well as the effects of gendered institutional culture and teachers training. Workshop will be organised with teachers to discuss their representations, and raise awareness among them.

Job and study choice by pupils and the role of advisors will be investigated by literature survey and website analysis; besides interviews with job counsellors, teachers, parents and advisors will be done, who are both stakeholders in the process of choosing a career and a discipline.

Stakeholders from the advisors' and educational sphere (selected job and study advisors' teachers, students, parents' representatives from European level) will be invited to the planned workshops and the final conference to exchange about key-moments of job decision per country and images of SET.

5. Consequences of gendered public and self images for SET job decisions

An overview of factors influencing gendered SET job decisions will be made through a literature study and by organizing an expert meeting, in which insights on gendered job decisions can be exchanged. There is a multitude of factors that potentially influence job decisions, e.g. personal talents and interests of the adolescent, their knowledge about a specific job and the influence of teachers, peers and the media. In general, the theory behind the influence of these factors on job decisions is that, adolescents systematically compare what they are good at, what they want from a job, and what activities they like, with their (in)correct expectations of a particular profession.

Several authors have argued, however, that gendered identity formation might be the most crucial factor (e.g. Rasmussen 1997; Faulkner 2000, Corneliussen 2002, Hannover & Kessels 2004, Rommes et al 2007). Hence, the main focus of this overview will be on how heterosexual, gendered, class and ethnic identity formation of adolescents influences their occupational choices. In their study on girl's reluctance to choose technological subjects like

computing science, Els Rommes et al (2007) analyzed data from individual interviews and focus group interviews with eighty six Dutch adolescents. They showed that rather than choosing on the basis of information adolescents had about the content of a job, adolescents' choices seemed to fit best with the 'self-to-prototype matching' theory. According to this theory, adolescents tend to choose based on a prototype of someone working in a profession, even when they know this prototype is incorrect, and even when this prototype includes characteristics that are irrelevant for that profession, such as sexual attractiveness. With this explanation they made it easier to understand why some initiatives to encourage girls to make 'gender inauthentic choices', especially those based on giving more correct information about a job, don't seem to work.

Aspects that influence adolescents' gendered occupational choices will be studied by doing some qualitative in-depth interviews with adolescents about their biography. Adolescents will be asked, amongst others, about their family members, school, their media 'diet' and possibly change measures that they have been subjected to. In the analysis of these interview data, the main question will be how adolescents' background has affected their interests for specific job directions, and more specifically, where they have gotten their information about SET jobs and how their gendered identity development has been influenced by their background and public images of SET.

To get more empirical information on the effects of other identity-forming factors, like ethnicity and sexuality, and to better understand whether countries and groups within countries have different prototypes, focus group interviews will be held in each partner country. Focus groups will be made by cooperating with schools in various parts of the partner countries, including schools with higher and lower levels of education and in areas with large and low numbers of ethnic minorities, by cooperating with organizations for sexual minorities and by cooperating with organizations that are engaged in inclusion measures. In these focus group interviews, culturally dominant images of people working in SET professions (prototypes), their status and popularity amongst adolescents and their origins will be studied.

6. Good Practice of changing measures for images of SET for both gender

First good practice in media presentation about images of SET will be evaluated. As media print media like magazines will be chosen, aiming on adolescents or their school books; above this gendered or non-gendered brochures of job and study counselling services will be analysed. Media plays an important role in the life of nowadays youth, above all television. A German study found out that youth perceive vocational fields in television primarily in so called soaps (soap operas), which present just a small number of preferred jobs, mainly creative and self-employed ones from service industries (Dostal & Troll 2002). Websites are important too in the today's world. Books, brochures, websites and TV should offer diverse, alternative role models for young women and men for identification with different possibilities. The images should fit with the reality and present a positive image of the future.

Second good practice examples will be collected which could influence the image of science and technology in school taking gender in account and will be compared relating to their effectiveness. For instance only in the Germany federal state North-Rhine-Westphalia about 450 projects and initiatives in NRW (Germany), which should help to interest young people for science and technology (<http://www.zukunft-durch-innovation.nrw.de/>) are currently running. Summer universities and "Schnuppertage" are classical examples for measures to

motivate especially girls for studying a subject related to SET. But also competitions for young innovators as FinnUpp www.finnupp.nu, Snilleblixarna, www.snilleblix.nu and Teknikspanarna, www.teknikspanarna.se try to raise young people's interest in SET through active engagement. Another idea of MOTIVATION is to prove transfer ability and promote the Swedish good-practice example to other European countries: KomTek (2005), which started as an Equal partnership project in the city of Orebro and has spread to another nine, soon 12, cities within a few years (www.nutek.se/komtek). The transnational Equal partnership of KomTek produced the book Women Creating Technology, where a strategy of changing images is suggested. <http://www.upptackkomtek.se/material.php>. Measures for changing images of SET will also be collected in the Netherlands, www.technika10.nl, Finland, Denmark (Komtek Holstebro).

Third measures for raising gender and SET awareness in consultants (advisors) for girls and boys in job decisions situations will be evaluated. A study from the OECD in the year 2002 has shown that job and study advisors are not qualified for professional advising of young people. So it's no wonder that young people, who were asked in a study from Beinke (2006), have no trust in them (http://doku.iab.de/ibv/2002/ibv3802_2677.pdf).

Fourth information will be collected about recruitment and supporting measures recruitment. In some of the MOTIVATION countries schools and universities offer in close cooperation with industry recruitment measures with the aim to attract more (female) adolescents again for jobs in fields related to SET. Also single-sex mentoring projects, like the Ada-Lovelace Project (www.ada-mentoring.de 26.08.06) are helpful to interest young women for technology and science and to support them. Efforts and projects will be looked upon by comparing their effectiveness from evaluations made by researchers from each country.

7. Potential impact of MOTIVATION

The expected impacts in relation to the topics in question will be an insight about the current image of SET in media targeting on youth audience and will provide information for realistic pictures of SET as a vocational field with future prospective. Additionally the impact will be towards more gender equality in SET and the processes which lie before decision making for or against SET. The impacts will be either short-term impacts or long-term.

Increasing SET and gender awareness (Sagebiel et al 2006) in private and professional lives as well as educational institutions will lead to support changes in organisational cultures in classrooms and schools and also a change in popular media. The project's website will be the most important arena for spreading excellence, exploiting results and disseminating knowledge and will be continuously updated, and will be linked to other relevant websites in this field.

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